Recursion

2022 Annual Report

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2022

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from _____ to _____

Commission File Number: 001-40323

Recursion Pharmaceuticals, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**46-4099738**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

41 S Rio Grande Street
Salt Lake City, UT 84101
(Address of principal executive offices) (Zip code)
(385) 269 - 0203
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Class A Common Stock, par value $0.00001	RXRX	Nasdaq Global Select Market

Securities registered pursuant to section 12(g) of the Act: **None**

_____
(Title of class)

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.
Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).
Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☒	Non-accelerated filer	☐
Accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the 115,639,551 shares of Class A common voting stock held by non-affiliates of the Registrant, computed by reference to the closing price as reported on the Nasdaq Stock Exchange, as of the last business day of the registrant's most recently completed second fiscal quarter (June 30, 2022) was $941.3 million.

As of January 31, 2023, there were 183,443,480 and 7,789,209 of the registrant's Class A and B common stock, par value $0.00001 per share, outstanding, respectively.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement for use in connection with the registrant's 2023 Annual Meeting of Stockholders to be filed hereafter are incorporated by reference into Part III of this report.

A Letter from Our Co-Founder and CEO

Dear Shareholder,

I am filled with a sense of gratitude for your continued support of Recursion and our mission to Decode Biology to Radically Improve Lives. 2022 was a year of great progress, and I am honored to share our successes and opportunities with you looking back, as well as to lay out our plan going forward.

With the world facing uncertainty, not only as a result of economic headwinds and geopolitical tensions, but also from the broad implications resulting from advances in technology making waves across the tech industry and threatening to change the way many people work, we are proud to be a company that is focused on using cutting-edge technology to find solutions to some of the most complex and pressing problems in biotechnology. Our mission is a unifying force for good, a rallying call for our team reminding us of our purpose and driving us forward through times of uncertainty.

2022 was, no doubt, an uncertain time for many, and especially for growth stage biotechnology companies. At Recursion, we adapted quickly to changing conditions by pulling back on growth and hiring plans in January and updating our tactics to increase our relative focus on near and mid-term value drivers without changing our long-term strategy to seize what we continue to see is an inevitable opportunity to leverage technology to fundamentally alter the efficiency and impact of the biopharma industry.

2022 Highlights

INITIATED 5 CLINICAL TRIALS IN 2022
and planning a 6th clinical trial to initiate

Specific key examples of our delivery in 2022 include:

- We initiated 5 clinical trials, including three Phase 2 programs, setting the stage for readouts later this year, into 2024, and beyond.
- We delivered against the core foundational data pillars of our Roche/Genentech collaboration in neuroscience and an indication in gastrointestinal oncology while advancing multiple fibrosis programs simultaneously with our partners at Bayer. This work sets the stage for potential advancement of programs or map-building milestones and data-usage options that underlie the strength of our approach.
- We continued to build-out the Recursion OS, which we believe is among the most comprehensive full-stack technology solutions in the biopharma industry spanning target discovery through digital chemistry, lead optimization, translation and IND-enabling work. The most significant advances include the acceleration of our scaled transcriptomic technologies, industry-leading build-out of hiPSC-derived cell production, and acceleration of our efforts to incorporate additional in-house chemistry capabilities at Recursion.
- We continued operating from a position of strength through our expanded laboratory facilities, improved compliance processes fit for a company of our scale, our high-ratings after our first annual ESG report, and our ability to raise significant funds from long-term oriented investors in our $150M PIPE offering in October.

All of these achievements and many more have been possible because of the exceptional team we have at Recursion. I am proud to say that we have attracted some of the brightest minds from the technology and biotechnology industries. In 2022, we codified Recursion's Founding Principles as a way to frame how Recursion approaches problems from a first-principles perspective, solidify our culture that is at the interface of technology and biotechnology, and drive maximal impact and value. We believe that investing in our team is one of the most important things we can do to ensure our long-term success, and we will continue to do so in the years ahead.

WE BELIEVE THAT WE HAVE BUILT ONE OF THE LARGEST PROPRIETARY BIOLOGICAL AND CHEMICAL DATASETS

>21 petabytes of data

>3 trillion searchable relationships

RELEASED THE RXRX3 DATASET AND MOLREC APPLICATION

framing how data itself can be a unique value driver

"We are proud to be a company that is focused on using cutting-edge technology to find solutions to some of the most complex and pressing problems in biotechnology. We are operating from a leading position among TechBio companies."

Despite the economic uncertainties of 2022, we are operating from a leading position among TechBio companies. With roughly $550M of cash and equivalents at the end of 2022, some of the largest partnerships, one of the broadest and most advanced clinical pipelines, and one of the most diverse and integrated technology stacks, we are well positioned to take advantage of opportunities as they arise. While we will remain prudent stewards of capital, we will not be afraid to take advantage of the creative destruction in the private and public stage biopharma space including prudent consolidation where and when it fits with our strategy.

Perhaps one of the biggest shifts we noticed in 2022 was the continued acceleration of people's appreciation of the potential for the TechBio space. From large pharmaceutical companies to large technology companies, it feels to us like there is a growing sense of inevitability among leaders at these companies that technology will indeed create step-function shifts in the healthcare industry; an opinion that has not been widely accepted until recently. Seeing the nexus of interest between both biopharma industry players and technology players in the space is creating an exciting recipe for transformational partnerships and collaborations.

At Recursion, our Roche/Genentech deal, signed in late 2021, set a precedent that may have been underappreciated at the time for selling access to portions of our proprietary dataset. And our recent dataset release of RxRx3, the largest public dataset of its kind ever shared, has created significant interest in our data. Looking forward into 2023, we see our proprietary dataset of over 21 petabytes as a unique value driver not only for our own discovery programs and those of our close partners, but perhaps as a harbinger of a new market of extraordinarily high-quality biological and chemical data built fit-for-the purpose of training machine learning and AI algorithms.

In closing, I want to express my sincere gratitude for your continued support of Recursion. We are incredibly proud of what we have accomplished together and remain committed to delivering value to our shareholders, our team, and the patients we aim to serve. We could not be more excited about the long-term future of our space and how our team is prepared to continue building and executing against this grand opportunity. If we can achieve even a portion of our ambitious mission, we have the opportunity to create massive positive impact in the world and build an incredible business to drive it. We won't let up in our work to achieve that outcome.

Thank you,

Chris Gibson, Ph.D.

Co-Founder and Chief Executive Officer

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PART I

RISK FACTOR SUMMARY

Below is a summary of the principal factors that make an investment in the common stock of Recursion Pharmaceuticals, Inc. (Recursion, the Company, we, us, or our) risky or speculative. This summary does not address all of the risks we face. Additional discussion of the risks summarized below, and other risks that we face, can be found in the section titled “Item 1A. Risk Factors” in this Annual Report on Form 10-K.

- We are a clinical-stage biotechnology company with a limited operating history. We have no products approved for commercial sale and have not generated any revenue from product sales.
- Our drug candidates are in preclinical or clinical development, which are lengthy and expensive processes with uncertain outcomes and the potential for substantial delays.
- We have incurred significant operating losses since our inception, we expect to incur substantial and increasing operating losses for the foreseeable future, and we may not be able to achieve or maintain profitability.
- Our mission is broad and expensive to achieve and we will need to raise substantial additional funding, which may not be available on commercially reasonable terms or at all.
- We expect to finance our cash needs for the foreseeable future potentially through a combination of private and public equity offerings and debt financings, as well as strategic collaborations. If we are unable to raise capital when needed, we would be forced to delay, reduce, or eliminate at least some of our product development programs and other activities, and to possibly cease operations.
- Raising additional capital entails risks, including that it may adversely affect the rights, or dilute the holdings, of our existing stockholders; increase our fixed payment obligations; require us to relinquish rights to our technologies or drug candidates; and/or divert management’s attention from our core business.
- If we are unable to establish additional strategic collaborations on commercially reasonable terms or at all, or if current or future collaborations are not successful, we may have to alter our drug development plans.
- We or our current and future collaborators may never successfully develop and commercialize drug candidates, or the market for approved drug candidates may be less than anticipated, which in either case would materially and adversely affect our financial results and our ability to continue our business operations.
- Our approach to drug discovery is unique and may not lead to successful drug products for various reasons, including potential challenges identifying mechanisms of action for our candidates.
- Although we intend to explore other therapeutic opportunities in addition to the drug candidates we are currently developing, we may fail to identify viable new candidates or we may need to prioritize candidates and, as a result, we may fail to capitalize on profitable market opportunities.
- We may experience delays in initiating and completing clinical trials, including due to difficulties in enrolling patients or maintaining compliance with trial protocols, or our trials may produce inconclusive or negative results.
- If we are unable to obtain or there are delays in obtaining regulatory approvals for our drug candidates in the U.S. or other jurisdictions, or if approval is subject to limitations, we will be unable to commercialize, or delayed or limited in commercializing, the products in that jurisdiction and our ability to generate revenue may be materially impaired.
- Our quarterly and annual operating results may fluctuate significantly due to a variety of factors, a number of which are outside our control or may be difficult to predict, which could cause our stock price to fluctuate or decline.
- If we are not able to develop new solutions and enhancements to our drug discovery platform that keep pace with technological developments, or if we experience breaches or malfunctions affecting our platform, our ability to identify and validate viable drug candidates would be adversely impacted.
- Third parties that provide supplies or equipment, or that manufacture our drug products or drug substances, may not provide sufficient quantities at an acceptable cost or may otherwise fail to perform.
- We or third parties on which we depend may experience system failures, cyber-attacks, and other disruptions to information technology or cloud-based infrastructure, which could harm our business and subject us to liability for disclosure of confidential information.
- Force majeure events, such as the COVID-19 pandemic, a natural disaster, global political instability, or warfare, could materially disrupt our business and the development of our drug candidates.
- If we are unable to adequately protect and enforce our intellectual property rights, including obtaining and maintaining patent protection for our key technology and products that is sufficiently broad, our competitors

could develop and commercialize technology and products similar or identical to ours and our ability to successfully commercialize our technology and products may be impaired.
- If we are unable to protect the confidentiality of our trade secrets and know-how, our business and competitive position may be harmed.
- If we fail to comply with our obligations in the agreements under which we collaborate with and/or license intellectual property rights from third parties, or otherwise experience disruptions to our business relationships with our partners, we could lose rights that are important to our business.
- We face substantial competition, which may result in others discovering, developing, or commercializing competing products before we do.
- If we are unable to attract and retain key executives, experienced scientists, and other qualified personnel, our ability to discover and develop drug candidates and pursue our growth strategy could be impaired.
- We are subject to comprehensive statutory and regulatory requirements, noncompliance with which may delay or prevent our ability to market our products or result in fines or other liabilities.

Cautionary Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains “forward-looking statements” about us and our industry within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements other than statements of historical facts are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as “may,” “will,” “should,” “would,” “expect,” “plan,” “anticipate,” “could,” “intend,” “target,” “project,” “contemplate,” “believe,” “estimate,” “predict,” “potential,” or “continue” or the negative of these terms or other similar expressions. Forward-looking statements contained in this report may include without limitation those regarding:

- our research and development programs
- the initiation, timing, progress, results, and cost of our current and future preclinical and clinical studies, including statements regarding the design of, and the timing of initiation and completion of, studies and related preparatory work, as well as the period during which the results of the studies will become available;
- the ability of our clinical trials to demonstrate the safety and efficacy of our drug candidates, and other positive results;
- the ability and willingness of our collaborators to continue research and development activities relating to our development candidates and investigational medicines;
- future agreements with third parties in connection with the commercialization of our investigational medicines and any other approved product;
- the timing, scope, and likelihood of regulatory filings and approvals, including the timing of Investigational New Drug applications and final approval by the U.S. Food and Drug Administration, or FDA, of our current drug candidates and any other future drug candidates, as well as our ability to maintain any such approvals;
- the timing, scope, or likelihood of foreign regulatory filings and approvals, including our ability to maintain any such approvals;
- the size of the potential market opportunity for our drug candidates, including our estimates of the number of patients who suffer from the diseases we are targeting;
- our ability to identify viable new drug candidates for clinical development and the rate at which we expect to identify such candidates, whether through an inferential approach or otherwise;
- our expectation that the assets that will drive the most value for us are those that we will identify in the future using our datasets and tools;
- our ability to develop and advance our current drug candidates and programs into, and successfully complete, clinical studies;
- our ability to reduce the time or cost or increase the likelihood of success of our research and development relative to the traditional drug discovery paradigm;
- our ability to improve, and the rate of improvement in, our infrastructure, datasets, biology, technology tools, and drug discovery platform, and our ability to realize benefits from such improvements;
- our expectations related to the performance and benefits of our BioHive-1 supercomputer;
- our ability to realize a return on our investment of resources and cash in our drug discovery collaborations;
- our ability to scale like a technology company and to add more programs to our pipeline each year;
- our ability to successfully compete in a highly competitive market;
- our manufacturing, commercialization, and marketing capabilities and strategies;
- our plans relating to commercializing our drug candidates, if approved, including the geographic areas of focus and sales strategy;

- our expectations regarding the approval and use of our drug candidates in combination with other drugs;
- the rate and degree of market acceptance and clinical utility of our current drug candidates, if approved, and other drug candidates we may develop;
- our competitive position and the success of competing approaches that are or may become available;
- our estimates of the number of patients that we will enroll in our clinical trials and the timing of their enrollment;
- the beneficial characteristics, safety, efficacy, and therapeutic effects of our drug candidates;
- our plans for further development of our drug candidates, including additional indications we may pursue;
- our ability to adequately protect and enforce our intellectual property and proprietary technology, including the scope of protection we are able to establish and maintain for intellectual property rights covering our current drug candidates and other drug candidates we may develop, receipt of patent protection, the extensions of existing patent terms where available, the validity of intellectual property rights held by third parties, the protection of our trade secrets, and our ability not to infringe, misappropriate or otherwise violate any third-party intellectual property rights;
- the impact of any intellectual property disputes and our ability to defend against claims of infringement, misappropriation, or other violations of intellectual property rights;
- our ability to keep pace with new technological developments;
- our ability to utilize third-party open source software and cloud-based infrastructure, on which we are dependent;
- the adequacy of our insurance policies and the scope of their coverage;
- the potential impact of a pandemic, epidemic, or outbreak of an infectious disease, such as COVID-19, or natural disaster, global political instability, or warfare, and the effect of such outbreak or natural disaster, global political instability, or warfare on our business and financial results;
- our ability to maintain our technical operations infrastructure to avoid errors, delays, or cybersecurity breaches;
- our continued reliance on third parties to conduct additional clinical trials of our drug candidates, and for the manufacture of our drug candidates for preclinical studies and clinical trials;
- our ability to obtain, and negotiate favorable terms of, any collaboration, licensing or other arrangements that may be necessary or desirable to research, develop, manufacture, or commercialize our platform and drug candidates;
- the pricing and reimbursement of our current drug candidates and other drug candidates we may develop, if approved;
- our estimates regarding expenses, future revenue, capital requirements, and need for additional financing;
- our financial performance;
- the period over which we estimate our existing cash and cash equivalents will be sufficient to fund our future operating expenses and capital expenditure requirements;
- our ability to raise substantial additional funding;
- the impact of current and future laws and regulations, and our ability to comply with all regulations that we are, or may become, subject to;
- the need to hire additional personnel and our ability to attract and retain such personnel;
- the impact of any current or future litigation, which may arise during the ordinary course of business and be costly to defend;
- our expectations regarding the period during which we will qualify as an emerging growth company under the JOBS Act;
- our anticipated use of our existing resources and the net proceeds from our initial public offering; and
- other risks and uncertainties, including those listed in the section titled “Risk Factors.”

We have based these forward-looking statements largely on our current expectations and projections about our business, the industry in which we operate, and financial trends that we believe may affect our business, financial condition, results of operations, and prospects. These forward-looking statements are not guarantees of future performance or development. These statements speak only as of the date of this report and are subject to a number of risks, uncertainties and assumptions described in the section titled “Risk Factors” and elsewhere in this report. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as predictions of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Except as required by applicable law, we undertake no obligation to update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, or otherwise.

In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this report. While we believe such information forms a reasonable basis for such statements, the information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and you are cautioned not to unduly rely upon them.

Recursion

ITEM 1.

Business

Item 1. Business.

Business Overview

Recursion is a clinical stage TechBio company leading this burgeoning space by decoding biology to industrialize drug discovery. Central to our mission is the Recursion Operating System (OS), a platform built across diverse technologies that enables us to map and navigate trillions of biological and chemical relationships within the Recursion Data Universe, one of the world's largest proprietary biological and chemical datasets. We frame this integration of the physical and digital components as iterative loops of atoms and bits. Scaled 'wet-lab' biology and chemistry data built in-house (atoms) are organized into virtuous cycles with 'dry-lab' computational tools (bits) to rapidly translate *in silico* hypotheses into validated insights and novel chemistry. Our focus on mapping and navigating the complexities of biology and chemistry beyond the published literature and in a target-agnostic way differentiates us from other companies in our space and leads us to confront a fundamental cause of failure for the majority of clinical-stage programs - the wrong target is chosen due to an incomplete and reductionist view of biology. Our balanced team of life scientists and computational and technical experts creates an environment where empirical data, statistical rigor and creative thinking are brought to bear on our decisions.

We leverage our Recursion OS to enable three key value drivers:

1. An expansive **pipeline** of internally-developed clinical and preclinical programs focused on genetically-driven rare diseases and oncology with significant unmet need and market opportunities in some cases potentially in excess of $1 billion in annual sales
2. Transformational **partnerships** with leading biopharma companies to map and navigate intractable areas of biology, identify novel targets and develop potential new medicines that are further developed in resource-heavy clinical trials overseen by our partners
3. Development of one of the largest fit-for-purpose proprietary biological and chemical **datasets** in the world at a time when advances in AI paired with the right training data are creating disruptive value.

Key Achievements in 2022

Pipeline Delivery

- Initiated five clinical trials including Phase 2 trials in Cerebral Cavernous Malformation (CCM) and Familial Adenomatous Polyposis (FAP), a Phase 2/3 trial in *NF2*-mutated meningiomas and Phase 1 healthy volunteer trials for REC-4881 and REC-3964
- Received Fast Track Designation from the US FDA and Orphan Drug Designation from the European Commission for REC-4881 for the potential treatment of FAP
- Leveraged our map of biology and chemistry to expand the scope of REC-4881 beyond FAP with plans for a fifth clinical program (Phase 1b/2) being readied to explore the molecule in *AXIN1* or *APC* mutant solid tumors
- Focused our discovery and preclinical pipelines in oncology, with significant advances made in our Target Alpha checkpoint sensitization program and our RBM39 program in homologous recombination proficient ovarian cancer (formerly named Target Gamma) which are now both nearing IND-enabling studies

Partnership Delivery

- Initiated four new programs (for eight total programs initiated to date) in the space of fibrosis with our partners at Bayer and advanced multiple programs towards value inflection points
- Made significant progress against both the gastrointestinal-oncology and neuroscience portions of our collaboration with Roche and Genentech, including cell type evaluation and significant cell scale up in support of initial Phenomap-building efforts which remain on track

Recursion OS Building

- Industrialized transcriptomics-based validation, including using transcriptomics data to advance programs for one of our partners (at the end of 2022, we had sequenced over 250,000 individual transcriptome samples)
- Industrialized digital tolerability studies using our InVivomics technology to enable better, faster candidate selection
- Industrialized stem cell production (produced over 500 billion neural hiPSC-derived cells in 2022) to enable neurology research at exceptional levels of quality and simultaneously making Recursion one of the largest producers of neural hiPSC-derived cells on earth in the span of a single year
- Advanced several in-house internal digital chemistry applications (two of which we have published on: MolE and Multi-Objective GFlowNets)[1]

Company Building

- Closed a significant PIPE offering from a cohort of supportive, long-term investors including both new and existing shareholders (Kinnevik, Baillie-Gifford, Mubadala, Laurion, Platinum, Invus)
- Demonstrated commitment to ethical business practices as demonstrated in our inaugural ESG report
- Expanded our laboratory facilities to enable novel technology, partnerships and pipeline
- Evolved as a public company by preparing for SOX and SOC2 compliance

Vision, Mission, People and Culture

Human biology is a highly complex system for which human intelligence alone is insufficient to fully understand. While hundreds of thousands of incredible scientists around the world dedicate themselves to expanding our understanding each day, the extraordinarily high failure rates of human-generated hypotheses in our industry suggest to us that we still understand just a small percentage of biology, chemistry and the interactions between the two.

Simultaneously, our world is currently transiting its next industrial revolution based on extraordinary progress in scaled computation, machine learning (ML) and artificial intelligence (AI). While progress in this field has been steady for decades, the exponential growth trajectory is becoming more apparent to many members of modern society through accessible applications like ChatGPT. While progress is being made using sophisticated computation in virtually every industry, the complexity of biology and the highly regulated nature of the biopharma industry has resulted in a delay in the fruits of technology in our space. However, this means we are in a position to learn from the lessons of the application to technology to many other fields. One of the primary lessons learned across numerous industries is that computational sophistication alone is rarely sufficient to create disruptive change. It is when computational sophistication is paired with the right data, typically in an iterative process of ongoing learning, prediction and refinement, where outsized change is created.

[1] Recursion shared preprints at the AI for Accelerated Materials Design workshop and Learning Meaningful Representations of Life workshop: Multi-Objective GFlowNets (https://arxiv.org/pdf/2211.02657.pdf); MolE: A Molecular Foundation Model for Drug Discovery (https://arxiv.org/abs/2210.12765)

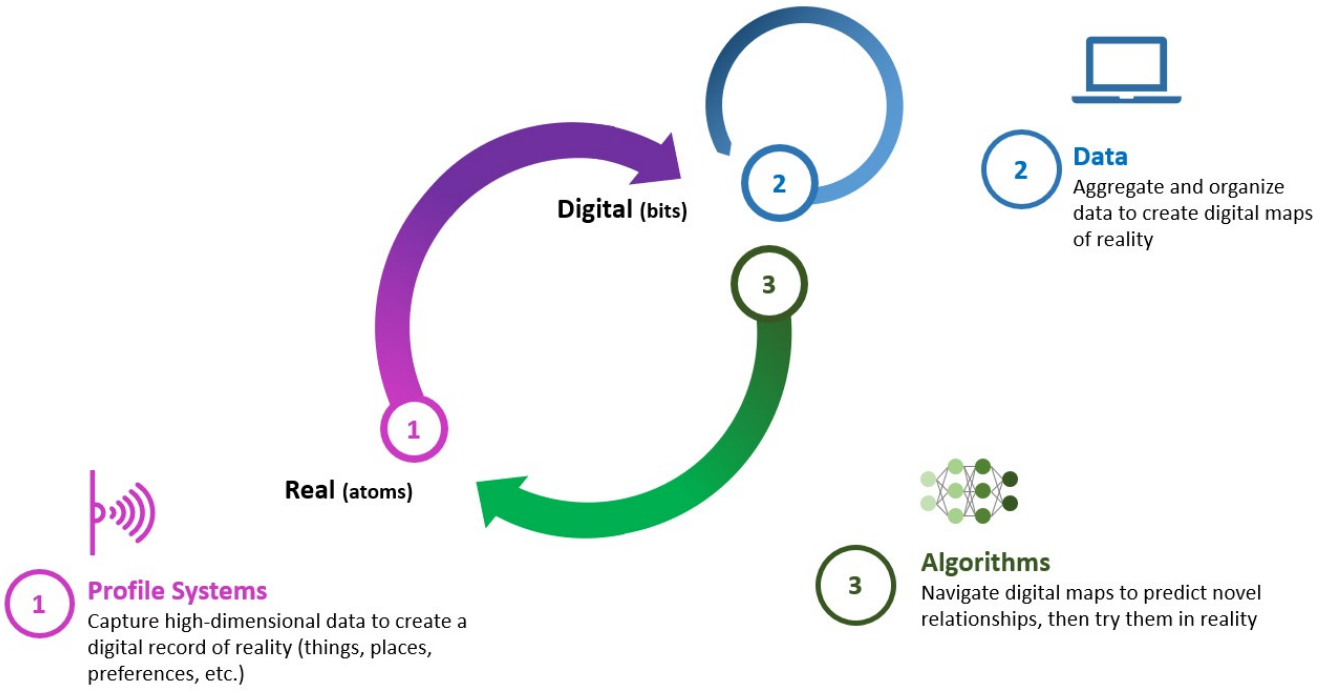


Figure 1. Machine learning native companies across multiple industries create iterative loops of profiling, analysis and inference[2]. A common theme in the successful application of ML / AI to many industries is the creation of a virtuous loop of learning and iteration. First, real systems (atoms) are profiled in order to create digital representations (bits) which can be analyzed by ML and AI to infer the rules, shapes or values of the real system. For example, digitizing the physical state of the planet using satellite imaging traffic flow, weather and other real-world data allows one to model the real world and predict optimal, real-time and flexible navigation routes.

Recursion was founded in 2013 with a vision to capitalize on the convergence of advancements in computation and machine learning to address the decreasing efficiency of drug discovery and development. We believe that this opportunity represents one of the most positively impactful applications of ML and AI. Our vision is to leverage technology to map and navigate biology and chemistry to discover and develop more, better medicines faster. We believe that neither advanced computational approaches, massive datasets, nor human intelligence alone can fundamentally shift the efficiency curve of drug discovery and development; instead, we believe that those companies that augment their teams with sophisticated computational tools leveraging hard-to-replicate proprietary datasets will have a significant advantage. We believe we are among the companies leading this burgeoning new sector of the biopharma industry that we call TechBio. Our success, and the success of this new sector generally, has the promise to drive better new medicines to patients at higher scale and lower prices. We are working hard to not only lead this space, but define it.

[2] Adapted from Rutgers, V and Sniderman, B. (Oct 2018) Around the physical-digital-physical loop - A current look at Industry 4.0 capabilities. Deloitte Insights.

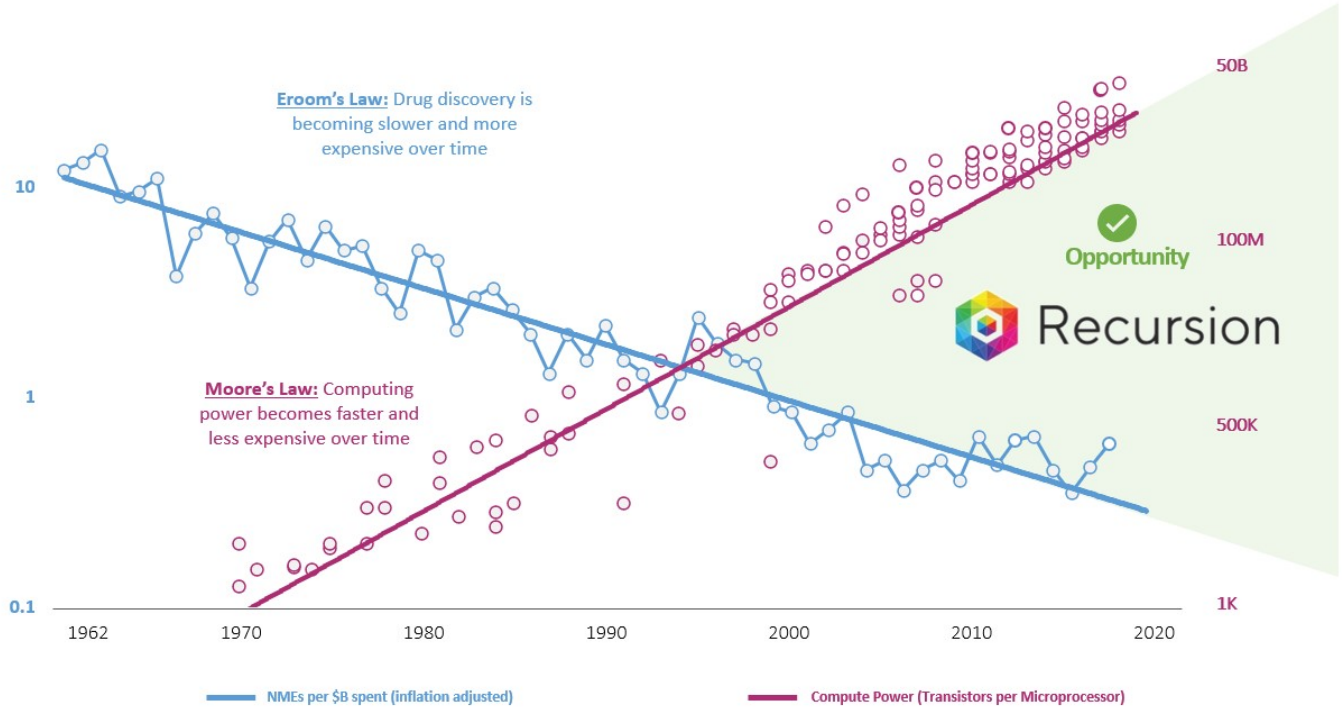


Figure 2. Eroom's Law observes that while technology advancements have made many processes faster and less expensive over the years, drug discovery is becoming slower and more expensive.[3,4] Recursion was created to take advantage of the discontinuity between these fields and harness the power of accelerating technological innovations to improve the efficiency of drug discovery and development.

Our mission at Recursion, ***Decoding Biology to Radically Improve Lives,*** flows naturally from our vision. We interpret our mission expansively and believe it to be a durable direction and source of inspiration for our team. While we are best-known for industrializing phenomics (data based on images of cellular structures), we do not feel constrained by that foundation and will use any technology or combination of technologies we see fit to decode biology. Success in decoding biology implies our ability to predict ways to navigate it. The ability to predictably navigate biology may enable us to build a massive pipeline of medicines, either by ourselves, with partners or both. As part of that work, we seek not only to radically improve the lives of patients who could benefit from the medicines we help to deliver, but the lives of those who care for those patients, the lives of our employees and their families, as well as the communities in which we operate our company.

[3] Adapted from Scannell, J et al (2012). Diagnosing the decline in pharmaceutical R&D efficiency. *Nat Rev Drug Discov*, 11, 191-200.
[4] Adapted from Roser, M et al. (2013). Technological Change. *OurWorldInData.org*.

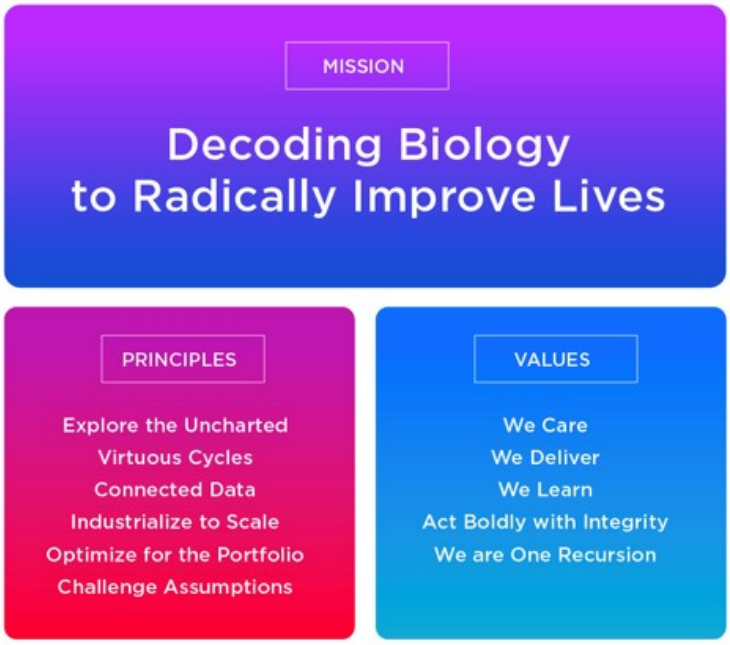


Figure 3: Recursion's Founding Principles and Values support our ambitious mission. Together, these elements shape Recursion's culture by guiding our people to high-impact decision-making and behaviors.

Our culture at Recursion is designed with intention to fuel our mission. We believe culture drives delivery. Essential to decoding biology in our context, is a mindset deeply committed to achieving impact at unprecedented scale through pioneering new industrialized approaches. We call it the Recursion Mindset. To embrace this mindset and our ambition, our people must deeply learn what will make them impactful in our context while questioning what made them successful in prior contexts. Sometimes this requires unlearning. Sometimes this requires a professional metamorphosis. For everyone it requires change. To decode biology we intentionally source for an incredible breadth of fields from multiple industries and for all of them Recursion is a new kind of company. The guideposts for teaching our people to successfully transition to TechBio and deliver our mission are our Founding Principles and Values. They are the essential shape of our culture. The Founding Principles direct us in making scientific and technical decisions that further our mission. The Values define the day-to-day behaviors and mindsets that further our mission. Together, along with the brilliance, humility and diversity of our people, our culture comes to life. Together, they are the compass that point our people towards decoding biology.

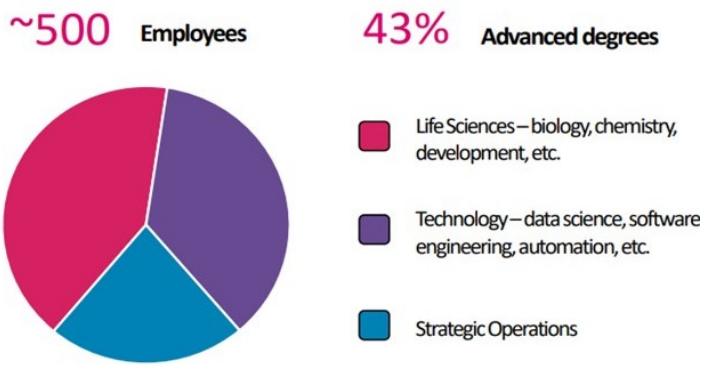


Figure 4. Recursion's team requires operating at the interface of many diverse fields. Building a TechBio company requires fluency in operating at the interface of many disciplines and fields not previously attuned to working as closely in traditional BioPharma.

Business Strategy and Value Drivers

While most small to medium-sized biopharma companies are focused on a narrow slice of biology or therapeutic area, where they believe they have an advantage or insight based on the summed experience of their team, the Recursion OS allows us to discover and translate at scale across biology. However, we are cognizant that building disease-area expertise, especially in clinical development, is essential. And so, we have developed a multi-pronged, capital-efficient business model focused on key value-drivers that enable us to demonstrate our progress over time while continuing to invest in the development of the Recursion OS, which we believe is the engine of value creation in the long-term. While our mapping and navigating tools have the plasticity to be applied across therapeutic areas and modalities, our business model is tailored to maximize value and advance programs cost-effectively based on the nature of market and regulatory dynamics associated with our three value drivers (internal pipeline, transformational partnerships and fit-for-purpose proprietary biological and chemical data).

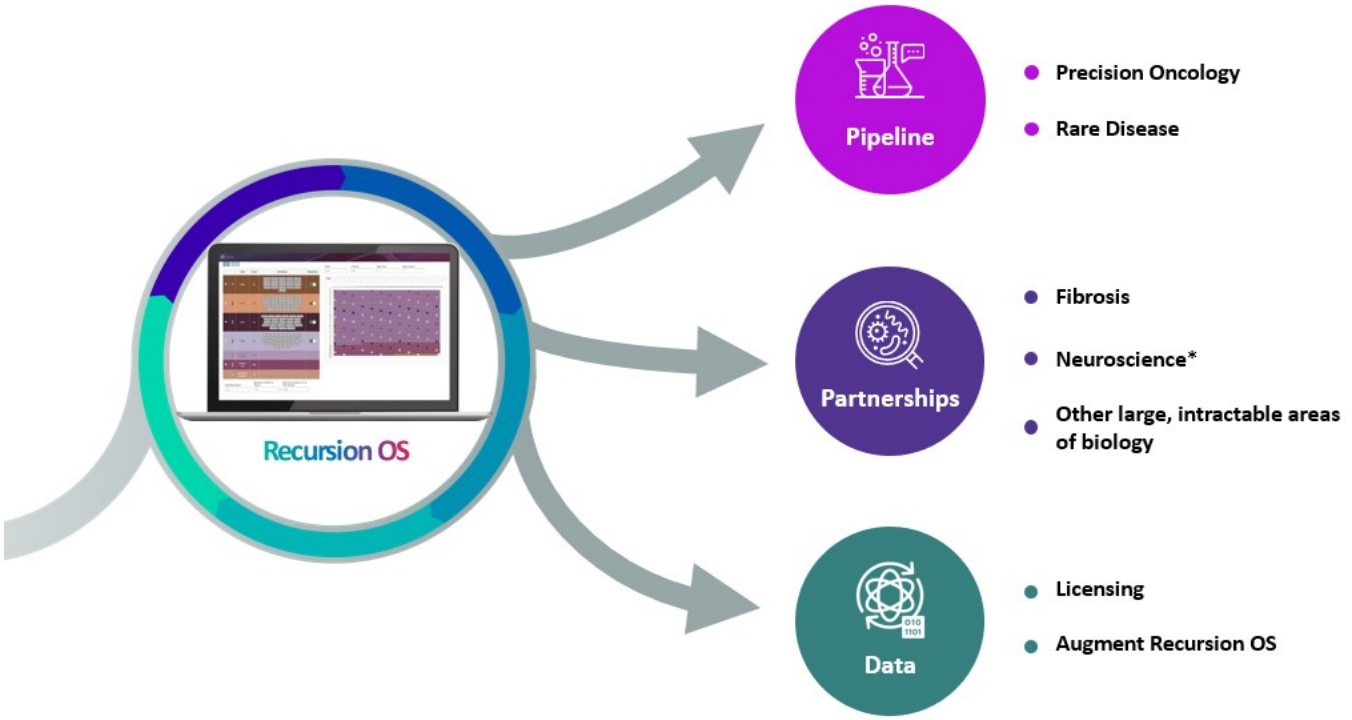


Figure 5. We harness the value and scale of our maps of biology using a capital efficient business strategy. Our business strategy is segmented into our following value-drivers: (i) internally developed programs in capital-efficient therapeutic areas; (ii) partnered programs in resource-intensive therapeutic areas; and (iii) proprietary, fit-for-purpose training data. *Includes a single oncology indication from our Roche and Genentech collaboration.

Value-Driver 1 - Internally Developed Programs in Capital-Efficient Therapeutic Areas
Recursion is advancing five clinical-stage programs across rare disease and oncology, which we believe are capital-efficient opportunities for our growing clinical development team to focus on. We continue to advance internal preclinical programs focused on oncology to continue building our pipeline.

Value-Driver 2 - Partnered Programs in Resource-Intensive Therapeutic Areas
Recursion has made substantial progress to deliver against two transformational discovery collaborations; first a collaboration in neuroscience and a single gastrointestinal oncology indication with Roche and Genentech signed in late 2021, and second a collaboration in fibrosis with Bayer signed in 2020 and significantly expanded in 2021. We expect to continue making progress towards potential value-accreting program milestones and map-building and data option milestones.

Value-Driver 3 - Proprietary, Fit-for-Purpose Training Data
While we will direct the generation of new data and utilize the latest data in Recursion's Data Universe to maximize our pipeline and partnership value-drivers, we increasingly see the potential to license subsets of our over 21

petabytes of proprietary data to a growing universe of collaborators from both the biopharma and technology industries.

The Recursion OS

The creation of virtuous cycles of atoms and bits has been a competitive advantage for leaders in many industries outside of biopharma. This virtuous cycle of profiling the real (atoms) to create digital representations (bits) can be paralleled as an approach to mapping and navigating biology and chemistry as well.

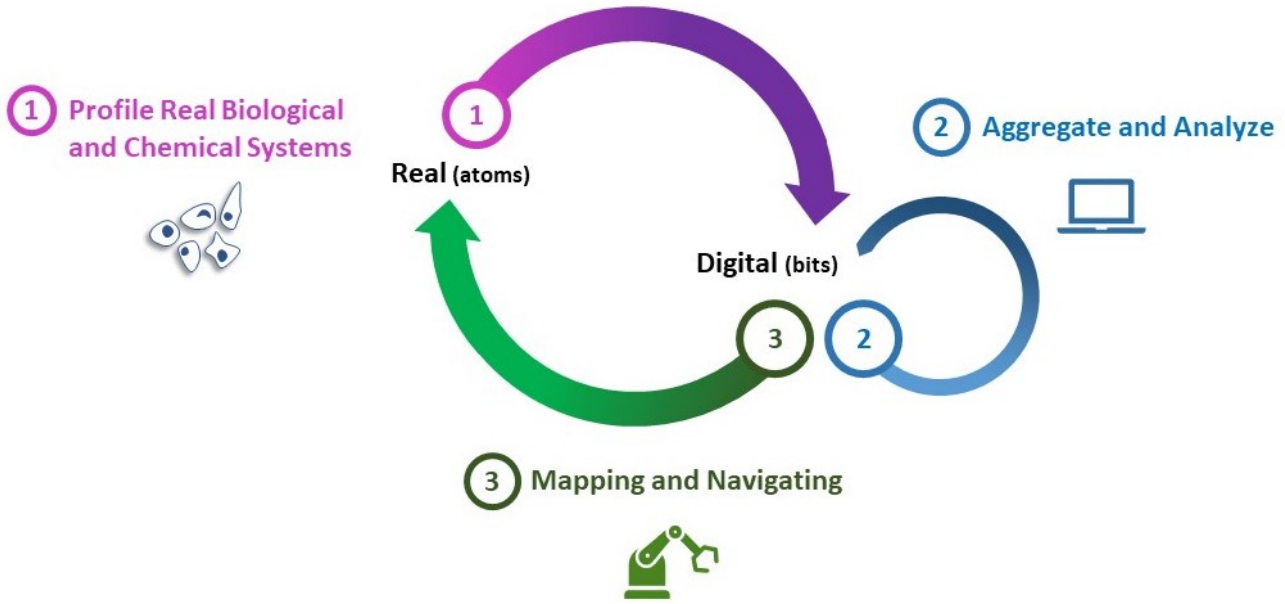


Figure 6. Recursion's virtuous cycle of atoms and bits. (1) Profile real biological and chemical systems using automation to scale a small number of data-rich assays, including phenomics, transcriptomics, InVivomics and ADMET to generate massive, high quality empirical data; (2) Aggregate and analyze the resultant data using a variety of in-house software tools including proprietary machine learning algorithms in both public and private clouds; and (3) Map and navigate leveraging proprietary software tools to infer relationships between biology and chemistry tested independently. These inferred relationships serve as the basis of our ability to predict how to navigate between biological states using chemical or biological perturbations, which we can then validate in our automated laboratories, completing a virtuous cycle of learning and iteration.

Specifically, at Recursion, automated wet-lab biology and dry-lab computational tools are organized in an iterative loop to rapidly translate *in silico* hypotheses into testable predictions, which in turn generates more data on which improved predictions can be made. The Recursion OS cycles between the profiling of real systems (atoms) and the aggregation and analysis of data (bits) to infer relationships across biological and chemical systems (mapping and navigating). Collectively, the components of the Recursion OS can be joined together to identify, validate and advance a broad portfolio of novel therapeutic programs quickly, cost-effectively and with minimal human intervention and bias - industrializing drug discovery. We use standardized, automated workflows to identify programs and advance them through key stages of the drug discovery and development pipeline as in the following graphic.

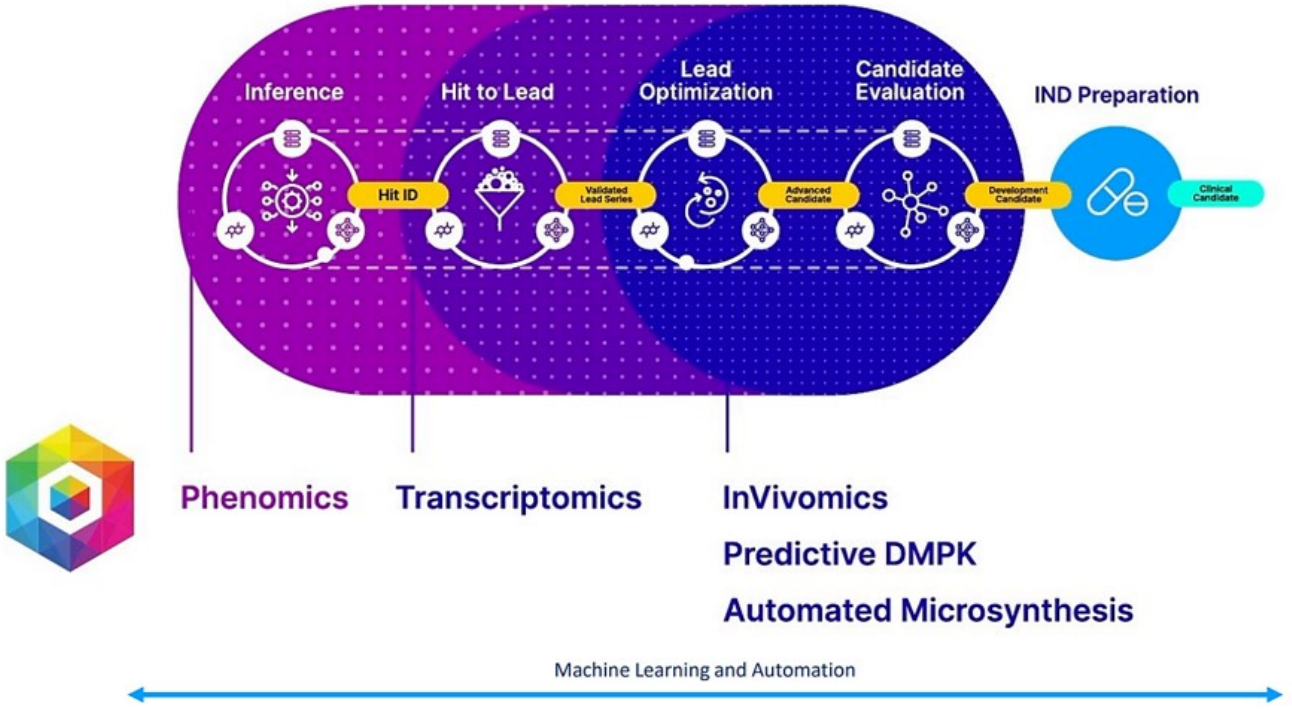


Figure 7. The Recursion OS is meant to industrialize the drug discovery and development process through multiple cycles of learning and iteration.

Atoms

Our Recursion OS is composed of a broad suite of automated laboratory systems used to conduct standardized, high-dimensional data acquisition at scale. These data span phenomics, transcriptomics, InVivomics and ADME/DMPK assays. Recursion has built a physical library of approximately 1.7 million compounds, including over 1 million new chemical entity (NCE) starting point substances, a large library of known chemical entities which can serve as guideposts, and more than 500 thousand compounds belonging to our collaborators. Further, Recursion has generated a custom whole-genome arrayed CRISPR guide library. Together, these tools allow Recursion to explore millions of different biological perturbations in our own wet-labs. Our tissue culture facility has scaled the production of nearly 50 human cell types and has also enabled work at scale in co-cultures and complex iPSC-derived cell types. In 2022, for example, Recursion generated more than 500 billion human neuronal iPSC-derived cells for our partnered work with Roche and Genentech - a scale achieved by few if any other companies in the world.

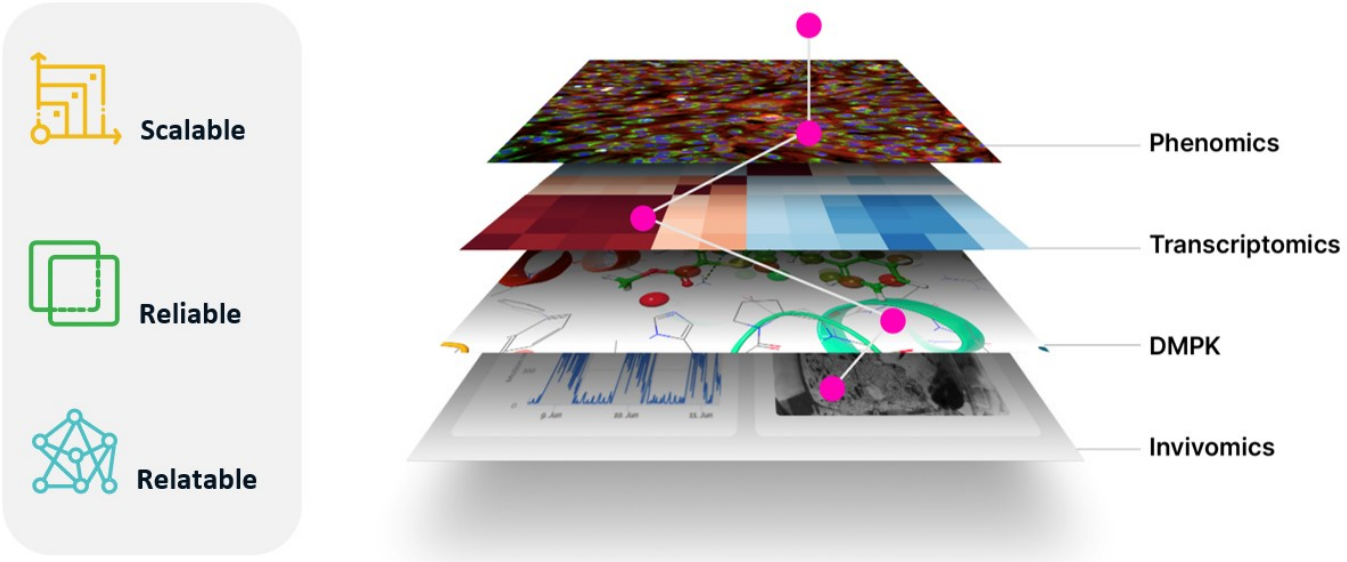


Figure 8. Diverse datasets within the Recursion Data Universe are highly complementary. The Recursion Data Universe consists of complementary datasets spanning multiple data modalities. While phenomics data can be generated cost-effectively and at scale, other datasets such as transcriptomics, DMPK and InVivomics offer increasing insight as we translate programs from early discovery through development.

Bits

The Recursion OS is built on top of a core technology stack that is highly scalable and flexible. This stack is composed of infrastructure components, such as our wholly-owned supercomputer, *BioHive-1,* where much of our deep learning model training and research happens. In addition, we have built a custom software stack including many proprietary tools integrated into a full-stack data collection, aggregation, storage and analysis pipeline spanning target discovery to digital chemistry.

Flowing through our software infrastructure are more than 21 petabytes of highly relatable biological and chemical data, including: phenomics, transcriptomics, InVivomics, ADMET assays and bespoke bioassay data we call the Recursion Data Universe. We generate, evaluate and analyze this scaled data using our enabling software tool suite, which includes a custom Laboratory Information Management System (LIMS), custom applications to design large experimental layouts consisting of millions of perturbation conditions, tools and dashboards to automatically execute and continuously monitor experimental protocols and a *MapApp* which enables users to map and navigate core components of our data spanning more than three trillion predicted relationships. Recursion recently released a demo-version of one of our internal tools, MolRec, along with a massive open-source dataset (RxRx3), which allows potential collaborators to get a taste of how Recursion explores relationships among and between potential medicines and genes.

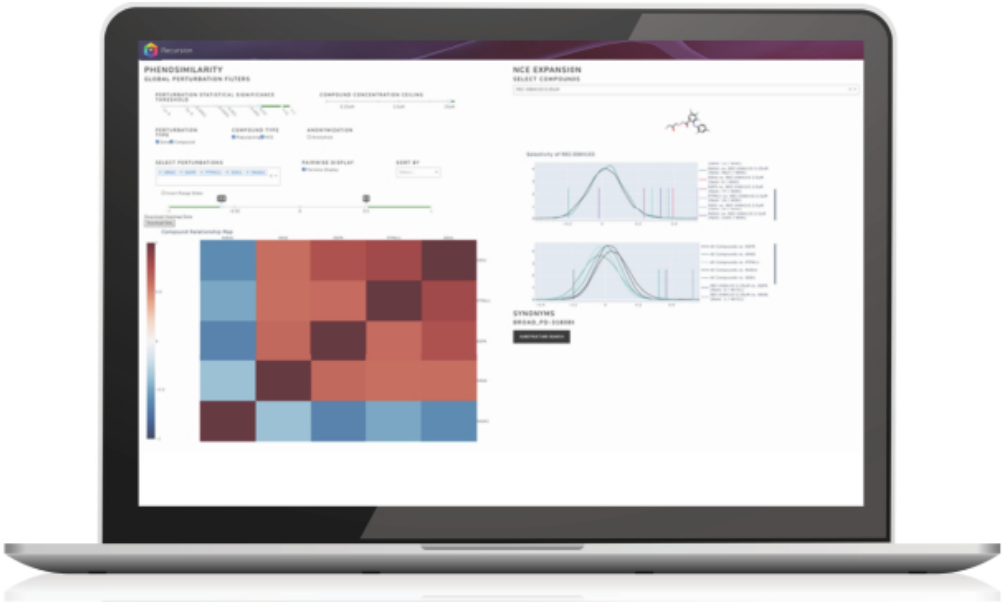


Figure 9. The MapApp allows our team to simultaneously view multiple relationships between genes and compounds. This proprietary software application enables us to rapidly explore inferred biological and chemical relationships in order to: (i) discover targets, (ii) predict active hits, (iii) optimize for similar or dissimilar relationships and (iv) predict mechanisms of action.

Virtuous Cycles of Atoms and Bits to Advance Programs

As of December 31, 2022, using our highly-automated wet-lab infrastructure, we have executed over 175 million experiments across different biological and chemical contexts in multiple human cell types. Experimental results reside within the Recursion Data Universe, which grows as new experiments are performed. Using this data, we apply sophisticated computational techniques to infer trillions of relationships between biological and pharmacological perturbations *in silico* and prioritize the most novel and promising candidates for further validation in our wet laboratories. Our mapping and navigating approach to drug discovery means that the ambitious experimental explorations that would have taken us over 1,000 years to physically execute can now be inferred nearly instantaneously due to the relatability of the datasets that we have already constructed. The computational methods at the core of mapping and navigating allow us to turn the output of each experiment from “data exhaust” into a data engine: every compound we profile is analyzed not for its activity against a single target, but for its inferred activity against *all possible targets* in our arrayed CRISPR library, as well as its similarity to every compound we have run before in its phenomap (digital relationship map of phenomic data) – producing a super-linear growth in biological relationships as we conduct experiments.

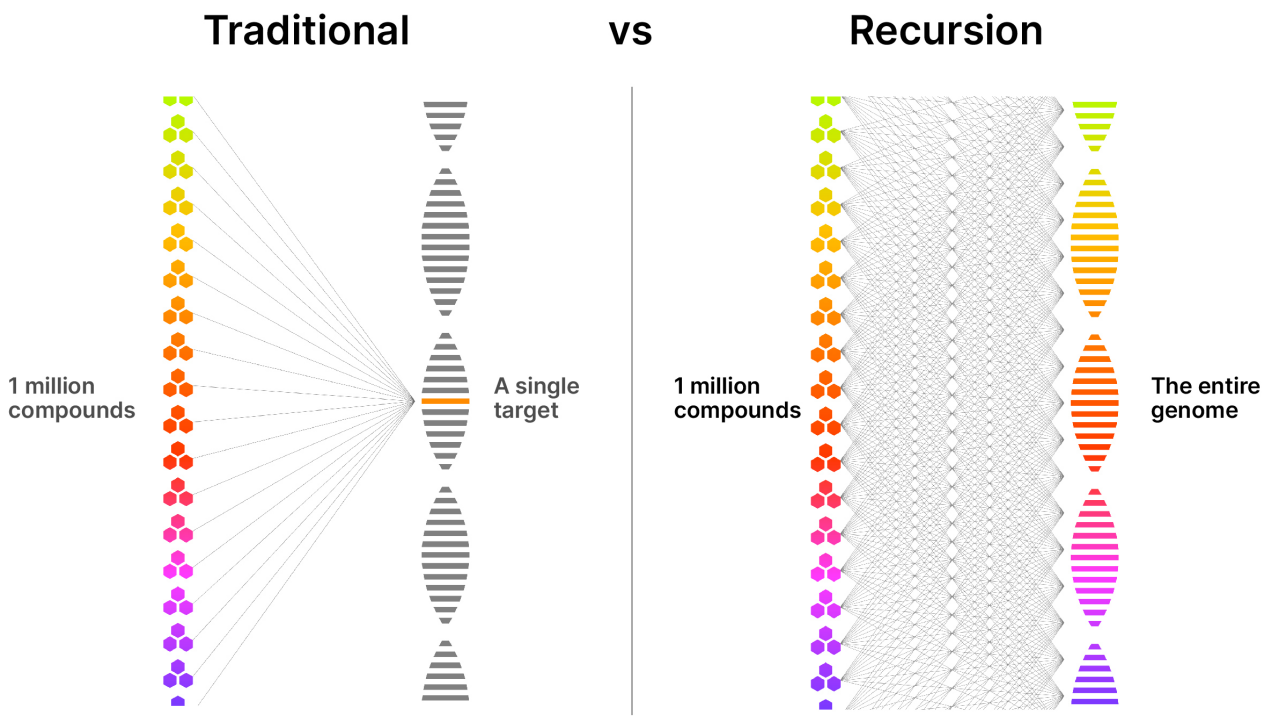


Figure 10. Mapping and navigating enables simultaneous genome-wide screening. Traditional pharma high-throughput screening methods screen thousands to millions of compounds simultaneously against single targets, deriving information about compound activity on that single target, but no information about other targets. Recursion's mapping and navigating approach in phenomics enables us, in a single experiment, to infer the activity of a compound against all potential targets in our arrayed CRISPR knockout screen.

When building the Recursion OS, we first focused on discovering and validating novel *biological* targets because we believe that identifying the appropriate target is the most challenging step in the drug discovery process due to bias and limitations associated with the traditional approach to drug discovery. More recently, we have been actively expanding the Recursion OS to more rapidly identify novel *chemical* starting points, more rapidly drive chemistry optimization through structure-activity-relationships (SAR) and achieve higher success rates in translating our novel target discovery work into IND-enabled programs. In the future, we envision that we will further evolve our approach and incorporate data and techniques that improve our ability to *execute clinical programs* at scale, including population-scale genomics data and precision medicine tools in order to identify patients for which a potential therapeutic would be beneficial.

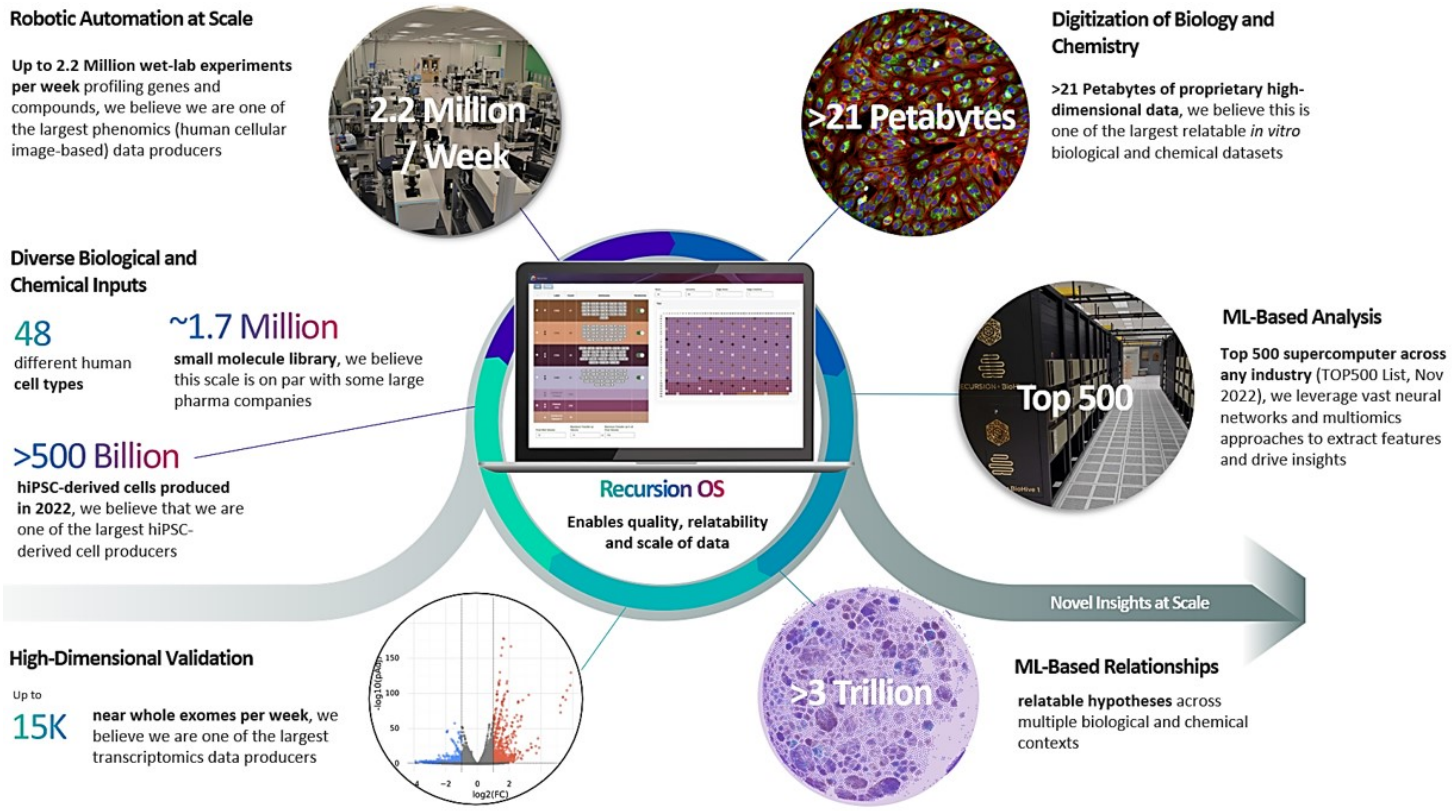


Figure 11. The productionized portions of the Recursion OS today. We use our proprietary software and highly-automated wet laboratory to design and execute up to 2.2 million experiments each week across diverse biological and chemical matter. Complex, high-dimensional data from these experiments are generated at a rate of up to 110 terabytes per week and aggregated and analyzed by proprietary neural networks in either distributed cloud computing environments or on our own supercomputer, BioHive-1. We leverage ML approaches to predict relationships between combinations of biological and chemical perturbations and have made more than 3 trillion such predictions. Our scientists navigate these predictions using proprietary software to discover novel relationships, which we can quickly test either in-house with our Industrialized Program Generation workflow or with clinical research organizations (CROs). As we validate or refute the predictions, our Recursion OS continuously improves.

Demonstrable Impact

Late-stage clinical failures are the primary driver of costs in today's pharmaceutical R&D model, due in part to inherent uncertainty in the clinical development and regulatory process. Reducing the rate of costly, late-stage failures and accelerating the timeline from hit to a clinical candidate would create a more sustainable R&D model. To achieve this more sustainable model, we believe that in its ideal state, a drug discovery funnel would morph from the being shaped like the letter 'V' to being be shaped like the letter 'T,' where a broad set of possible therapeutics could be narrowed rapidly to the best candidate, which would advance through subsequent steps of the process quickly and with no attrition. Recursion's goal is to leverage technology to reshape the typical drug discovery funnel towards its ideal state by moving failure as early as possible to rapidly narrowing the funnel into programs with the highest probability of success.

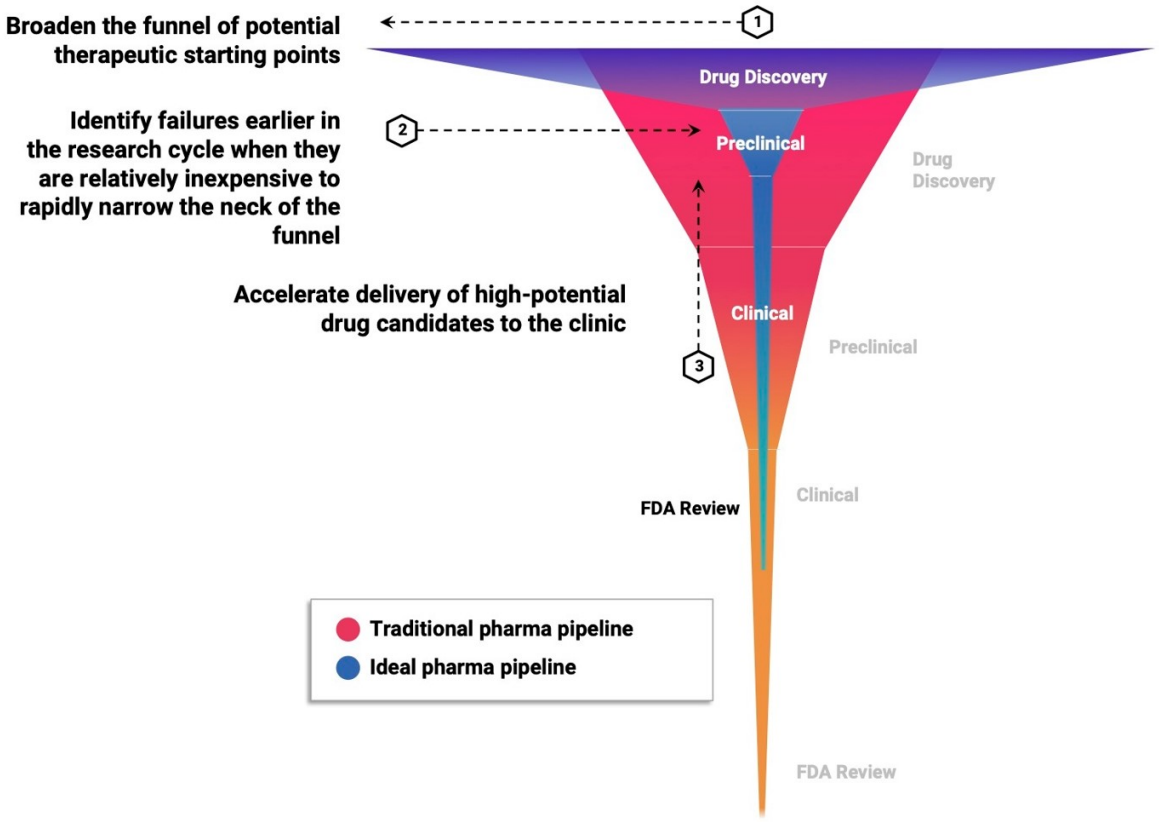


Figure 12. Reshaping the drug discovery funnel. Recursion's goal is to leverage technology to reshape the typical drug discovery funnel towards its ideal state by moving failure as early as possible to rapidly narrowing the funnel into programs with the highest probability of success.

We believe we have made progress in reshaping the traditional drug discovery funnel in the following ways:

- *Broaden the funnel of therapeutic starting points.* Our flexible and scalable mapping tools and infrastructure enable us to infer trillions of relationships between human cellular disease models and therapeutic candidates based on real empirical data from our own wet-labs, 'widening the neck' of the discovery funnel beyond human-hypothesized targets.

- *Identify failures earlier when they are relatively inexpensive.* Our proprietary navigation tools enable us to explore our massive biological and chemical datasets to validate more and varied hypotheses rapidly. While this strategy results in an increase in early stage attrition, the system is designed to rapidly prioritize programs with a higher likelihood of downstream success based on the exploration of high-dimensional, systems-biology data. Over time, and as our OS improves, we expect that moving failure earlier in the pipeline will result in an overall lower cost of drug development.

- *Accelerate delivery of high-potential drug candidates to the clinic.* The Recursion OS contains a suite of digital chemistry tools that enable highly efficient exploration of chemical space, including 3D virtual screening as well as translational tools that improve the robustness and utility of *in vivo* studies.

By leveraging our Recursion OS to explore more than 170 disease programs, we have shown quantifiable improvements in the time, cost and anticipated likelihoods of program success by stage when compared to the traditional drug discovery process. We believe that future iterations of the Recursion OS will enable even greater improvements minimizing the total dollar-weighted failure and maximizing the likelihood of success.

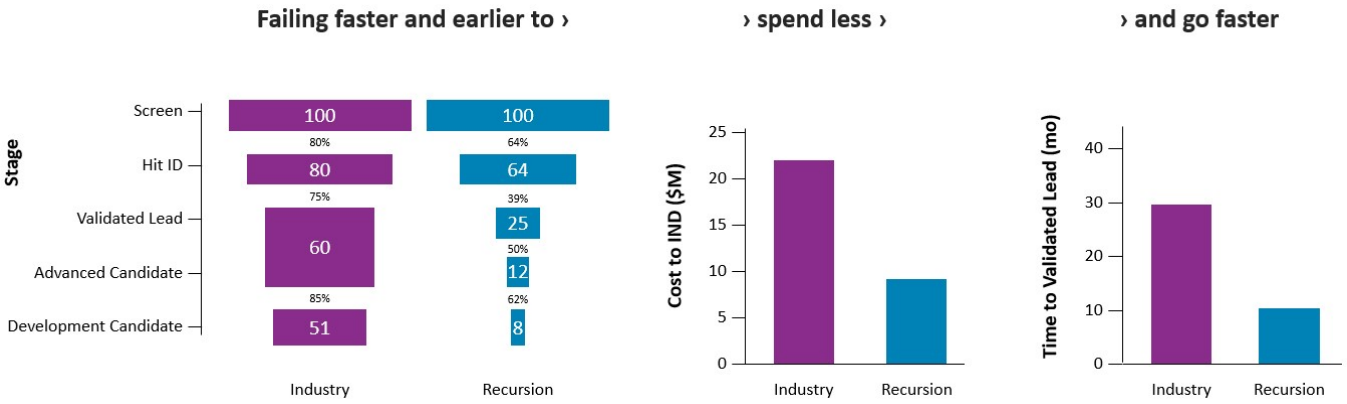


Figure 13. The trajectory of our drug discovery funnel mirrors the 'ideal' pharmaceutical drug discovery funnel. We believe that, compared to industry averages, our approach allows us to: (i) identify low-viability programs earlier in the research cycle, (ii) spend less per program and (iii) rapidly advance programs to a validated lead. Data shown are the averages of all our programs from 2017 through 2022.

Over time, we believe continued successes and improvements in any or all of the dimensions highlighted above will improve overall R&D productivity, allowing us to address targeted patient populations that may otherwise not be commercially viable using traditional drug discovery approaches. Furthermore, we have seen our unbiased approach lead us to novel targets which we believe could enable us to outperform others in highly competitive disease areas where multiple parties often simultaneously pursue a limited number of similar target hypotheses. These advantages potentially significantly expand the total addressable market for our technology. However, the process of clinical development is inherently uncertain, and there can be no guarantee of success.

Pipeline

All of the programs in our internal pipeline are built on unique biological insights surfaced through the Recursion OS where: (i) the disease-causing biology is well defined but the downstream effects of the disease-cause are typically poorly understood, the primary targets are typically considered undruggable, or the primary targets are not well known in the context of a disease and (ii) there is a high unmet medical need, no approved therapies, or significant limitations to existing treatments. Several of our internal pipeline programs could have potential market opportunities in excess of $1.0 billion in annual sales. We currently have four programs in active clinical studies and are preparing for a fifth program to enter a Phase 1b/2 clinical trial in early 2024. In addition to our clinical stage programs, we are actively developing dozens of preclinical and discovery programs.

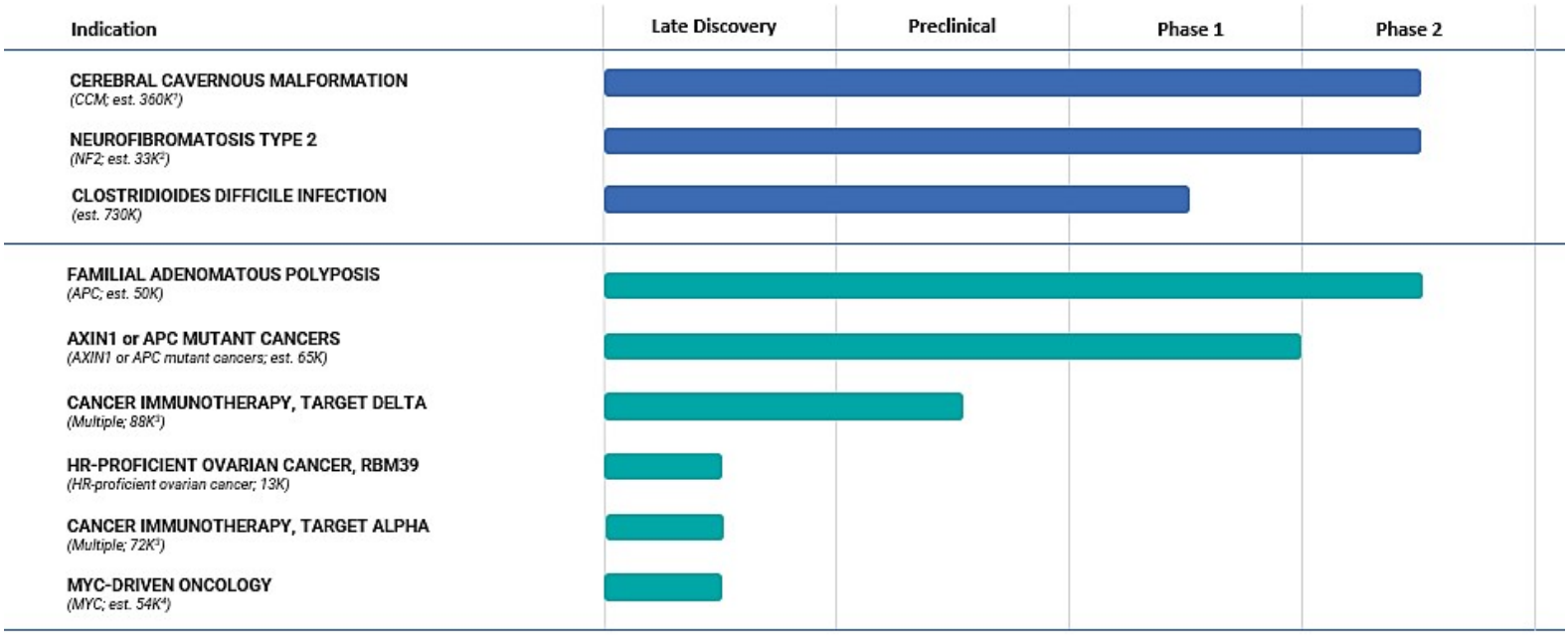


Figure 14. The power of our Recursion OS as exemplified by our expansive therapeutic pipeline. All populations defined above are US and EU5 incidence unless otherwise noted. EU5 is defined as France, Germany, Italy, Spain and UK. [1] Prevalence for hereditary and sporadic symptomatic CCM population. [2] Annual US and EU5 incidence for all *NF2*-driven meningiomas. [3] Our Targets Delta and Alpha programs have the potential to address a number of indications in the immunotherapy space. [4] Our MYC program has the potential to address a number of indications driven by MYC alterations, totaling 54,000 patients in the US and EU5 annually. We have not finalized a target product profile for a specific indication.

Clinical Programs

- REC-994 for the potential treatment of cerebral cavernous malformation, or CCM — a Phase 2, double-blind, placebo-controlled, safety, tolerability and exploratory efficacy study is underway. Orphan Drug Designation has been granted in the US and EU. We expect to share top-line data in 2H 2024.

- REC-2282 for the potential treatment of neurofibromatosis type 2, or NF2 — an adaptive, Phase 2/3, randomized, multicenter study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted. We expect to share a Phase 2 interim safety analysis in 2024.

- REC-4881 for the potential treatment of familial adenomatous polyposis, or FAP — a Phase 2, double-blind, randomized, placebo-controlled study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted.

- REC-4881 for the potential treatment of *AXIN1* or *APC* mutant cancers — a Phase 1b/2 study in select tumor types is expected to initiate in early 2024.

- REC-3964 for the potential treatment of *Clostridioides difficile* infection — a Phase 1 study in healthy volunteers is underway. We expect to share safety and PK data in 2H 2023.

Preclinical and Discovery Programs

Recursion continues to develop a suite of oncology programs progressing to and in the preclinical space. We believe many of these programs will remain internal at least through early clinical trials, though a subset may be well-positioned for asset-level partnerships at the preclinical or early clinical stages.

Partnerships

Recursion has made substantial progress to deliver against two large discovery collaborations; first a collaboration in neuroscience and a single gastrointestinal oncology indication with Roche and Genentech signed in late 2021, and second a collaboration in fibrosis with Bayer signed in 2020 and significantly expanded in 2021. We expect to continue to make progress to set up the potential for value-accreting program milestones and map-building and data option milestones.

Roche and Genentech

On December 5, 2021, we entered into a collaboration with Roche and Genentech with the goal to use the Recursion OS to create maps of chemical and whole genome genetic perturbations in multiple cellular contexts of relevance to neuroscience and a single gastrointestinal oncology indication. In addition, together with Roche and Genentech we will create multi-modal models and maps, including significant single-cell sequencing data supplied by our partners, to further expand and refine the number of inferred relationships we uncover. Both approaches will be used to discover and develop up to 40 collaboration programs. In 2022, we made significant progress against both the gastrointestinal-oncology and neuroscience portions of the collaboration, including cell type evaluation and significant cell scale up in support of initial Phenomap-building efforts which remain on track.

Bayer

In August 2020, we entered into a Research Collaboration and Option Agreement with Bayer AG in the field of fibrosis. In December 2021, we significantly expanded this agreement to use our mapping and navigating tools to more efficiently identify biological and chemical insights that can be advanced as therapeutic programs. In 2022, we augmented our existing phenomaps with approximately 500,000 compounds from Bayer's proprietary chemical library, significantly expanding the chemical diversity within our phenomaps. Additionally, we initiated four (4) new Programs (for a total of eight (8) total Programs initiated to date) and advanced multiple Programs towards value inflection points. Going forward, we expect the use of our mapping and navigating tools to rapidly accelerate the scale and pace at which we can initiate additional Programs.

Recursion.

Business Detail

Business Detail

Recursion's Founding

Recursion was founded in November of 2013 as a spin-out from the laboratory of Recursion co-founder Dean Y. Li, then Vice-Dean of Research and Professor of Medicine at the University of Utah (currently President of Merck Research Labs). In Dean's lab, then MD/PhD student Chris Gibson (currently Recursion CEO) was working with a team to study Cerebral Cavernous Malformation (CCM), a genetic disease for which Recursion now has a drug in human clinical trials. Their research had led them to believe that activation of a protein called RhoA played the central role in the manifestation of CCM pathophysiology in humans. They leveraged an approved drug called simvastatin that is known to inhibit RhoA activation to evaluate their hypothesis in an animal model of CCM disease. The result was the opposite of what they expected; the treatment trended towards making the mice worse, not better.

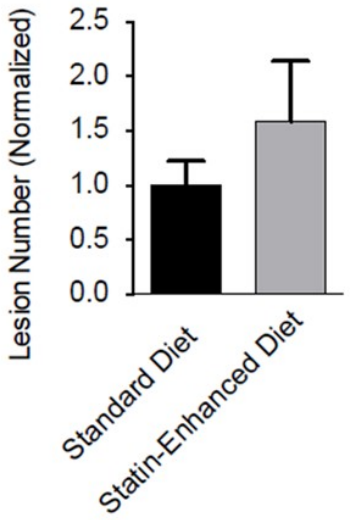


Figure 15. Modulating a hypothesis highlighted by a traditional approach resulted in a treatment that trended towards doing the opposite of what was expected.[5]

There were many reasons the experiment could have failed, but the real significance was that the result challenged the team to question the validity of the RhoA hypothesis that they had arrived at using traditional molecular and cellular biology tools. Coming off the failure, the team went back to the drawing board. During their work, they had noticed that human cellular models of CCM in human cells looked very different from healthy cells; that is to say that their cellular morphology was markedly different. That difference sparked an idea to try to unbias the approach by leveraging a phenotypic screen where they applied many different potential treatments to diseased cells, collected images and looked for molecules that reverted the 'diseased' cell morphology back to 'healthy.'

Rather than use a traditional phenotypic screening approach, where people would look at the images by eye or use a very basic measure like the intensity of a single marker from the microscopy images, the team instead used very early ML approaches to make this process much more objective, quantifiable and scalable. It turned out that the ML algorithms had a much higher probability of predicting "hits" - i.e., chemical compounds that demonstrated efficacy in a subsequent completely different experiment where diseased cells were treated and measured to evaluate the level of improvement.

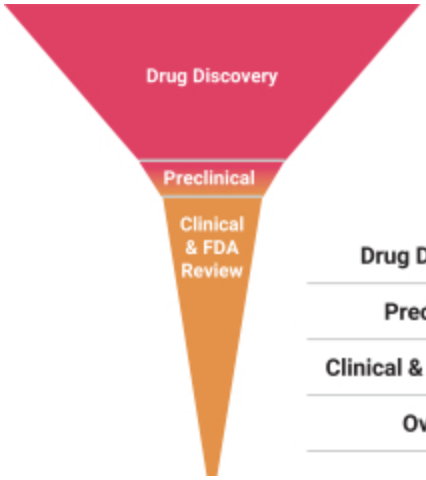
They ran the best molecules from the increasingly complex assay systems through multiple different animal studies, and together with their collaborators ultimately demonstrated that two of those compounds, including what is now REC-994 (a molecule that Recursion is exploring in a phase 2 human safety and exploratory efficacy clinical trial for CCM), rescued multiple aspects of the disease in mice.

[5] Gibson, et al. (2015). Strategy for identifying repurposed drugs for the treatment of cerebral cavernous malformation. *Circulation, 131(3)*, 289-99.

The early success of leveraging machine learning to explore complex biological data to generate novel hypotheses in a target-agnostic way compelled Chris and Dean, along with a third co-founder, Blake Borgeson to spin-out the technology from the University of Utah. They wanted to test the hypothesis of whether one could use this approach, or similar approaches, to scale drug discovery and development, and thus Recursion was born.

Industrializing the Drug Discovery Process

The traditional drug discovery and development process is characterized by substantial financial risks, with increasing and long-term capital outlays for development programs that often fail to reach patients as marketed products. Historically, it has taken over ten years and an average capitalized R&D cost of approximately $2 billion per approved medicine to move a drug discovery project from early discovery to an approved therapeutic. Such productivity outcomes have culminated in a rapidly declining internal rate of return for the biopharma industry.



Historical Biopharma R&D Metrics

	Success rate	Time (years)	Capitalized R&D spend per approval
Drug Discovery	51%	4.5	$881-$1,098
Preclinical	69%	1	
Clinical & FDA Review	8-14%	8-11	$954-$1,460
Overall	<4%	~14	$1,778-$2,558

Figure 16. Historical biopharma industry R&D metrics. The primary driver of the cost to discover and develop a new medicine is clinical failure. Less than 4% of drug discovery programs that are initiated result in an approved therapeutic, resulting in a risk-adjusted cost of approximately $1.8 to $2.6 billion per new drug launched.[6,7,8,9,10]

Despite significant investment and brilliant scientists, these metrics point to the need to evolve a more efficient drug discovery process and explore new tools. Traditional drug discovery relies on basic research discoveries from the scientific community to elucidate disease-relevant pathways and targets to interrogate. Coupled with biology's incredible complexity, this approach has forced the industry to rely on reductionist hypotheses of the critical drivers of complex diseases, which can create a 'herd mentality' as multiple parties chase a limited number of therapeutic targets. The situation has been exacerbated by human bias (e.g., confirmation bias and sunk-cost fallacy). Accentuating this problem, the sequential nature of current drug discovery activities and the challenges with aggregation and relatability of data across projects, teams and departments lead to frequent replication of work and long timelines to discharge the scientific risk of such hypotheses. Despite decades of accumulated knowledge, the result is that drug discovery has unintentionally created hurdles for innovation.

Simultaneously, exponential improvements in computational speed and reductions in data storage costs driven by the technology industry, coupled with modern ML tools, have transformed complex industries from media to transportation to e-commerce. The biopharma sector, however, has been slower to embrace such innovations, except in narrow areas.

At Recursion, we are pioneering the integration of innovations across biology, chemistry, automation, data science and engineering to industrialize drug discovery in a full-stack solution built from the bottom-up across dozens of key workflows and processes critical in discovering and developing a drug. For example, by combining advances in high

[6] Zhou, S. and Johnson, R. (2018). Pharmaceutical Probability of Success. *Alacrita Consulting, 1-42*
[7] Steedman M, and Taylor K. (2020). Ten years on: Measuring the return from pharmaceutical innovation. *Deloitte*. 1-44.
[8] DiMasi et al. (2016). Innovation in the pharmaceutical industry: New estimates of R&D costs. *Journal of Health Economics*. 47, 20-33.
[9] Paul, et al. (2010). How to improve R&D productivity: the pharmaceutical industry's grand challenge. *Nature Reviews Drug Discovery*. 9,203-214
[10] Martin et al. (2017). Clinical trial cycle times continue to increase despite industry efforts. *Nature Reviews Drug Discovery*. 16, 157

content microscopy with arrayed CRISPR genome editing techniques, we can rigorously *profile* massive, high-dimensional biological and chemical perturbation libraries in multiple human cellular contexts. Leveraging advancements in data storage and computation, we can *aggregate and analyze* the massive resultant datasets to create digital 'maps' of human cellular biology. Finally, we can use modern AI and ML tools to *infer* relationships within the data, unconstrained by known biology or presumptive hypotheses. We believe that by harnessing advances in technology to industrialize drug discovery, we can derive novel biological insights not previously described by scientific researchers, reduce the effects of human bias inherent in discovery biology and reduce translational risk at the program outset.

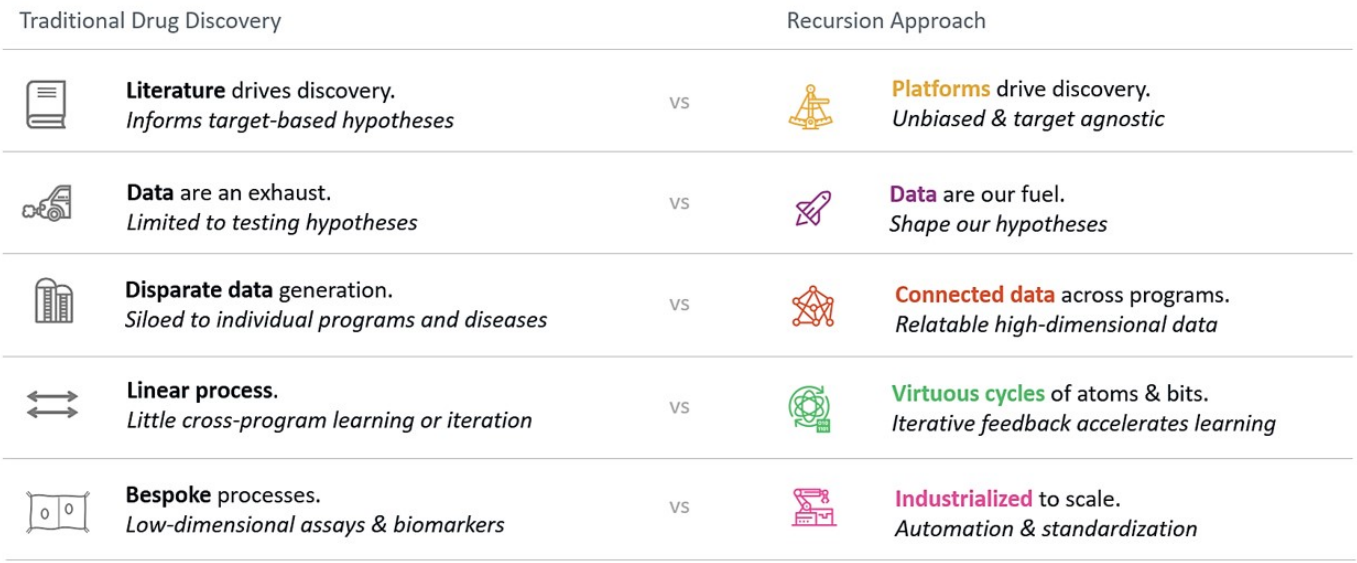


Figure 17. Recursion's approach to drug discovery. We utilize our Founding Principles on the right to build datasets which are scalable, reliable and relatable in order to elucidate novel biological and chemical insights and industrialize the drug discovery process.

We have used our approach to generate one of the largest biological and chemical datasets in the world (over 21 petabytes at the end of 2022) which includes proprietary phenomics, transcriptomics, InVivomics, ADME data and more across a large number of biological and chemical contexts. Additionally, we have built a proprietary suite of software applications within the Recursion OS which has identified over 3 trillion predicted biological and chemical relationships. The following table highlights how Recursion has scaled with respect to experiments, data and biological and chemical relationships. With our approach, we look to turn drug discovery into a search problem where we map and navigate biology in an unbiased manner to discover new insights and translate them into potential new medicines at scale.

Year	2018	2019	2020	2021	2022
Total Phenomics Experiments (Millions)	8	24	56	115	175
Total Transcriptomics Experiments (Thousands)	NA	NA	2	91	258
Data (PB)	1.8	4.3	6.8	12.9	21.2
Cell Types	12	25	36	38	48
Unique Compounds Physically Housed at Recursion[1] (Millions)	0.02	0.1	0.7	1.0	1.7
In Silico Chemistry Library (Billions)	NA	0.02	3	12	>1,000
Predicted Biological and Chemical Relationships[2] (Trillions)	NA	NA	0.01	0.2	3.1

Table 1. Biology and chemistry are complex – data that is scalable and relatable is a differentiator. We are a biotechnology company scaling more like a technology company, as demonstrated by our growth in inputs (experiments as well as biological and chemical contexts) and growth in outputs (data as well as biological and chemical relationships). (1) Includes approximately 500,000 compounds from Bayer's proprietary library. (2) 'Predicted Relationships' refers to the number of unique perturbations that have been predicted using our maps.

Business Strategy and Value Drivers

While most small to medium-sized biopharma companies are focused on a narrow slice of biology or therapeutic area, where they believe they have an advantage or insight based on the summed experience of their team, the Recursion OS allows us to discover and translate at scale across biology. However, we are cognizant that building disease-area expertise, especially in clinical development, is essential. And so, we have developed a multi-pronged, capital-efficient business model focused on key value-drivers that enable us to demonstrate our progress over time while continuing to invest in the development of the Recursion OS, which we believe is the engine of value creation in the long-term. While our mapping and navigating tools have the plasticity to be applied across therapeutic areas and modalities, our business model is tailored to maximize value and advance programs cost-effectively based on the nature of market and regulatory dynamics associated with our three value drivers (internal pipeline, transformational partnerships and fit-for-purpose proprietary biological and chemical data).

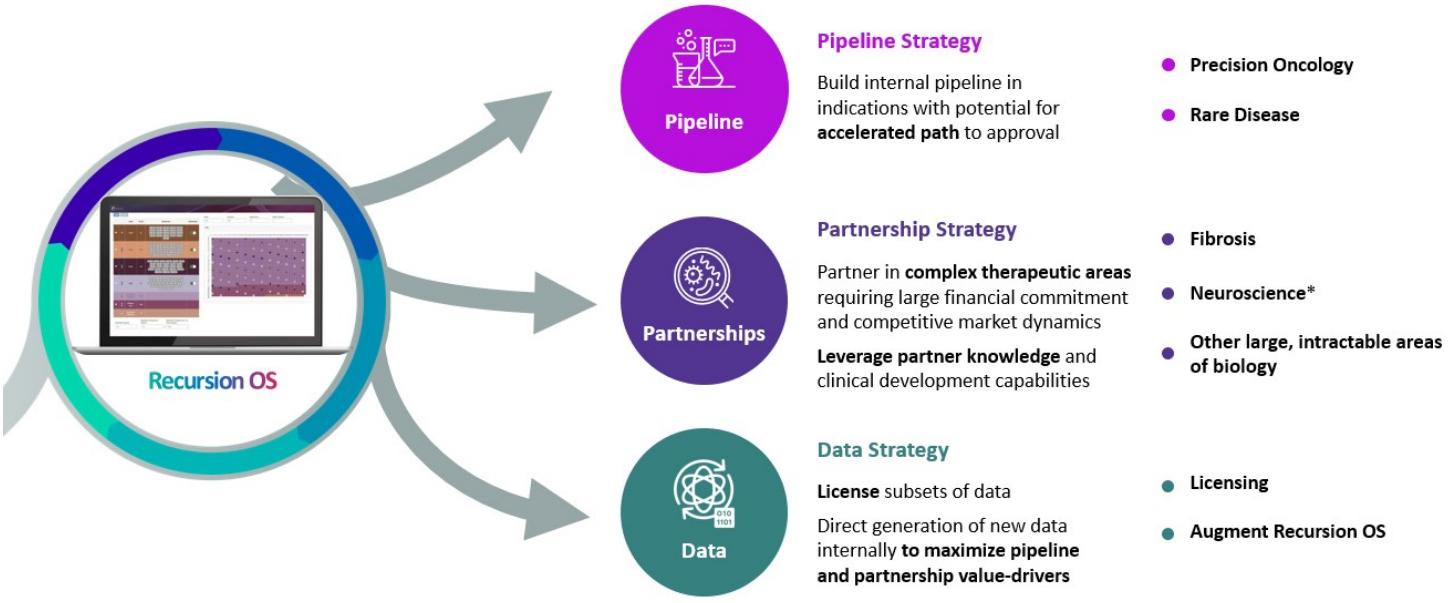


Figure 18. We harness the value and scale of our maps of biology using a capital efficient business strategy. Our business strategy is segmented into our following value-drivers: (i) internally developed programs in capital-efficient therapeutic areas; (ii) partnered programs in resource-intensive therapeutic areas; and (iii) proprietary, fit-for-purpose training data. *Includes a single oncology indication from our Roche and Genentech collaboration.

Value Driver 1 - Internally Developed Programs in Capital Efficient Therapeutic Areas

We believe that the primary currency of any biotechnology company today is clinical-stage assets. These programs can be valued using a variety of models by stakeholders in the biopharma ecosystem and most importantly, present the potential to meet critical patient needs. Further, for Recursion, these assets have a variety of additional benefits, including: (i) validation of key elements of the Recursion OS, (ii) growing our expertise in clinical development and (iii) building in-house processes to facilitate smooth interaction with regulatory agencies and advance medicines towards the market. If the Recursion OS evolves in the manner with which it has been designed, then it will improve with more iterations such that future programs could be more novel and potentially more valuable than today's programs. In this way, operating as a vertically-integrated biopharma company that leverages technology at every step from target discovery through clinical development (and even marketing and distribution) may be the long-term business model with the most upside for our stakeholders, including both investors and patients. Furthermore, we may be opportunistic about selling or licensing assets after they achieve key value-inflection milestones so that we can re-invest in our long-term strategy.

Value Driver 2 - Partnered Programs in Resource Intensive Therapeutic Areas

We believe that in its current form, our Recursion OS is already capable of delivering many more therapeutic insights than we would be able to responsibly shepherd alone today. As such, we have chosen to partner with experienced, top-tier biopharma companies to explore intractable and resource-intensive areas of biology like fibrosis with Bayer and neuroscience with Roche and Genentech. The key advantages of these partnerships are that: (i) we are able to deploy the Recursion OS to turn latent value into tangible value in areas of biology where it would be challenging for us to do so alone; (ii) the clinical development paths for these large therapeutic areas are often resource-intensive and highly complex; and (iii) we are able to learn from our colleagues at these top-tier companies such that it could give us a competitive advantage in the industry over the longer term. This strategy also embeds us in the discovery process of large pharmaceutical companies and gives rise to an alternative long-term business model whereby we become a valued partner of many such companies. Here, Recursion would focus on discovery efforts across a broad set of programs while relying on its partners to develop and market the medicines. Based on how value is ascribed across our industry today, this model alone is not yet feasible to maximize our business impact. However, we feel that due to shifts within the biopharma industry there is some potential for this portion of our business model to accrete notable value over the long-term.

Value Driver 3 - Proprietary, Fit-for-Purpose Training Data

As has been demonstrated in many other industries, a value drive and competitive advantage can be generated from the creation of a proprietary dataset. At Recursion, we have generated what we believe to be one of the largest fit-for-purpose, relatable biological and chemical datasets on earth. Spanning multiple omics technologies and more than 175 million unique experiments, the over 21 petabyte Recursion Data Universe is of the same rough scale as those generated by some of the oldest and largest pharma companies,[11] but is built from scratch in our laboratories with a fundamental purpose to be used as training data for machine learning models. Through intensive internal work, Recursion uses this data and our own algorithms and software to generate and advance our own internal pipeline of medicines (Value Driver 1), as well as in partnership with our collaborators to advance additional discovery programs (Value Driver 2). Our most recent collaboration announcement with Roche and Genentech set an important precedent - there are up to or exceeding $500M in milestones unrelated to specific drug discovery programs, but instead based on successful creation and optioning of collaboration data generated by Recursion. As our field increasingly recognizes the potential for a coming revolution in drug discovery based on virtuous cycles of atoms and bits, these data are themselves becoming a direct value driver. While we will likely direct the generation of new data and exploit the latest data in our data Universe to maximize our pipeline and partnership value-drivers, we increasingly see the potential to license subsets of our data to a growing universe of collaborators for which internal efforts would be minimal, but value could be significant.

Competitive Landscape and Differentiation

There are three key factors that differentiate Recursion from the vast majority of other TechBio companies.

1. Recursion is **biology-first**, while most other companies are chemistry-first. The highest probability of failure for clinical stage programs in our industry is a lack of efficacy in the intended disease state or an unexpected side-effect. These failure modes are primarily driven by picking the wrong target or not fully understanding the role of that target in broader physiology and not by failure to generate molecules that successfully agonize or antagonize the target of interest. There are of course exceptions to this, but we believe that mapping and navigating biology solves a zero-to-one type problem, while optimizing chemistry is a critical, but insufficient step alone. Because the chemistry problem is more tractable, the vast majority of TechBio companies have started (or remain) here. We believe our biology-first approach is a more critical unlock, and now have the opportunity to build on that success at low cost by adding digital chemistry and related solutions to our solution stack, especially amidst an over-crowded space.
2. Recursion **integrates the wet-lab and dry-lab in-house** and at scale. With scaled wet-lab (atoms) and dry-lab (bits) creating a virtuous cycle of iteration, Recursion is well positioned compared to those companies of a similar stage either focused more completely on the wet-lab only (traditional biotech or pharma companies) or dry-lab only focused companies who are facing rapidly commoditized algorithms and a challenge differentiating on non-proprietary data.
3. Recursion has achieved a **significant scale** and stage much earlier than other companies. With five clinical-stage programs, an exciting preclinical pipeline, and two of the largest discovery partnerships in the industry with Roche/Genentech and Bayer, Recursion has achieved a scale, level of integration and stage that few other TechBio companies have. In the context of steep competition for resources amidst challenging capital markets, this position serves Recursion well, especially compared to many of the late stage private companies with significant valuations and burn.

[11] Dougherty, E. (2018, October 24). *On being and becoming a data science company*. Novartis. https://www.novartis.com/stories/being-and-becoming-data-science-company

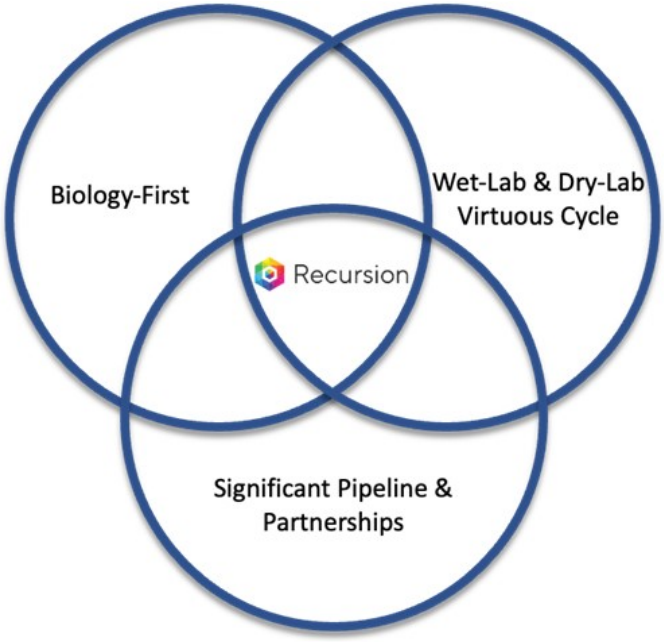


Figure 19. Recursion sits at a unique intersection of key advantages. Among TechBio companies, Recursion sits at a unique intersection of a (i) biology vs chemistry-first organization, focused on identifying novel relationships across biological targets and disease areas, which we believe to be the most pressing challenge in our industry; (ii) a virtuous cycle of wet-lab and dry-lab enabling virtuous cycles of iteration and proprietary insight generation; and (iii) with a scaled pipeline and partnerships differentiating from the many early startups and fee-for-service organizations.

While emerging competitors and large, well-resourced incumbents may pursue a similarly differentiated strategy to ours, we have two advantages as a first mover: (i) no amount of resources can compress the time it takes to observe naturally occurring biological processes and (ii) the growing Recursion Data Universe creates compounding network effects that may make it difficult for others to close the competitive gap.

The Recursion OS - Creating Virtuous Cycles of Atoms and Bits

The creation of virtuous cycles of atoms and bits has been a competitive advantage for leaders in many industries outside of biopharma. This virtuous cycle of profiling the real (atoms) to create digital representations (bits) can be paralleled as an approach to mapping and navigating biology and chemistry as well.

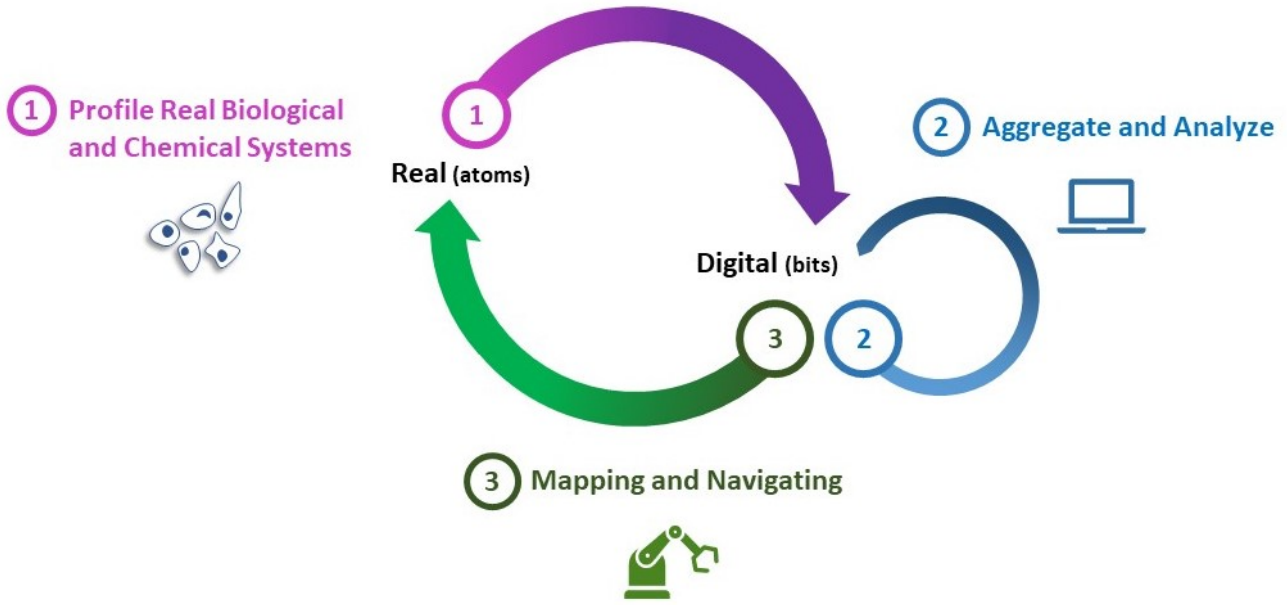


Figure 20. Recursion's virtuous cycle of atoms and bits. (1) Profile real biological and chemical systems using automation to scale a small number of data-rich assays, including phenomics, transcriptomics, InVivomics and ADMET to generate massive, high quality empirical data; (2) Aggregate and analyze the resultant data using a variety of in-house software tools including proprietary machine learning algorithms on both public and private clouds**;** and (3) Map and navigate leveraging proprietary software tools to infer relationships between biology and chemistry tested independently. These inferred relationships serve as the basis of our ability to predict how to navigate between biological states using chemical or biological perturbations, which we can then validate in our automated laboratories, completing a virtuous cycle of learning and iteration**.**

Specifically, at Recursion, automated wet-lab biology and dry-lab computational tools are organized in an iterative loop to rapidly translate *in silico* hypotheses into testable predictions, which in turn generates more data on which improved predictions can be made. The Recursion OS cycles between the profiling of real systems (atoms) and the aggregation and analysis of data (bits) to infer relationships across biological and chemical systems (mapping and navigating). Each of these components is explored in more detail, below.

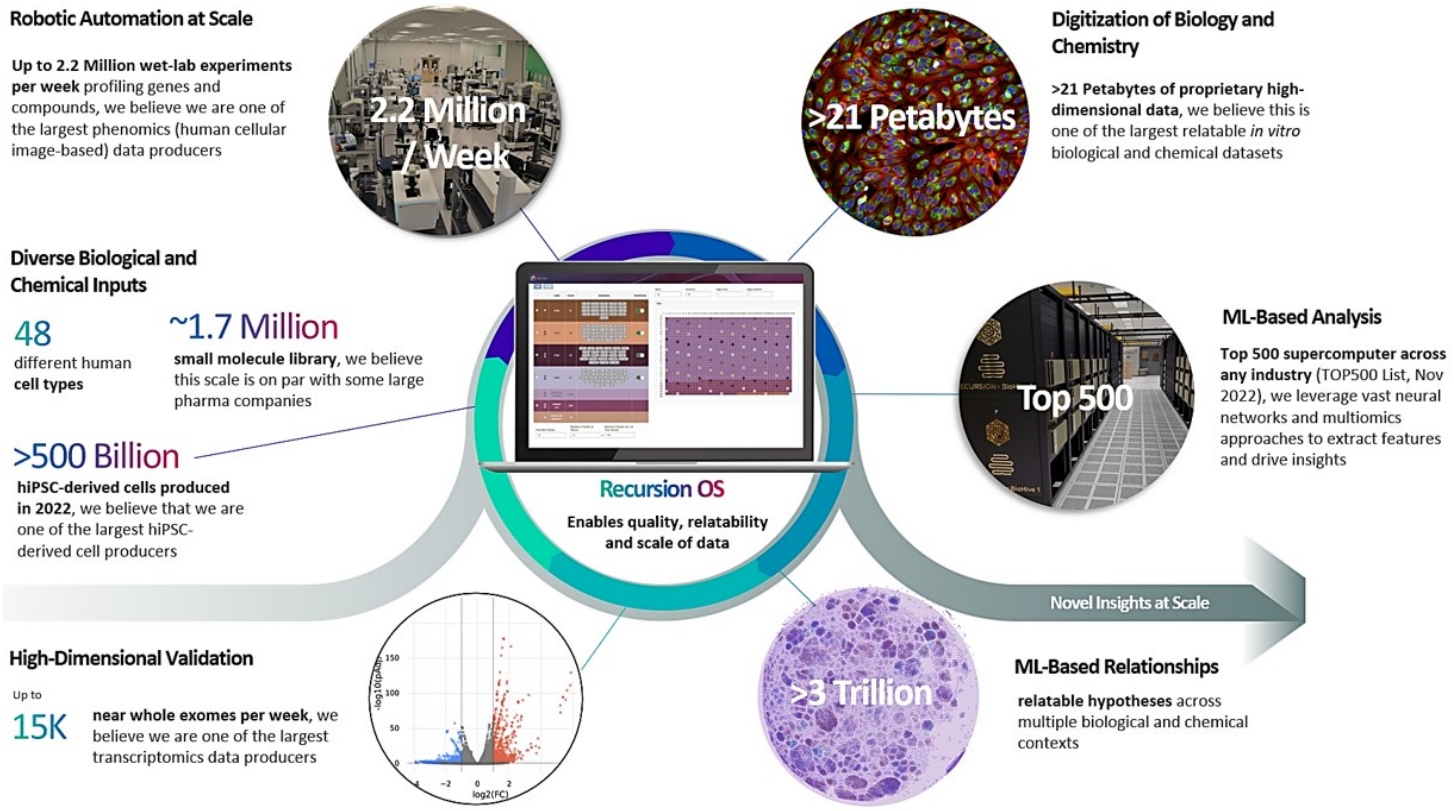


Figure 21. The productionized portions of the Recursion OS today. We use our proprietary software and highly-automated wet laboratory to design and execute up to 2.2 million experiments each week across diverse biological and chemical matter. Complex, high-dimensional data from these experiments are generated at a rate of up to 110 terabytes per week and aggregated and analyzed by proprietary neural networks in either distributed cloud computing environments or on our own supercomputer, BioHive-1. We leverage ML approaches to predict relationships between combinations of biological and chemical perturbations and have made more than 3 trillion such predictions. Our scientists navigate these predictions using proprietary software to discover novel relationships, which we can quickly test either in-house with our Industrialized Program Generation workflow or with contract research organizations (CROs). As we validate or refute the predictions, our Recursion OS continuously improves.

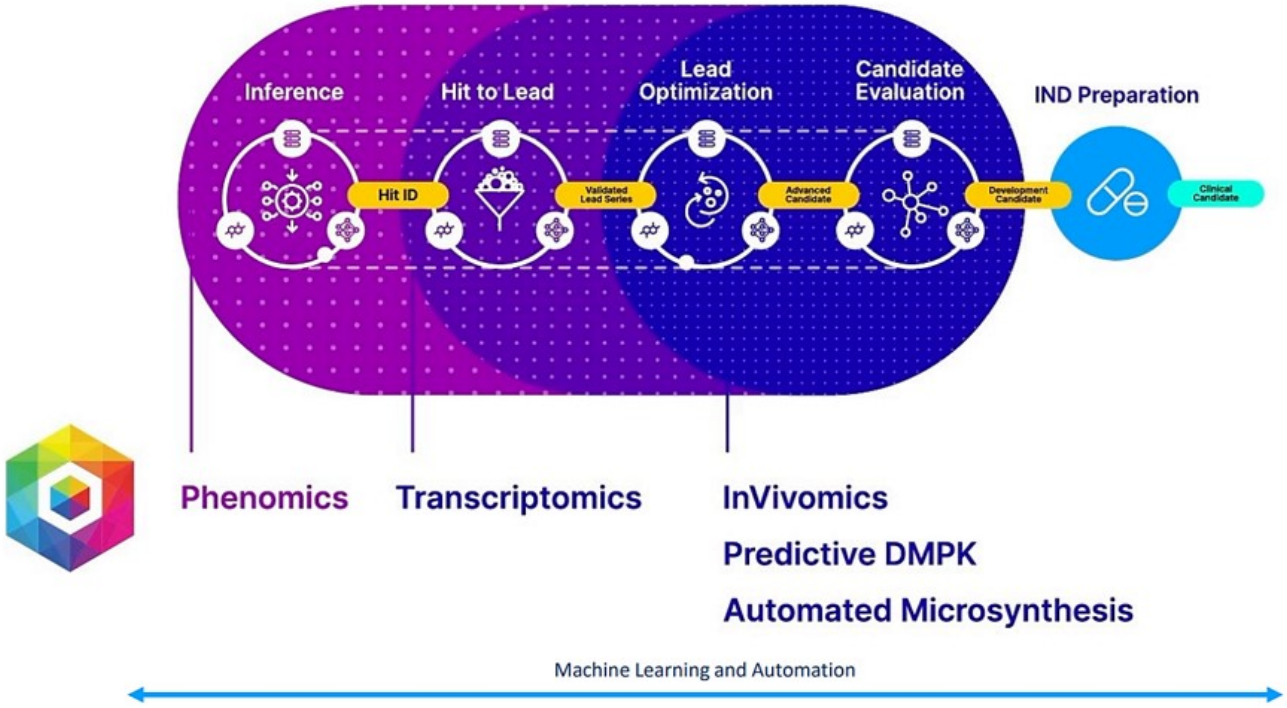


Figure 22. The Recursion OS is meant to industrialize the drug discovery and development process through multiple cycles of learning and iteration. The Recursion OS is built on biologically-native cycles of atoms and bits leveraging phenomics, transcriptomics and InVivomics to drive discovery and validation of targets and compounds, while chemically-native cycles of predictive DMPK (drug metabolism and pharmacokinetics) and automated microsynthesis drive optimization of validated hits towards development candidates suitable for human clinical trials.

Atoms

In order to create large and relatable data sets, standardization and scale are two critical requirements that can be best achieved through automation. Standardization means that the experiment is executed consistently every time, day after day, year after year - and that any deviations can be detected, tracked and quantified. It involves meticulous metadata collection, prospective/retrospective experiment execution analysis, standard results storage, quantitative quality control and more. At the same time, massive scale, with millions of experiments executed per week, requires execution of multi-step assays processed rapidly and in a tightly orchestrated manner. This combination of precise repetition, high speed and massive volumes favors relying on robots over highly trained scientists, whose time is better spent on context-specific problems. In addition, automation of high-dimensional experiment readouts at scale enables cost reductions in the large high-dimensional digital data sets that can underpin today's cutting edge opportunities in machine learning (bits).

Automation

While we do not consider ourselves to be hardware innovators, we have leveraged a significant team of automation scientists to assemble and synchronize advanced but widely-available robotic components, such as liquid dispensers, plate washers, incubation stations, automated HPLC, mass spectrometry and automated microscopy camera systems, to efficiently execute millions of experiments per week across a variety of data-rich outputs with only a small team overseeing the process at any given time. These robotic systems are modular by design and easily configurable to allow us to create complex and variable workflows. Furthermore, we have recently operationalized a fully integrated system that processes plates continuously through all steps in our primary experimental workflows. This fully integrated system is interoperable with the existing batch processing workcells but provides greater walk-away time for our operators and greater throughput in a smaller footprint.

Figure 23. Our high-throughput automation platforms make our labs look more like sophisticated manufacturing facilities than biology R&D laboratories. Our high-throughput phenomics platform (top) can execute up to 2.2 million experiments each week with high quality to enable downstream analyses. We are increasingly automating many other of our assays at Recursion.

Phenomics

At the core of the Recursion Data Universe is our proprietary cellular image dataset generated by our automated phenomics platform. While investigating various biological and chemical contexts, the readout remains constant: a fluorescent microscopy image that captures composite changes in cellular morphology; a cellular phenotype. We use our proprietary staining protocol to capture these changes in cellular morphology across our phenomic experiments. This protocol, consisting of six subcellular dyes imaged in six different channels, has been optimized to capture a wide array of biology across nearly any adherent human cell type that can be cultured and perturbed in laboratory conditions. As a result, we can capture the effects of a wide range of biological and pharmacological

phenomena of interest, including phenotypic changes induced by small molecules, genetic gain- and loss-of-function, toxins, secreted factors, cytokines, infectious agents, or any combination of the above.

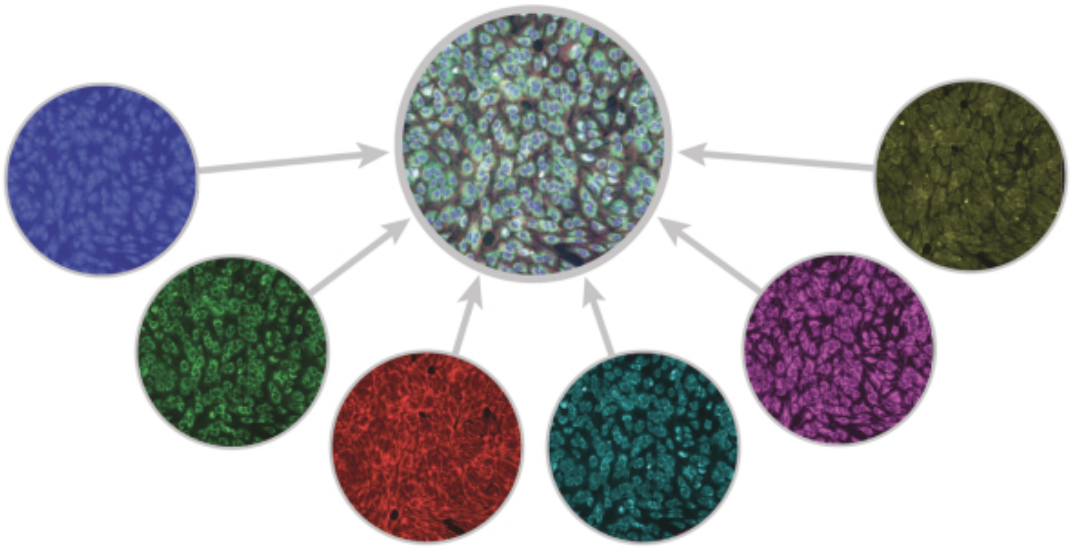


Figure 24. Our fluorescent staining protocol images multiple large cellular structures to capture a holistic assessment of cellular state. We use fluorescent dyes to stain a set of common cellular substructures that are subsequently captured using fluorescent microscopy imaging. Combined with tools from the Recursion OS, this complex and rich biological data modality can inform a host of scientific questions. The top image is a composite of the 6 channels, in HUVEC cells. It is followed by faux-colored images of each of the 6 individual channels: nuclei in blue, endoplasmic reticula in green, actin in red, nucleoli in cyan, mitochondria in magenta and Golgi apparatus in yellow. The overlap in channel content is due in part to the lack of complete spectral separation between fluorescent stains.

Cellular morphology is a holistic measure of cellular state that integrates changes from underlying layers of cell biology, including gene expression, protein production and modification and cell signaling, into a single, powerful readout. Image-based -omics can be two to four orders of magnitude more data-dense per dollar than other -omics datasets that focus on these more proximal readouts, enabling us to generate far more data per dollar spent to inform our drug discovery efforts. We currently generate up to 13.2 million images or 110 terabytes of new data to the Recursion Data Universe per week across up to 2.2 million experiments. Lastly, our phenomics approach builds on the recent explosion of powerful computer vision and ML approaches driven by the technology industry over the last decade. Modern ML tools can be trained to identify the most salient features of images without relying on any pre-selected, disease-specific subject matter expertise, even if these features are imperceptible to the human eye. Using these tools, we can capture the aggregate cellular response induced by a disease-causing perturbation or therapeutic and quantify these changes in an unbiased manner, freeing us from human bias. In contrast, traditional drug discovery relies on presumptive target hypotheses and bespoke biological signaling assays that only capture narrow, pre-determined biology and thus limit the scope of biological exploration.

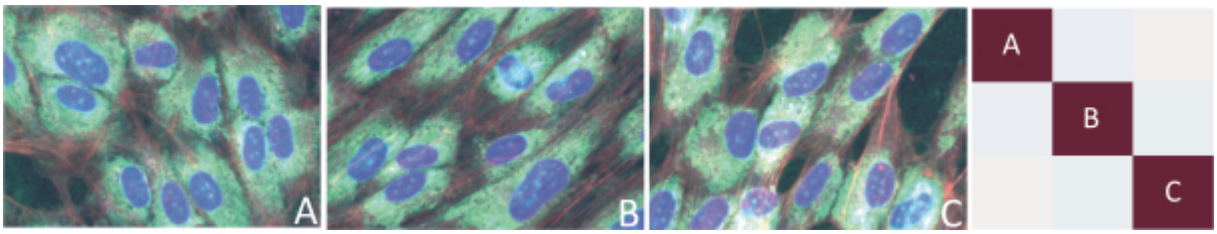


Figure 25. ML algorithms can detect cellular phenotypes that are indistinguishable to the human eye. Most morphological differences within our images are too subtle for the human eye to detect, but ML algorithms like those we deploy in our Recursion OS can readily distinguish between them. The heatmap of similarities shown here between learned embeddings of these images shows clear separation where even well-trained cell biologists or pathologists would be hard-pressed to describe consistent differences.

Our phenomics laboratory operates approximately 50 weeks each year. We have achieved this level of operational excellence by integrating state-of-the-art technology and adopting lean manufacturing principles. Furthermore, we ensure our lab generates consistent, accurate and precise data through the use of multiple systems: facility controls to prevent contamination of cells, rigorous assay validation and instrument qualification to ensure consistency and routine quality monitoring to automatically capture data and track all critical experiment specifications. Our quality system is designed such that we routinely monitor our performance to identify and implement the appropriate preventive and continuous improvement actions.

Transcriptomics

We have developed an in-house transcriptomics laboratory platform, complete with walk up automation and push button digital data processing, capable of profiling up to 15,000 samples per week covering expression of nearly 20,000 genes from samples drawn from any of our biological modules. At the end of 2022, we had leveraged our transcriptomics platform to sequence over 250,000 individual transcriptome samples to improve our biological understanding of many of our programs. In 2023, we intend to scale and automate this capacity further to enable hits identified from our phenomics platform to be confirmed using an orthogonal, transcriptomic readout as part of our Industrialized Program Generation workflows. This approach of combining high dimensional, large scale data layers from the Recursion OS, across phenomics and transcriptomics, allows us to increase our confidence around which insights to prioritize for scientist follow-up, while at the same time minimizing cost and human effort.

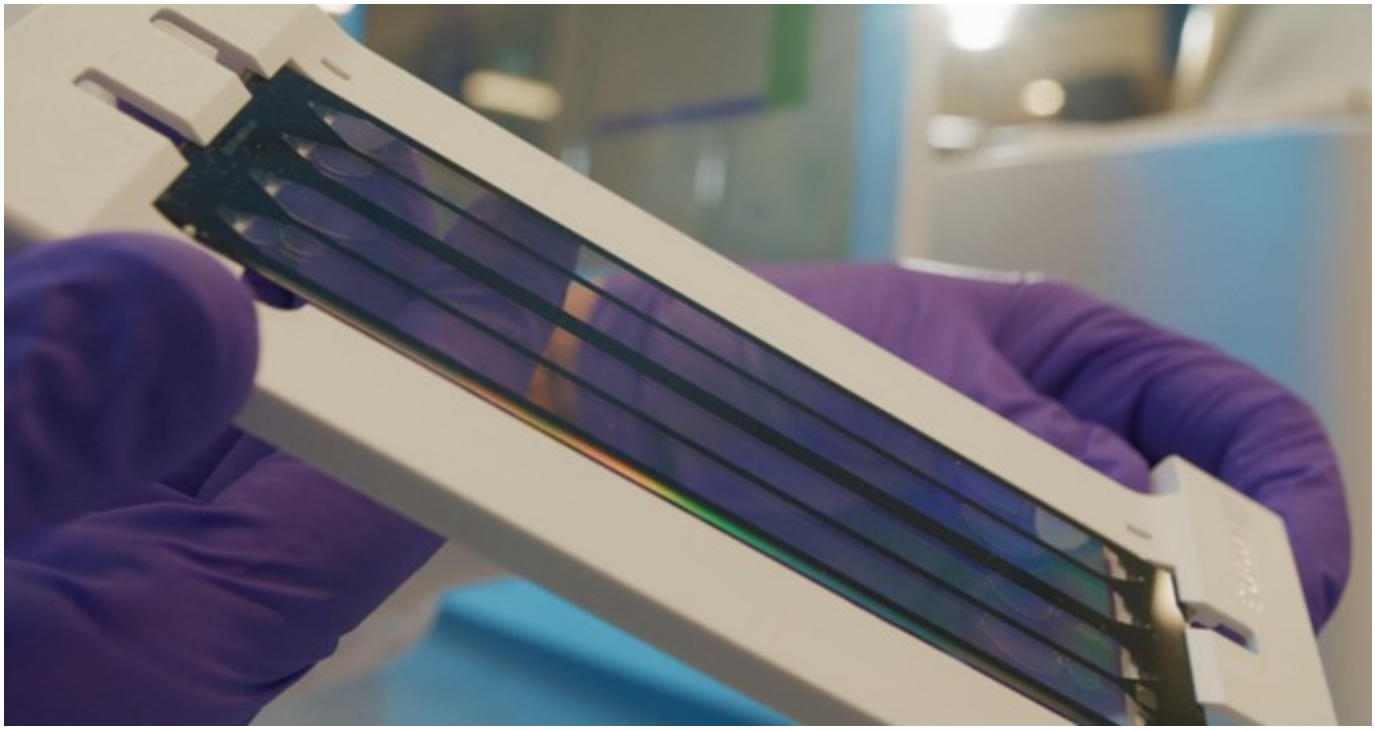


Figure 26. Recursion utilizes an adapted transcriptomic experimental process to leverage industry-standard sequencing systems at vastly reduced cost per sample.

InVivomics

In vivo studies are an important tool for providing an assessment of the efficacy and safety of a compound within the context of a complete, complex whole-organism system. Similar to other steps within the drug discovery and development process, conventional *in vivo* studies are fraught with human bias and limited in the post-study endpoints that they measure. Using our In Vivo Data Collection Infrastructure, we can collect more holistic measurements of an individual animal's behavior and physiological state using continuous video feeds and sensor technology (e.g., temperature), surveilling animals in their home environment and analyzing readouts live throughout studies in progress. By automating the process of data collection, we can amass uninterrupted data on animal behavior and physiology across days, weeks, or even months allowing for a more accurate and holistic assessment of the animal's health state across the entirety of the study. This data can subsequently be used to create more abstract representations of animal behavior, potentially allowing us to rapidly phenotype new animal

models and identify *in vivo* disease signatures that may be more relevant for assessing compound efficacy and potential liabilities.

In 2022, our Digital Vivarium consisted of 1,000 total digital cage units and we ran 21 safety (Digital Tolerability Assay) and 14 InVivomic efficacy studies involving our drug candidates. Our Digital Tolerability Assay allows us to non-invasively monitor activity in digital cages and detect meaningful differences between treated and untreated subjects that serve as an early indicator of established disease.

Figure 27. Our proprietary, scalable Smart Housing System for *in vivo* studies automatically collects and analyzes video and sensor data from all cages continuously.

ADME Data

In 2022, a total of 26 new in vitro pharmacology assays were developed and qualified for validating hits and characterizing molecules. Prioritized assays were optimized with standard operating procedures (SOPs) and quality control (QC) metrics and incorporated into workflows for compound prosecution and program advancement. In addition, three DMPK assays were developed in preparation for on-boarding to a custom-built integrated high-throughput robotic chemistry platform. As this data is generated, it is included in our data warehousing system that connects one-off experimental assays with the rest of the Recursion Data Universe. We have built an analytical laboratory equipped with state-of-the-art liquid chromatography-mass spectrometry equipment. Our analytical chemistry team supports work throughout the lifecycle of our programs, including assessing compound purity and identification for quality control, measuring compound levels in plasma and tissue samples from *in vivo* ADME and efficacy studies and biomarker identification and validation activities in support of preclinical and clinical translational efforts. To support SAR and the development of predictive models, we have invested in an automated, connected module to process multiple *in vitro* DMPK assays at scale to evaluate compounds for plasma protein binding, microsomal stability and cell permeability. Using this system we expect an operational capacity of up to 500 compounds per week.

Figure 28. Recursion's automated DMPK system allows for automated assay execution across plasma protein binding, microsomal stability and cell permeability studies at scale to advance programs while generating state-of-the-art training data for ML and AI algorithm development. The system has been designed to allow for future potential addition of additional modules into the automated workflow such as addition *in vitro* absorption, distribution, metabolism, excretion, and toxicity (ADMET) testing**.**

Cell Culture and Cell Differentiation Tools

We have built a state-of-the-art cell culture facility to consistently produce high-quality, primary mammalian cells, such as vein, kidney, lung, liver, skin and immune cell subsets, as well as stem cell-derived and cancer cell lines. Approximately 50 cell types have been onboarded to our high-throughput discovery systems, spanning primary cells, cell lines and iPSCs. In 2022, we greatly expanded our cell culture facility footprint to perform work using human induced pluripotent stem cell (hiPSC) lines. Specifically, we have developed protocols using CRISPR genome editing technologies to generate knock-out or knock-in lines. We have developed protocols to differentiate hiPSC cells into several distinct cell types using 3D and 2D differentiation methods. Furthermore, we have developed internal capabilities to characterize these cells using standardized and partly automated methods to molecularly and functionally characterize the differentiated progeny. Lastly, we have developed a scalable platform to produce 50-100 billion cells of interest per week and cryopreserve cells in assay-ready frozen format. In 2022, our team produced over 500 billion hiPSC-derived cells of interest to support various ongoing projects.

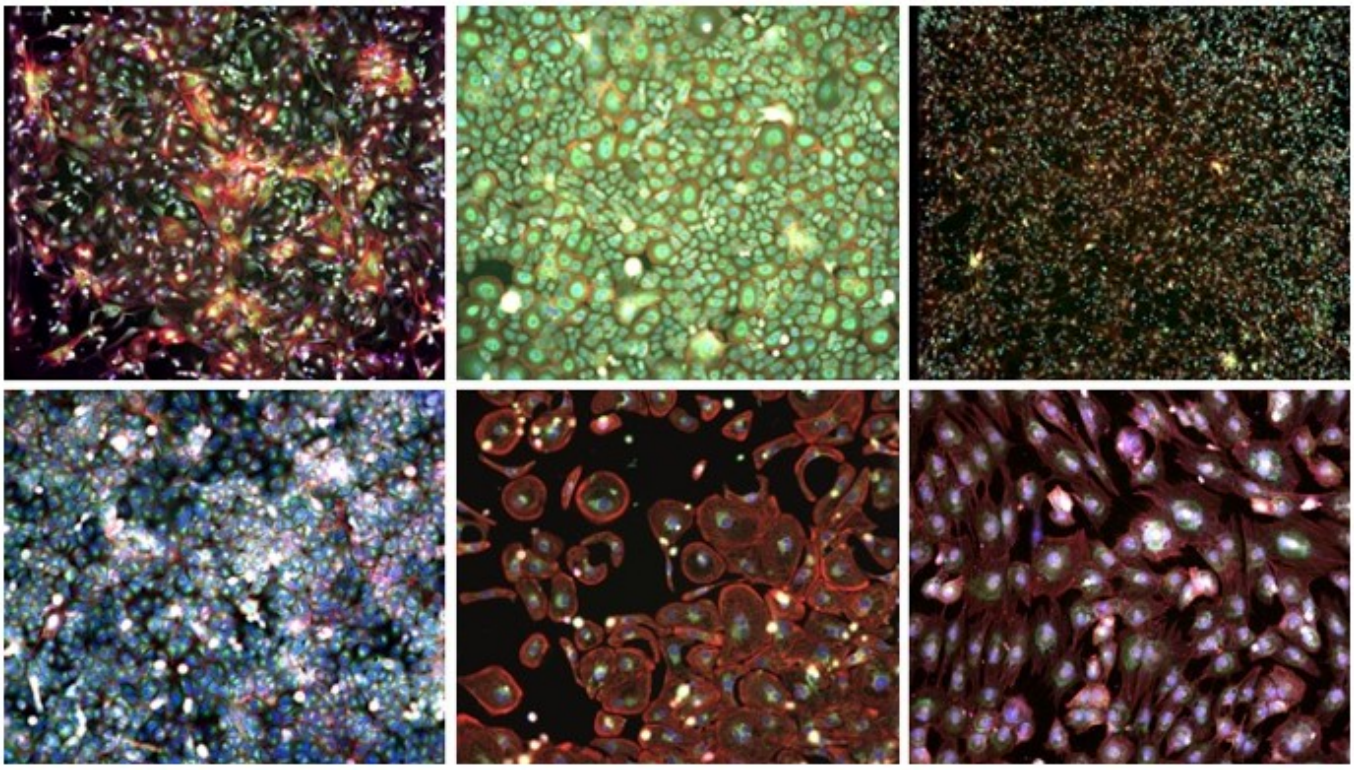


Figure 29. Various cells grown at scale for phenomics assays in-house by Recursion. From top left in clockwise order: iPSC-astrocytes, Bronchial Epithelial Cells, iPSC-neurons, dermal fibroblasts, iPSC-cardiomyocytes and U2OS cells.

Primary cells	Abbr.
Normal Human Dermal Fibroblast	*NHDF*
Renal Primary Proximal Tubule Epithelial Cells	*R-PTEC*
Human Mesenchymal Stem Cells	*hMSC*
Hepatic Progenitor Cells	*HepaRG*
Skeletal Muscle Myoblasts	*SKMM-Ad*
Human Renal Cortical Epithelial Cells	*HRCE*
Human Cardiac Microvascular Endothelial Cells	*HMVEC-C*
Human Pulmonary Artery Endothelial Cells	*HPAEC*
Human Umbilical Vein Endothelial Cells	*HUVEC*
Normal Human Epidermal Keratinocytes	*NHEK*
Macrophages (from Apheresis, Leukopacs)	*Macrophages*
Peripheral Blood Mononuclear Cells	*PBMC*
Adult Retinal Pigment Epithelial Cells	*RPE-Ad*
Human Pulmonary Artery Smooth Muscle Cells	*PASMC*
Small Airway Epithelial Cells	*SAEC*
Normal Human Bronchial Epithelial Cells	*NHBE*
Normal Human Lung Fibroblasts	*NHLF*
Normal Human Fibrocytes	*Fibrocytes*
Purified Monocytes (from Apheresis, Leukopacs)	*Monocytes*

Cell lines	Abbr.
Adenocarcinoma human alveolar basal epithelial cells	*A549*
Human Cardiomyocyte Cell Line	*AC16*
Spontaneous Immortalized Retinal Pigment Epithelial	*ARPE-19*
Lung adenocarcinoma	*Calu-3*
Immortal Human Keratinocytes	*HaCaT*
Human Liver Carcinoma	*HepG2*
Breast cancer cell line	*MCF7*
Human colon adenocarcinoma	*Caco-2*
Human primary pancreatic adenocarcinoma	*BXPC3*
Neuoroblastoma cell line	*SH-SY5Y*
Monocytic cell line	*THP-1*
Human bone osteocarcoma epithelial cells	*U2OS*
Mammary gland/breast; derived from metastatic site	*AU565*
Human Hepatocellular Carcinoma	*Huh7*
Breast cancer cell line	MDA-MB-2
Hepatic Stellate	*LX-2*

Cell lines
Proprietary cell line from partner – 1
Proprietary cell line from partner – 2
Proprietary cell line from partner – 3
Proprietary cell line from partner – 4
Proprietary cell line from partner – 5
Proprietary cell line from partner – 6
Proprietary cell line from partner – 7

iPSC-derived cell types
iPSC-derived cardiomyocytes
iPSC-derived neurons
iPSC-derived astrocytes
Confidential neural iPSC type – 1
Confidential neural iPSC type – 2
Confidential neural iPSC type – 3

Table 2. Numerous and diverse cell types onboarded to our platform enable us to broadly interrogate biology. Approximately 50 human cell types have been onboarded to our high-throughput discovery systems, spanning primary cells, cell lines and cells derived from iPSCs.

We have on-boarded innovations including large scale, microcarrier-based, suspension culture systems to reduce footprint and increase growth surface for additional scale. We will continue to onboard additional cutting-edge innovations to scale our work further. We maintain a strong track record of quality and consistency in our cell culture facility by implementing facility design and control systems that are uncommon among technology-enabled drug discovery companies. These designs and controls include rigorous process validation and documentation, a personnel training and qualification program and routine quality monitoring. Our quality system is designed such that we routinely monitor our performance to identify and implement the appropriate preventive and continuous improvement actions.

Figure 30. Recursion's recent facilities expansion has created room for further growth of its specialized high-scale precision tissue culture of diverse and complex human cell types.

Chemistry Tools

Our in-house chemistry tools include physical compound collections, state-of-the-art compound storage and handling infrastructure and high-precision analytical equipment. Our experienced team of chemists use this equipment and a network of reputable CROs to advance discovery efforts and deliver differentiated drug candidates.

We have a total in-house chemical library of approximately 1.7 million small molecules from a combination of commercial, semi-proprietary and proprietary and partner sources and use this library to identify chemical starting points for discovery campaigns. Over 1 million of these compounds reside within the Recursion's novel chemical entity library (i.e. these are not compounds belonging to our big-pharma partners), curated by our medicinal chemists and designed for highly druggable chemical properties while avoiding undesirable chemical properties, such as poor solubility and permeability. While this library has been constructed to maximize chemical diversity, we have ensured that several analogs of many compound cores are included to help identify emergent SAR for early hits and enable rapid hit expansion into readily available analogs. Additionally, we have curated a selection of approximately 9,000 clinical-stage and preclinical compounds from public forums or filings, covering approximately 1,000 unique mechanisms of action, for which an abundance of existing data and annotations currently exist. These well-characterized molecules are frequently used as tool compounds within our work and may be advanced as therapeutic programs if the Recursion OS reveals unique and previously undisclosed biological activity. Approximately 500,000 compounds are from Bayer's NCE library, for which we do not have structural information.

We believe that the scale of our total in-house chemical library is comparable to the scale of chemical libraries curated by some large pharmaceutical companies. We plan to substantially increase the size and diversity of our NCE library over the coming years through a combination of partnerships and investments in automated chemical microsynthesis in order to more fully understand novel biological and chemical relationships. Furthermore, we envision that an automated chemical microsynthesis system would integrate with existing sample management, synthesis and purification capabilities. With the completion of our recent wet-laboratory expansion, we now have the potential capability to store up to more than 60 million compounds (in plated formats) onsite.

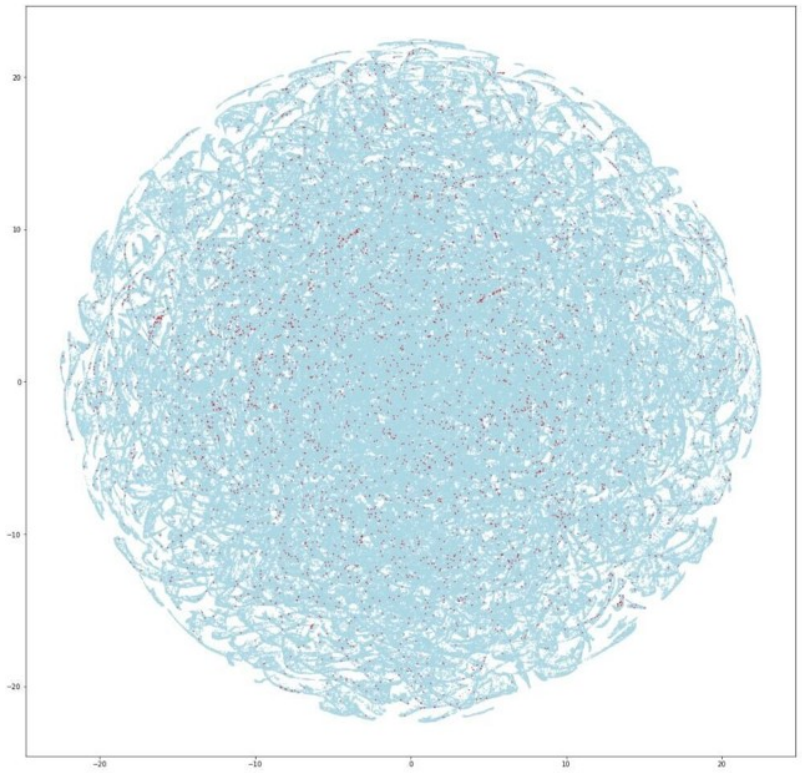


Figure 31. Our internal chemical libraries are highly diverse. This visualization of the structural diversity of approximately 1,000,000 of our in-house small molecules, where compounds are clustered based on descriptors using t-distributed stochastic neighbor embedding, demonstrates the evenly distributed and diverse nature of our

compounds. This diversity increases the probability that we capture useful biochemical interactions across a broad range of biology. Note that red dots indicate known chemical entities.

Bits

Processing and Data Storage Infrastructure
The Recursion OS is built on top of a core technology stack that is highly scalable and flexible. We have adopted a hybrid-cloud strategy, leveraging the benefits of both public and private cloud infrastructure depending on the context and our needs:

- *Public Cloud.* The public cloud is our default choice for production workloads and applications. The scale, elasticity of compute and storage and economies of scale offered by public cloud computing providers enable us to cost-effectively execute our strategy.

- *Private Cloud.* The private cloud, or edge computing, is used to integrate our lab data flows, including the upload of data to the public cloud.

- *BioHive-1 and High Performance Computing in a Private Cloud.* Much of our deep learning model training and research happens with our world-class supercomputer named BioHive-1. BioHive-1 is built on NVIDIA's DGX SuperPod architecture and is on the TOP500 list of the world's most powerful supercomputers as of November 2022.

Figure 32. We believe BioHive-1 is one of the most powerful supercomputers dedicated wholly to drug discovery for a single company. BioHive-1 consists of 40 NVIDIA DGX A100 640GB nodes, which further expands our capability to rapidly improve ML models.

Enabling Software Tools
Alongside our infrastructure, we have built a suite of tools that empower our scientists to accurately design, execute and verify the quality of up to 2.2 million diverse experiments each week. Our tools, which take into account real-time onsite reagent supplies, enable consistent control strategies and design standards that make each week's data relatable across time. Additionally, these tools automatically flag experiments or processes which miss quality

requirements or stall at some point in the process and notify the appropriate Recursionaut, providing them the tooling needed for manual intervention. Elements of our Enabling Software Tool suite include:

- *Experiment Design.* The Laboratory Information Management System (LIMS) tracks reagent inventory and enables compound selection from our library. Custom applications design large experimental layouts consisting of millions of perturbation conditions with appropriate randomization and control strategies. Proprietary algorithms design CRISPR gene editing guide RNAs for maximal knockout efficiency.

- *Experiment Execution and QC.* This suite of tools and dashboards automatically executes and continuously monitors experimental protocols to ensure reliable experiment execution. Custom web applications enable our Recursion scientists to view and interact with microscopy images and associated metadata from our phenomics platform for systematic QC at both the image- and plate-level.

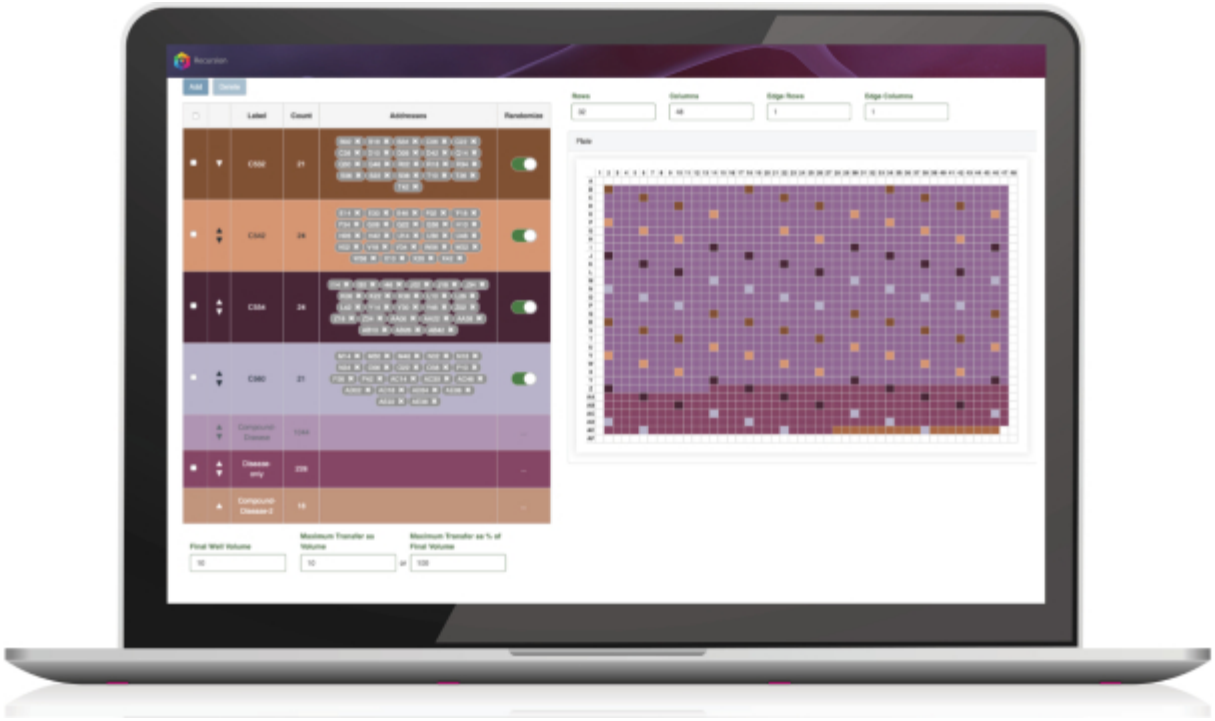


Figure 33. Software tools allow our scientists to design massive experiments while complying with our complex proprietary rules for layout. This graphical interface facilitates experiment plate layout specification for experiments that can span more than 1,000 1536-well plates while ensuring the relatability and appropriate design fit for the purpose of training machine-learning algorithms.

The Recursion Data Universe

The Recursion Data Universe comprises over 21 petabytes of highly relatable biological and chemical data, including: phenomics, transcriptomics, InVivomics, ADMET assays and bespoke bioassay data. These different data modalities are highly complementary as we advance drug discovery and development programs. Phenomic data provides a broad, foundational layer of biological and chemical data, while other datasets provide greater translational insights.

Data Processing Tools

To understand, explore and relate new or existing data in the Recursion Data Universe, we must normalize, transform and analyze the data. Our tools in this layer manage the streaming of our data at scale to the appropriate public and private cloud, the transformation of our images into mathematical representations through our in-house proprietary convolutional neural networks and the standard and custom analyses performed on our data as parameterized and requested by users. Anomalies are flagged to the team for fast resolution.

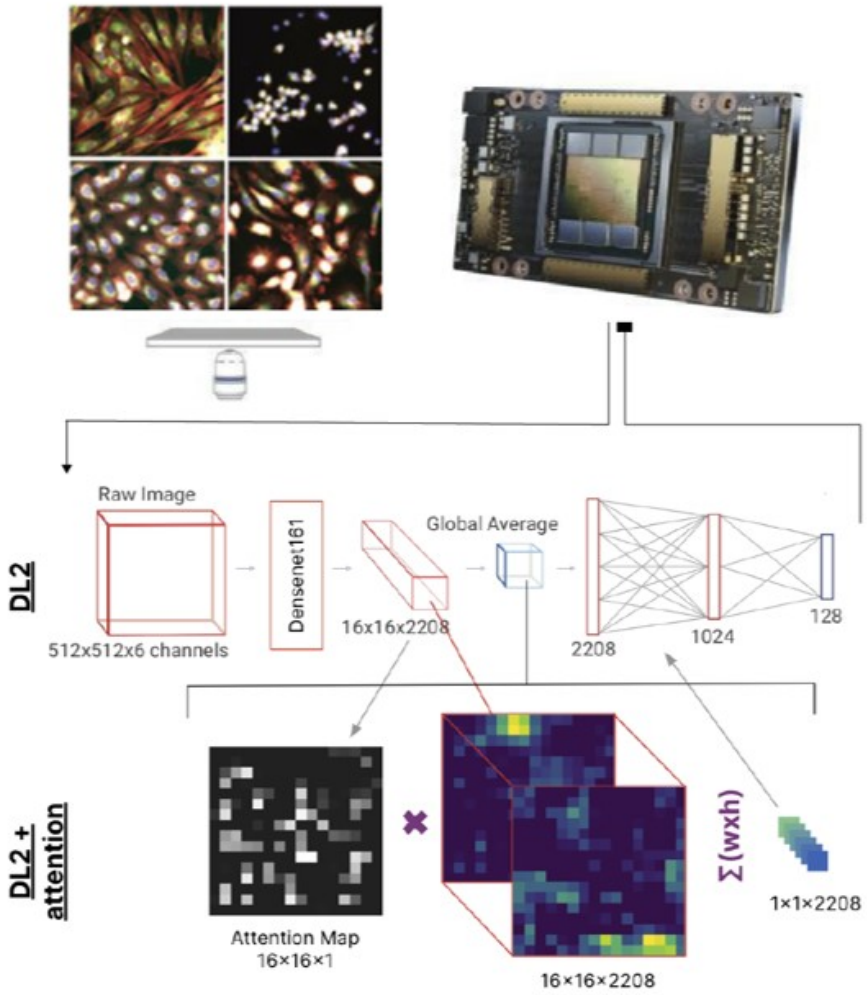


Figure 34. We convert raw images into a list of features that allows cross-image comparison. Microscopy images are run through a deep convolutional network with an architecture similar to the one above. The network is trained on our phenomics data so that, layer by layer, each image is transformed into a list of 128 features representing the cellular biology in the image. The resulting features power downstream analysis.

Biological and Chemical Activity Assessment

Our activity assessment tools enable us to evaluate the robustness of diverse disease model phenotypes and subsequently measure the activity of potential therapeutic agents within these disease models. These tools are target-agnostic by design, explore cellular biology holistically and enable the exploration of many disease models and potential therapeutics simultaneously with no significant alteration to the core platform.

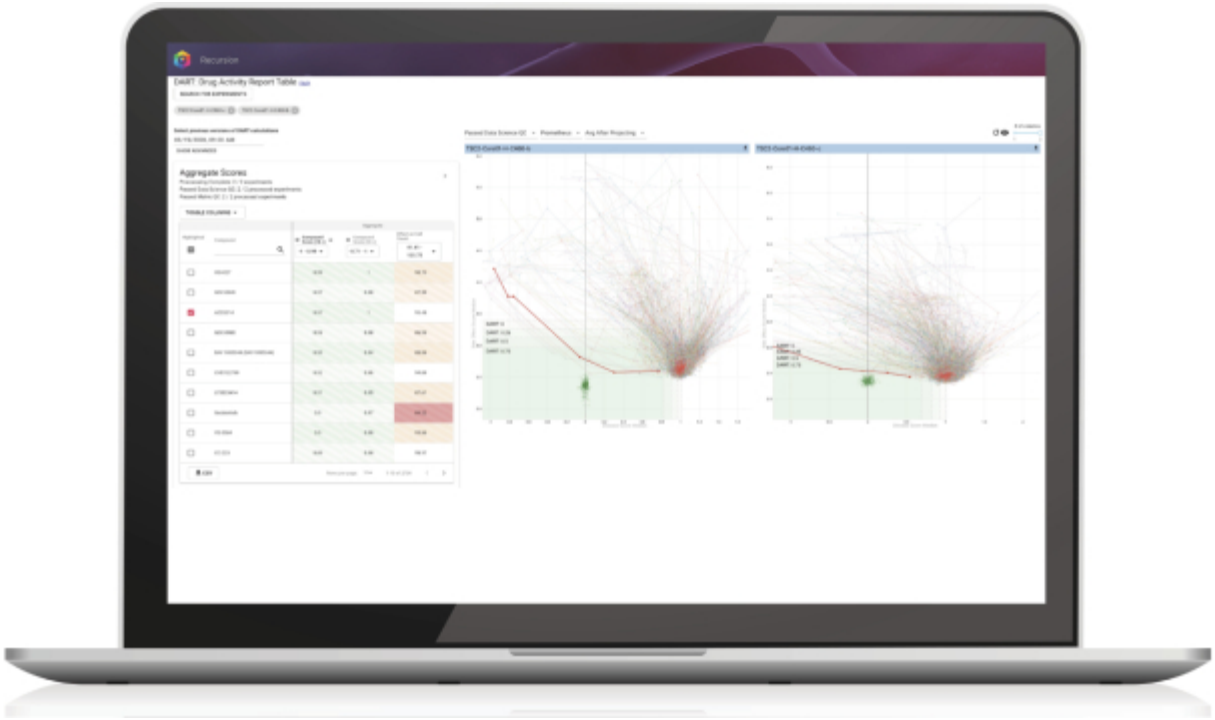


Figure 35. Our proprietary user interface enables our scientists to rapidly identify compounds with maximum positive effect on a disease phenotype while minimizing side effects. The results from our empirical hit identification screens allow drug discovery teams to rapidly explore results and focus on compounds that are believed to be the most promising.

Mapping and Navigating to Drive Outcomes

Our mapping and navigating tools are a rapidly growing suite of in-house software applications designed to process and translate data from the Recursion Data Universe into actionable insights for our research and development teams to accelerate programs which fall into two categories: (i) insights into underlying biology and early therapeutic starting points and (ii) insights into the specific chemical substrate of interest.

Recursion's phenomaps are a massive database of relationships amongst biological and chemical perturbations inferred *in silico* based on phenotypic similarity. To date, we have built phenomaps consisting of whole genome CRISPR genetic knockouts as well as a large number of small and large molecule-perturbations at multiple concentrations in multiple human cell types. Collectively, these phenomaps contain over 3 trillion inferred biological and chemical relationships generated solely by ML tools without human bias. Our ability to query the relationships between any perturbations in our phenomaps changes drug discovery from an iterative trial-and-error process into a computationally-driven search problem. Furthermore, our teams use phenomaps to understand the mechanisms underpinning disease and how to manipulate them. For example, we can query the similarity (or dissimilarity) created by the CRISPR-engineered knockout of any two genes from our whole-genome arrayed CRISPR screen, revealing both known and novel drug targets never before described in scientific literature. We can also query the similarity between any small molecule in our library and all genetic knockouts, uncovering a compound's mechanism of action and, most importantly, can infer the activity of such molecules against high-value drug targets. Using automated workflows, we can iteratively add phenotypes for new chemical compounds to our phenomaps on a weekly cadence, further expanding the diversity of chemical space that we can explore and allowing us to optimize individual program chemistry.

The computational methods enabling phenomaps allow us to turn the output of each experiment from "data exhaust" into a data engine. Unlike a traditional high-throughput screen, in which many compounds are profiled for their activity against a single target at a time, in our mapping and navigating approach, every compound we profile is analyzed not for its activity against a single target, but for its inferred activity against *all possible targets* in our arrayed CRISPR library, as well as its similarity to every compound we have run before in its phenomap – producing a super-linear growth in biological relationships as we conduct experiments.

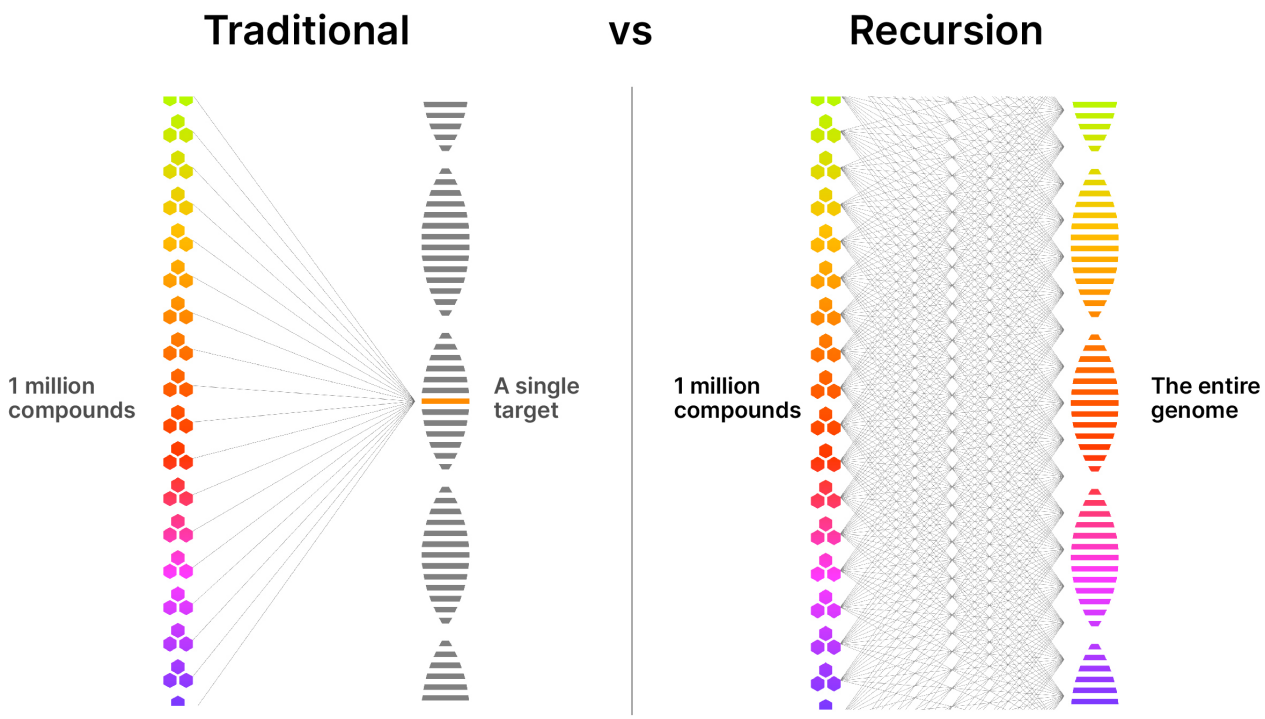


Figure 36. Mapping and navigating enables simultaneous genome-wide screening. Traditional pharma high-throughput screening methods (left) screen thousands to millions of compounds simultaneously against single targets, deriving information about compound activity on that single target, but little or no information about other targets. Recursion's mapping and navigating approach (right) enables us, in a single experiment, to infer the activity of a compound against all potential targets in our arrayed CRISPR knockout screen.

We have invested to create processing pipelines and intuitive user interfaces of our phenomaps that help our scientists navigate the breadth of these relationships and elucidate which insights are most promising. Our flagship user interface, the *MapApp*, enables users to mine relationships using several complementary visualizations, statistical measurements and data layers including known information about compounds or known relationships between genes and diseases to rapidly distinguish novel insights. We are looking to augment this information further to include predicted data related to physicochemical and structural properties, synthesizable compounds not yet tested on our platform, ADMET assays and *in vivo* experiments.

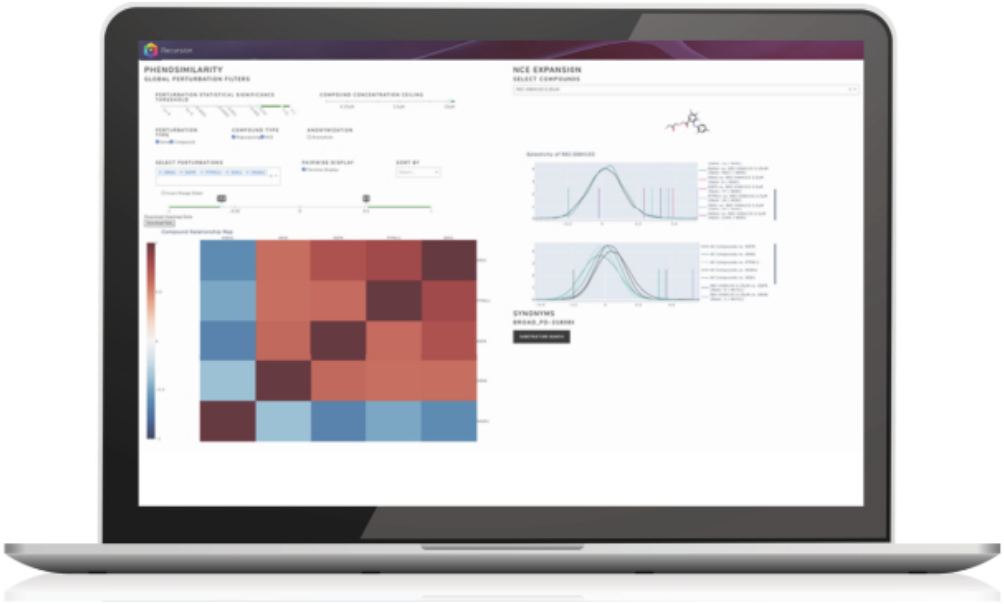


Figure 37. The MapApp allows our team to simultaneously view multiple relationships between genes and compounds. This proprietary software application enables us to rapidly explore inferred biological and chemical relationships in order to: (i) discover targets, (ii) predict active hits, (iii) optimize for similar or dissimilar relationships and (iv) predict mechanisms of action.

Digital Chemistry Platform

The Digital Chemistry Platform is a core part of Recursion's software ecosystem, comprising an integrated suite of proprietary and commercial tools, enabling our medicinal and computational chemistry team to scalably advance programs from hit to candidate. Key components of the digital chemistry platform include: (i) unified access to and visualization of chemical structures and assay data (including internally-generated high or low-dimensional assay data, externally-generated *in vitro* or *in vivo* data and DMPK data); (ii) integrated predictive modeling, chemical search and computational chemistry capabilities; and (iii) molecular design and collaboration. Predictive modeling available in the Digital Chemistry Platform includes both commercially available predictive tools as well as internally developed deep-learning based methods and is applied to both potency and ADMET optimization. We intend to further invest in predictive and digital chemistry capabilities across three domains: (i) chemistry-centric ML model development, (ii) chemistry-centric data generation and (iii) digital and physical chemistry process development to more efficiently drive the Design-Make-Test-Analyze cycle of chemistry optimization, including the roll-out of industrialized workflows that integrate chemistry and biological assay steps autonomously.

InVivomics Research Suite

Our InVivomics Research Suite is a proprietary collection of software tools that enable scientists to monitor and analyze behavioral and physiological data from ongoing and completed *in vivo* studies. Study data for individual animals or aggregated study groups can be explored in near real-time, better ensuring that the final study data will be reproducible and interpretable and allowing researchers to prepare for follow-on activities prior to final study completion. Continuous monitoring allows researchers to similarly flag unexpected effects that may arise from animal handling, dosing, or compound liabilities and modify or terminate a study as needed. At the end of the study, graphical and tabular data are automatically generated to aid in the evaluation of study results and the design of follow-up *in vivo* studies.

Additionally, continuous video feeds and our proprietary animal cages enable us to amass uninterrupted data on animal behavior and physiology across days, weeks, or even months. ML tools within our InVivomics Research Suite can use this data to create more comprehensive representations of animal behavior, allowing us to rapidly phenotype new animal models and identify *in vivo* disease signatures that may be more relevant for assessing potential compound safety and efficacy attributes.

Figure 38. The InVivomics Research Suite allows our team to track and analyze a broad range of data in ongoing animal studies. These tools enable our *in vivo* scientists to monitor individual subjects through near real-time video feed and data generation and review study level data.

Bridging from Recursion OS Insights to Program Advancement

The Recursion OS is an integrated, multi-faceted system for iteratively *mapping* and *navigating* massive biological and chemical datasets that contain trillions of inferred relationships between disease-causative perturbations and potentially therapeutic compounds. Individually, components of the Recursion OS can be used to build or interrogate one piece of the drug discovery value chain. Collectively, the components of the Recursion OS can be joined together to identify, validate and advance a broad portfolio of novel therapeutic programs quickly, cost-effectively and with minimal human intervention and bias - industrializing drug discovery. We use standardized, automated workflows to identify programs and advance them through key stages of the drug discovery and development pipeline as in Figure 22.

Step 1: Inference
Using our mapping tools and infrastructure, we have profiled diverse biological and pharmacological perturbations, including CRISPR gene knockouts, soluble factors, bacterial toxins and small molecules. Recursion's phenomaps contain trillions of inferred relationships amongst these perturbations that have been inferred *in silico* based on phenotypic similarity.

In order to identify novel program starting points, it is important that the Recursion OS accurately predict relationships across diverse domains of biology. To confirm the accuracy of our predictions, we have demonstrated that our approach recapitulates hundreds of well-known biological pathways. In the example below, we illustrate our phenomap predictions for approximately 150 gene knockouts from canonical biological pathways and known agonists or antagonists of these same pathways. By comparing the phenotypes induced by these perturbations to one another using our Recursion OS, we observed that each perturbation creates a unique phenotype and phenotypes form clusters that recapitulate well-understood biological pathways, including genes involved in Bcl-2 signaling, NF-KB signaling, RAS signaling, JAK/STAT signaling and TGFß signaling.

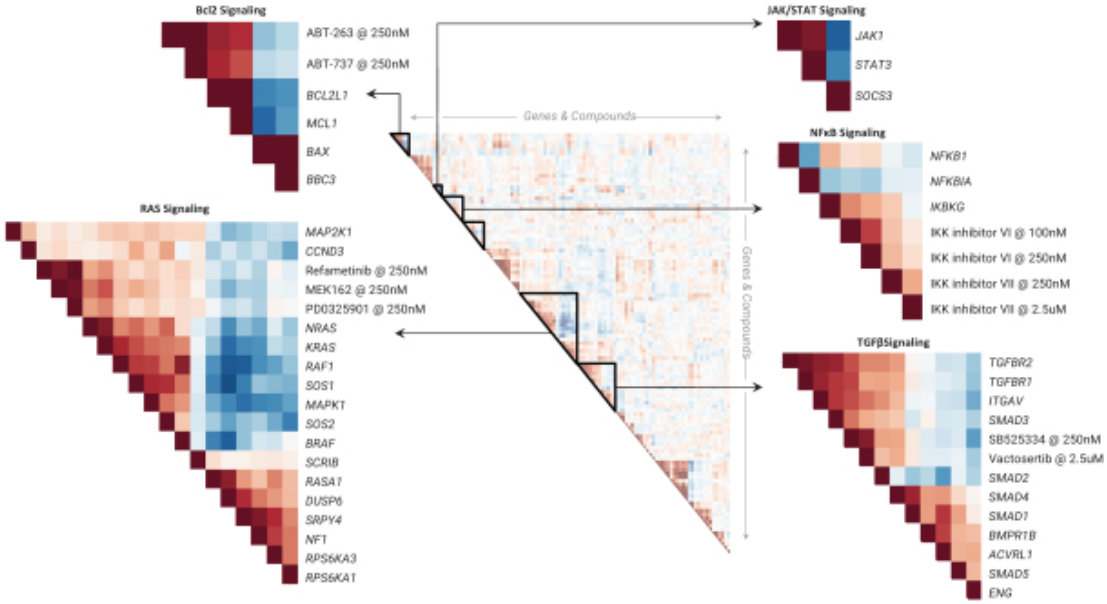


Figure 39. Inferred relationships between genes and small molecules recapitulate well known biology. Above, we show a visualization of well studied genes and small molecules. Increasingly dark shades of red reflect an increasing degree of phenotypic similarity. Increasingly dark shades of blue reflect an increasing degree of phenotypic oppositeness or anti-similarity (which often suggests inhibitory relationships between genes, though possibly distal).

These findings validate the accuracy of our phenomap relationships and suggest that we can use our approach to identify new drug targets or early therapeutic starting points. We begin *de novo* programs by searching our phenomaps with respect to (i) well-known biological pathways or (ii) human genetics data and identifying novel gene targets or compound (e.g., small molecule) perturbations that are inferred to have a therapeutic effect above statistically-defined thresholds.

Step 2: Hit Identification
Promising compounds are automatically advanced in our Industrialized Program Generation workflows for further evaluation. First, we physically test candidate compounds in multiple concentrations and replicates using our phenomics assay, including directly in the disease-relevant background, to confirm our predictions. These experiments are designed to confirm predicted relationships of interest from our phenomaps and can be completed rapidly.

Compounds that advance from our phenomics platform are evaluated in one or more high-dimensional, *in vitro* orthogonal assays to confirm the relationship we observed from our phenomics platform. Today, our transcriptomics platform is used as the primary orthogonal assay within our automated workflows. However, proteomics or metabolomics assays may also be used in the future. Compounds, and related compound series, that confirm and validate in one or more orthogonal assays may be advanced to more bespoke and low-throughput assays as deemed necessary by our scientific teams.

Throughout the early stages of this process, we have intentionally limited human intervention in order to (i) minimize bias and (ii) minimize our dependency on scientists to evaluate and analyze voluminous data packages. Rather, program advancement is automatically triggered if compounds meet pre-specified statistical thresholds. The decision to automate the decision making process, in addition to automating physical experimentation, allows us to advance large numbers of programs simultaneously and efficiently. Data from each assay is summarized in reports which can be reviewed by our scientific teams to assist with program prioritization and advancement as needed.

Step 3: Hit to Lead
After compounds have been empirically confirmed in multiple orthogonal assays, our medicinal chemists work to optimize early chemical starting points into drug-like molecules using our Industrialized Hit-to-Lead (iH2L) workflows. One critical step in this process is to further understand the mechanism by which compounds are demonstrating a therapeutic effect. One way in which our chemists can begin this process, is by using our mapping

and navigating software tools to compare the phenotype of a candidate molecule to the phenotypes of (i) approximately 9,000 well-characterized clinical-stage and preclinical compounds in our library or (ii) tens of thousands of CRISPR-engineered genetic knockouts in our phenomaps. Novel chemical entities that cluster with annotated compounds and genetic landmarks may share similar mechanistic functions. The below data demonstrates the power of our embeddings to accurately cluster diverse compounds with similar mechanisms of action.

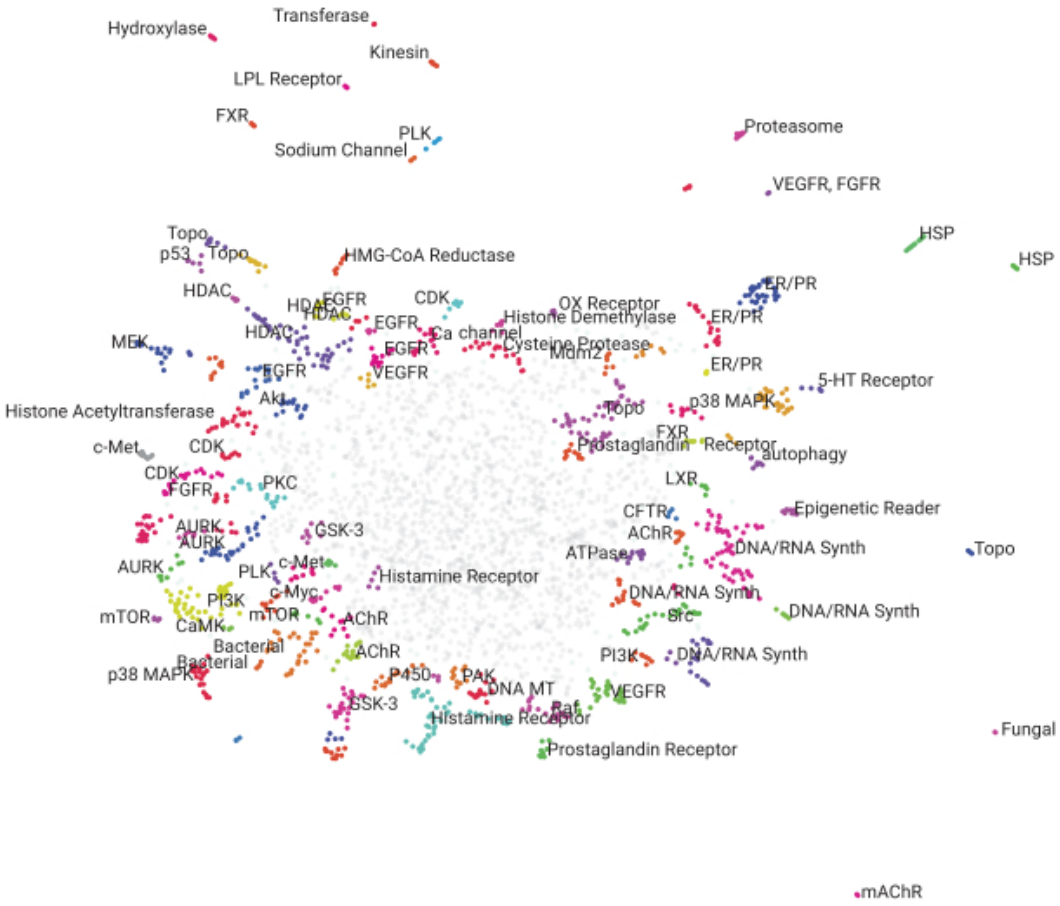


Figure 40. Compounds with the same mechanism cluster together phenotypically. Each dot represents a different compound. Compounds that are phenotypically similar reside closer together and recapitulate mechanistic similarities.

Additionally, while a compound may be active in our screens, most early therapeutic starting points have low potency and undesirable drug properties and must be optimized before advancing into *in vivo* and, ultimately, human studies. During the hit-to-lead process, our chemists may leverage our phenomics platform to repeatedly measure changes in compound potency and selectivity that result from changes in compound structure. Our chemists also take advantage of our Digital Chemistry Platform to conduct chemical expansion exercises across more than 1 trillion molecules in our *in silico* library which we can then order for further profiling.

Because this process may extend over several months, it is critical that our platform assay is highly stable over time. To ensure this stability, we test that our assay can reproduce specific measures of compound activity, such as a compound's EC50 (the concentration of a drug that gives half-maximal response) or max-effect (the maximal response), in experiments run weeks, or even months, apart. In the example below, we ran four separate experiments of a HIF2a inhibitor known to be active against our VHL disease model over a period of three months. Dose-response curves across all four runs demonstrate a high degree of overlap, including highly similar EC50s and max-effect. Our calculated minimum significance ratio from this study, a common industry metric of *in vitro*

assay reproducibility over time, is 1.076, which is highly robust by industry benchmarks[12]. These results demonstrate the stability of our assay and the ability to use our phenomic platform as a basis for SAR.

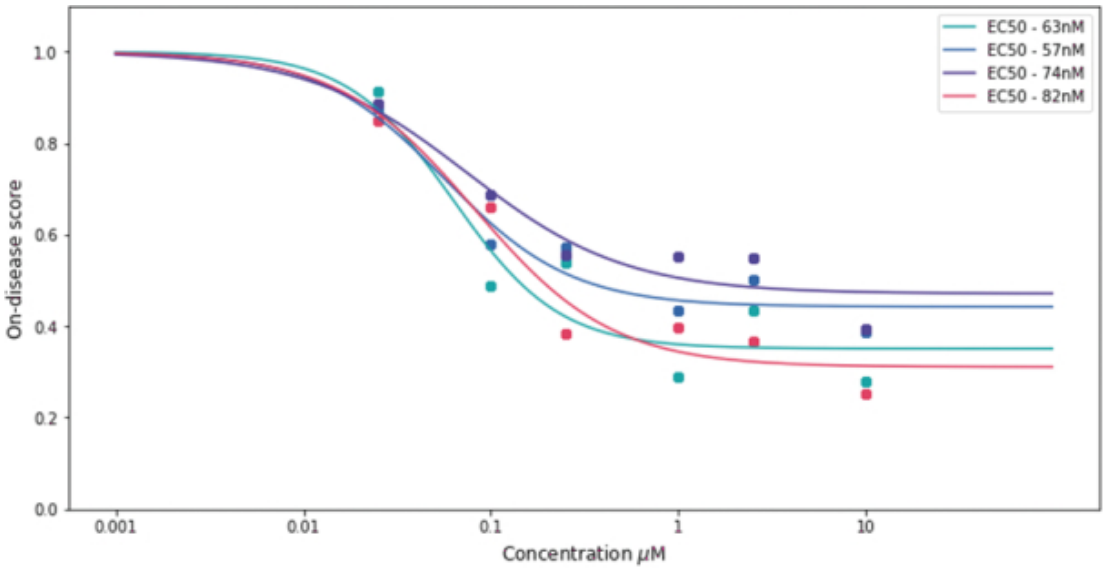


Figure 41. Compound activity is reproducible across experimental runs. Dose response curves from multiple runs of the same tool compound against our disease model for VHL loss-of-function show high consistency with a minimum significance ratio of 1.076.

Step 4: Candidate Evaluation and IND Preparation

Prior to nominating a clinical candidate, optimized molecules are evaluated in more complex and disease-relevant *in vivo* models using our InVivomics platform. This process consists of two steps. Firstly, compounds are tested in Digital Tolerability studies, during which we non-invasively monitor subject activity to confirm the most promising compound (e.g. within a series) and identify an optimal dosage. Secondly, we run efficacy studies using our proprietary cage hardware, including continuous sensors and high-resolution video systems, to assess compound effects. Readouts are reported in real time rather than at the end of a study enabling scientists to make informed and impactful decisions regarding study continuation, modification, or termination as well as program advancement.

After optimizing therapeutic drug candidates, we select those compounds that have the best chemical properties to advance through development and ultimately clinical trials. We have built the internal capabilities to drive clinical candidates through IND-enabling studies, regulatory approval processes and human clinical studies. Collectively, members of our team have been involved in hundreds of clinical trials. Additionally, we work closely with a team of external consultants across regulatory, CMC and clinical development to ensure execution success. In the future, we envision that we will evolve the Recursion OS to incorporate data and techniques that improve our ability to execute clinical programs at scale, including population-scale genomics data, industrialized biomarker development and precision medicine tools in order to identify patients for which a potential therapeutic would be beneficial.

The End Result - A Pipeline Designed to Move Failure Early in the Process

Late-stage clinical failures are the primary driver of costs in today's pharmaceutical R&D model, due in part to inherent uncertainty in the clinical development and regulatory process. Reducing the rate of costly, late-stage failures and accelerating the timeline from hit to a clinical candidate would create a more sustainable R&D model. To achieve this more sustainable model, we believe that in its ideal state a drug discovery funnel would morph from the being shaped like the letter 'V' to being shaped like the letter 'T,' where a broad set of possible therapeutics could be narrowed rapidly to the best candidate, which would advance through subsequent steps of the process quickly and with no attrition.

[12] Haas JV, Eastwood BJ, Iversen PW, et al. (Updated 2017). Minimum Significant Ratio – A Statistic to Assess Assay Variability. *Assay Guidance Manual [Internet]*.

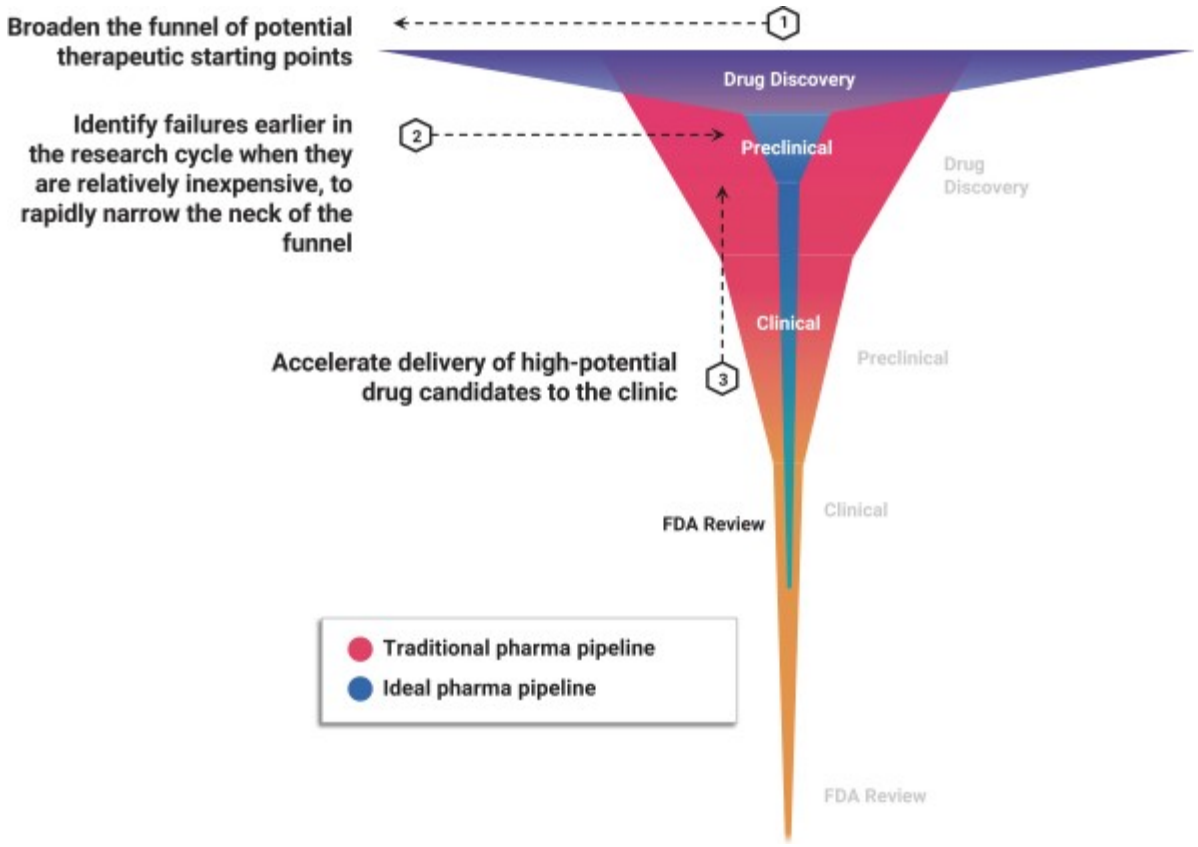


Figure 42. Reshaping the drug discovery funnel. Recursion's goal is to leverage technology to reshape the typical drug discovery funnel towards its ideal state by moving failure as early as possible to rapidly narrowing the funnel into programs with the highest probability of success.

We believe we have made progress in reshaping the traditional drug discovery funnel in the following ways:

- *Broaden the funnel of therapeutic starting points.* Our flexible and scalable mapping tools and Infrastructure enable us to infer trillions of relationships between human cellular disease models and therapeutic candidates based on real empirical data from our own wet-labs, 'widening the neck' of the discovery funnel beyond hypothesized and therefore human-biased targets.

- *Identify failures earlier when they are relatively inexpensive.* Our proprietary navigation tools enable us to explore our massive biological and chemical datasets to validate more and varied hypotheses rapidly. While this strategy results in an increase in early stage attrition, the system is designed to rapidly prioritize programs with a higher likelihood of downstream success because they have been explored in the context of high-dimensional, systems-biology data. Over time, and as our OS improves, we expect that moving failure earlier in the pipeline will result in an overall lower cost of drug development.

- *Accelerate delivery of high-potential drug candidates to the clinic.* The Recursion OS contains a suite of digital chemistry tools that enable highly efficient exploration of chemical space, including 3D virtual screening as well as translational tools that improve the robustness and utility of *in vivo* studies.

We have leveraged our Recursion OS to explore more than 170 disease programs to a depth sufficient to quantify improvements in the time, cost and anticipated likelihoods of program success by stage compared to the traditional drug discovery paradigm. We believe that future iterations of the Recursion OS will enable greater improvements. Ultimately, we look to minimize the total dollar-weighted failure while maximizing the likelihood of success.

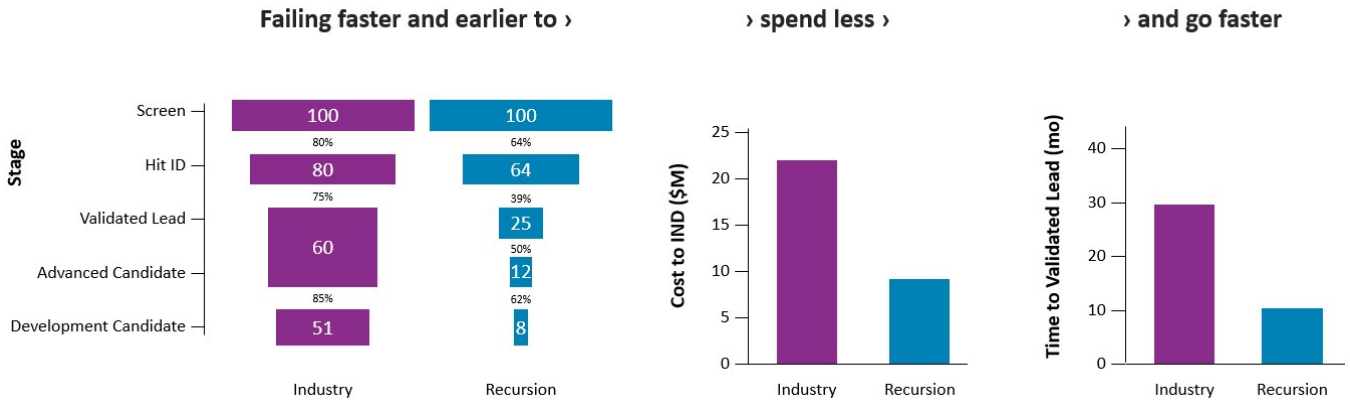


Figure 43. The trajectory of our drug discovery funnel mirrors the 'ideal' pharmaceutical drug discovery funnel. We believe that, compared to industry averages, our approach allows us to: (i) identify low-viability programs earlier in the research cycle, (ii) spend less per program and (iii) rapidly advance programs to a validated lead. Data shown are the averages of all our programs from 2017 through 2022.

Over time, we believe continued successes and improvements in any or all of the dimensions highlighted above will improve overall R&D productivity, allowing us to address targeted patient populations that may otherwise not be commercially viable using traditional drug discovery approaches. Furthermore, we have seen our unbiased approach lead us to novel targets which we believe could enable us to outperform others in highly competitive disease areas where multiple parties often simultaneously pursue a limited number of similar target hypotheses. These advantages potentially significantly expand the total addressable market for our technology. However, the process of clinical development is inherently uncertain, and there can be no guarantee that we will achieve shorter development timelines with future product candidates.

Investment Roadmap

There are three key factors that differentiate Recursion from the vast majority of other TechBio companies. First, Recursion integrates both wet-lab and dry-lab capabilities in-house in order to create virtuous cycles of learning and iteration. Second, Recursion already functions at significant scale (e.g., five clinical-stage programs, an exciting preclinical pipeline, and two of the largest discovery partnerships in the industry with Roche/Genentech and Bayer, one of the largest biological and chemical datasets in the world, etc.). Third, although Recursion has built significant chemistry capabilities, Recursion was founded as a biology-first company in order to mitigate one of the fundamental causes of failure in drug discovery, choosing the wrong target associated with a disease. While emerging competitors and large, well-resourced incumbents may pursue a similarly differentiated strategy to ours, we have two advantages as a first mover: (i) no amount of resources can compress the time it takes to observe naturally occurring biological processes and (ii) the growing Recursion Data Universe creates compounding network effects that may make it difficult for others to close the competitive gap. In the future, we envision building the following technologies into the Recursion OS.

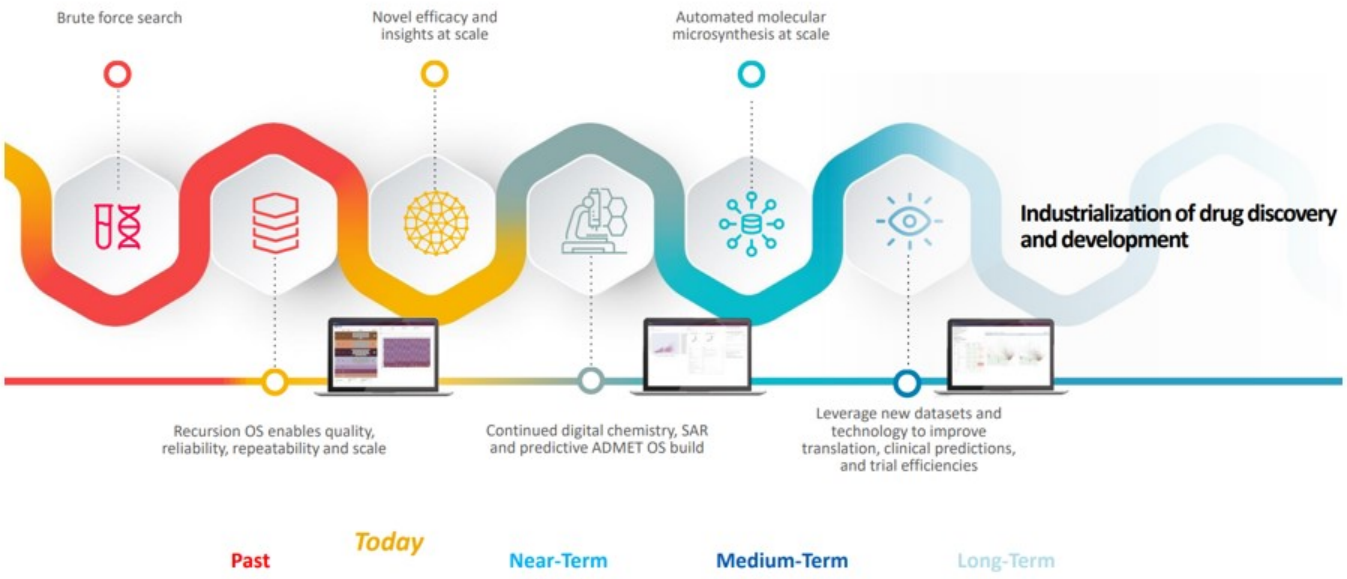


Figure 44. We continue to integrate new capabilities into the Recursion OS in order to create additional cycles of learning and iteration that can lead to a more complete understanding of biology and chemistry. In the future, we envision investing in additional digital chemistry capabilities, automated chemical microsynthesis, population-scale genomics data and other technologies.

Our Pipeline

All of the programs in our internal pipeline are built on unique biological insights surfaced through the Recursion OS where: (i) the disease-causing biology is well defined but the downstream effects of the disease-cause are typically poorly understood, the primary targets are typically considered undruggable, or the primary targets are not well known in the context of a disease and (ii) there is a high unmet medical need, no approved therapies, or significant limitations to existing treatments. Several of our internal pipeline programs could have potential market opportunities in excess of $1.0 billion in annual sales. We currently have four programs in active clinical studies and are preparing for a fifth program to enter a Phase 1b/2 clinical study in early 2024. In addition to our clinical stage programs, we are actively developing dozens of preclinical and discovery programs.

Clinical Programs

- REC-994 for the potential treatment of cerebral cavernous malformation, or CCM — a Phase 2, double-blind, placebo-controlled, safety, tolerability and exploratory efficacy study is underway. Orphan Drug Designation has been granted in the US and EU. We expect to share top-line data in 2H 2024.

- REC-2282 for the potential treatment of neurofibromatosis type 2, or NF2 — an adaptive, Phase 2/3, randomized, multicenter study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted. We expect to share a Phase 2 interim safety analysis in 2024.

- REC-4881 for the potential treatment of familial adenomatous polyposis, or FAP — a Phase 2, double-blind, randomized, placebo-controlled study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted.

- REC-4881 for the potential treatment of *AXIN1* or *APC* mutant cancers — a Phase 1b/2 study in select tumor types is expected to initiate in early 2024.

- REC-3964 for the potential treatment of Clostridioides difficile infection — a Phase 1 study in healthy volunteers is underway. We expect to share safety and PK data in 2H 2023.

We believe that the number of potential programs we can generate with our Recursion OS is key to the future of our company, as a greater volume of validated programs has a higher likelihood of creating value. Additionally, we believe that our large number of potential programs makes us an attractive partner for larger pharmaceutical companies. The static or declining level of R&D output at many large pharmaceutical companies means that they have an ongoing need for new projects to fill their pipelines.

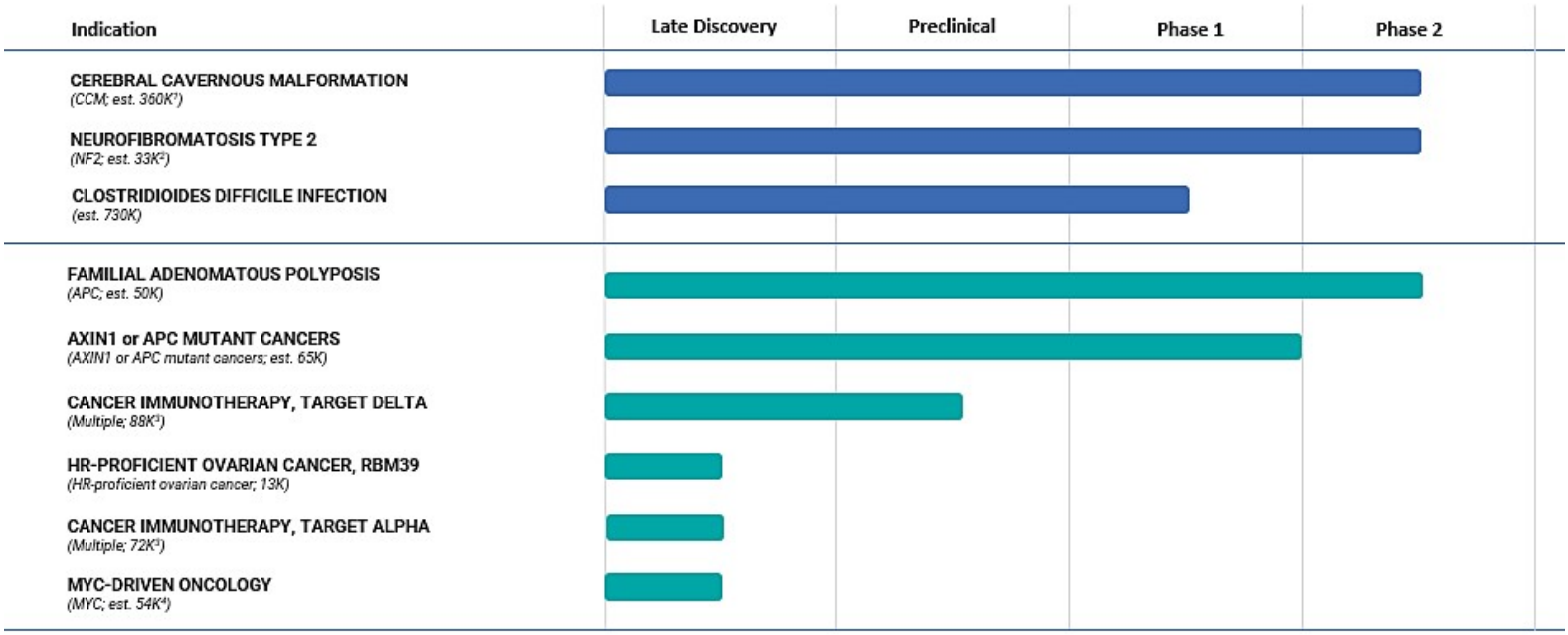


Figure 45. The power of our Recursion OS as exemplified by our expansive therapeutic pipeline. All populations defined above are US and EU5 incidence unless otherwise noted. EU5 is defined as France, Germany, Italy, Spain and UK. [1] Prevalence for hereditary and sporadic symptomatic CCM population. [2] Annual US and EU5 incidence for all *NF2*-driven meningiomas. [3] Our Targets Delta and Alpha programs have the potential to address a number of indications in the immunotherapy space. [4] Our MYC program has the potential to address a number of indications driven by MYC alterations, totaling 54,000 patients in the US and EU5 annually. We have not finalized a target product profile for a specific indication.

REC-994 for Cerebral Cavernous Malformation - Phase 2

REC-994 is an orally bioavailable, superoxide scavenger small molecule being developed for the treatment of symptomatic CCM. In Phase 1 SAD and MAD trials in healthy volunteers directed and executed by us, REC-994 demonstrated excellent tolerability and suitability for chronic dosing. CCM is among the largest rare disease opportunities and has no approved therapies to date. A Phase 2 double-blind, placebo-controlled, safety, tolerability and exploratory efficacy study is underway. Orphan Drug Designation has been granted in the US and EU. We expect to share top-line data in 2H 2024.

Disease Overview

CCM is a disease of the neurovasculature for which approximately 360,000 patients in the US and EU5 are symptomatic. Less than 30% of patients with CCM experience symptoms, resulting in the disease being severely underdiagnosed and suggesting that well more than 1 million patients may have the disease in the US and EU5. CCM and its hallmark vascular malformations are caused by inherited or somatic mutations in any of three genes involved in endothelial function: *CCM1, CCM2,* or *CCM3*. Approximately 20% of patients have a familial form of CCM that is inherited in an autosomal dominant pattern. Sporadic disease in the remaining population is caused by somatic mutations that arise in the same genes. CCM manifests as vascular malformations of the spinal cord and brain characterized by abnormally enlarged capillary cavities without intervening brain parenchyma. Patients with CCM lesions are at substantial risk for seizures, headaches, progressive neurological deficits and potentially fatal

hemorrhagic stroke. Current non-pharmacologic treatments include microsurgical resection and stereotactic radiosurgery. Given the invasive and risky nature of these interventions, these options are reserved for a subset of patients with significant symptomatology and/or easily accessible lesions. Rebleeds and other negative sequelae of treatment further limit the effectiveness of these interventions. There is no approved pharmacological treatment that affects the rate of growth of CCM lesions or their propensity to bleed or otherwise induce symptoms. CCM can be a severe disease resulting in progressive neurologic impairment and a high risk of death due to hemorrhagic stroke.

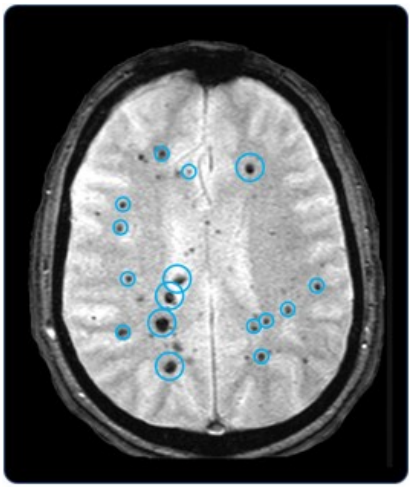


Figure 46. Vascular malformations (cavernomas) in the brain of a CCM patient.[13]

Insight from Recursion OS

CCM2 knock-down in human endothelial cells reveal pronounced structural and functional phenotypes that are distinct from healthy cells. We hypothesized that these observed structural changes could be used to enable unbiased drug discovery. Fluorescent microscopy and automated cellular quantification and profiling software enabled high throughput analysis. More than 2,000 commercially available and known chemical entities were rapidly evaluated with this strategy based on the hypothesis that hits from this library could be more quickly translated to the clinic. The novel use of REC-994 for CCM was discovered leveraging this early form of the Recursion OS. The exciting aspect of this novel, unbiased approach was that the drug candidates chosen using automated software analysis outperformed those chosen by human analysis in subsequent orthogonal screens.

[13] Cooper, AD. et al. (2008). Susceptibility-weighted imaging in familial cerebral cavernous malformations. *Neurology, 71,* 382.

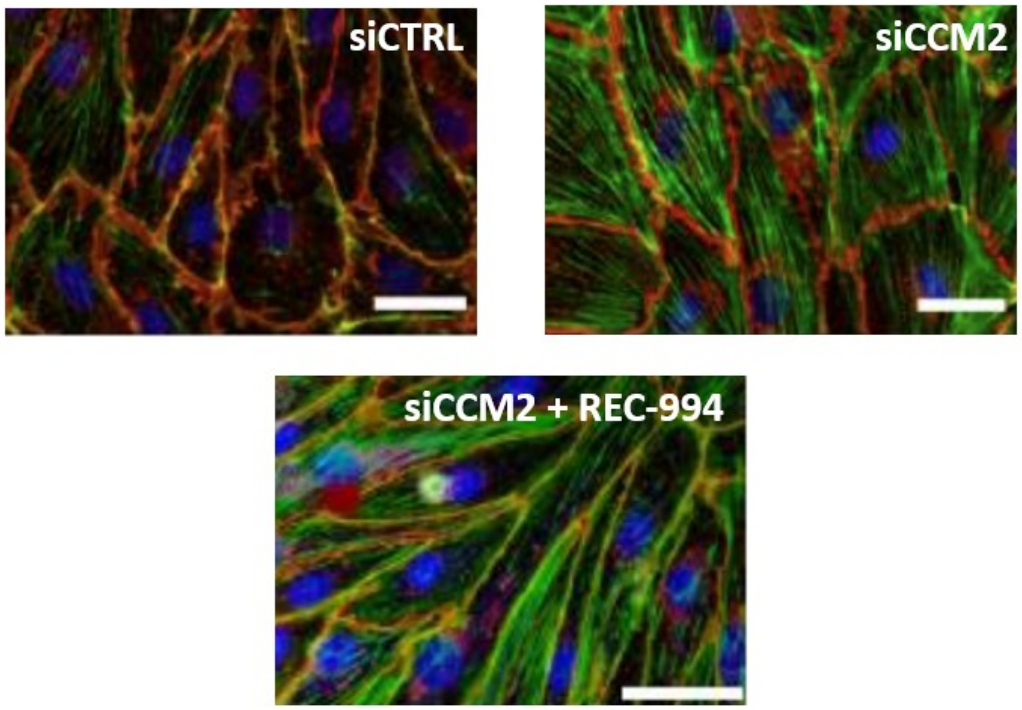


Figure 47: Rescue of structural phenotypes associated with loss of *CCM2*. Immunofluorescence images of endothelial cells treated with siCTRL, siCCM2, or siCCM2 treated with REC-994 stained for DNA (blue), actin (green) and VE-cadherin (red). According to a machine learning classifier trained on images, REC-994 shows image-based rescue.

REC-994 is a small molecule therapeutic designed to alleviate neurological symptoms associated with CCM and potentially reduce the accumulation of new lesions. REC-994 is an orally bioavailable superoxide scavenger with pharmacokinetics supporting once-daily dosing in humans. The putative mechanism of action of REC-994 is through reduction of reactive oxygen species and decreased oxidative stress that leads to stabilization of endothelial barrier function. In addition, REC-994 exhibits anti-inflammatory properties which could be beneficial in reducing disease-associated pathology.

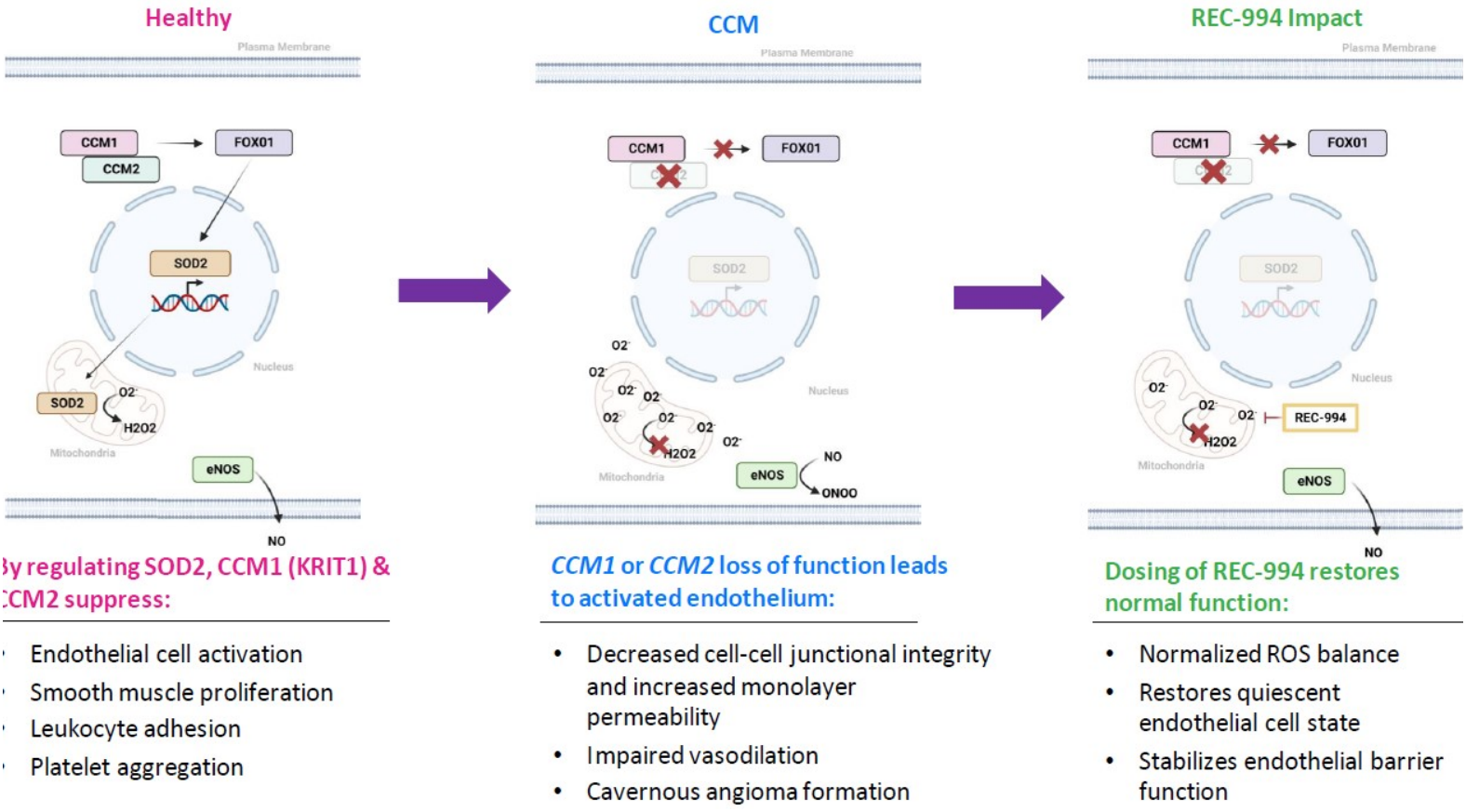


Figure 48. REC-994 mechanism of action and proposed potential therapeutic impact.

Preclinical

The activity of REC-994 as a potential treatment for CCM was further confirmed in orthogonal functional assays and in acute and chronic *in vivo* models. REC-994 demonstrated benefit on acute to subacute disease-relevant hemodynamic parameters such as vascular dynamics and vascular permeability. Chronic administration of REC-994 was also tested in two endothelial-specific knockout mouse models for the two most prevalent genetic causes, *CCM1* and *CCM2*. These mouse models faithfully recapitulate the CNS cavernous malformations of the human disease. Mice treated with REC-994 demonstrated a decrease in lesion number and/or size compared to vehicle treated controls. Notably, 24-hour circulating plasma levels of REC-994 in this *in vivo* experiment were consistent with exposures seen in humans at a 200 mg daily dose.

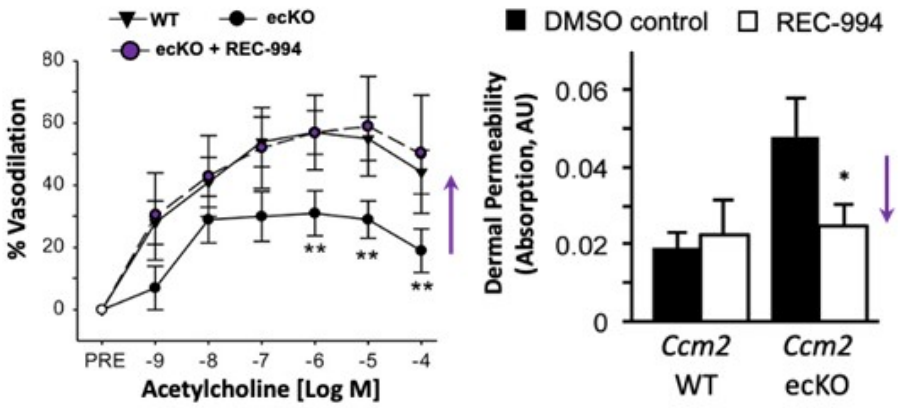


Figure 49. REC-994 rescues acetylcholine-induced vasodilation defect and dermal permeability defect in Ccm2 endothelial specific knockout mice.[14]

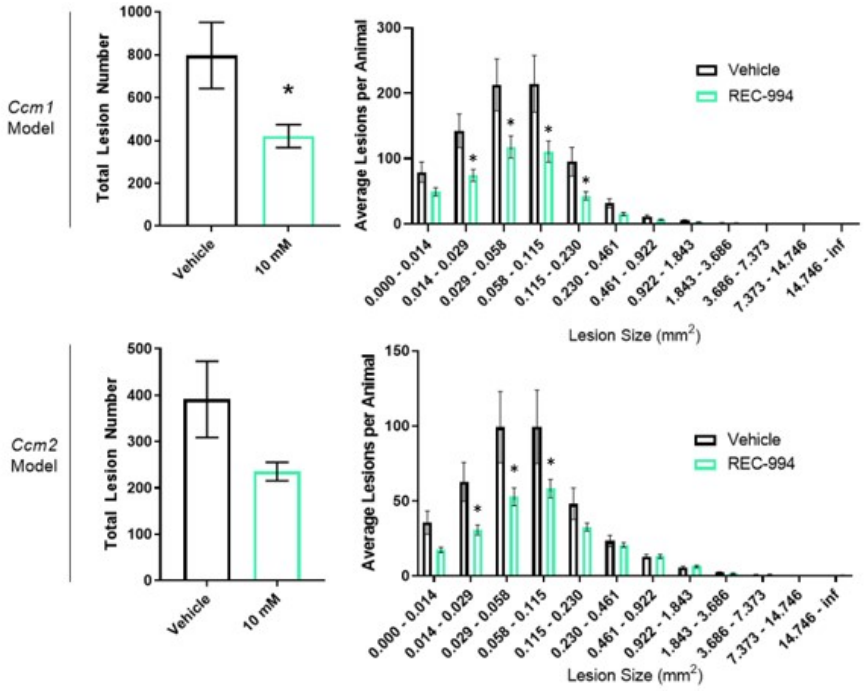


Figure 50. REC-994 reduces lesion severity in chronic mouse models of CCM Disease. Mice treated with REC-994 demonstrated a statistically significant decrease in the number of small-size lesions, with a trend toward a decrease in the number of mid-size lesions.[14]

Clinical

We conducted a Phase 1 Single Ascending Dose (SAD) study in 32 healthy human volunteers using active pharmaceutical ingredients with no excipients in a powder-in-bottle (PIB) dosage form. Results showed that systemic exposure (C_{max} and AUC) generally increased in proportion to REC-994 dose after both single and multiple doses. Median T_{max} and $t_{1/2}$ appeared to be independent of dose. There were no deaths or SAEs reported during this study and no TEAEs that led to the withdrawal of subjects from the study. These data supported a MAD study in healthy human volunteers.

A subsequent Phase 1 Multiple Ascending Dose (MAD) study was conducted in 52 healthy human volunteers and was designed to investigate the safety, tolerability and PK of multiple oral doses of REC-994, to bridge from the PIB

[14] Gibson, et al. (2015). Strategy for identifying repurposed drugs for the treatment of cerebral cavernous malformation. Circulation, 131(3), 289-99.

dosage form to a tablet dosage form, as well as to assess the effect of food on PK following a single oral dose. Overall, multiple oral doses of REC-994 were well tolerated in healthy male and female subjects at each dose level administered in this study. There appeared to be no dose-related trends in TEAEs, vital signs, ECGs, pulse oximetry, physical examination findings, or neurological examination findings. Pharmacokinetic results support once-daily oral dosing with the tablet formulation.

MAD Study	Placebo	50 mg	200 mg	400 mg	800 mg
Total Number of TEAEs	5	0	10	4	15
Total Subjects with ≥ one TEAE	4	0	3	3	4
Severity					
Mild	3	0	3	3	3
Moderate	1	0	0	0	1
Severe	0	0	0	0	0
Relationship to Study Drug					
None	3	0	0	2	1
Unlikely	1	0	1	1	2
Possibly	0	0	0	0	0
Likely	0	0	2	0	1
Definitely	0	0	0	0	0
Total Number of SAEs	0	0	0	0	0
Total Subject with ≥ one TEAE	0	0	0	0	0
Discontinued Study Drug Due to AE	0	0	0	0	0

Table 3. Summary of Adverse Events from Phase 1 Multiple Ascending Dose Study. AE=adverse event; MAD=multiple ascending dose; SAE=serious adverse event; TEAE=treatment-emergent adverse event.

A two-part Phase 2 study is underway. Part 1 is a randomized, double-blind, placebo-controlled trial to investigate the safety, efficacy and PK of daily doses of REC-994 (200 mg and 400 mg) compared to placebo in participants with symptomatic CCM over a treatment period of 12 months. Part 2 is an optional, double-blind, long-term extension (LTE) study of daily doses of REC-994 (200 mg and 400 mg) for participants completing Part 1 of the study. Currently, there is no development or regulatory precedent or pathway for CCM drug development. Results from the ongoing Phase 2 study are expected to inform a pivotal trial design with guidance from the FDA.

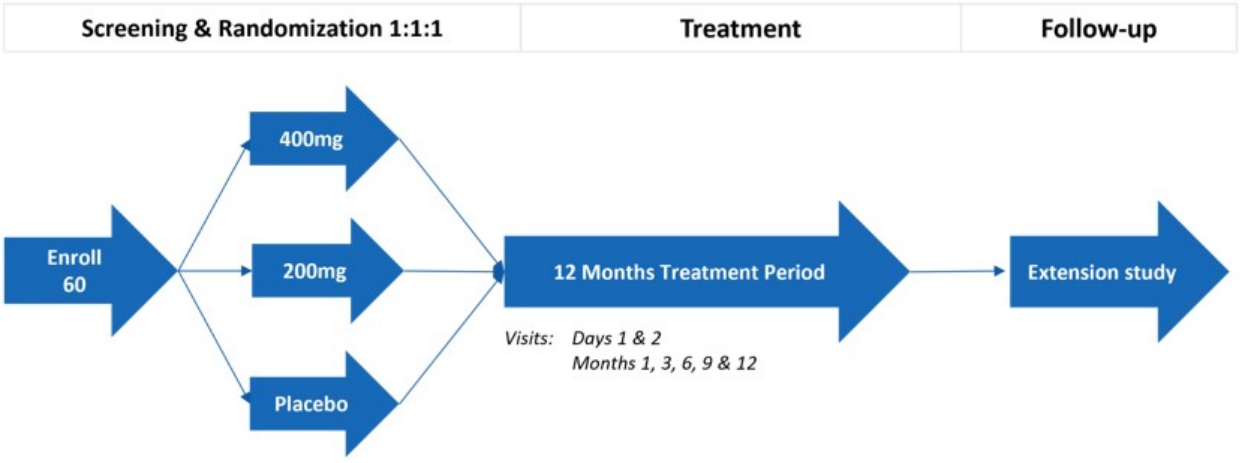


Figure 51. Phase 2 clinical trial schematic for REC-994. Phase 2 trial design to assess the efficacy and safety of REC-994 in patients with symptomatic CCM. Enrollment criteria includes MRI-confirmed lesion(s), diagnosis of familial or sporadic CCM and having symptoms directly related to CCM. Primary outcome measures are safety and

tolerability. Secondary measures are focused on efficacy, including clinician-measured outcomes, imaging of CCM lesions, acute stroke scales and patient reported outcomes.

Competitors
To our knowledge, the REC-994 program is the only industry-sponsored therapeutic program in clinical trials for CCM. If approved, REC-994 would be the first pharmacologic disease-modifying treatment for CCM, one of the largest areas of unmet need in the rare disease space. Other ongoing research includes an investigator-initiated study of a marketed therapeutic and a preclinical industry-sponsored program.

- Investigators at the University of Chicago are evaluating the efficacy of atorvastatin, or Lipitor, on reduction in hemorrhage rate in patients with CCM. As of February 2023, the phase 1/2 randomized, placebo-controlled, double-blinded, single-site clinical trial is ongoing with an estimated study completion date of June, 2025.

- Neurelis is currently in preclinical development of NRL-1049, a repurposed ROCKi to potentially reduce the accumulation of new lesions and alleviate neurological symptoms in patients with CCM.

REC-2282 for Neurofibromatosis Type 2 - Phase 2/3

REC-2282 is a small molecule HDAC inhibitor being developed for the treatment of *NF2*-mutant meningiomas. In previous clinical studies, the molecule has been well tolerated, including in patients dosed for multiple years, and potentially reduced cardiac toxicity that differentiates it from other HDAC inhibitors. In contrast to approved HDAC inhibitors, REC-2282 is both CNS-penetrant and orally bioavailable. An adaptive, Phase 2/3, randomized, multicenter study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted. We expect to share a Phase 2 interim safety analysis in 2024.

Disease Overview
Neurofibromatosis type 2 (NF2) is an autosomal dominant, inherited, rare, tumor syndrome that predisposes affected individuals to multiple nervous system tumors, the most common of which are bilateral vestibular schwannomas, intracranial meningiomas, spinal meningiomas and other spine tumors such as ependymomas.

Approximately one-half of individuals with NF2 have meningiomas and most of these individuals will have multiple meningiomas. In patients with NF2 the incidence of meningiomas increases with age, and lifetime risk may be as high as 75%. Combined, we believe *NF2*-driven meningiomas occur in approximately 33,000 patients per year in the US and EU5. Patients with NF2 are diagnosed typically in their late teens or early 20s and present with hearing loss which is usually unilateral at the time of onset, focal neurological deficits and symptoms relating to increasing intracranial pressure.

Although most meningiomas are benign their location often makes complete resection untenable, and subsequently patients with NF2 experience loss of hearing, facial paralysis, poor balance and visual difficulty. Spinal tumors can result in weakness and disability and some patients become wheelchair bound. Many patients with multi-tumor disease die in early adulthood. Due to the catastrophic nature of the disease and lack of non-surgical options for management, new approaches to treatment are needed, particularly those directed toward shrinking tumor burden.

Insight from Recursion OS
To select REC-2282 for our NF2 program, we employed our brute-force approach by developing a high content phenotypic screen to identify cellular and structural changes associated with the genetic knockdown of NF2 by siRNA in HUVEC cells. Transfected *NF2*-deficient cells were treated with thousands of compounds to discover molecules that restored the structural defects associated with loss of NF2. REC-2282 reversed this complex cellular phenotype back to a healthy state (wildtype) in four independent screens at concentrations between 0.1 to 1 μM, in line with efficacious concentration levels in our preclinical experiments. Additionally, REC-2282 failed to exhibit the same level of dose dependent rescue in the evaluation of hundreds of other tumor suppressor or oncogene knockdown models, providing further evidence of a selective effect in the specific context of *NF2* loss of function. Together, these experiments demonstrated robust and reproducible activity in disease relevant settings suggesting the therapeutic potential of REC-2282 in treating *NF2*-mutant tumors.

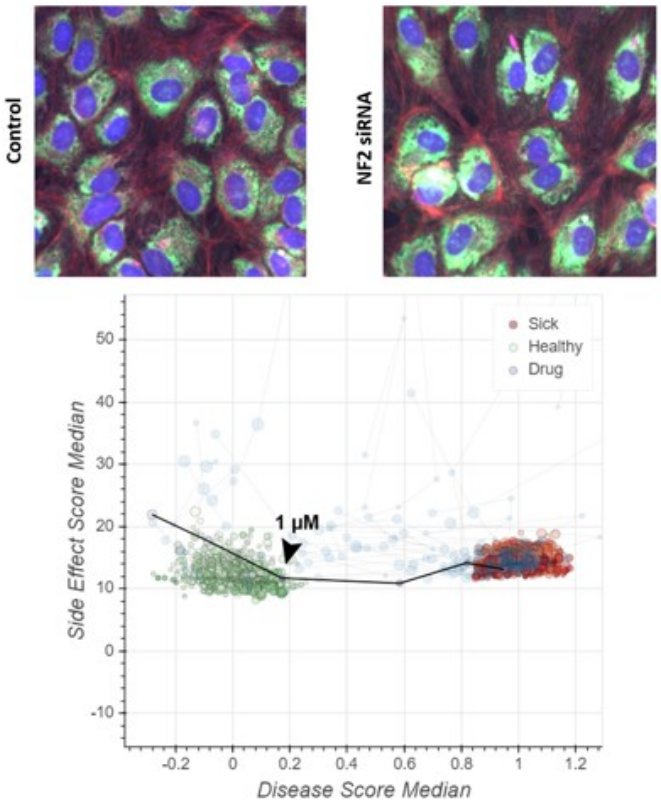


Figure 52. REC-2282 rescued the loss of NF2. A) Immunofluorescent images of human endothelial cells treated with siRNA control or siRNA NF2. B) REC-2282 rescued the high-dimensional disease phenotype as evidenced with a left shift from the disease to the healthy state. HUVEC, human umbilical vein endothelial cells; NF2, neurofibromatosis type 2; siRNA, small interfering RNA.

REC-2282, is an orally bioavailable, CNS-penetrating, pan-histone deacetylase, or HDAC, inhibitor with PI3K/AKT/mTOR pathway modulatory activity. By comparison to marketed HDAC inhibitors, REC-2282 is uniquely suited for patients with NF2 and *NF2*-mutant CNS tumors, due to its oral bioavailability, CNS-exposure and lack of cardiovascular liabilities.

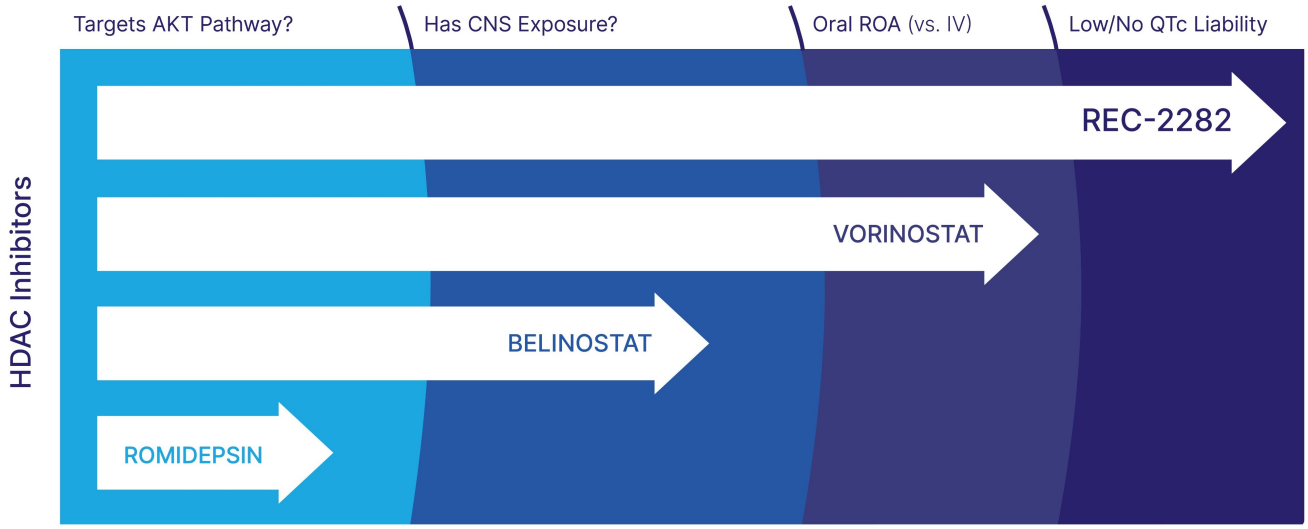


Figure 53. REC-2282 would be a first-in-class HDAC inhibitor for the potential treatment of NF2 meningiomas. We believe REC-2282 is well suited for NF2 vs other HDAC inhibitors due to its oral bioavailability and CNS-exposure.[15,16,17]

NF2 disease is driven by mutations in the *NF2* gene, which encodes an important cell signaling modulator, merlin. Loss of merlin results in activation of multiple signaling pathways converging on PI3K/AKT/mTOR among others and results in enhanced cell proliferation. Anti-neoplastic effects of HDAC inhibitors, like REC-2282, are thought to derive primarily via disruption of the protein phosphatase 1 (PP1)-HDAC interaction, and the subsequent inhibition of PI3K/AKT signaling leading to growth arrest and apoptosis of cancer cells.

We obtained a global license for REC-2282 from the Ohio State Innovation Foundation in December 2018. Orphan drug designation for REC-2282 in NF2 has been granted in the US and EU. Fast Track Designation for REC-2282 in *NF2*-mutated meningioma was granted in the US in 2021.

[15] Sborov, D.W et al. (2017) A phase 1 trial of the HDAC inhibitor AR-42 in patients with multiple myeloma and T- and B-cell lymphomas. *Leuk Lymphoma, 58(10)*, 2310-2318.
[16] Collier KA, et al. (2021). A phase 1 trial of the histone deacetylase inhibitor AR-42 in patients with neurofibromatosis type 2-associated tumors and advanced solid malignancies. *Cancer Chemother Pharmacol. 87(5),* 599-611.
[17] Prescribing Information of Vorinostat/Belinostat/Romidepsin respectively.

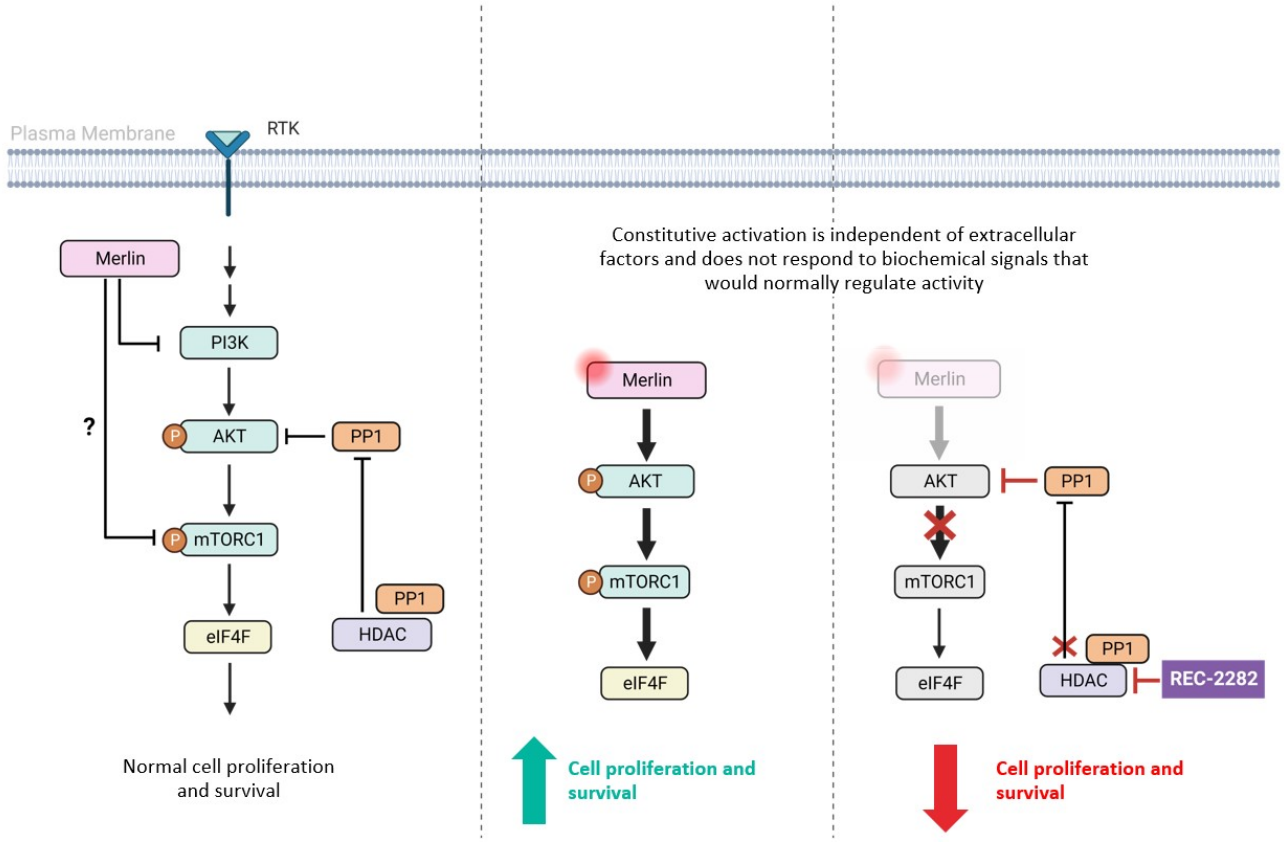


Figure 54. REC-2282 acts on an important pathway in tumor development to inhibit the growth of tumor cells. A potential mechanism of action of REC-2282 in NF2.[18]

Preclinical

After we discovered the novel use of REC-2282 for NF2 using our platform, we performed a literature search to better understand the molecule and validate disease models. REC-2282 has been shown to be pharmacologically active in various cancer cell lines and mouse xenograft models. REC-2282 had been shown to inhibit *in vitro* proliferation of vestibular schwannoma, or VS, and meningioma cells by inducing cell cycle arrest and apoptosis at doses that correlate with AKT inactivation. In preclinical models, REC-2282 inhibited the growth of primary human VS and *Nf2*-deficient mouse schwannoma cells, as well as primary patient-derived meningioma cells and the benign meningioma cell line, Ben-Men-1.

In animal models of NF2, REC-2282 suppressed *in vivo* tumor growth of an *Nf2*-deficient mouse vestibular schwannoma allograft. In addition, REC-2282 suppressed *in vivo* tumor growth of human vestibular schwannoma xenograft models in mice fed chow formulated to deliver 25 mg/kg/day REC-2282 for 45 days. REC-2282 also suppressed the growth of meningioma cells in an orthotopic mouse model of *NF2*-deficient meningioma that contained luciferase-expressing Ben-Men-1 meningioma cells. These animal data served as a functional and orthogonal validation of our platform findings.

[18] Adapted from Petrilli and Fernández-Valle. (2016). Role of Merlin/NF2 inactivation in tumor biology. *Oncogene, 35(5)*, 537-48.

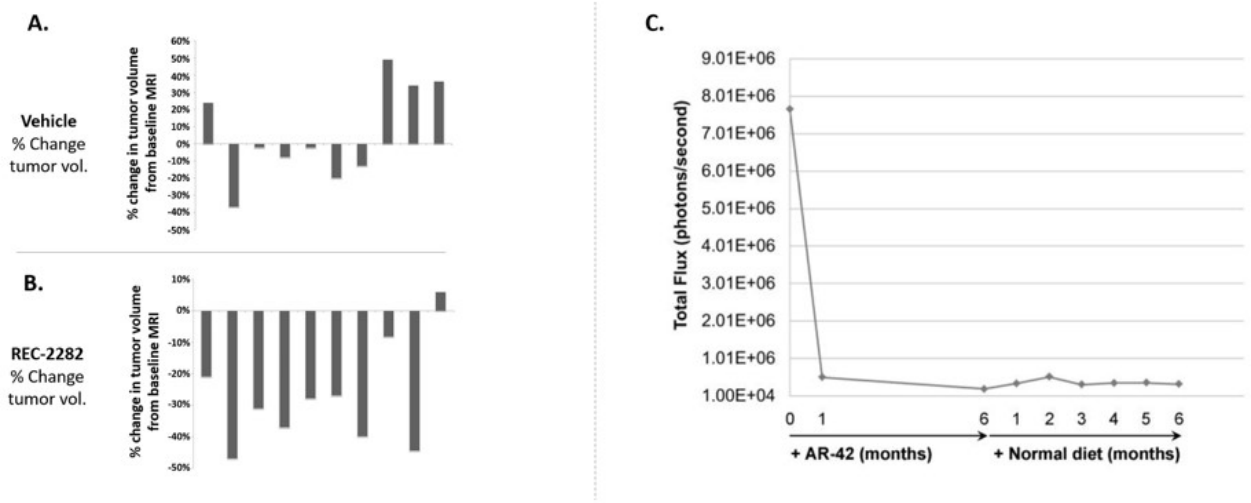


Figure 55. REC-2282 shrinks vestibular schwannoma xenografts in SCID-ICR mice and prevents growth & regrowth of tumors in the *NF2*-deficient meningioma mouse model. (A) Change in VS tumor volume for each control mouse, demonstrating a mean 6% increase. (B) REC-2282 significantly reduces the mean size of VS tumor volume by ~28% across SCID-ICR mice implanted with VS xenografts. Error bars shown are the 95% CI. P=0.006. C) REC-2282 also suppressed the growth of Ben-Men-1-LucB tumor xenografts as measured by tumor bioluminescence.[19,20]

Clinical

Four Investigator-Sponsored Trials (ISTs) of REC-2282 (previously referred to as AR-42) have been completed. In study AR-42-001, REC-2282 was administered as monotherapy. In the other 3 trials, REC-2282 was administered in combination with anti-neoplastic agents: decitabine (AR-42-002), pazopanib (AR-42-003) and pomalidomide (AR 42 004), respectively. In these studies, REC-2282 was given to 77 patients with solid or hematological malignancies in doses ranging from 20 mg to 80 mg three times a week for three weeks followed by one week off-treatment in four-week cycles. Multiple patients were treated for multiple years using this dosing regimen at the 60 mg dose and the longest recorded treatment duration is 4.4 years at the 40 mg dose. The majority of adverse events were transient cytopenia that did not result in dose reduction or stoppage. The MTD in patients with solid tumors was determined to be 60 mg. The REC-2282 plasma exposure in patients with hematological malignancies and solid tumors generally increased with increasing doses. There were no consistent signs of plasma REC-2282 accumulation across a 19-day administration period nor obvious differences in PK between hematologic and solid tumor patients.

In another early Phase 1 pharmacodynamic IST conducted by Ohio State University, it appeared that REC-2282 suppressed aberrant activation of ERK, AKT and S6 pathways in vestibular schwannomas from adult patients undergoing tumor resection. These results may be difficult to achieve with single pathway inhibitors of ALK or MEK.

Recursion is currently conducting an adaptive, Phase 2/3, randomized, multicenter study to evaluate the efficacy and safety of REC-2282 in patients with progressive *NF2*-mutated meningiomas with underlying NF2 disease and sporadic meningiomas with documented *NF2* mutations. The study is designed to accelerate the path to potential product registration by allowing for initiation of a confirmatory Phase 3 study prior to full completion of Phase 2. It is a combined Phase 2/3 study design, beginning with a Proof-of-Concept Phase 2 portion in which 20 adult subjects and up to nine adolescent subjects will begin treatment on two active dose arms. Subject safety will be monitored by an independent Data Monitoring Committee, which will apply dose modification and stopping rules as indicated. After all 20 adult subjects have completed six months of treatment, an interim analysis will be performed for the purpose of 1) determination of go/no-go criteria for Phase 3 portion of the study, 2) selection of the dose(s) to carry forward, 3) re-estimation of sample size for the planned Phase 3 and 4) agreement from FDA to initiate Phase 3. Subjects in the Phase 2 portion will continue treatment for up to 26 months total and then have the option to enroll in an Extension study. The Phase 3 portion currently requires recruitment of an additional 60 subjects (adult and potentially adolescent subjects), who will receive treatment for up to 26 months. The planned primary endpoint is Progression-Free Survival (PFS).

[19] Adapted from Jacob A, et al. (2012). Triological Society Thesis Preclinical Validation of AR42, a Novel Histone Deacetylase Inhibitor, as Treatment for Vestibular Schwannomas. *Laryngoscope, 122(1)*, 174-189.
[20] Burns SS, et al. (2013). Histone Deacetylase Inhibitor AR-42 Differentially Affects Cell-cycle Transit in Meningeal and Meningioma Cells, Potently Inhibiting NF2-Deficient Meningioma Growth. *Cancer Res; 73(2)*, 792-803.

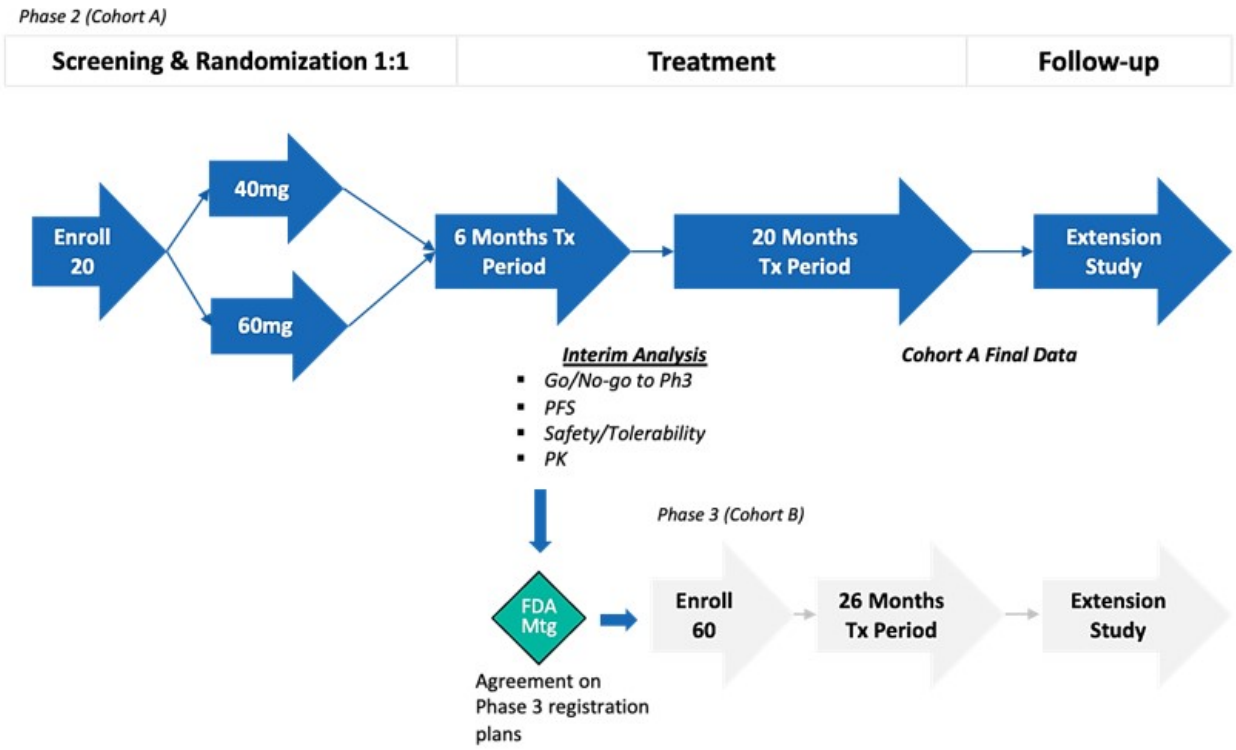


Figure 56. Phase 2/3 clinical study for REC-2282. Phase 2/3 study design to assess the efficacy and safety of REC-2282 in patients with progressive *NF2*-mutated meningiomas. Enrollment criteria include MRI-confirmed progressive meningioma and either (1) sporadic meningiomas with confirmed *NF2* mutation or (2) confirmed diagnosis of NF2 disease. The primary outcome measure for the phase 2 portion of the study is safety and tolerability. Primary endpoint for the phase 3 portion of the study is Progression-Free Survival (PFS).

Competitors

There are currently five active programs in clinical development targeting *NF2*-driven brain tumors.

- Brigatinib, an approved ALK inhibitor for NSCLC from Takeda Pharmaceuticals, is in Phase 2 for NF2 disease meningioma, vestibular schwannoma and ependymoma.
- Crizotinib, an ALK/ROS1 inhibitor, is being studied in an investigator sponsored Phase 2 study in progressive vestibular schwannoma in NF2 patients.
- Selumetinib, a MEK inhibitor from AstraZeneca, is being studied in a Phase 2 study for *NF2* related tumors.
- GSK2256098, a FAK inhibitor from GlaxoSmithKline, is being studied in a basket Phase 2 for meningiomas with a variety of targeted therapies and genetic alterations, including *NF2* mutation.
- IK-930, a TEAD inhibitor from Ikena Oncology, is being studied in a basket Phase 1 for advanced solid tumors driven by hippo signaling, including patients with *NF2* mutations.

REC-4881 for Familial Adenomatous Polyposis (FAP) - Phase 2

REC-4881 is an orally bioavailable, non-ATP-competitive allosteric small molecule inhibitor of MEK1 and MEK2 being developed to reduce polyp burden and progression to adenocarcinoma in FAP patients. REC-4881 has been

well tolerated in prior clinical studies. A Phase 2, double-blind, randomized, placebo-controlled study is underway. Orphan Drug Designation in the US and EU as well as Fast Track Designation in the US have been granted.

Disease Overview

FAP is a rare tumor predisposition syndrome affecting approximately 50,000 patients in the US and EU5 with no approved therapies. FAP is a genetic disorder resulting from a heterogeneous spectrum of point mutations in the adenomatous polyposis coli (*APC*) gene. The *APC* gene is a tumor suppressor gene which encodes a negative regulator of the Wnt signaling pathway.

FAP is characterized by progressive development of hundreds to thousands of adenomatous polyps in the lower gastrointestinal tract, mainly in the colon and rectum, and is associated with up to a 100% lifetime risk of colorectal cancer before age 40, if left untreated. Standard of care for patients with FAP is colectomy in late teenage years. Without surgical intervention, affected patients will progress to colorectal cancer by early adulthood. Post-colectomy, patients receive endoscopic surveillance every 6-12 months to monitor disease progression given the ongoing risk of malignant transformation.

Despite removing the main at-risk organ, approximately 50% of patients will develop adenomatous lesions in the neo-rectum. Once endoscopic management is no longer sufficient, additional surgical procedures are required. Similarly, these patients also develop duodenal (particularly ampullary) adenomas which also require endoscopic management. In the presence of larger adenomas and evidence of carcinoma, patients require additional localized surgery, including radical Whipple procedures. There are currently no approved therapies for FAP.

Insights from Recursion OS

The novel use of REC-4881 for FAP was discovered by leveraging knock-down of the FAP disease gene APC in human cells using the Recursion OS. To select REC-4881 as a potential therapeutic for FAP, Recursion developed a high content phenotypic screen to identify cellular and structural changes associated with knockdown of APC using small interfering RNA (siRNA) in osteosarcoma U2OS cells. Using machine vision and automated analysis software, Recursion quantified hundreds of cellular parameters associated with *APC* knockdown. This complex phenotype was used as the basis for a chemical screen of more than 3,000 known drugs and bioactive compounds, revealing several RAF and MEK inhibitors, including REC-4881, which reversed the structural defects associated with loss of *APC*. REC-4881 exhibited highly specific and potent reversal of cellular phenotypes when compared to the MEK inhibitors selumetinib and binimetinib.

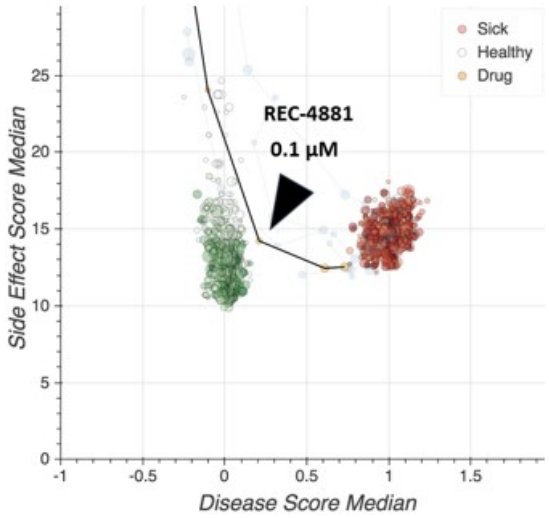


Figure 57. REC-4881 rescued phenotypic defects of cells with *APC* knockdown. Compared to thousands of other molecules tested, REC-4881 rescued phenotypic defects substantially better (including better rescue than other MEK inhibitors) for *APC*-specific knockdown.

REC-4881 is an orally bioavailable, non-ATP-competitive allosteric small molecule inhibitor of MEK1 and MEK2 (IC50 2-3 nM and 3-5 nM, respectively) that is being developed to reduce polyp burden and progression to adenocarcinoma in FAP patients. We obtained a global license for REC-4881 from Takeda Pharmaceuticals

(TAK-733) in May 2020. Orphan drug designation for REC-4881 in FAP and *APC*-driven tumors was granted by the FDA in 2021.

FAP is driven by loss of function of *APC*, which is a critical component of the β-catenin destruction complex, leading to aberrant activation of the Wnt pathway. This Wnt-on state can lead to RAS stabilization, activation of the RAS/ERK pathway and the activation of MYC, leading to cell proliferation and survival - including the growth of adenomas seen in FAP. REC-4881 inhibits MEK1/2 thereby inhibiting ERK activation, decreasing MYC activity, restoring cells back to a Wnt-off state and inhibiting cell proliferation.

Lending further support for the use of MEK inhibitors in FAP, studies have shown that ERK signaling is activated in adenoma epithelial cells and tumor stromal cells, including fibroblasts and vascular endothelial cells. In addition, genomic events resulting in alteration of mitogen-activated protein kinase signaling, such as activating mutations in KRAS, are frequent somatic events that promote the growth of adenomas in FAP. Overall, suppression of aberrant MAPK signaling in adenomas of FAP with REC-4881 has the potential to regress or slow the growth of these tumors by acting on core pathways driving their growth.

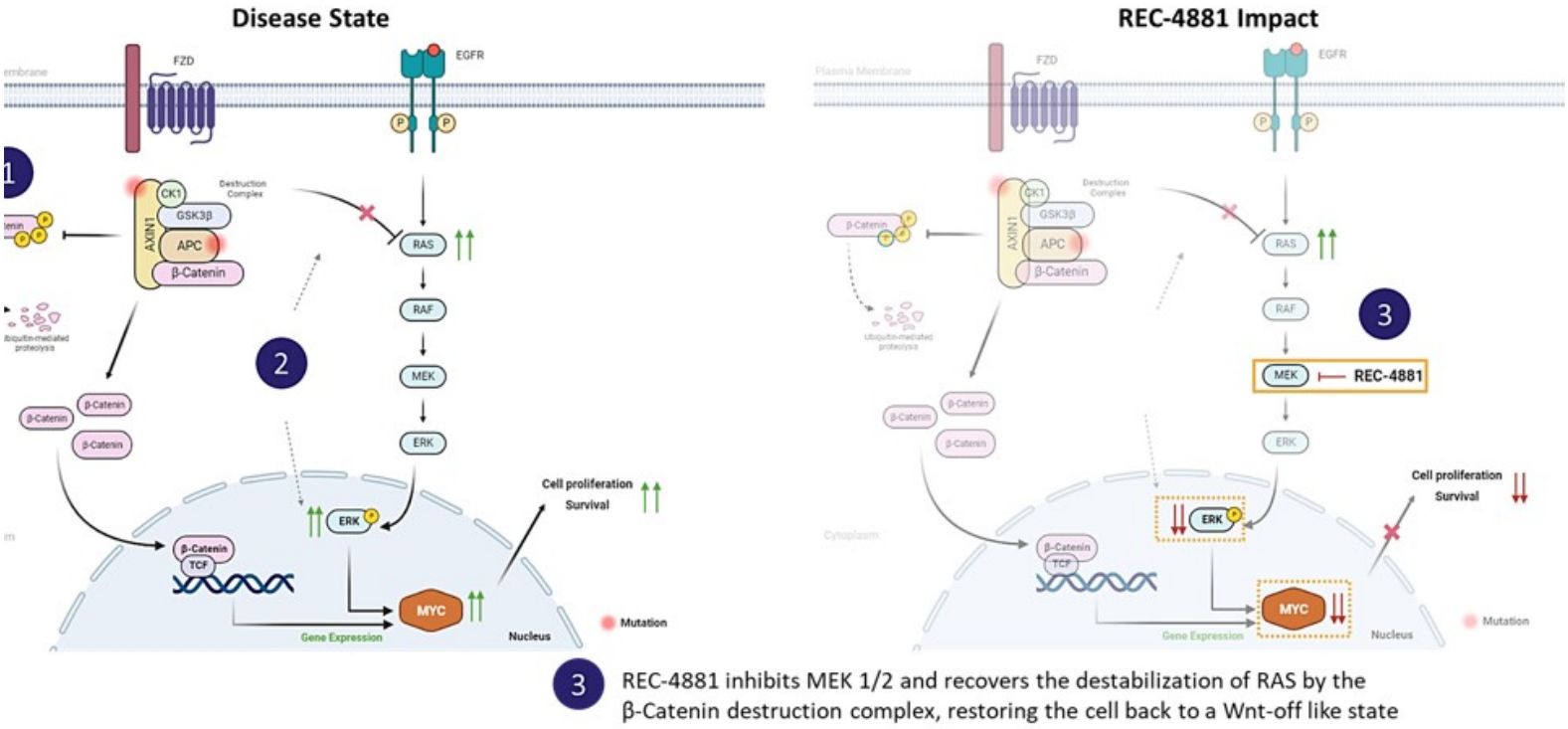


Figure 58. REC-4881 inhibits *APC*-mutation induced MAPK signaling to block cell proliferation in the context of FAP. A potential mechanism of action of REC-4881 in cells with loss of function mutations in *APC*.[21]

Preclinical

We validated the findings from the initial phenotypic screens using tumor cell lines and spheroids grown from human epithelial tumor cells with a mutation in *APC*. REC-4881 inhibited both the growth and organization of spheroids in these models and, in tumor cell lines, had well over a 1,000-fold selectivity range in cells harboring *APC* mutations.

We subsequently evaluated REC-4881 in a disease relevant preclinical model of FAP. Mice harboring truncated *Apc*, or Apc^{Min}, were treated with multiple oral daily doses of REC-4881 or celecoxib (as a comparator) over an eight-week period. Mice treated with celecoxib had approximately 30% fewer polyps than did those treated with vehicle, whereas mice treated with 1 mg/kg or 3 mg/kg REC-4881 exhibited approximately 50% fewer polyps than

[21] Jeon, WJ, et al. (2018). Interaction between Wnt/β-catenin and RAS-ERK pathways and an anti-cancer strategy via degradations of β-catenin and RAS by targeting the Wnt/β-catenin pathway. npj Precision Oncology, 2(5).

vehicle-treated mice. Mice that were treated with 10 mg/kg REC-4881, the highest dose tested, exhibited an approximately 70% reduction in total polyps.

In FAP, polyps arising from mutations in *APC* may progress to high-grade adenomas through accumulation of additional mutations and eventually to malignant cancers. To evaluate the activity of REC-4881 on both benign polyps and advanced adenomas, gastrointestinal tissues from mice treated with REC-4881 were histologically evaluated and polyps were classified as either benign or high-grade adenomas. While celecoxib reduced the growth of benign polyps in the model, a large proportion of polyps that remained were dysplastic. By contrast, treatment with REC-4881 specifically reduced not only benign polyps, but also precancerous high-grade adenomas, a finding with the potential for translational significance.

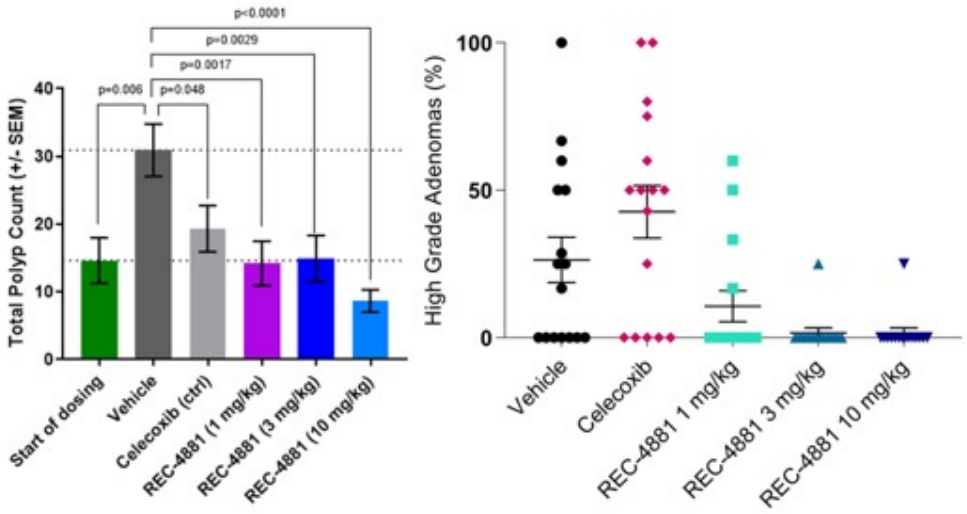


Figure 59. REC-4881 reduces GI polyp count and high grade adenomas in the *Apc*^{Min} mouse model of FAP. GI polyp count (left panel) and the percent of high grade adenomas (right panel) after oral administration of indicated dose of REC-4881, celecoxib, or vehicle control for 8 weeks. Polyp count at the start of dosing reflects animals sacrificed at the start of study (15 weeks of age). $P < 0.001$ for all REC-4881 treatment groups versus vehicle control. Quantification of high-grade adenomas versus total polyps was based on blinded histological review by a pathologist. While celecoxib reduces benign polyps, the majority of remaining lesions are high grade adenomas. By contrast, REC-4881 reduces both polyps and high-grade adenomas.

Clinical

In the Phase 1 dose escalation study previously conducted by Millenium Pharmaceuticals in 51 participants with non-hematologic malignancies (Study C20001), TAK-733 (REC-4881) was administered in the dose range of 0.2 mg QD to 22 mg QD for 21 days. The maximum tolerated dose (MTD) was determined to be 16 mg QD in this study. In this study, REC 4881 exposures increased in a less than dose-proportional manner.

The most commonly reported AEs were rashes, with rash of any type reported in 34 participants (67%); 4 of the 7 participants who discontinued study drug treatment due to an AE discontinued for rash or some type of skin condition. Fourteen (27%) participants experienced at least 1 treatment-emergent SAE; the only SAEs that occurred in more than 1 participant were metastatic melanoma (3 participants; 6%), pulmonary embolism (2; 4%) and anemia (2; 4%). Five participants died during the study; all deaths were due to disease progression.

REC-4881-101 was a safety and PK study conducted by Recursion in healthy volunteers to confirm comparability of REC-4881 with TAK-733. Twenty-five (25) healthy participants, separated into 2 cohorts, were exposed to single doses of REC-4881 4 mg and 8 mg (under fed and fasting conditions) and single doses of REC-4881 12 mg (under fasting conditions). Each cohort received single doses of study drug across 3 study periods with each period separated by 14 days.

REC-4881 was generally well tolerated. No deaths or SAEs were reported during the study. For both cohorts, the percentage of participants reporting TEAEs was comparable between participants who received REC-4881 and placebo. No apparent relationship with the dose of REC-4881 or food conditions was observed. All TEAEs were

assessed by the Investigator as being of Grade 1 severity except 1 (blurred vision reported with 4 mg REC-4881/fed). Two additional participants reported treatment-related eye disorders (blurred vision in both eyes in 1 participant with 8 mg REC-4881/fasted and vitreous floaters in 1 participant with 12 mg REC-4881/fasted). In all instances, the symptoms resolved. Notably, no instance of QTcF abnormality (change from baseline or prolongation) was noted in these healthy participants.

A Phase 2, randomized, double-blind, placebo-controlled study to evaluate efficacy, safety and pharmacokinetics of REC-4881 in classical FAP patients is underway. The study is being conducted in two parts. Part 1 will evaluate the PK, safety, tolerability and PD in participants with FAP following administration of REC-4881 in single and multiple doses. Part 2 will assess the efficacy, safety, PK and PD following administration of once daily doses of REC-4881 to participants with FAP who have previously undergone a colectomy/proctocolectomy and have a confirmed germline APC mutation. Study drug will be administered orally for 6 months. Recent protocol amendments were aimed at enhancing the quality and pace of the trial.

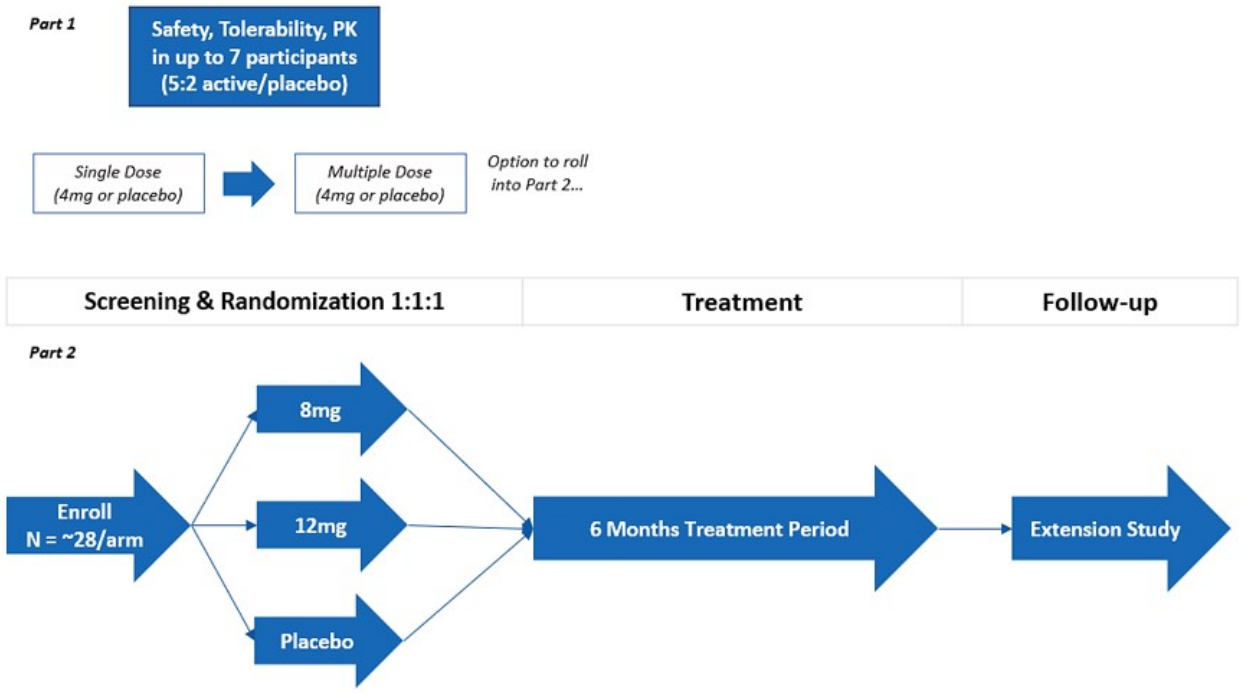


Figure 60. Phase 2 clinical study for REC-4881. Phase 2 clinical study to assess the efficacy, safety and pharmacokinetics of REC-4881 in patients with classical FAP. Enrollment criteria include (1) Confirmed *APC* mutation; (2) Post-colectomy/proctocolectomy; (3) No GI cancer; (4) Polyps in duodenum (including ampulla of Vater and/or rectum/pouch). Outcome measures: PK, safety, tolerability, preliminary efficacy (change from baseline in polyp burden, histological grade, extent of desmoid disease).

Competitors

There are four primary therapeutic approaches in clinical development for FAP; all are focused on reduction in colorectal polyposis.

- Guselkumab (Tremfya) is an IL-23 human monoclonal antibody, or mAb, that recently completed Phase 1b development in March 2022 by Janssen Pharmaceuticals. It is hypothesized to reduce cytokine production, inflammation and rectal/pouch polyp burden in patients with FAP.

- Eicosapentaenoic acid-free fatty acid is a polyunsaturated fatty acid currently in Phase 3 development for FAP by S.L.A. Pharma AG. Eicosapentaenoic acid-free fatty acid is hypothesized to reduce polyp formation due to its activity as a competitive inhibitor of arachidonic acid oxidation.

- A combination of eflornithine (CPP-1X) and sulindac (Flynpovi) is in development by Cancer Prevention Pharma for FAP and, in a recent Phase 3 study, the incidence of disease progression with the combination

was not significantly lower than either drug alone. The company submitted an NDA in June 2020, and it remains under review. The company withdrew their MAA application in October 2021.

- Encapsulated rapamycin, or eRAPA, is currently in Phase 2 development by Emtora Biosciences for FAP and is hypothesized to reduce tumor formation through its inhibitory effect on the mTOR pathway.

REC-4881 for AXIN1 or APC Mutant Cancers - Phase 1b/2

REC-4881 is an orally bioavailable, non-ATP-competitive allosteric small molecule inhibitor of MEK1 and MEK2 being developed for the treatment of *AXIN1* or *APC* mutant cancers. REC-4881 was well tolerated in prior clinical studies, demonstrating dose dependent increases in exposure with no reported ocular toxicities typically associated with this class. We expect to initiate a Phase 1b/2 biomarker enriched basket study across select *AXIN1* or *APC* mutant tumors in early 2024.

Disease Overview
AXIN1 and APC function as critical tumor suppressors that form part of the beta-catenin destruction complex, directly and indirectly regulating beta-catenin and RAS levels, respectively, in the cell. Aberrant activation of the Wnt and RAS pathways through inactivating mutations in *AXIN1* or *APC* appears frequently across a wide variety of human cancers with an estimated 65,000 patients in the US and EU5 eligible for treatment. These tumors are often considered clinically aggressive and less sensitive to treatments with chemotherapies and/or immunotherapies, representing a heavily refractory population. Accordingly, there is a substantial need for developing therapeutics for patients harboring mutations in *AXIN1* or *APC*, as these mutations are considered undruggable. There are no treatments specifically approved for *AXIN1* or *APC* mutant cancers.

Insight from Recursion OS
The REC-4881 program for *AXIN1* or *APC* mutant cancers is our first program nominated solely based on our inferential search approach. In our HUVEC map, we discovered that REC-4881 exhibited a phenotypically opposite relationship across clinically relevant doses to the gene knockout of *AXIN1*, in addition to the previously uncovered relationship with *APC*. We interpreted this relationship as a second novel insight around this molecule and that the use of REC-4881 could potentially restore the biological consequences driven by *AXIN1* or *APC* loss, found in many cancers.

Two additional insights provided us with conviction in this interpretation:

- AXIN1 and APC are central components of the beta-catenin destruction complex. This destruction complex physiologically regulates the levels of beta-catenin and RAS in cells. As AXIN1 and APC exist together in a complex, they are considered functionally related. Our map revealed a strong degree of phenotypic similarity between the gene knockout of *AXIN1* and *APC*, suggesting that this axis of biology is recapitulated in our high dimensional embedding space.

- Our Phase 2 program for REC-4881 in FAP was initiated using our brute-force screen approach where we discovered a dose dependent cellular restoration from a modeled disease state (APC gene knockdown by siRNA) to a modeled healthy state (wildtype) in the U2OS cell type. Our map imputed a similar phenotypic effect with REC-4881 across doses in HUVEC, suggesting alignment between the brute-force approach and the inferential search approach. These discoveries arose from two different cell contexts, were conducted at different points in time, and under different conditions, robustly validating our interpretation.

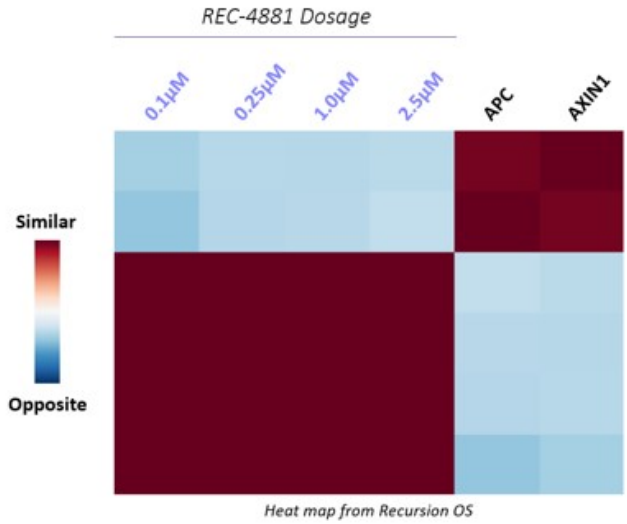


Figure 61. Insights from Recursion OS. REC-4881 displays a phenotypic opposite relationship across clinically relevant doses to genetic knockout of *AXIN1* and *APC* in HUVEC.

Preclinical

On the basis of our inference generation from our Recursion OS, we advanced REC-4881 into two PDX mouse studies, focusing on HCC and Ovarian tumors. A PDX clinical trial (PCT) is a population study with PDX models that can be used to assess efficacy and predict responders to treatment in the preclinical setting. Across 29 total PDX models, treatment with single-agent REC-4881 resulted in a significantly better response in *AXIN1* or *APC* mutant models versus wildtype models. These responses led to a significant benefit in PFS (modeled as the time of tumor doubling from baseline), observed specifically in *AXIN1* or *APC* mutant models, providing further evidence of a biomarker driven effect.

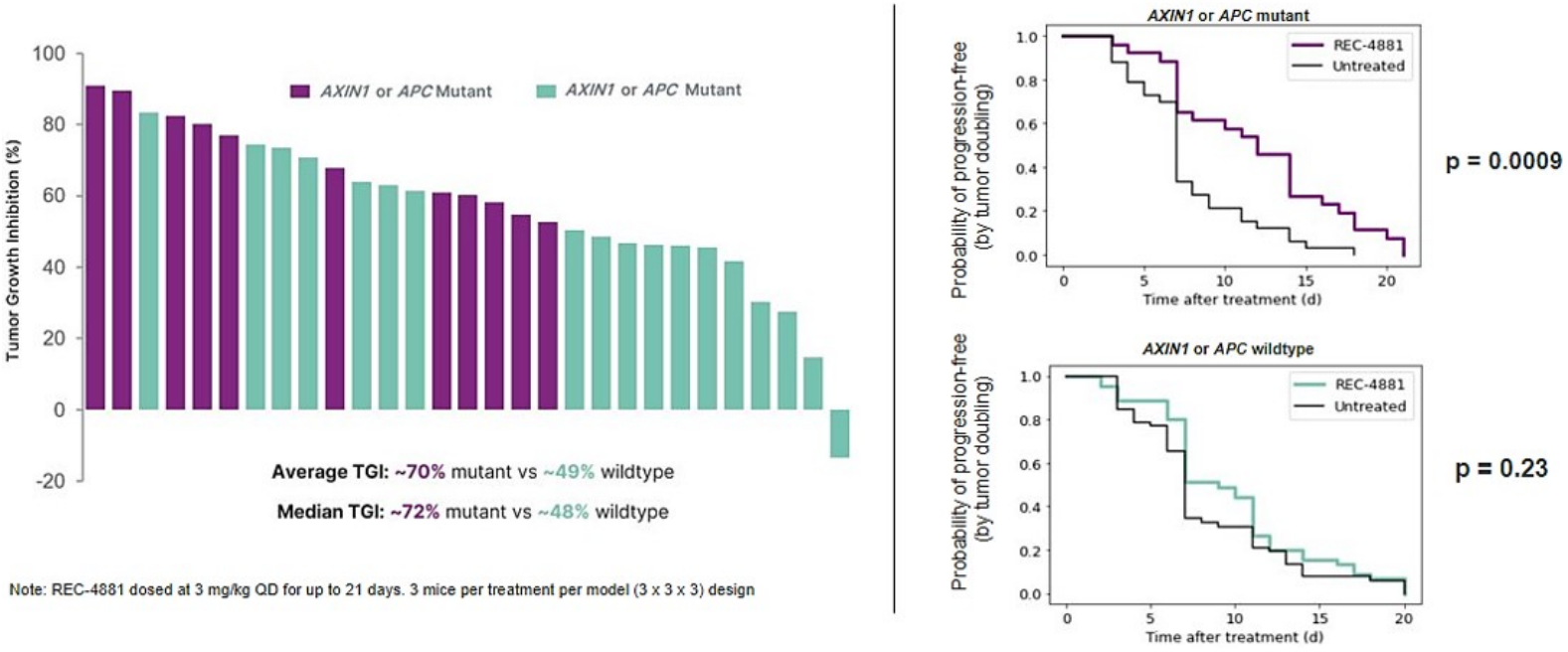


Figure 62. Tumor growth inhibition and PFS across 29 PDX mouse models. REC-4881 shows enhanced activity in mouse models with *AXIN1* or *APC* mutant tumors.

Clinical

We are finalizing the design of a Phase 1b/2 biomarker-enriched clinical trial, and plan to initiate it in select tumor types in early 2024.

There are two investigator-initiated clinical studies ongoing to study cancers with *AXIN1* or *APC* mutations

- MD Anderson investigating DKN-01, an anti-DKK1 monoclonal antibody, in combination with pembrolizumab for the treatment of endometrial cancers, including non-endometrioid histologies with Wnt activating mutations such as *AXIN1* and *APC.*

- The University of Utah is investigating cetuximab, an anti-EGFR monoclonal antibody, for the treatment of third line colorectal cancers harboring mutations in *APC, TP53* and *RAS.*

To our knowledge, REC-4881 is the only industry sponsored small molecule therapeutic designed to enroll solid tumor patients harboring mutations in *AXIN1* or *APC*.

REC 3964 for Clostridioides difficile Infection - Phase 1

REC-3964 is an orally active, small molecule inhibitor of *C. difficile* glucosyltransferase. This molecule has the potential to prevent recurrent disease and be used as secondary prophylaxis therapy in high-risk patients with *C. difficile* infections, a leading cause of antibiotic-induced diarrhea and a major cause of morbidity and mortality. A Phase 1 study in healthy volunteers is underway. We expect to share safety and PK data in 2H 2023.

Disease Overview
C. difficile-induced diarrhea is a leading cause of antibiotic-induced diarrhea and arises from the disruption of normal bacterial flora in the colon. Toxins A, or TcdA, and B, or TcdB, secreted by the bacterium are responsible for considerable morbidity, including severe diarrhea, colitis, toxic megacolon, sepsis, extended hospital stays and potentially, death. More than 730,000 patients are diagnosed in the US and EU5 each year. Recurrence of disease occurs in 20-30% of patients treated with standard of care. Standard of care includes antibiotic therapies which can further impair gut flora and lead to relapse.

Insight Recursion OS
REC-3964 is a new chemical entity that was identified with our brute-force approach which utilized phenomics to identify cellular and structural changes in epithelial cells associated with the pathological changes resulting from exposure to *C. difficile* toxins. Structure-activity-relationship (SAR) was driven through the Recursion OS to identify structural series that restored structural defects resulting from *C. difficile* toxins' effects. REC-3964 was identified from a lead benzodiazepinedione structural series that confers selective antagonism against the *C. difficile* toxins' effects with nanomolar potency on our platform, and dose dependent cellular restoration to a modeled healthy state in human endothelial cells.

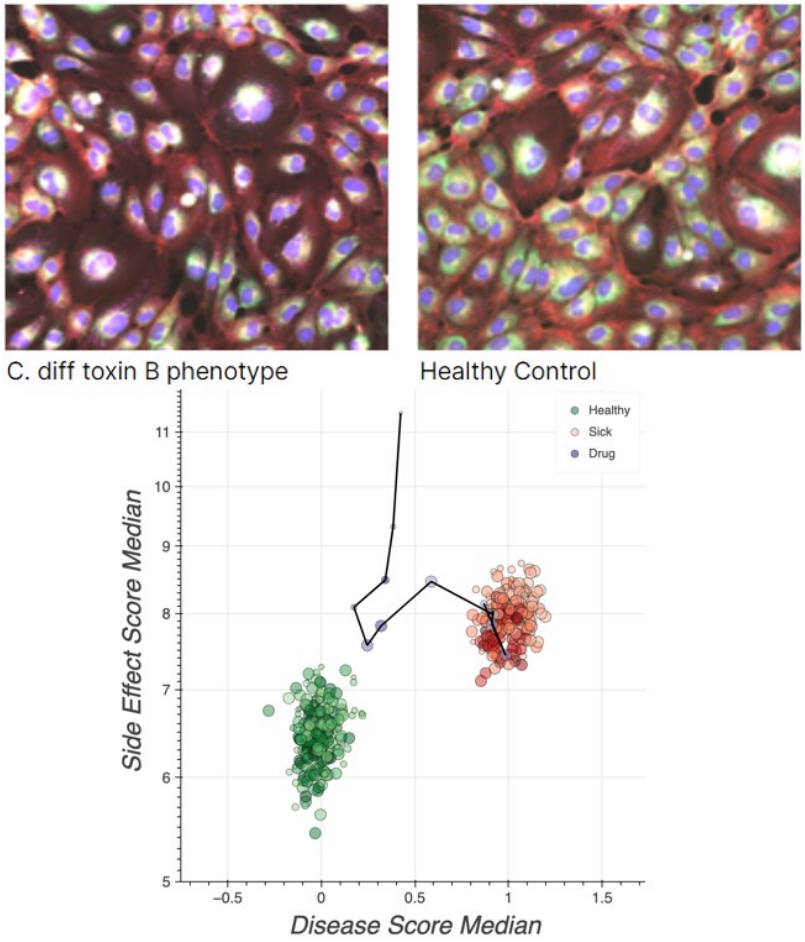


Figure 63. REC-3964 rescued the phenotype of human epithelial cells treated with *C. difficile* toxin. REC-3964 was identified as demonstrating strong dose-responsive rescue in HUVEC cells treated with *C. difficile* toxin b on Recursion's phenomics platform.

We aim to develop REC-3964 as the first safe and efficacious, orally bioavailable, small molecule toxin inhibitor of *C. difficile*, which could be used to prevent recurrent disease and potentially used as secondary prophylaxis in high-risk patients, including elderly immunocompromised patients in long-term care facilities who have a history of related infections and hospitalizations. In addition, this molecule represents a novel mechanism that could be used in combination with currently approved and novel antimicrobials in development for this disease. Unlike antibiotic treatments that can eliminate the gut microbiota and further enhance *C. difficile* infection, this toxin-targeted mechanism would not be expected to negatively impact the gut microbiome. REC-3964 could have the potential to offer protection against recurrent *C. difficile* infections, thereby preventing significant morbidity and mortality.

Preclinical

REC-3964 was validated in orthogonal functional assays including the Electrical Cell-substrate Impedance Sensing (ECIS) assay where it demonstrated concentration-dependent activity in blocking toxin-mediated barrier disruption. We have shown in a target-based validation assay that REC-3964 selectively inhibits the toxin's innate glucosyltransferase (IC50 = 1.2-10 nM), suggesting suppression of toxin-induced glycosylation of Rho-GTPases in host cells as the most likely mode of action. REC-3964 has negligible off-target activity, does not target the host's glucosyltransferases, produces favorable gut and plasma exposure levels following oral dosing, and is non-mutagenic. Further, in an *in vivo* hamster model of *C.Difficile* infection, treatment with REC-3964 significantly prolonged the survival of animals relative to vehicle-treated controls.

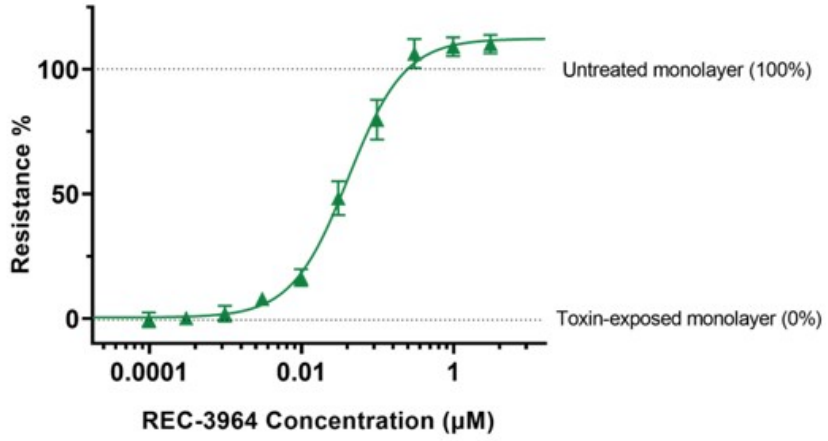


Figure 64. REC-3964 blocks *C. difficile* Toxin B-mediated endothelial barrier disruption. Transendothelial resistance was quantified with ECIS after incubation of HUVEC cells with 10ng/mL TcdB from *C. difficile* in the presence of REC-3964. Barrier resistance is shown on a normalized scale with 0% representing the resistance in the absence of REC-3964, and 100% representing the resistance of healthy monolayers that were not exposed to toxin B. Data are presented as Mean ± SEM, N≥3 independent experiments.

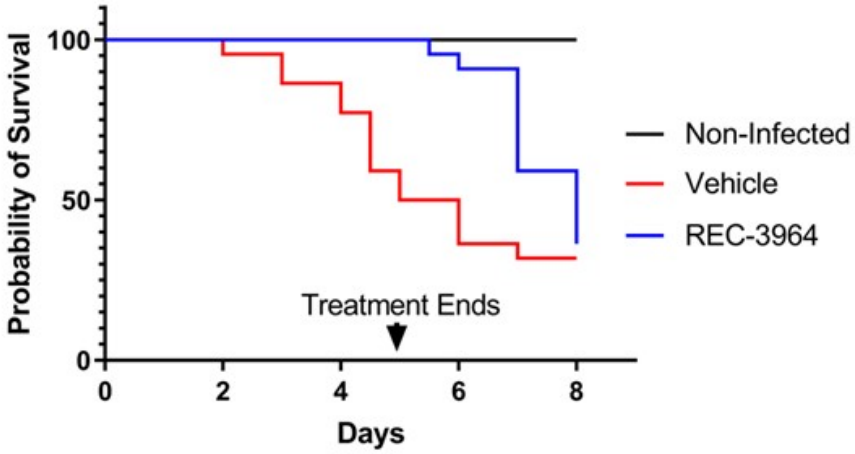


Figure 65. *C. difficile*-infected model hamsters treated with REC-3964 survive longer than vehicle-treated animals. REC-3964 was administered by oral gavage twice daily for 5 consecutive days along with groups for vehicle and vancomycin (50 mg/kg, QD). N=5 in untreated and vancomycin-treated animals and N=10 in vehicle and test-compound treated animals.

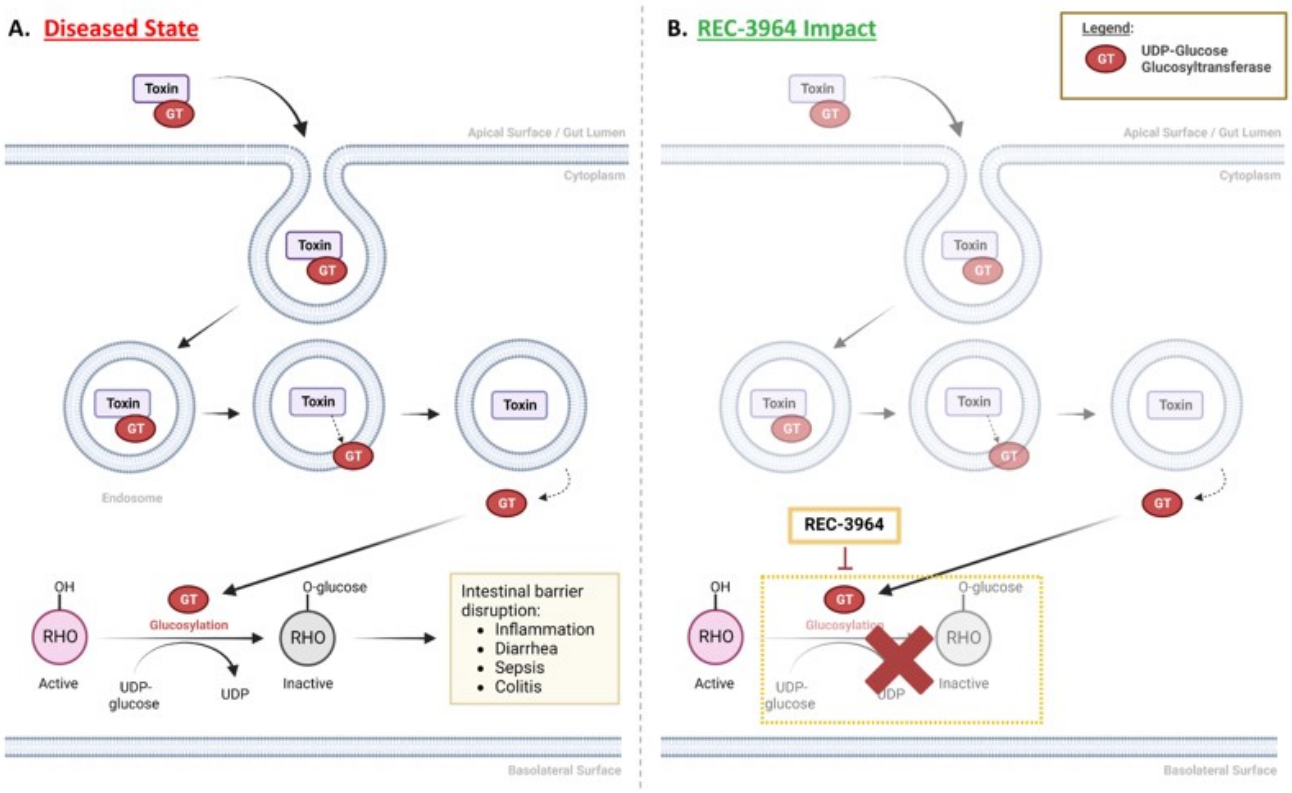


Figure 66. REC-3964 selectively inhibits the toxin's innate UDP-glucose glucosyltransferase. (A) Autocatalytic event releases *C. difficile* toxin's glucosyltransferase enzymatic domain into the infected cell, which locks Rho family GTPases in the inactive state. Inactivation of Rho GTPases alters cytoskeletal dynamics, induces apoptosis and impairs barrier function which drives the pathological effects of *C. difficile* infection. (B) REC-3964 binds and blocks catalytic activity of the toxin's innate glucosyltransferase with no effect on the host protein.[22]

Clinical

REC-3964 has completed IND-enabling safety studies. A Phase 1 first-in-human SAD/MAD clinical study in healthy volunteers is underway. We expect to share safety and PK data in 2H 2023.

Competitors

The following therapeutics are approved to treat *C. difficile* infection:

- The current standard of care for treating *C. difficile* infection is the oral antibiotic vancomycin, according to the 2018 Infectious Diseases Society of America guidelines for the diagnosis and management of *C. difficile* infection.
- Metronidazole is an antibiotic that can be administered orally or IV. It is not prescribed as frequently as other approved therapeutics due to its inferior efficacy compared to vancomycin, especially in severe disease.
- Fidaxomicin is an approved antibiotic launched by Merck in 2011. Though guidelines recommend it as first line therapy due to its superior efficacy in treating *C. difficile* infection and preventing recurrence, it is rarely prescribed.
- Bezlotoxumab is a human monoclonal antibody against *C. difficile* toxin B. It is administered via an infusion as an adjuvant with vancomycin.

There are currently two fecal microbiota transplantation (FMT) potential therapeutics that are anticipated to enter the market in 2023.

- RBX2660 is an enema developed by Ferring/Rebiotix for potentially treating recurrent *C. difficile* infection in patients who have experienced 2 recurrences. Rbx 2660 was voted for approval by the FDA in November 2022.

[22] Awad, MM. et al. (2014). Clostridium difficile virulence factors: Insights into an anaerobic spore-forming pathogen. *Gut Microbes. 5(5)*, 579-593.

- SER-109 is an oral FMT developed by Seres Therapeutics for potentially treating recurrent *C. difficile* infection in patients who have experienced 2 recurrences. Positive results from the Phase 3 clinical trials were reported in May 2022 and Seres was granted a Priority Review designation with a Prescription Drug User Fee Act action date of April 26, 2023.

Selected Preclinical and Discovery Programs

- Novel CDK12-adjacent target, RBM39, for the potential treatment of HR-proficient ovarian cancer (previously identified as Target Gamma).
- Potential first-in-class novel chemical entity with novel MOA to enhance anti-PD-(L)1 response (Target Alpha).
- Potentiator of anti-PD-(L)1 response in high tumor mutational burden cancers (Target Delta).
- Potential treatment of solid and hematological malignancies using indirect MYC inhibition.

HR-Proficient Ovarian Cancer (Previously Identified as Target Gamma) - Late Discovery

Using inferential-search, we identified compounds that inhibit RBM39 and phenocopy the loss of *CDK12*, but not *CDK13*. We further optimized these molecules to generate lead molecules with oral bioavailability that are capable of sensitizing homologous recombination-proficient (HRP) ovarian tumors to PARP inhibitors. There are approximately 13,000 cases per year of HR-proficient ovarian cancers in the US and EU5. While PARP inhibitors have significantly improved outcomes for patients with HR-deficient tumors, patients with HR-proficient tumors are either not eligible for certain PARP-targeted therapies, or have significantly worse response rates. There are currently no approved therapies that sensitize HR-proficient tumors to PARP inhibitors. This program anticipates reaching IND-enabling studies in 2023.

Disease Overview
Ovarian cancer carries a particularly poor prognosis as most patients are diagnosed at an advanced stage. Mutations in genes involved in the DNA Damage Repair pathway, including *BRCA1/2*, are identified in up to 50% of ovarian cancer patients. PARP inhibitors, including olaparib, rucaparib and niraparib, were developed to exploit the resulting susceptibility to additional genomic damage in tumors harboring these mutations. Outcome for ovarian cancer patients with HR-deficient tumors have improved approximately twofold, with even better survival data observed in patients with *BRCA1/2* mutant tumors; however, patients with HR-proficient tumors have not similarly benefited from PARP inhibition; these patients often have poorer prognoses and unfavorable outcomes.

Insight from Recursion OS
CDK12 is a critical transcriptional CDK that regulates the expression of genes involved in the DNA Damage Response (DDR). Inhibiting *CDK12* sensitizes cancer cells to DDR agents such as PARP inhibitors. Additionally, genome-wide studies suggest that *CDK12* deficiency may predict sensitivity to PARP inhibitors in the clinic. As a result CDK12 has been identified as a therapeutic target that can induce synthetic lethality in both HR-deficient and HR-proficient cancers. Discovery of selective CDK12 inhibitors has been challenging as CDK12 and CDK13 share conserved kinase domains. Inhibiting CDK13 may lead to toxicities based on human genetic evidence studies, making combinations difficult to tolerate. Despite reports of functional redundancy, we observed that genetic knockout of *CDK12* could be clearly distinguished phenotypically from that of *CDK13*. We leveraged this insight from the Recursion OS to identify *RBM39* as an alternative target that selectively mimics *CDK12* loss, but not *CDK13*, providing a novel approach for targeting CDK12 biology while mitigating toxicities due to CDK13. We subsequently discovered REC-65029 as closely mimicking the phenotypic loss of *CDK12* and *RBM39*, but not *CDK13*.

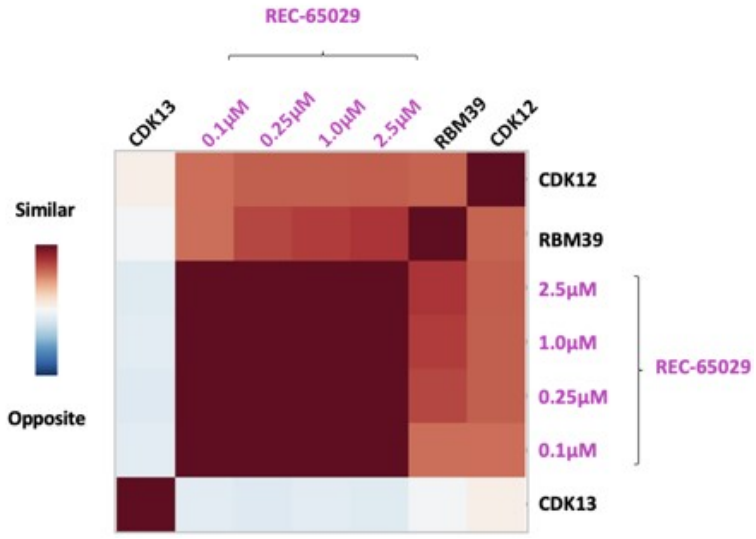


Figure 67: Inferred map relationships between *CDK12, CDK13, RBM39* and REC-65029. Map representation demonstrating a high degree of phenotypic similarity between *CDK12*, *RBM39* and multiple concentrations of REC-65029. *CDK13* shows little or no functional similarity to *CDK12*, *RBM39* or any concentration of REC-65029.

Product Concept

We aim to discover and develop novel, orally bioavailable small molecules that drive de novo sensitivity to PARP inhibitors in HR-proficient tumors. CDK12 inhibition has been proposed as a mechanism to drive sensitivity to PARP in this setting, but the high homology of CDKs makes targeting a single homolog difficult and prone to off-target toxicity. Mimicking the effects of CDK12 inhibition via alternative novel targets could be a route to increase the effectiveness of PARP inhibitors in HR-proficient tumors. We intend to position this agent in combination with PARP inhibitors in HR-proficient ovarian cancer, and potentially explore single agent activity.

Preclinical

In 2022, we evaluated a Recursion-generated NCE molecule REC-1170204 with high phenotypic similarity to REC-65029, the initial small molecule discovered for this program. In vivo efficacy studies evaluated single agent and combination activity with niraparib in OV0273, an ovarian HR-proficient patient derived xenograft (PDX) model. We observed statistically significant responses in both single agent REC-1170204 and combination vs either Niraparib or vehicle arms. We also saw significant survival for animals treated with REC-1170204 alone or in combination with Niraparib at >30 days post final dose. We have identified a lead series and are advancing lead molecules into pilot (rodent and non-rodent species) safety studies while pursuing back-up molecules.

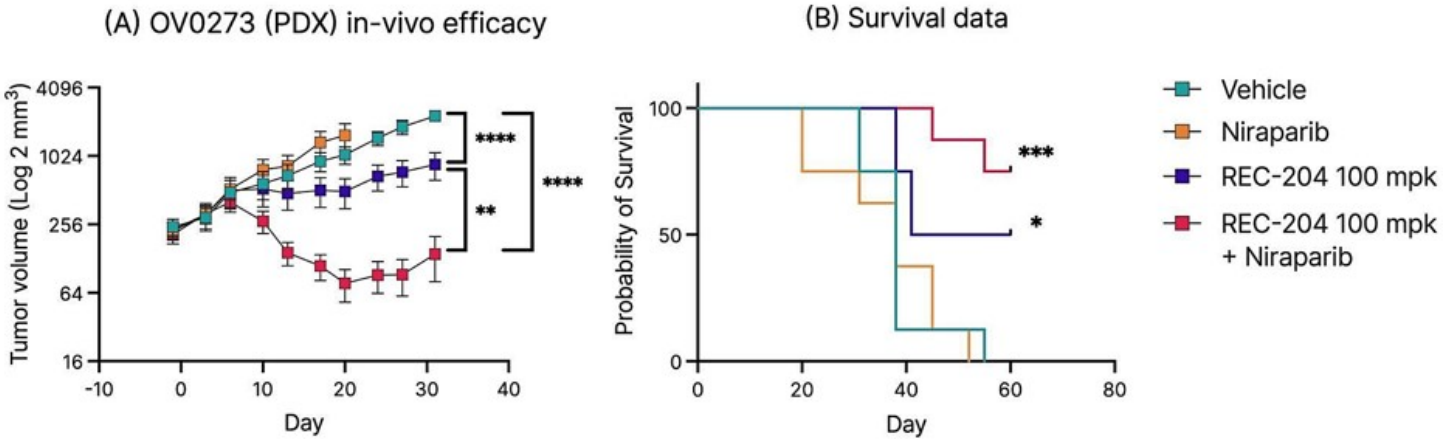


Figure 68. REC-1170204 ± Niraparib inhibits tumor growth in the OV0273 PDX mouse model. In the OV0273 PDX model, mice were treated with a representative lead molecule REC-1170204 (100 mg/kg, BID, PO) ± Niraparib

(40 mg/kg, QD, PO) for 32 days. Single agent REC-1170204 or in combination with Niraparib resulted in a statistically significant response vs either Niraparib or vehicle arms. In addition, there was a statistically significant improvement in survival > 30 days post final dose. *p<0.05, ** p<0.01, **** p<0.0001.

Enhancing Anti-PD-(L)1 Response by Inhibiting Novel Targets (Target Alpha) - Late Discovery

We identified a lead series using our inferential-search approach that is capable of amplifying the response to checkpoint therapy *in vivo*. A therapy that enhances anti-PD-(L)1 effect has the potential to increase the response rate in anti-PD-(L)1-eligible patients or expand the eligibility criteria of patients not expected to respond to immune checkpoint therapy. Additional priming of tumors can have a significant benefit, as response rates in checkpoint-eligible settings is approximately 12-15%. Furthermore, many tumor types have proven intractable for immunotherapy and could greatly benefit from this approach. Although there are several approved combinations with anti-PD-(L)1, the vast majority of these are combinations with other checkpoint antibodies. These combinations frequently lead to an increase in the presence of immune-related adverse events (IRAEs), thereby causing treatment discontinuation and hindering the overall patient benefit. This program anticipates reaching IND-enabling studies in 2023.

Disease Overview
Anti-PD-(L)1 therapies have significantly changed the landscape of cancer therapy over the past ten years. In eligible patients, overall survival has nearly doubled for certain tumors and serious adverse events have nearly halved compared to historical chemotherapies. Despite the use of biomarkers, such as PD-L1 expression and tumor mutation burden (TMB) status, low response rates persist in many checkpoint-eligible settings. Furthermore, next generation checkpoints such as LAG-3 and TIGIT, or strategies to promote secondary immune activation (e.g., STING or dual checkpoint) focus primarily on addressing these efficacy limitations. Yet these newer agents have been shown to amplify IRAEs, leading to treatment reductions and discontinuations. An agent that increases sensitivity to anti-PD-1 therapy without concomitant increases in peripheral inflammation could enhance response rates in under-responsive tumor types and lead to more durable clinical benefits for patients.

Insight from Recursion OS
We mapped 110 genes identified as causal markers of response or resistance to immunotherapy derived from *in vivo* pooled CRISPR genetic screens in mice. We discovered an interesting novel relationship between *BIRC2*, other *BIRC2* family genes and Gene A, a known modulator of inflammation and a counterintuitive target for enhancing immunotherapy response. We used the Recursion OS to identify both an annotated inhibitor of Gene A, REC-648918, and a second gene, Gene B as a second target of REC-648918, which was independently uncovered as a potential immunotherapy resistance marker.

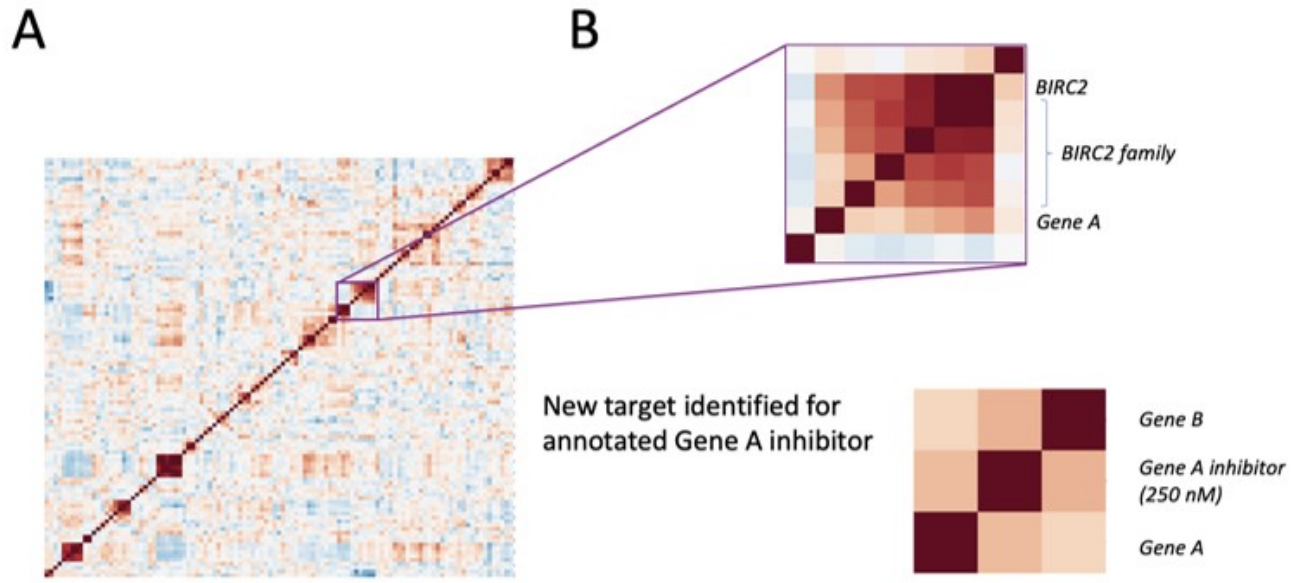


Figure 69: Inferred map relationships supporting initiation of Target Alpha. (A) Map representation of 110 causal markers of response or resistance to immunotherapy identified from *in vivo* pooled CRISPR screens in mice.

(B) Cluster of genes including *BIRC2*, *BIRC2* family genes and Gene A, an druggable gene with unexpected clustering in this group. Map relationship between Gene A, an annotated Gene A inhibitor and Gene B.

Product Concept

We aim to discover and develop novel, orally bioavailable small molecules that drive sensitivity to immune checkpoint therapies. We identified an agent that potentiates anti-PD-1 tumor efficacy while decreasing peripheral inflammation compared to anti-PD-(L)1 alone that could both enhance response rates in under-responsive tumor types and decrease IRAEs, likely leading to more durable clinical benefits for patients. We intend to position this therapeutic in combination with anti-PD-(L)1 in both checkpoint-eligible and checkpoint-resistant patients.

Preclinical

In June 2022, we characterized a novel chemical entity, REC-1170035, with significantly increased potency from the original compound, REC-648918. *In vivo* efficacy was improved in the CT26 tumor model from 40% to 60% complete responses in combination with anti-PD-1 therapy, and all complete responders elicited immunological memory upon rechallenge. REC-1170035 in combination with anti-PD-1 caused significant recruitment of $CD45^+$ cells into the tumor microenvironment, while significantly attenuating the percentage of immunosuppressive, alternatively activated (M2) macrophages and percentage of exhausted, $LAG3^+$, $CD8^+$ T cells. While REC-1170035 maintained local anti-tumor inflammation, the levels of IFNγ and CXCL10 were significantly reduced in the blood as compared to anti-PD-1 therapy alone. Additional chemical optimization efforts for this program have focused on improving human dose projection and pharmacokinetic properties.

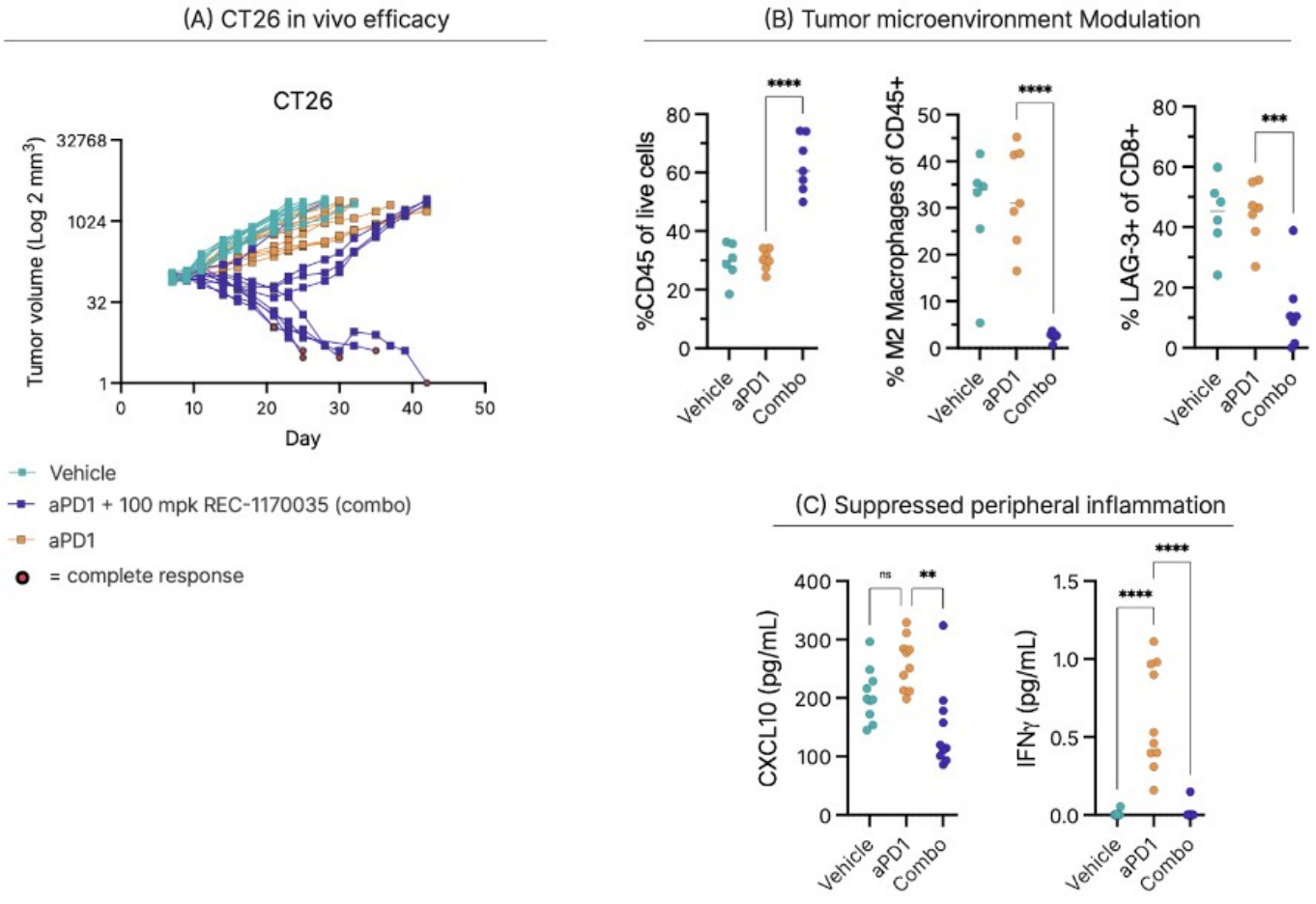


Figure 70. REC-1170035 inhibits tumor growth in a mouse CT26 colorectal cancer model in combination with anti-PD-1 without inducing peripheral inflammation. (A) Mice harboring CT26 tumors show 60% complete tumor regressions upon treatment with 100 mpk REC-1170035 in combination with 10 mpk anti-PD-1. (B) Flow cytometric analysis of the CT26 tumor microenvironment following 11 days of dosing. One-way ANOVA and Tukey's post test, ***p<0.001, ****p<0.0001. (C) Blood levels of CXCL10 (left) and IFNγ (right) in CT26 tumor bearing mice

following 10 days of dosing. Statistical analysis performed using one-way ANOVA and Tukey's post test against aPD1 alone, **p<0.01, ****p<0.0001.

Potentiator of Anti-PD-(L)1 in High TMB Cancers (Target Delta) - Preclinical

We have identified a novel use for a clinical-stage, orally bioavailable small molecule to improve sensitivity to immune checkpoint inhibitors in non-small cell lung cancer (NSCLC) and additional tumors harboring high TMB including *KRAS* and p53 mutations. Each year over 150,000 high TMB patients are eligible for treatment in the US and EU5 Although many of these patients receive anti-PD-1 therapy, response rates are highly variable and the need for a chemotherapy-free regimen in the refractory setting remains high in this population. This program is currently in the dose-optimization phase.

Disease Overview
While anti-PD-1 therapy is approved for high TMB (greater than or equal to 10 muts/Mb), there is a significant degree of heterogeneity in responses, there remains a significant need for additional therapies to act as single agents or to potentiate the activity of currently approved immunotherapies.

Insight from Recursion OS
Certain loss of function (LoF) mutations in cancer are known to drive immune checkpoint resistance. We hypothesized that agonizing the same targets in a wildtype setting may work to further augment immune sensitivity and response to checkpoint inhibitors. We searched the Recursion OS to identify small molecules that act phenotypically opposite to several loss of function genes and identified Gene A and the compound REC-64151, which is strongly phenotypically opposite to Gene A. On the basis of this inference, we advanced REC-64151 into a non-small cell lung carcinoma (NSCLC) model to determine if it would potentiate the response to anti-PD-1.

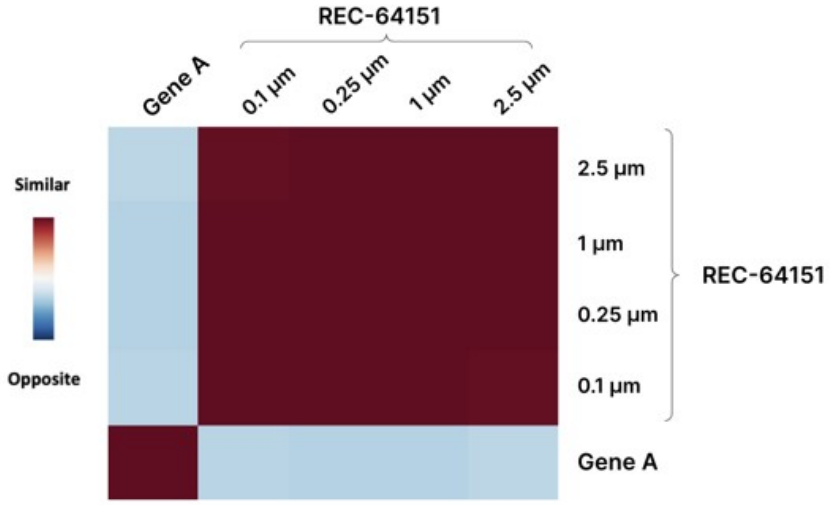


Figure 71: Inferred map relationships between Gene A and REC-64151. Map representation demonstrating a high degree of phenotypic opposite between Gene A and REC-64151 at multiple concentrations.

Product Concept
We aim to discover and develop orally bioavailable, small molecule therapeutics that potentiate immunotherapies. We intend to position these therapeutics in combination with anti-PD-(L)1 and other targeted therapies in metastatic NSCLC and other populations with high tumor mutation burden.

Preclinical
We capitalized on our inferential-search approach to identify small molecules that show pheno-opposite relationships to LoF mutations in cancer known to drive immune checkpoint resistance. In Q4 2022, we showed that REC-64151 potentiates anti-PD-1 in a NSCLC model compared to anti-PD-1 alone. All complete responders elicited immunological memory upon rechallenge. We are currently evaluating several molecules with similar mechanisms of action in *in vivo* efficacy and tolerability studies.

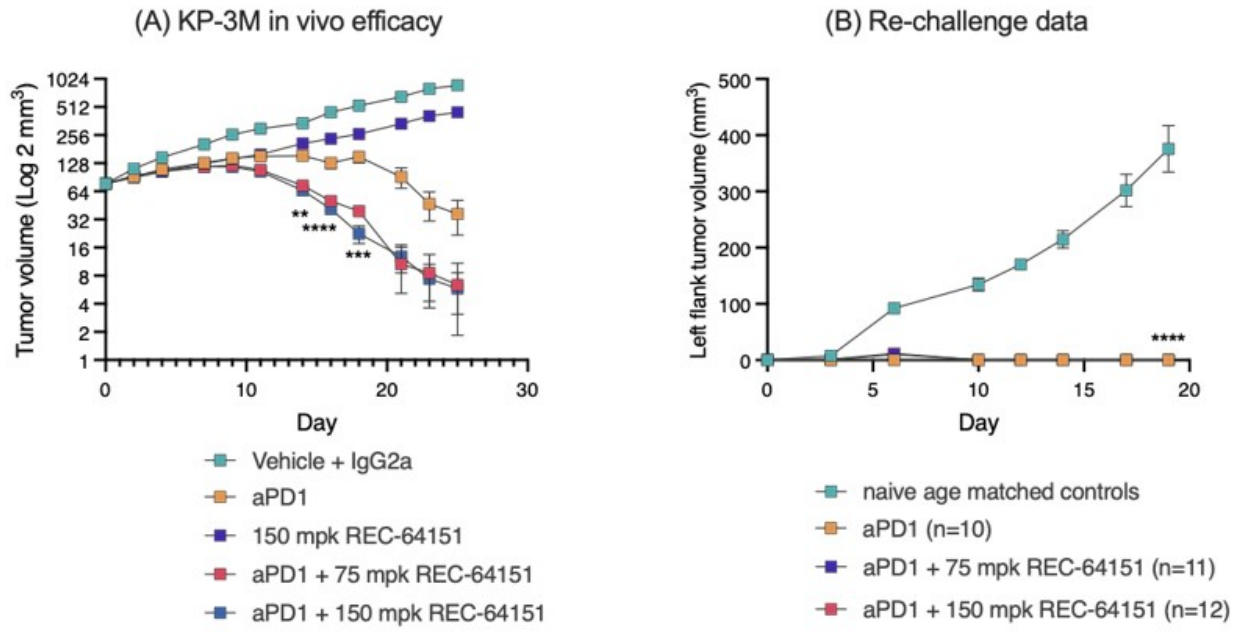


Figure 72. REC-64151 potentiates anti-PD-1 in a high TMB NSCLC model. (A) KP-3M tumor cells were injected into the subcutaneous right flank of mice, allowed to size match and then treated for 25d with either vehicle, anti-PD-1 (10 mg/kg/day BIW), REC-64151 (150 mg/kg/day QD), anti-PD-1 + REC-64151 (at 75 or 150 mg/kg/day QD). Tumor volumes are represented as mean ± SEM. Statistical analysis performed using mixed-effects two way ANOVA and Tukey's post test against aPD1 alone, **p<0.01, ****p<0.0001, ***p<0.001. (B) When re-challenged with KP-3M tumor cells on the left flank, all mice that achieved CR rejected re-implantation. Statistical analysis performed using two way repeated measures ANOVA and Tukey's post test against naive age-matched controls, ****p<0.0001.

Partnerships

We have and in the future may collaborate with third parties to broadly explore diverse disease domains (such as fibrosis, neuroscience, oncology, immunology and inflammation) in order to identify novel target insights and potential therapeutics that may include small molecules, large molecules, gene therapies and cell therapies. We may also explore a communal asset-type strategy where we license search results from our phenomaps to partners.

The goal of every partnership is to create therapeutics, yet the approach may take multiple forms:

- *Novel Therapeutics*. Without any presumptive target hypothesis, we can identify differentiated therapeutics by rapidly evaluating large compound libraries within our maps of human cellular biology.
- *Novel Targets*. By profiling diverse biological perturbations (such as genetic factors) on our platform, we may be able to identify novel druggable targets that we can then exploit with partners to generate therapeutic candidates.

Roche & Genentech Collaboration and License Agreement

On December 5, 2021, we entered into a Collaboration and License Agreement with Genentech, Inc. and F. Hoffmann-La Roche Ltd, pursuant to which we will construct, using our imaging technology and proprietary machine learning algorithms, unique maps of the inferred relationships amongst perturbation phenotypes in a given cellular context and together with Roche and Genentech will create multi-modal models and maps to further expand and refine such inferred relationships, in both cases with the goal to discover and develop therapeutic small molecule programs in a gastrointestinal cancer indication and in key areas of neuroscience.

Upfront Payment. In January 2022, Roche paid us an upfront cash payment of $150.0 million.

Phenomap Creation, Acceptance and Access. Under the Collaboration Agreement, we are responsible for creating a certain number of phenomaps in each of the Exclusive Fields. We will also provide Roche with limited access to our pre-existing human umbilical vein endothelial cells (HUVEC) phenomap. Roche will have specified rights to query or access the phenomaps to generate novel inferences that may lead to the discovery or development of therapeutic products.

Phenomap-Related Options. Each of the phenomaps requested by Roche and created by Recursion may be subject to either an initiation fee, acceptance fee or both. Such fees could exceed $250.0 million for sixteen (16) accepted phenomaps. In addition, for a period of time after Roche's acceptance of certain phenomaps, Roche will have the option to obtain, subject to payment of an exercise fee, rights to use outside the collaboration the raw images generated in the course of creating those phenomaps. If Roche exercises its External Use Option for all twelve (12) eligible phenomaps, Roche's associated exercise fee payments to Recursion could exceed $250.0 million.

Collaboration Programs and Roche Options. Roche and Recursion will collaborate to select certain novel inferences with respect to small molecules or targets generated from the phenomaps for further validation and optimization as collaboration programs. Roche and Recursion may also combine sequencing datasets from Roche with Recursion's phenomaps and collaborate to generate new algorithms to produce multi-modal maps from which additional collaboration programs may be initiated. For every collaboration program that successfully identifies potential therapeutic small molecules or validates a target, Roche will have an option to obtain an exclusive license to develop and commercialize such potential therapeutic small molecules or to exploit such target in the applicable Exclusive Field.

Payments if Roche Exercises Option for a Collaboration Program. Under the collaboration, Roche may initiate up to forty (40) small molecule collaboration programs. Each small molecule collaboration program, if optioned and successfully developed and commercialized by Roche, could yield more than $300.0 million in research, development, commercialization and net sales milestones for Recursion, as well as mid- to high-single digit tiered royalties on net sales. Recursion is also eligible for research, development, commercialization and net sales milestones for target collaboration programs optioned by Roche.

Recursion Programs. If Roche does not exercise its options in the Collaboration Agreement for certain collaboration programs, we may, with Roche's prior consent, choose to independently validate, develop and commercialize products in a limited number of such programs, subject to agreed milestones and royalties to Roche. Roche will have rights to obtain an exclusive license to exploit such products by providing notice and paying us an opt-in fee and economics exceeding those that would otherwise be applicable if Roche had exercised its option for such program.

Exclusivity. During an agreed period of time after the Collaboration Agreement's effective date, we are subject to certain exclusivities that limit our ability to conduct certain research and development activities with respect to compounds and targets in the Exclusive Fields, other than pursuant to the collaboration with Roche. However, we may continue pursuing products that we are researching and developing in the Exclusive Fields as of the effective date of the Collaboration Agreement.

Termination. The Collaboration Agreement includes standard termination provisions, including for material breach or insolvency and for Roche's convenience. Certain of these termination rights can be exercised with respect to a particular Exclusive Field or exclusive license, as well as with respect to the entire Collaboration Agreement.

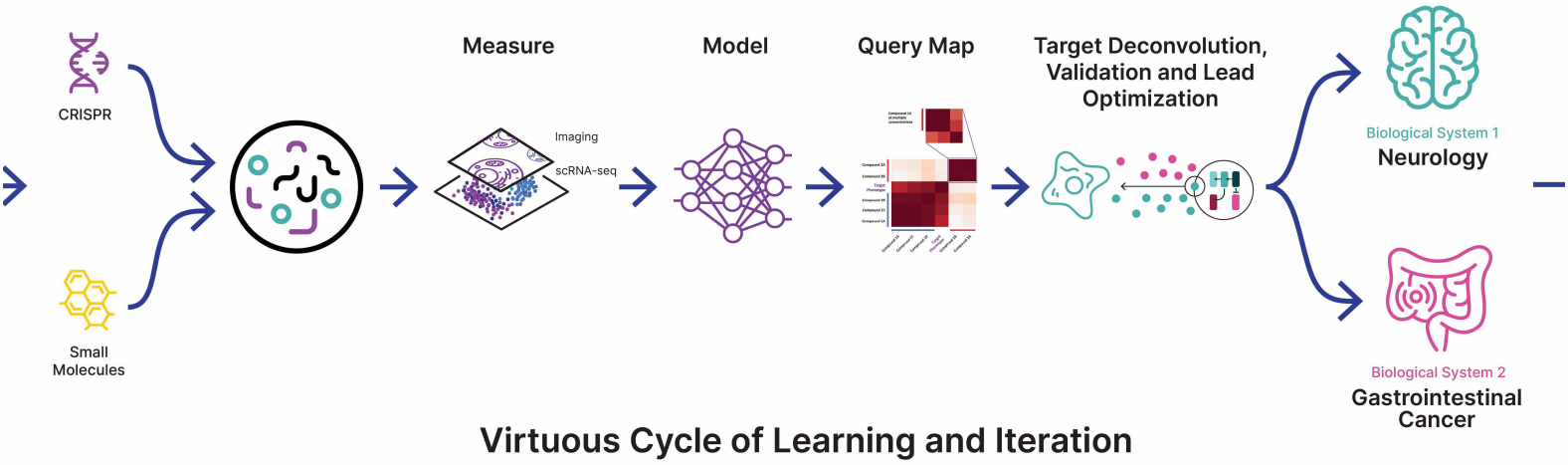


Figure 73. Under our collaboration with Roche & Genentech, we are creating multimodal maps of cellular biology to elucidate novel targets and starting points.

Bayer AG Research Collaboration and Option Agreement

In August 2020, we entered into a Research Collaboration and Option Agreement, or the Bayer Agreement, with Bayer AG, or Bayer. The Bayer Agreement was subsequently amended in December 2021 to incorporate usage of our biological mapping and navigating tools (inferential search). This agreement has a five-year term pursuant to which we and Bayer may initiate more than a dozen projects related to fibrosis across multiple organ systems, including lung, liver and heart. Under the agreement, we contributed approximately 190,000 compounds from our proprietary library and Bayer contributed approximately 500,000 compounds from its proprietary library and will contribute scientific expertise throughout the collaboration. During the five-year term of the Bayer Agreement, we are prohibited from conducting certain research and development activities in the field of fibrosis outside of the collaboration, either by ourselves or together with third parties.

We received an upfront technology access fee of $30.0 million in September 2020 as part of the Bayer Agreement. Under each research project, we will work with Bayer to identify potential candidates for development. Under the agreement, Bayer has the first option for licenses to potential candidates; each such license could potentially result in option exercise fees and development and commercial milestones paid to us with an aggregate value of up to approximately $100.0 million (for an option on a lead series) or up to approximately $120.0 million (for an option on a development candidate), as well as tiered royalties for each such license, ranging from low- to mid-single-digit percentages of sales, depending on commercial success. Royalty periods for each license are on a country-by-country basis, and the duration of each such period is tied to the duration of patent or regulatory exclusivity in each country (with a minimum term of 10 years each).

If Bayer does not exercise its option with respect to a development candidate or otherwise discontinues a research project prior to completion, within a specified period of time, we may exercise an option to negotiate with Bayer in good faith to obtain an exclusive license under Bayer's interest in any lead series or development candidate developed pursuant to the research project and backup compounds related to thereto, as well as a non-exclusive license under Bayer's background intellectual property necessary for our use of the project results related to such compounds.

Bayer may terminate the collaboration at any time without cause. Either party may terminate the agreement for a material breach by the other party. The term of each lead series or development candidate license agreement continues on a product-by-product and country-by-country basis until the later of (a) the expiration of the last to expire valid claim of the licensed patents covering such product in such country, (b) the expiration of any applicable regulatory exclusivity period for such product in such country and (c) ten (10) years after the first commercial sale of such product in such country. Bayer may terminate each such license agreement at any time without cause. Either party may terminate each such license agreement for the other party's uncured material breach. As of this prospectus, we have not entered into any lead series or development candidate license agreements with Bayer.

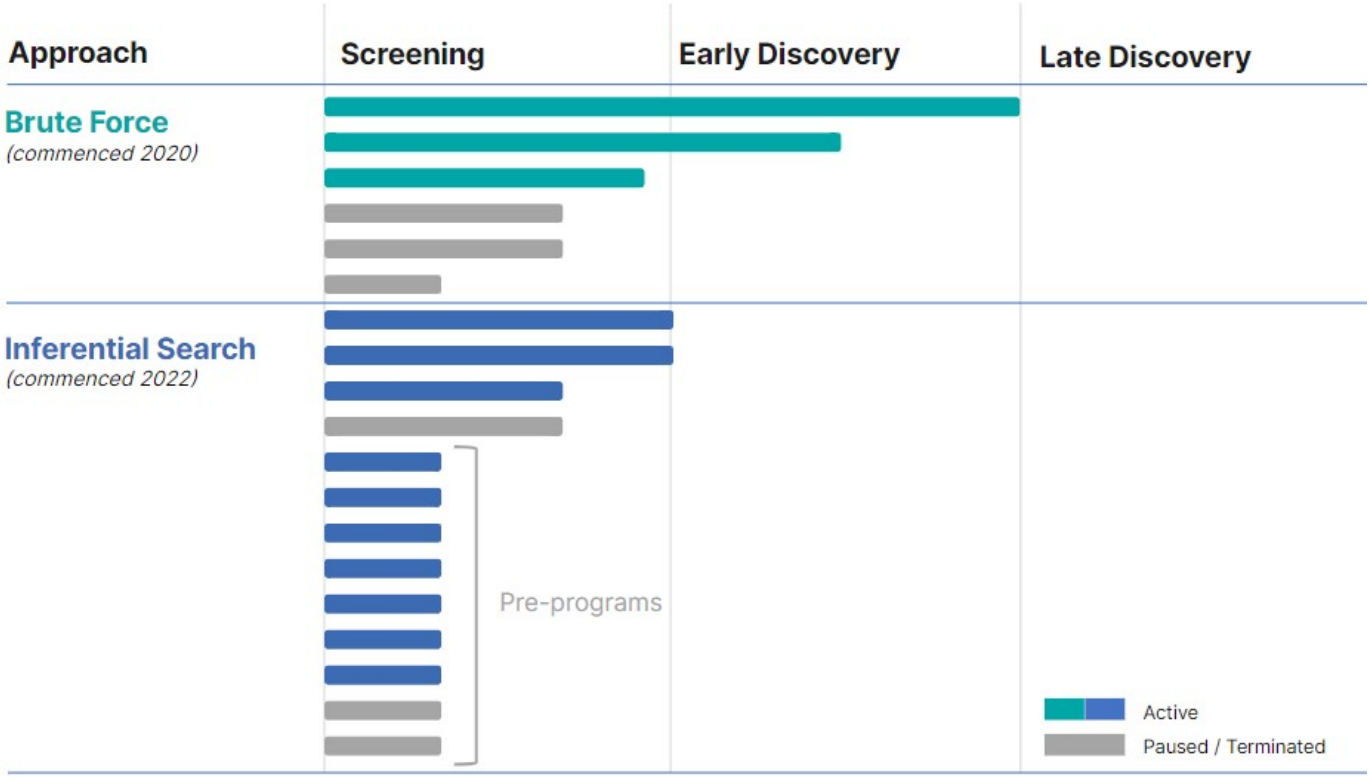


Figure 74. Multiple programs are advancing simultaneously in parallel to near-term milestones in the Bayer collaboration. Brute force programs commenced early in the partnership are making substantial progress, while the transition to inferential search accelerated new program initiation in 2022.

People and Culture

Essential to leading and defining TechBio is our growing team of approximately 500 Recursionauts, balanced between life scientists such as chemists and biologists (approximately 40% of employees) and computational and technical experts such as data scientists and software engineers (approximately 35% of employees). This kind of functional balance intentionally stands in contrast to traditional biotechnology companies. Together our team creates an environment where empirical data, statistical rigor and creative thinking is brought to bear on the problems we address. While we are united in a common mission, ***Decoding Biology to Radically Improve Lives***, our greatest strength lies in our differences: expertise, gender, race, disciplines, experience and perspectives. Deliberately building and cultivating this culture is critical to achieving our audacious goals.

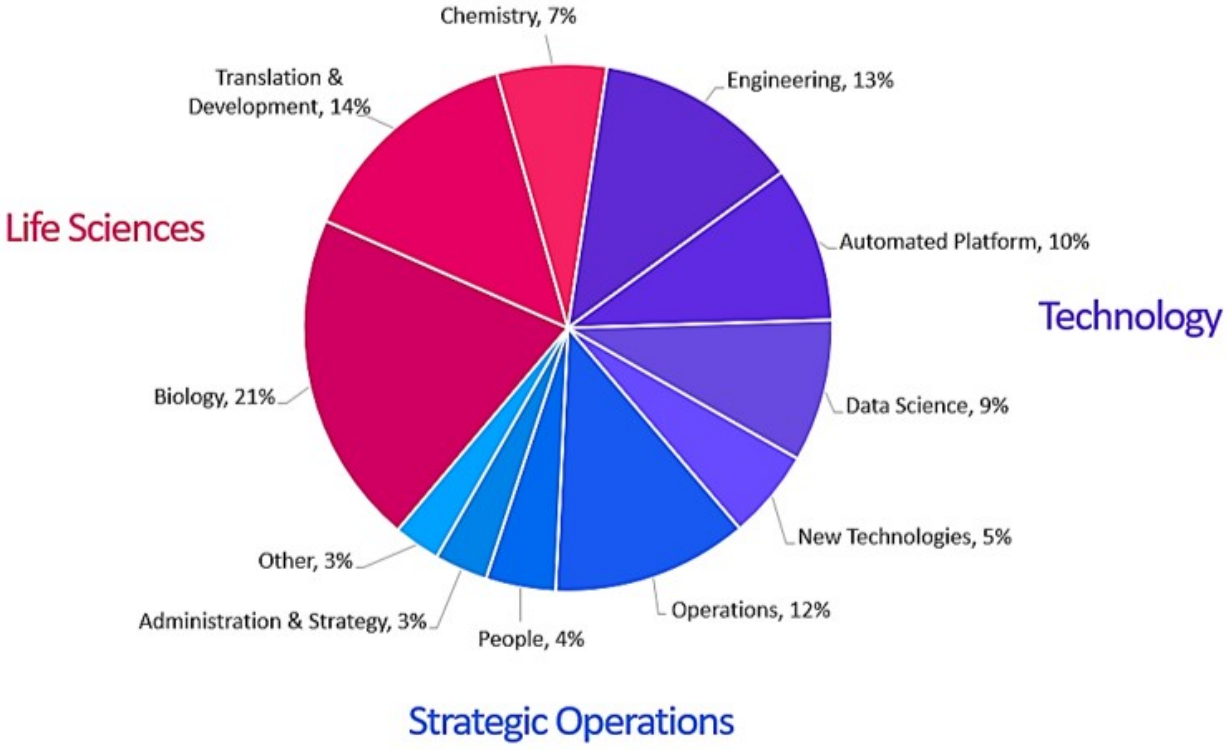


Figure 75. Breakdown of Recursion's approximately 500 employees across life sciences, technology and strategic operations.

One of the most critical elements supporting Recursion's leadership in TechBio is what we call the Recursion Mindset– a deep belief and commitment to industrialization through automation, systems-thinking, algorithms and data to deliver our mission. Broadly at the company we apply this mindset to eliminate toil and inefficiency creating space for our creative energy to be pointed at Recursion's hardest problems. The Recursion Mindset is made manifest through our Founding Principles and supported by our Culture and Values. Our Founding Principles are the guideposts to our approach to technical and scientific decision-making. Our Values are the core behaviors that define our Culture and are the simplest definition of how we will achieve our mission. Combined they are the shape of our culture and guide us to reimagine how medicines are made on the path to delivering our mission.

Figure 76. Recursion's Founding Principles. These six founding principles differentiate our approach from nearly every other biopharma company, enable us to lead TechBio and form the foundation for a mindset we teach and enrich for at Recursion.

Figure 77. Recursion's Values. These five values support our founding principles and guide our culture at Recursion.

Diversity, Equity, Inclusion and Belonging

At Recursion, we believe in the moral and business case for diversity. The research-based evidence is unequivocal that diverse perspectives support better complex decision-making, foster greater innovation and ultimately result in greater company performance and success. We seek the best talent by maximizing diversity at the top of the recruiting funnel and then mitigating bias through objective decision-making throughout the hiring process. We foster an environment of inclusion for candidates and employees to unleash the strength of our differences. Lastly, acknowledging the breadth of societal injustice and inequities we pursue fair and equitable outcomes across all people-decisions through process design and supported by analytics.

Employee Recruitment, Development and Training

We take a design-thinking approach to building the employee experience at Recursion. It is a fit-for-purpose system that finds, grows and retains top talent to deliver our mission. Our people are mission-driven, humble, bright, generous of spirit and constructively dissatisfied with the status quo. We employ a targeted approach to identify, attract and hire diverse employees across highly-technical scientific disciplines including: biology, chemistry, data science, machine learning, engineering, robotics, clinical development and more. We seek people that are a fit for our commitment to industrialization as defined by our Recursion Mindset, which is manifested in our Founding Principles and Values.

Culturally, we instill an expectation to be constantly learning and teaching in pursuit of growing ourselves as fast as Recursion. Most notable is a 2-day experience offered year-round to all employees called Decoding Recursion. It is an opportunity for close interaction with senior leaders who teach the Recursion Mindset through stories. The need to learn is reinforced throughout our performance system which creates accountability for our learning, delivery and impact on others.

People stay at Recursion because of the opportunity to impact the world and grow in a place where they feel challenged, supported and connected. Throughout the employee experience we create moments, rituals, programs and spaces that inspire ambition, reward contributions and growth and foster belonging.

Employee Health and Safety
We have dedicated Standard Operating Procedures to manage occupational health and safety, safety training and injury and illness and incident reporting. Every employee is responsible to ensure these procedures and policies are followed. We offer extensive training to ensure understanding and compliance. Compliance is mandatory for all laboratory employees per requirements of the Occupational Safety and Health Administration standard on Hazardous Chemicals in Laboratories. Our Co-Founder and CEO is the Director of Public Safety at the company and has the ultimate responsibility for chemical hygiene within the organization. Our Chemical Hygiene Officer and Lab Manager oversees the day-to-day management of institutional chemical hygiene.

Read more about how we invest in and motivate our people to achieve our mission in Recursion's latest Environmental, Social and Governance Report, available at our corporate website.

Facilities

Headquarters

In 2018, we moved to our current headquarters which is located in downtown Salt Lake City, Utah. We lease office, research and laboratory space under a lease that expires in May 2028 and have entered into a lease for an additional research and laboratory space that expires in May 2032. Our modern headquarters is a draw for local, national and international talent and houses both traditional and automated laboratories for drug research.

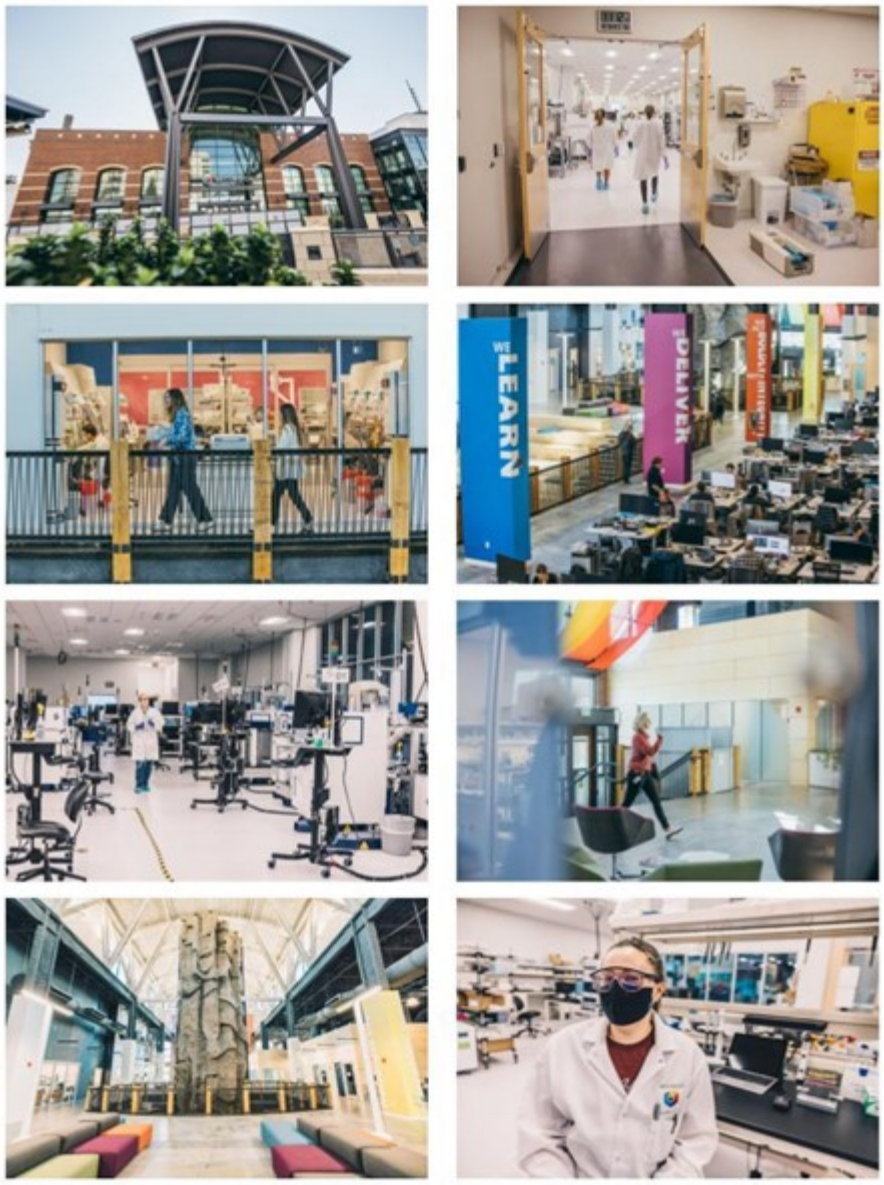


Figure 78. Our headquarters is centrally located in downtown Salt Lake City, Utah. Images of our headquarters in Salt Lake City, Utah. We are a proud founding member of BioHive, the branding effort of the life science hub of Utah. Working with state and local government, we are helping to create a burgeoning life science ecosystem around a downtown cluster of existing and soon to move companies centered around our headquarters.

Satellite Offices and Facilities

Toronto and Montreal. In 2021, we announced plans for our first major international expansion in Toronto. This site serves as a multidisciplinary hub across data science, machine learning, engineering and computational biology and is scheduled to open in 2023. Additionally, we announced a multi-year collaboration with Mila, the Quebec Artificial Intelligence Institute, to accelerate Recursion's machine learning capabilities, and opened our Montreal site in September 2022.

Figure 79. Recursion's satellite offices and facilities. Left panel: Mila, the Quebec Artificial Intelligence Institute, is recognized worldwide for its major contributions to AI. Right panel: Our Toronto office is Recursion's first major expansion project outside of the United States. This site, along with the Mila Montreal office, will serve as multidisciplinary hubs across data science and machine learning.

Digital Vivarium. We lease a property that serves as a rodent vivarium. This lease expires in May 2028. We use this facility to conduct drug-discovery enabling pharmacokinetic, pharmacodynamic and exploratory safety studies. The facility is equipped with proprietary, digitally-enabled cage technology.

Corporate Social Responsibility

We believe that to achieve our mission, we must *act like the company we aim to be*, which means we must be a good corporate citizen. In recognition of our commitment to excellence in environment, social and governance, Recursion received a Prime Rating in 2022 for ESG performance from Institutional Shareholder Services (ISS). The ISS ESG Corporate Rating provides an assessment of a company's environmental, social and governance activity. A Prime Rating is awarded to companies with ESG performance above a sector-specific threshold and is defined by ISS as "absolute best in class". Additionally, as of October 2022, Recursion was ranked 98 out of over 850 companies (approximately top 10%) in the pharmaceutical category by Morningstar Sustainalytics[23] which gives an in-depth analysis of a company's ESG performance and compares it to industry peers.

To date, we have focused our community efforts in areas of impact that are aligned with our Values and our strengths, including: (i) diversity, equity and inclusion in technology and biotechnology (e.g., the Recursion Foundation has partnered with the University of Utah to sponsor Altitude Lab, a life science incubator and accelerator for diverse health care entrepreneurs); (ii) the growth and sustainability of our local life science and technology ecosystems (e.g., Recursion is a founding member of BioHive, a Utah life science collective); and (iii) the promotion of sustainable environmental practices. We believe that through these principles of community engagement, we can extend our mission of radically improving lives to those in our communities.

Read more about how we are delivering on that belief in Recursion's Environmental, Social and Governance Report

Commercialization

We may retain significant development and commercial rights to some of our drug candidates. If marketing approval is obtained, we may commercialize our drug candidates on our own, or potentially with a partner, in the United States and other geographies. We currently have no sales, marketing, or commercial product distribution capabilities. Decisions to create this infrastructure and capability will be made following further advancement of our drug candidates and based on our assessment of our ability to build the necessary capabilities and infrastructure

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with competitive advantage. Clinical data, the size of the addressable patient population, the size of the commercial infrastructure, manufacturing needs and major trends as to how value is accrued in the industry may all influence or alter our commercialization plans.

Manufacturing

We currently utilize contract development and manufacturing organizations to produce drug substance and investigational drug product in support of the assets within our pipeline. To date, we have obtained drug substance and drug product for our drug candidates from third party contract manufacturers. We are in the process of developing our supply chain for each of our drug candidates on a project-by-project basis based on our development needs.

Strategic Agreements

In order to achieve our mission, we partner with leading biotechnology companies, pharmaceutical companies and academic research institutions to identify novel therapeutics and unlock biological insights using our discovery technology. Our partnering efforts take two primary forms: i) Discovery Platform Partnerships and ii) Asset-Based Collaborations.

Asset-Based Collaborations

In addition to NCEs, the Recursion OS may discover new uses for known chemical entities owned or controlled by third parties. In such circumstances, we may license rights to these assets in order to advance these programs internally. Following are four such enabling licensing agreements underlying our four clinical stage programs.

REC-994: University of Utah Research Foundation Agreements

In February 2016, we entered into an Amended and Restated License Agreement with the University of Utah Research Foundation, or UURF, pursuant to which we obtained an exclusive license under certain patents and a non-exclusive license under certain know-how, in each case controlled by UURF and related to the drug tempol, or REC-994, to make, have made, use, offer to sell, sell, import and distribute products incorporating REC-994 worldwide for the treatment of cerebral cavernous malformation, or CCM. In partial consideration for the license rights, we issued UURF equity in our company. In addition, we agreed to reimburse UURF for a specified portion of costs associated with the filing, maintenance and prosecution of the licensed patent rights. The Amended and Restated License Agreement will expire on a country-by-country basis upon the expiration of the last-to-expire patent within the patent rights in the applicable country. UURF may terminate the agreement for an uncured material breach, if we cease commercially diligent efforts to develop or commercialize a licensed product or service, or our bankruptcy or insolvency.

REC-2282: Ohio State Innovation Foundation In-License

In December 2018, we entered into an Exclusive License Agreement with the Ohio State Innovation Foundation, or OSIF, pursuant to which we obtained an exclusive, sublicensable, non-transferable, royalty-bearing license under certain patents and fully-paid up, royalty-free, nonexclusive license under certain know-how, in each case controlled by OSIF and related to the pan-histone deacetylase inhibitor, OSU-HDAC42, or REC-2282, to develop, make, have made, use, sell, offer for sale and import products incorporating OSU-HDAC42 worldwide. OSIF also assigned certain assets to us, relating to the pharmaceutical composition known as AR-42. OSIF retains the right to use and allow other academic, nonprofit and government institutions to use the licensed intellectual property for research, non-commercial and educational purposes. OSIF shall not practice, have practiced, or transfer such reserved rights for any clinical purpose other than completion of the existing clinical trials at the time of the license agreement without our prior written consent. We are developing REC-2282 for the treatment of NF2 and are evaluating the utility of the compound in additional disease states using our platform.

Pursuant to the agreement, we must use commercially reasonable efforts to commercialize licensed products and are required to meet certain diligence milestones within two years following the execution of the agreement, including the initiation of clinical trials. The license agreement is also limited by and made subject to certain rights and regulations of the government, including the Bayh-Dole Act.

In consideration for the license, we paid OSIF an upfront payment of $2.0 million dollars and are obligated to pay OSIF certain milestones, totaling up to $20.0 million dollars, as well as mid-single digit royalties on net sales of the licensed products. In addition, we owe 25% of any non-royalty sublicensing consideration prior to a Phase II clinical trial or 15% of such sublicensing consideration after initiation of a Phase II clinical trial, provided that milestone payments are creditable against these sublicensing fees. In 2022 we paid OSIF $1.0 million dollars upon dosing of the first patient in the Phase 2 study of REC-2282 for the treatment of NF2.

The agreement expires on the expiration of the last valid claim within the licensed patents. We may terminate this agreement on 90 days prior written notice to OSIF. Either party may terminate the agreement on 60 days prior written notice for an uncured, material breach by the other party, or bankruptcy or insolvency of the other party.

REC-3599: Chromaderm License Agreement

In December 2019, we entered into a License Agreement with Chromaderm, Inc., or Chromaderm, pursuant to which we obtained an exclusive, sublicensable, worldwide license under certain know-how and future patents that may arise controlled by Chromaderm to develop, manufacture and commercialize products containing ruboxistaurin, an inhibitor of protein kinase C, in non-topical formulations for all uses other than the treatment, prevention and/or diagnosis of skin hyperpigmentation conditions or disorders. Chromaderm obtained an exclusive license from Eli Lilly to certain intellectual property necessary for the development, commercialization and manufacture of ruboxistaurin and has developed certain additional intellectual property. Chromaderm reserved the right to use the licensed intellectual property to fulfill its obligations under supply and manufacturing agreements with us, and both Chromaderm and Eli Lilly reserved rights to use the licensed intellectual property to fulfill obligations under existing agreements and in the case of Eli Lilly for internal research. In Q4 2022, we announced that we had discontinued development of ruboxistaurin, or REC-3599, in GM2; however, we continue to evaluate the compound as a potential medicine for various other indications. We are required to use commercially reasonable efforts to develop and commercialize the licensed products in the territory in accordance with a specified development plan as may be modified by us at any time in our sole discretion. Under the agreement, we are prohibited from developing, manufacturing, or commercializing licensed products for the treatment, prevention and/or diagnosis of skin hyperpigmentation conditions or disorders.

Under the agreement, we paid Chromaderm an upfront payment of $1.3 million. We are obligated to pay Chromaderm certain development milestones with respect to the licensed products, totaling up to $35.5 million for a first indication, up to $52.5 million if multiple indications are pursued, and certain commercial milestones totaling up to $49 million. Finally, we will owe Chromaderm mid-single-digit to low-double-digit tiered royalties on net sales of REC-3599. As of the date of this filing, we have not made any milestone or royalty payments to Chromaderm.

The agreement will expire, on a licensed product-by-licensed product basis, a country-by-country basis upon the later of (a) the last to expire of the licensed patents applicable to the development, manufacture or commercialization of a licensed product in such country, (b) ten years from the first commercial sale of licensed product in such country, or (c) the expiration of regulatory exclusivity of such licensed product in such country. We may terminate the agreement on 90 days prior written notice to Chromaderm. Either party may terminate the agreement upon 45 days prior written notice (15 days for payment breaches) for an uncured, material breach by the other party.

REC-4881: Takeda License Agreement

In May 2020, we entered into a License Agreement, or the Takeda In-License, with Takeda Pharmaceutical Company Limited, or Takeda, pursuant to which we obtained an exclusive (even as to Takeda and its affiliates), worldwide, sublicensable under certain conditions, transferable, royalty-bearing license to certain Takeda patents, know-how and materials related to develop, manufacture and commercialize Takeda's clinical-stage compound known as TAK-733, a non-ATP-competitive allosteric inhibitor of MEK1 and MEK2, subject to a non-exclusive, royalty-free, irrevocable, fully paid up, license back to Takeda to use the licensed compounds for non-clinical research purposes. We are currently developing the compound REC-4881 for the treatment of FAP, and patients with spontaneous *APC*-mutant tumors. We are also evaluating the utility of the compound in additional disease states using our platform.

We are required to use commercially reasonable efforts to develop and commercialize at least one licensed product in each of (a) the US, (b) at least three of the following European countries: the United Kingdom, France, Germany, Italy and Spain and (c) Japan.

Upon execution of the agreement, we paid an upfront fee of $1.5 million to Takeda. Under the Takeda In-License, we are obligated to pay Takeda milestones amounts totaling up to $39.5 million upon achievement of specified development and regulatory milestone events. In addition, we are obligated to pay Takeda low-to-mid single-digit royalties based on net sales of products containing the licensed compounds by us, our affiliates or sublicensees, subject to specified reductions. Our obligation to pay royalties continues on a country-by-country basis until the latest of expiration of the last to expire patent licensed by Takeda that covers the product, expiration of any regulatory exclusivity period for the product and ten years after the first commercial sale of the product, in such country. As of the date of this filing, we have not made any milestone or royalty payments to Takeda.

Each party has the right to terminate the license agreement for the other party's material uncured breach, insolvency or bankruptcy. In addition, we may terminate the agreement without cause any time after May 2023, and Takeda may terminate the agreement if we have not conducted any material activities in support of the development or commercialization of the licensed compounds or any product containing a licensed compound and have not demonstrated that we used commercially reasonable efforts towards the development of such compounds or products for a period of 12 consecutive months and such failure is not due to events beyond our reasonable control. Further, Takeda may terminate the license agreement if we challenge the validity or enforceability of a licensed patent. Upon termination for any reason other than for Takeda's breach of the license agreement, upon Takeda's request we are obligated to negotiate in good faith, for a period of 120 days, terms and conditions of a license to Takeda under certain technology developed by us during the term of the agreement for the purpose of developing, commercializing and otherwise exploiting the licensed compounds and products containing the licensed compounds.

Competition

We are a clinical-stage biotechnology company utilizing advanced technologies across biology, chemistry, automation and computer science to discover and design therapeutics at unprecedented scale and efficiency. Our efforts to date have resulted in an expansive pipeline of differentiated programs in early discovery and preclinical development and four clinical-stage programs as well as an intellectual property portfolio comprising patents, trademarks, software and trade secrets. We believe that our differentiated approach to technology-enabled drug discovery, a combination of both wet lab and computational approaches embodied by the Recursion OS, provides us with a significant competitive advantage.

We are a hybrid company, comprising the best elements of technology-enabled drug discovery companies, scalable platform companies and traditional biopharma companies. As such, we compete within multiple categories of the pharmaceutical and biotechnology industries where companies are similarly working to integrate rapidly advancing technologies into their drug discovery and development activities and/or are creating scalable scientific platforms with the potential to generate large therapeutic pipelines and where other companies are developing therapies targeting indications we are or may choose to pursue. While we believe we have the competitive advantages referred to above, we face competition from major pharmaceutical and biotechnology companies, academic institutions, governmental agencies, consortiums and public and private research institutions, among others, many of whom have significantly greater resources than us. Notable competitors include:

- *Technology-Enabled Drug Discovery Companies.* Such companies apply computational tools to unlock novel insights or accelerate drug discovery and development across different points in the value chain. Representative examples include Relay Therapeutics, Exscientia, Schrodinger, AbCellera and Insitro.

- *Scalable Platform Companies*. Such companies are applying novel scientific approaches or engineering novel therapeutic modalities with the potential to seed large numbers of therapeutic candidates. These companies may compete directly with our pipeline of predominantly small molecule therapeutics. Representative companies include Moderna, BioNTech and CureVac.

- *Traditional Biopharma Companies*. Such companies, while primarily engaged in late-stage clinical development and product commercialization, are increasingly making their own investments in the application of ML and advanced computational tools across the drug discovery and development value

chain. Such investments may include partnerships with other biotechnology companies (including Recursion) from which we may benefit. Representative companies include Novartis, Janssen (a subsidiary of Johnson & Johnson), Merck and Pfizer.

- *Large Technology Companies.* Large technology companies constantly seek growth opportunities. Technology-enabled drug discovery may represent a compelling opportunity for these companies, some of which have research groups or subsidiaries focused on drug discovery and others of which have signed large technology partnerships with biopharma companies. Representative companies include Alphabet, Microsoft and Amazon.

Intellectual Property

Our intellectual property focus is the industrialization of phenomics, a new class of -omics data, and have applied industry knowledge to date to continue to build out and expand a variety of other cutting-edge technologies. Further, we have generated algorithmic, software and statistical insights in the course of our work. Within the burgeoning field of technology-enabled drug discovery, we seek to protect our innovations, with a combination of patents and trade secrets and for each novel technology or improvement we develop, we consider the appropriate course of intellectual property protection.

Our commercial success depends in part on our ability to obtain and maintain proprietary protection for drug candidates and any of our future drug candidates, novel discoveries, product development technologies and know how; to operate without infringing, misappropriating or otherwise violating the proprietary rights of others; and to prevent others from infringing, misappropriating or otherwise violating our proprietary rights. Our policy is to seek to protect our proprietary position by, among other methods, filing or in-licensing U.S. and foreign patents and patent applications related to our proprietary technology, inventions and improvements that are important to the development and implementation of our business. We also rely on trademarks, trade secrets, know-how, continuing technological innovation and potential in-licensing opportunities to develop and maintain our proprietary position.

We believe in the benefits of open-source science and that open-source data sharing drives value for us and society as a whole. For example, we have published certain key findings and datasets derived from our platform around COVID-19 under terms designed to allow anyone to make use of the data, in the hope that the data would be useful in fighting the global pandemic. We have also released some of the largest open-sourced biological datasets in the world under terms that allow for broad academic and non-commercial use.

Patents

As of February 2023, Recursion has a number of issued patents and pending applications in the US and over 75 foreign jurisdictions. These filings are from over 90 different patent families, covering all aspects of our business, including Platform IP and Program IP.

- Recursion Platform IP: The Recursion Platform IP encompasses the Recursion OS IP, as well as many other inventions related to cell perturbations, gene editing, cell manufacturing and hardware solutions. We also pursue a strategy of seeking patent protection on smaller discrete inventions throughout the breadth of our pipeline, ranging from experiment design, operations within our labs, data collection and analysis (including deep learning insights). We have 23 distinct patent families related to our Recursion Platform, with patents expiring as late as 2044.

- InVivomics: Additionally, through our acquisition of Vium, we obtained a collection of active patent families related to InVivomics, including 39 issued U.S. patents covering cage design, data collection and data analysis, 19 pending U.S. non-provisional patent applications and 1 pending U.S. design application. Our patents related to our InVivomics generally expire between 2035 and 2040.

- Recursion Program IP: A breakdown of our Program IP portfolio is below:

    - REC-2282: We exclusively license patents and patent applications related to REC-2282 from OSIF; this patent estate includes composition of matter IP for REC-2282. Our licensed patents related to REC-2282 generally expire between 2027 and 2038, excluding any patent term adjustment or patent term extension.

- REC-994: We exclusively license patents in connection with our REC-994 product candidate from UURF; this patent estate is targeted at the use of REC-994 for the treatment of CCM. Our licensed patents related to REC-994 generally expire between 2035 and 2036, excluding any patent term adjustment or patent term extension. Orphan drug exclusivity in the U.S. would run seven years from marketing authorization.

- REC-4881: We exclusively license patents and patent applications in connection with our REC-4881 product candidate from Takeda; this patent estate includes composition of matter IP for REC-4881. Our licensed patents related to REC-4881 generally expire between 2027 and 2032, excluding any patent term adjustment or patent term extension. Orphan drug exclusivity in the U.S. for FAP would run seven years from marketing authorization.

- REC-3964: This program was generated internally and has pending patent applications that would expire in 2042 excluding any patent term adjustment or patent term extension.

The patent positions of companies like ours are generally uncertain and involve complex legal and factual questions. No consistent policy regarding the scope of claims allowable in patents in the field of biotechnology has emerged in the United States and in Europe, among other countries. Changes in the patent laws and rules, either by legislation, judicial decisions, or regulatory interpretation in other countries may diminish our ability to protect our inventions and enforce our intellectual property rights, and more generally could affect the value of our intellectual property. In particular, our ability to stop third parties from making, using, selling, offering to sell, importing, or otherwise commercializing any of our patented inventions, either directly or indirectly, will depend in part on our success in obtaining, defending and enforcing patent claims that cover our technology, inventions and improvements. With respect to both licensed and company-owned intellectual property, we cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents that may be granted to us in the future will be commercially useful in protecting our platform and drug candidates and the methods used to manufacture them. Moreover, our issued patents and those that may issue in the future may not guarantee us the right to practice our technology in relation to the commercialization of our platform's drug candidates. The area of patent and other intellectual property rights in biotechnology is an evolving one with many risks and uncertainties, which may prevent us from commercializing our drug candidates and future drug candidates and practicing our proprietary technology.

Our issued patents and those that may issue in the future may be challenged, narrowed, circumvented, or invalidated, which could limit our ability to stop competitors from marketing related platforms or drug candidates or limit the length of the term of patent protection that we may have for our drug candidates, future drug candidates and platforms. In addition, the rights granted under any issued patents may not provide us with complete protection or competitive advantages against competitors with similar technology. Furthermore, our competitors may independently develop similar technologies that achieve similar outcomes but with different approaches. For these reasons, we may have competition for our drug candidates. Moreover, the time required for the development, testing and regulatory review of our candidate products may shorten the length of effective patent protection following commercialization. For this and other risks related to our proprietary technology, inventions, improvements, platforms and drug candidates, please see the section titled "Risk Factors—Risks Related to Our Intellectual Property."

Our commercial success will also depend in part on not infringing upon the proprietary rights of third parties. It is uncertain whether the issuance of any third-party patent would require us to alter our development or commercial strategies for our products or processes or to obtain licenses or cease certain activities. Our breach of any license agreements or failure to obtain a license to proprietary rights that we may require to develop or commercialize our future products may have an adverse impact on us. If third parties prepare and file patent applications in the United States that also claim technology to which we have rights, we may have to participate in interference or derivation proceedings in the USPTO to determine priority of invention. For more information, please see "Risk Factors—Risks Related to Our Intellectual Property."

Some of our pending patent applications in the United States are provisional patent applications. Provisional patent applications are not eligible to become issued patents until, among other things, we file a non-provisional patent application within 12 months of filing of one or more of our related provisional patent applications. If we do not timely

file any non-provisional patent applications, we may lose our priority date with respect to our provisional patent applications and any patent protection on the inventions disclosed in our provisional patent applications. While we intend to timely file non-provisional patent applications relating to our provisional patent applications, we cannot predict whether any such patent applications will result in the issuance of patents that provide us with any competitive advantage.

The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the earliest date of filing a nonprovisional patent application related to the patent. However, the actual protection afforded by a patent varies on a product-by-product basis, from country to country, and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country, and the validity and enforceability of the patent. A U.S. patent also may be accorded patent term adjustment, or PTA, under certain circumstances to compensate for delays in obtaining the patent from the USPTO. In some instances, such a PTA may result in a U.S. patent term extending beyond 20 years from the earliest date of filing a non-provisional patent application related to the U.S. patent. In addition, in the United States, the term of a U.S. patent that covers an FDA-approved drug may also be eligible for patent term extension, which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process.

Trademarks

As of January 2023, our trademark portfolio comprises more than 70 registered trademarks or active trademark applications worldwide, among which we have issued trademarks in the U.S. for “Recursion” and “Recursion Pharmaceuticals.”

Trade Secrets

In addition to our reliance on patent protection for our inventions, drug candidates and programs, we also rely on trade secrets, know-how, confidentiality agreements and continuing technological innovation to develop and maintain our competitive position. For example, some elements of manufacturing processes, proprietary assays, analytics techniques and processes, knowledge gained through clinical experience such as approaches to dosing and administration and management of patients, as well as computational-biological algorithms, and related processes and software, are based on unpatented trade secrets and know-how that are not publicly disclosed. Although we take steps to protect our proprietary information and trade secrets, including through contractual means with our employees, advisors and consultants, these agreements may be breached, and we may not have adequate remedies for any breach. In addition, third parties may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets or disclose our technology. As a result, we may not be able to meaningfully protect our trade secrets. It is our policy to require our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information concerning our business or financial affairs developed or made known to the individual or entity during the course of the party’s relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. In the case of employees, the agreements provide that all inventions conceived of by the individual during the course of employment, and which relate to or are reasonably capable or being used in our current or planned business or research and development are our exclusive property. In addition, we take other appropriate precautions, such as physical and technological security measures, to guard against the misappropriation of our proprietary technology by third parties. However, such agreements and policies may be breached, and we may not have adequate remedies for such breaches. For more information regarding the risks related to our intellectual property, see “Risk Factors—Risks Related to Our Intellectual Property.”

Government Regulation

Government authorities in the United States at the federal, state and local level and in other countries regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of drug and biological products. Generally, before a new drug can be marketed, considerable data demonstrating its quality, safety and efficacy must be obtained, organized into a format specific for each regulatory authority, submitted for review and approved by the relevant regulatory authority.

U.S. Drug Development

In the United States, the FDA regulates drugs under the Food, Drug, and Cosmetic Act, or FDCA. Drugs also are subject to other federal, state and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process or post-market may subject an applicant to administrative or judicial sanctions. These sanctions could include, among other actions, the FDA's refusal to approve pending applications, withdrawal of an approval, a clinical hold, untitled or warning letters, product recalls or market withdrawals, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement and civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

- Our drug candidates are considered small molecule drugs and must be approved by the FDA through the new drug application, or NDA, process before they may be legally marketed in the United States. The process generally involves the following: completion of extensive preclinical studies in accordance with applicable regulations, including studies conducted in accordance with good laboratory practice, or GLP;

- submission to the FDA of an investigational new drug, or IND, application, which must become effective before human clinical trials in the U.S. may begin;

- approval by an independent institutional review board, or IRB, or ethics committee at each clinical trial site before each trial may be initiated;

- performance of adequate and well-controlled human clinical trials in accordance with applicable IND regulations, good clinical practice, or GCP, requirements and other clinical trial-related regulations to establish substantial evidence of the safety and efficacy of the investigational product for each proposed indication;

- submission to the FDA of an NDA;

- a determination by the FDA within 60 days of its receipt of an NDA to accept the filing for review;

- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities where the drug will be produced to assess compliance with cGMP requirements to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;

- potential FDA audit of the preclinical study and/or clinical trial sites that generated the data in support of the NDA filing;

- payment of user fees for FDA review of the NDA;

- FDA review and approval of the NDA, including consideration of the views of any FDA advisory committee, prior to any commercial marketing or sale of the drug in the United States; and

- compliance with any post-approval requirements, including the potential requirement to implement a Risk Evaluation and Mitigation Strategy, or REMS, and the potential requirement to conduct post-approval studies.

The data required to support an NDA is generated in two distinct developmental stages: preclinical and clinical. The preclinical and clinical testing and approval process requires substantial time, effort and financial resources, and we cannot be certain that any approvals for any current and future drug candidates will be granted on a timely basis, or at all.

Preclinical Studies and IND

Before testing any drug product candidate in humans, the product candidate must undergo rigorous preclinical testing. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP and ICH

regulations for safety/toxicology studies. The preclinical developmental stage generally involves laboratory evaluations of drug chemistry, formulation and stability, as well as studies to evaluate toxicity in animals, which support subsequent clinical testing. The sponsor must submit the results of the preclinical studies, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. An IND is a request for authorization from the FDA to administer an investigational product to humans and must become effective before human clinical trials may begin.

Preclinical studies include laboratory evaluation of product chemistry and formulation, as well as *in vitro* and animal studies to assess the potential for adverse events and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations for safety/toxicology studies. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical studies, among other things, to the FDA as part of an IND. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to one or more proposed clinical trials and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials, which are generally required for FDA approval of an NDA, to commence. A separate submission to an existing IND must also be made for each successive clinical trial conducted during product development along with any subsequent changes to the investigational plan. Some long-term nonclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted.

Clinical Trials

The clinical stage of development involves the administration of the investigational product to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control, in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria and the parameters to be used to monitor subject safety and assess efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the IND. Furthermore, each clinical trial must be reviewed and approved by an IRB for each institution at which the clinical trial will be conducted to ensure that the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB must also approve the informed consent form that must be provided to each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed. There also are requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries.

A sponsor who wishes to conduct a clinical trial outside of the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. If a foreign clinical trial is not conducted under an IND, the sponsor may submit data from the clinical trial to the FDA in support of an NDA. The FDA will generally accept a well-designed and well-conducted foreign clinical trial not conducted under an IND if the trial was conducted in accordance with GCP and GMP requirements, and the FDA is able to validate the data through an onsite inspection, if deemed necessary, and the practice of medicine in the foreign country is consistent with the United States.

Clinical trials in the United States generally are conducted in three sequential phases, known as Phase 1, Phase 2 and Phase 3, and may overlap.

- Phase 1 clinical trials generally involve a small number of healthy volunteers or disease-affected patients who are initially exposed to a single dose and then multiple doses of the drug candidate. The primary purpose of these clinical trials is to assess the metabolism, pharmacologic action, tolerability and safety of the drug, the side effects associated with increasing doses, and if possible to gain early evidence on effectiveness.

- Phase 2 clinical trials involve studies in disease-affected patients to determine the dose and dosing schedule required to produce the desired benefits. At the same time, safety and further pharmacokinetic and pharmacodynamic information are collected, possible adverse effects and safety risks are identified, and a preliminary evaluation of efficacy is conducted.

- Phase 3 clinical trials generally involve a large number of patients at multiple sites and are designed to provide the data necessary to demonstrate the effectiveness of the product for its intended use, its safety in use and to establish the overall benefit/risk relationship of the product and provide an adequate basis for product approval. These trials may include comparisons with placebo and/or other comparator treatments. The duration of treatment is often extended to mimic the actual use of a product during marketing.

Post-approval trials, sometimes referred to as Phase 4 clinical trials, are conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, the FDA may mandate the performance of Phase 4 clinical trials as a condition of approval of an NDA.

Progress reports detailing the results of the clinical trials, among other information, must be submitted at least annually to the FDA. The sponsor is also responsible for submitting written IND safety reports, including reports of serious and unexpected suspected adverse events, findings from other studies suggesting a significant risk to humans exposed to the drug, findings from animal or *in vitro* testing that suggest a significant risk for human subjects, and any clinically significant increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure.

Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether a trial may move forward at designated checkpoints based on access to certain data from the trial.

Concurrent with clinical trials, companies usually complete additional animal safety studies and also must develop additional information about the chemistry and physical characteristics of the drug as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process, as performed by the manufacturing facility, must be capable of consistently producing quality batches of our drug candidates. Additionally, appropriate packaging must be selected and tested, and stability studies must be conducted to demonstrate that our drug candidates do not undergo unacceptable deterioration over their labeled shelf life.

NDA Review Process

Following completion of the clinical trials, data is analyzed to assess whether the investigational product is safe and effective for the proposed indicated use or uses. The results of preclinical studies and clinical trials are then submitted to the FDA as part of an NDA, along with proposed labeling, chemistry, and manufacturing information to ensure product quality and other relevant data. In short, the NDA is a request for approval to market the drug in the United States for one or more specified indications and must contain proof of safety and efficacy for a drug.

The application must include both negative and ambiguous results of preclinical studies and clinical trials, as well as positive findings. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a product's use or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational product to the satisfaction of the FDA. FDA approval of an NDA must be obtained before a drug may be legally marketed in the United States.

Under the Prescription Drug User Fee Act, or PDUFA, as amended, each NDA must be accompanied by a user fee. FDA adjusts the PDUFA user fees on an annual basis. PDUFA also imposes an annual program fee for each marketed human drug. Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business. Additionally, no user fees are assessed on NDAs for products designated as orphan drugs, unless the product also includes a non-orphan indication.

The FDA reviews all submitted NDAs before it accepts them for filing and may request additional information rather than accepting the NDA for filing. The FDA must make a decision on accepting an NDA for filing within 60 days of receipt. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA. Under the goals and policies agreed to by the FDA under PDUFA, the FDA has ten months, from the filing date, in which to complete its initial review of a new molecular-entity NDA and respond to the applicant, and six months from the filing date of a new molecular-entity NDA designated for priority review. The FDA does not always meet its PDUFA goal dates for standard and priority NDAs, and the review process is often extended by FDA requests for additional information or clarification.

Before approving an NDA, the FDA will conduct a pre-approval inspection of the manufacturing facilities for the new product to determine whether they comply with cGMP requirements. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The FDA also may audit data from clinical trials to ensure compliance with GCP requirements. Additionally, the FDA may refer applications for novel drug products or drug products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions, if any. The FDA is not bound by recommendations of an advisory committee, but it considers such recommendations when making decisions on approval. The FDA likely will reanalyze the clinical trial data, which could result in extensive discussions between the FDA and the applicant during the review process. After the FDA evaluates an NDA, it will issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete, and the application will not be approved in its present form. A Complete Response Letter usually describes all of the specific deficiencies in the NDA identified by the FDA. The Complete Response Letter may require additional clinical data, additional pivotal Phase 3 clinical trial(s) and/or other significant and time-consuming requirements related to clinical trials, preclinical studies and/or manufacturing. If a Complete Response Letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application. Even if such data and information are submitted, the FDA may decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data.

Under the Pediatric Research Equity Act, or PREA, NDAs or supplements to NDAs must contain data to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. The FDA may grant full or partial waivers, or deferrals, for submission of data.

The Best Pharmaceuticals for Children Act, or BPCA, provides NDA holders a six-month extension of any exclusivity —patent or non-patent—for a drug if certain conditions are met. Conditions for exclusivity include the FDA's determination that information relating to the use of a new drug in the pediatric population may produce health benefits in that population, the FDA making a written request for pediatric studies and the applicant agreeing to perform, and reporting on, the requested studies within the statutory timeframe. Applications under the BPCA are treated as priority applications, with all of the benefits that designation confers.

Orphan Drugs

Under the Orphan Drug Act, the FDA may grant an orphan designation to a drug or biological product intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making the product available in the United States for this type of disease or condition will be recovered from sales of the product.

Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

If a product that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may

not approve any other applications to market the same drug for the same indication for seven years from the date of such approval, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity by means of greater effectiveness, greater safety, or providing a major contribution to patient care or in instances of drug supply issues. However, competitors may receive approval of either a different product for the same indication or the same product for a different indication but that could be used off-label in the orphan indication. Orphan drug exclusivity also could block the approval of one of our products for seven years if a competitor obtains approval before we do for the same product, as defined by the FDA, for the same indication we are seeking approval, or if a drug candidate is determined to be contained within the scope of the competitor's product for the same indication. If one of our products designated as an orphan drug receives marketing approval for an indication broader than that which is designated, it may not be entitled to orphan drug exclusivity. Orphan drug status in the European Union has similar, but not identical, requirements and benefits.

Expedited Development and Review Programs

The FDA has a fast track program that is intended to expedite or facilitate the process for reviewing new drugs that meet certain criteria. Specifically, new drugs are eligible for fast track designation if they are intended to treat a serious or life-threatening condition and preclinical or clinical data demonstrate the potential to address unmet medical needs for the condition. Fast track designation applies to both the product and the specific indication for which it is being studied. The sponsor can request the FDA to designate the product for fast track status any time before receiving NDA approval, but ideally no later than the pre-NDA meeting with the FDA.

Any product submitted to the FDA for marketing, including under a fast track program, may be eligible for other types of FDA programs intended to expedite development and review, such as priority review and accelerated approval. Any product is eligible for priority review if it treats a serious or life-threatening condition and, if approved, would provide a significant improvement in safety and effectiveness compared to available therapies.

A product may also be eligible for accelerated approval, if it treats a serious or life-threatening condition and generally provides a meaningful advantage over available therapies. In addition, it must demonstrate an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, or IMM, which is reasonably likely to predict an effect on IMM or other clinical benefit. As a condition of approval, the FDA may require that a sponsor of a drug receiving accelerated approval perform adequate and well-controlled post-marketing clinical trials. FDA may withdraw drug approval or require changes to the labeled indication of the drug if confirmatory post-market trials fail to verify clinical benefit or do not demonstrate sufficient clinical benefit to justify the risks associated with the drug. If the FDA concludes that a drug shown to be effective can be safely used only if distribution or use is restricted, it may require such post-marketing restrictions as it deems necessary to assure safe use of the product.

Additionally, a drug may be eligible for designation as a breakthrough therapy if the product is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening condition and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over currently approved therapies on one or more clinically significant endpoints. The benefits of breakthrough therapy designation include the same benefits as fast track designation, plus intensive guidance from the FDA to ensure an efficient drug development program. Fast track designation, priority review, accelerated approval and breakthrough therapy designations do not change the standards for approval, but may expedite the development or approval process.

Post-approval Requirements

Following approval of a new product, the manufacturer and the approved product are subject to continuing regulation by the FDA, including, among other things, monitoring and record-keeping requirements, requirements to report adverse events and comply with promotion and advertising requirements, which include restrictions on promoting drugs for unapproved uses or patient populations, known as "off-label promotion," and limitations on industry-sponsored scientific and educational activities. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such uses. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use. Further, if there are any modifications to the drug, including changes in indications, labeling, or manufacturing processes or facilities, the applicant may be required to submit and obtain FDA approval of a new NDA or NDA supplement, which may require the development of additional data or preclinical studies and clinical trials.

The FDA may also place other conditions on approvals including the requirement for REMS, to assure the safe use of the product. A REMS could include medication guides, physician communication plans or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of products. Product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following initial marketing.

FDA regulations require that products be manufactured in specific approved facilities and in accordance with cGMP regulations. Manufacturers must comply with cGMP regulations that require, among other things, quality control and quality assurance, the maintenance of records and documentation, and the obligation to investigate and correct any deviations from cGMP. Manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP requirements and other laws. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain cGMP compliance. The discovery of violative conditions, including failure to conform to cGMP regulations, could result in enforcement actions, and the discovery of problems with a product after approval may result in restrictions on a product, its manufacturer or the NDA holder, including recalls.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical studies to assess new safety risks or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market, or product recalls;
- fines, warning letters, or holds on post-approval clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications;
- suspension or revocation of product approvals;
- product seizure or detention;
- refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

FDA Regulation of Companion Diagnostics

Safe and effective use of a therapeutic product may rely upon an *in vitro* companion diagnostic for use in selecting the patients that will be more likely to respond to that therapy. If an *in vitro* diagnostic is essential to the safe and effective use of the therapeutic product and if the manufacturer wishes to market or distribute such diagnostic for use as a companion diagnostic, then the FDA will require separate approval or clearance of the diagnostic as a companion diagnostic to the therapeutic product. According to FDA guidance, an unapproved or uncleared companion diagnostic device used to make treatment decisions in clinical trials of a drug generally will be considered an investigational medical device unless it is employed for an intended use for which the device is already approved or cleared. If used to make critical treatment decisions, such as patient selection, the diagnostic device generally will be considered a significant risk device under the FDA's Investigational Device Exemption, or IDE, regulations. The sponsor of the diagnostic device will be required to comply with the IDE regulations for clinical

studies involving the investigational diagnostic device. According to the guidance, if a diagnostic device and a drug are to be studied together to support their respective approvals, both products can be studied in the same clinical trial, if the trial meets both the requirements of the IDE regulations and the IND regulations. The guidance provides that depending on the details of the clinical trial protocol, the investigational product(s), and subjects involved, a sponsor may seek to submit an IDE alone (e.g., if the drug has already been approved by FDA and is used consistent with its approved labeling), or both an IND and an IDE.

Pursuing FDA approval/clearance of an *in vitro* companion diagnostic would require either a pre-market notification, also called 510(k) clearance, or a pre-market approval, or PMA, or a de novo classification for that diagnostic. The review of companion diagnostics involves coordination of review with the FDA's Center for Devices and Radiological Health.

510(k) clearance process

To obtain 510(k) clearance, a pre-market notification is submitted to the FDA demonstrating that the proposed device is substantially equivalent to a previously cleared 510(k) device or a device that was in commercial distribution before May 28, 1976 for which the FDA has not yet required the submission of a PMA application. The FDA's 510(k) clearance process may take three to 12 months from the date the application is submitted and filed with the FDA, but may take longer if FDA requests additional information, among other reasons. In some cases, the FDA may require clinical data to support substantial equivalence. In reviewing a pre-market notification submission, the FDA may request additional information, which may significantly prolong the review process. Notwithstanding compliance with all these requirements, clearance is never assured.
After a device receives 510(k) clearance, any subsequent modification of the device that could significantly affect its safety or effectiveness, or that would constitute a major change in its intended use, will require a new 510(k) clearance or require a PMA. In addition, the FDA may make substantial changes to industry requirements, including which devices are eligible for 510(k) clearance, which may significantly affect the process.

De novo classification process

If a new medical device does not qualify for the 510(k) pre-market notification process because no predicate device to which it is substantially equivalent can be identified, the device is automatically classified into Class III. The Food and Drug Administration Modernization Act of 1997 established a different route to market for low to moderate risk medical devices that are automatically placed into Class III due to the absence of a predicate device, called the "Request for Evaluation of Automatic Class III Designation," or the de novo classification process. This process allows a manufacturer whose novel device is automatically classified into Class III to request down-classification of its medical device into Class I or Class II on the basis that the device presents a low or moderate risk, rather than requiring the submission and approval of a PMA. If the manufacturer seeks reclassification into Class II, the manufacturer must include a draft proposal for special controls that are necessary to provide a reasonable assurance of the safety and effectiveness of the medical device. The FDA may reject the reclassification petition if it identifies a legally marketed predicate device that would be appropriate for a 510(k) or determines that the device is not low to moderate risk and requires PMA or that general controls would be inadequate to control the risks and special controls cannot be developed.

Obtaining FDA marketing authorization, de novo down-classification, or approval for medical devices is expensive and uncertain, may take several years and generally requires significant scientific and clinical data.

PMA process

The PMA process, including the gathering of clinical and nonclinical data and the submission to and review by the FDA, can take several years or longer. The applicant must prepare and provide the FDA with reasonable assurance of the device's safety and effectiveness, including information about the device and its components regarding, among other things, device design, manufacturing and labeling. PMA applications are subject to an application fee. In addition, PMAs for medical devices must generally include the results from extensive preclinical and adequate and well-controlled clinical trials to establish the safety and effectiveness of the device for each indication for which FDA approval is sought. In particular, for a diagnostic, the applicant must demonstrate that the diagnostic produces reproducible results. As part of the PMA review, the FDA will typically inspect the manufacturer's facilities for compliance with the Quality System Regulation, or QSR, which imposes extensive testing, control, documentation and other quality assurance and GMP requirements.

After a device is placed on the market, it remains subject to significant regulatory requirements. Among other requirements, medical devices may be marketed only for the uses and indications for which they are cleared or approved, device manufacturers must establish registration and device listings with the FDA and a medical device manufacturer's manufacturing processes and those of its suppliers are required to comply with the applicable portions of the Quality System Regulation, or QSR, which cover the methods and documentation of the design, testing, production, processes, controls, quality assurance, labeling, packaging and shipping of medical devices. Domestic facility records and manufacturing processes are subject to periodic unscheduled inspections by the FDA and the FDA also may inspect foreign facilities that export products to the U.S.

Other U.S. Regulatory Matters

- Our current and future arrangements with healthcare providers, third-party payors, customers and others may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations, which may constrain the business or financial arrangements and relationships through which we research, as well as, sell, market and distribute any products for which we obtain marketing approval. The applicable federal, state and foreign healthcare laws and regulations that may affect our ability to operate include, but are not limited to: the federal Anti-Kickback Statute, which makes it illegal for any person, including a prescription drug or medical device manufacturer (or a party acting on its behalf), to knowingly and willfully solicit, receive, offer or pay any remuneration that is intended to induce or reward referrals, including the purchase, recommendation, order or prescription of a particular drug, for which payment may be made under a federal healthcare program, such as Medicare or Medicaid. Moreover, the ACA (as defined below) provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;

- The federal criminal False Claims Act and Civil Monetary Penalties Laws, and the civil False Claims Act that can be enforced by private citizens through civil whistleblower or qui tam actions, prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government and/or impose exclusions from federal health care programs and/or penalties for parties who engage in such prohibited conduct;

- The Federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, prohibits, among other things, executing or attempting to execute a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and their implementing regulations also impose obligations on covered entities such as health insurance plans, healthcare clearinghouses and certain health care providers and their respective business associates, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;

- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers;

- the FD&C Act, which prohibits, among other things, the adulteration or misbranding of drugs, biologics and medical devices;

- The federal Physician Payments Sunshine Act requires applicable manufacturers of covered drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to annually report to Centers for Medicare & Medicaid Services, or CMS, information regarding certain payments and other transfers of value to physicians and teaching hospitals as well as information regarding ownership and investment interests held by physicians and their immediate family members; and

- Analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, state laws that require

biotechnology companies to comply with the biotechnology industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; state and local laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and require the registration of their sales representatives, state laws that require biotechnology companies to report information on the pricing of certain drug products and state and foreign laws that govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Pricing and rebate programs must also comply with the Medicaid rebate requirements of the U.S. Omnibus Budget Reconciliation Act of 1990 and more recent requirements in the Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010 (collectively, the "ACA"). If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. Manufacturing, sales, promotion and other activities also are potentially subject to federal and state consumer protection and unfair competition laws. In addition, the distribution of pharmaceutical and/or medical device products is subject to additional requirements and regulations, including extensive record-keeping, licensing, storage and security requirements intended to prevent the unauthorized sale of pharmaceutical and/or medical device products. Products must meet applicable child-resistant packaging requirements under the U.S. Poison Prevention Packaging Act as well as other applicable consumer safety requirements.

The failure to comply with any of these laws or regulatory requirements subjects firms to possible legal or regulatory action. Depending on the circumstances, failure to meet applicable regulatory requirements can result in significant civil, criminal and administrative penalties, including damages, fines, disgorgement, imprisonment, exclusion from participation in government funded healthcare programs, such as Medicare and Medicaid, integrity oversight and reporting obligations, contractual damages, reputational harm, diminished profits and future earnings, injunctions, requests for recall, seizure of products, total or partial suspension of production, denial or withdrawal of product approvals or refusal to allow a firm to enter into supply contracts, including government contracts.

U.S. Patent-Term Restoration and Marketing Exclusivity

Depending upon the timing, duration and specifics of FDA approval of any future drug candidates, some of our U.S. patents may be eligible for limited patent term extension under the Hatch-Waxman Act. The Hatch-Waxman Act permits restoration of the patent term of up to five years as compensation for patent term lost during product development and FDA regulatory review process. Patent-term restoration, however, cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent-term restoration period is generally one-half the time between the effective date of an IND or the issue date of the patent, whichever is later, and the submission date of an NDA plus the time between the submission date of an NDA or the issue date of the patent, whichever is later, and the approval of that application, except that the review period is reduced by any time during which the applicant failed to exercise due diligence. Only one patent applicable to an approved drug, a method for using it, or a method of manufacturing it, is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The USPTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, if and when our products receive FDA approval, we may apply for restoration of patent term for our currently owned or licensed patents covering products eligible for patent term extension to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA. Similar provisions are available in Europe and certain other jurisdictions to extend the term of a patent that covers an approved drug. We may seek patent term extension for any of our issued or licensed patents in any jurisdiction where these are available; however, there is no guarantee that the applicable authorities, including the FDA in the United States, will agree with our assessment of whether such extensions should be granted, and if granted, the length of such extensions.

Market exclusivity provisions under the FDCA also can delay the submission or the approval of certain applications. The FDCA provides a five-year period of non-patent marketing exclusivity within the United States to the first applicant to gain approval of an NDA for an NCE. A drug is an NCE if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application, or ANDA, or a 505(b)(2) NDA submitted by another company for a generic version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be

submitted after four years if it contains a certification of patent invalidity or non-infringement. The FDCA also provides three years of marketing exclusivity for an NDA, 505(b)(2) NDA or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example, new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the conditions of use associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness or generate such data themselves.

European Union Drug Development

Similar to the United States, the various phases of preclinical and clinical research in the European Union are subject to significant regulatory controls. Although the EU Clinical Trials Directive 2001/20/EC has sought to harmonize the EU clinical trials regulatory framework, setting out common rules for the control and authorization of clinical trials in the EU, the EU Member States have transposed and applied the provisions of the Directive differently. This has led to significant variations in the member state regimes. Under the current regime, before a clinical trial can be initiated, it must be approved in each of the EU countries where the trial is to be conducted by two distinct bodies: the National Competent Authority, NCA, and one or more Ethics Committees, or ECs. Under the current regime all suspected unexpected serious adverse reactions to the investigated drug that occur during the clinical trial have to be reported to the NCA and ECs of the Member State where they occurred.

The EU clinical trials legislation currently is undergoing a transition process mainly aimed at harmonizing and streamlining clinical-trial authorization, simplifying adverse-event reporting procedures, improving the supervision of clinical trials and increasing their transparency. Recently enacted Clinical Trials Regulation EU No 536/2014 ensures that the rules for conducting clinical trials in the EU will be identical. In the meantime, Clinical Trials Directive 2001/20/EC continues to govern all clinical trials performed in the EU.

European Union Drug Review and Approval

In the European Economic Area, or EEA, which is composed of the 28 Member States of the European Union and three European Free Trade Association States (Norway, Iceland and Liechtenstein), medicinal products can only be commercialized after obtaining a Marketing Authorization, or MA. There are two types of marketing authorizations.

- The Community MA is issued by the European Commission through the Centralized Procedure, based on the opinion of the Committee for Medicinal Products for Human Use, or CHMP, of the EMA, and is valid throughout the entire territory of the EEA. The Centralized Procedure is mandatory for certain types of products, such as biotechnology medicinal products, orphan medicinal products, advanced-therapy medicines such as gene-therapy, somatic cell-therapy or tissue-engineered medicines and medicinal products containing a new active substance indicated for the treatment of HIV, AIDS, cancer, neurodegenerative disorders, diabetes, auto-immune and other immune dysfunctions and viral diseases. The Centralized Procedure is optional for products containing a new active substance not yet authorized in the EEA, or for products that constitute a significant therapeutic, scientific, or technical innovation or which are in the interest of public health in the EU.

- National MAs, which are issued by the competent authorities of the Member States of the EEA and only cover their respective territory, are available for products not falling within the mandatory scope of the Centralized Procedure. Where a product has already been authorized for marketing in a Member State of the EEA, this National MA can be recognized in another Member States through the Mutual Recognition Procedure. If the product has not received a National MA in any Member State at the time of application, it can be approved simultaneously in various Member States through the Decentralized Procedure. Under the Decentralized Procedure an identical dossier is submitted to the competent authorities of each of the Member States in which the MA is sought, one of which is selected by the applicant as the Reference Member State, or RMS. The competent authority of the RMS prepares a draft assessment report, a draft summary of the product characteristics, or SOPC, and a draft of the labeling and package leaflet, which are sent to the other Member States (referred to as the Member States Concerned) for their approval. If the Member States Concerned raise no objections, based on a potential serious risk to public health, to the

assessment, SOPC, labeling or packaging proposed by the RMS, the product is subsequently granted a national MA in all the Member States (i.e., in the RMS and the Member States Concerned).

Under the above described procedures, before granting the MA, EMA or the competent authorities of the Member States of the EEA make an assessment of the risk-benefit balance of the product on the basis of scientific criteria concerning its quality, safety and efficacy. Similar to the U.S. patent term-restoration, Supplementary Protection Certificates, or SPCs, serve as an extension to a patent right in Europe for up to five years. SPCs apply to specific pharmaceutical products to offset the loss of patent protection due to the lengthy testing and clinical trials these products require prior to obtaining regulatory marketing approval.

Coverage and Reimbursement

Sales of our products will depend, in part, on the extent to which our products will be covered by third-party payors, such as government health programs, commercial insurance and managed healthcare organizations. There is significant uncertainty related to third-party payor coverage and reimbursement of newly approved products. In the United States, for example, principal decisions about reimbursement for new products are typically made by CMS. CMS decides whether and to what extent a new product will be covered and reimbursed under Medicare, and private third-party payors often follow CMS's decisions regarding coverage and reimbursement to a substantial degree. However, no uniform policy of coverage and reimbursement for drug products exists. Accordingly, decisions regarding the extent of coverage and amount of reimbursement to be provided for any of our products will be made on a payor-by-payor basis.

Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Further, such payors are increasingly challenging the price, examining the medical necessity and reviewing the cost effectiveness of medical drug candidates. There may be especially significant delays in obtaining coverage and reimbursement for newly approved drugs. Third-party payors may limit coverage to specific drug candidates on an approved list, known as a formulary, which might not include all FDA-approved drugs for a particular indication. We may need to conduct expensive pharmaco-economic studies to demonstrate the medical necessity and cost effectiveness of our products. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be obtained.

In addition, companion diagnostic tests require coverage and reimbursement separate and apart from the coverage and reimbursement for their companion pharmaceutical or biological products. Similar challenges to obtaining coverage and reimbursement, applicable to pharmaceutical or biological products, will apply to companion diagnostics.

In addition, in most foreign countries, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing and reimbursement vary widely from country to country. For example, the European Union provides options for its member states to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. A member state may approve a specific price for the medicinal product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, products launched in the European Union do not follow the price structures of the United States and generally prices tend to be significantly lower.

Healthcare Reform

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or MMA, established the Medicare Part D program to provide a voluntary prescription drug benefit to Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities that provide coverage of outpatient prescription drugs. Unlike Medicare Part A and B, Part D coverage is not standardized. While all Medicare drug plans must give at least a standard level of coverage set by Medicare, Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must

include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for products for which we receive marketing approval. However, any negotiated prices for our products covered by a Part D prescription drug plan likely will be lower than the prices we might otherwise obtain. Moreover, while the MMA applies only to drug benefits for Medicare beneficiaries, private third-party payors often follow Medicare coverage policy and payment limitations in setting their own payment rates.

The United States government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid healthcare costs, including price-controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. For example, the Patient Protection and Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively, the ACA, was passed which substantially changed the way healthcare is financed by both the government and private insurers, and significantly impacts the U.S. pharmaceutical industry. The ACA contains provisions that may reduce the profitability of drug products through increased rebates for drugs reimbursed by Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. The Medicaid Drug Rebate Program requires pharmaceutical manufacturers to enter into and have in effect a national rebate agreement with the U.S. Department of Health and Human Services, or HHS, Secretary as a condition for states to receive federal matching funds for the manufacturer's outpatient drugs furnished to Medicaid patients. The ACA made several changes to the Medicaid Drug Rebate Program, including increasing pharmaceutical manufacturers' rebate liability by raising the minimum basic Medicaid rebate on most branded prescription drugs from 15.1% of average manufacturer price, or AMP, to 23.1% of AMP and adding a rebate calculation for "line extensions" (i.e., new formulations, such as extended release formulations) of solid oral dosage forms of branded products, as well as potentially impacting their rebate liability by modifying the statutory definition of AMP. The ACA also expanded the universe of Medicaid utilization subject to drug rebates by requiring pharmaceutical manufacturers to pay rebates on Medicaid managed care utilization and by enlarging the population potentially eligible for Medicaid drug benefits. Additionally, for a drug product to receive federal reimbursement under the Medicaid or Medicare Part B programs or to be sold directly to U.S. government agencies, the manufacturer must extend discounts to entities eligible to participate in the 340B drug pricing program. The required 340B discount on a given product is calculated based on the AMP and Medicaid rebate amounts reported by the manufacturer.

Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have passed.

On November 20, 2020, the HHS Office of Inspector General ("OIG") issued a final rule eliminating the federal Anti-Kickback Statute safe harbors for rebates paid by manufacturers to Medicare Part D plan sponsors, Medicaid managed care organizations, and those entities' pharmacy benefit managers, the purpose of which is to further reduce the cost of drug products to consumers. OIG created two safe harbors for certain point-of-sale reductions in price on prescription pharmaceutical products and certain pharmacy benefit manager service fees. On December 2, 2020, OIG and CMS each issued a final rule that set forth modifications to the federal Anti-Kickback Statute, Civil Monetary Penalties Law and Physician Self-Referral Law (or the Stark Law) (respectively) regulations to remove regulatory barriers to value-based care arrangements. CMS's final rule also clarifies and updates certain long-standing terms that appear throughout the Stark Law regulations.

Other legislative changes have been proposed and adopted in the United States since the ACA was enacted. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, effective April 1, 2013, which, due to subsequent legislative amendments, will stay in effect through 2029 unless additional congressional action is taken. The American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our drugs, if approved, and accordingly, our financial operations.

Additionally, there has been heightened governmental scrutiny recently over the manner in which drug manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and

proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs and reform government program reimbursement methodologies for drug products. For example, the federal Inflation Reduction Act, signed into law on August 16, 2022, contains multiple provisions that could have an adverse effect on our ability to generate revenue, attain profitability, or commercialize our drug candidates if approved, as the statute includes provisions intended to reduce the cost of prescription drugs under Medicare. In addition to the direct impact of the IRA on federal drug reimbursement, the statute may also lead to similar reductions in payments from private payers. Various members of the current U.S. Congress have indicated that lowering drug prices continues to be a legislative and political priority, and some have introduced other proposals aimed at drug pricing. Similarly, at the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Available Information

Our principal executive office is located at 41 S Rio Grande Street, Salt Lake City, UT 84101. Our telephone number is (385) 269-0203.

Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and all amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, or the Exchange Act, are available free of charge on our website as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. Our website is www.recursion.com. Investors and others should note that we announce material financial and other information to our investors using our investor relations website (https://ir.recursion.com/), SEC filings, press releases, public conference calls and webcasts. We use these channels as well as social media and blogs to communicate with our stakeholders and the public about our company, our services and other issues. It is possible that the information we post on social media and blogs could be deemed to be material information. Therefore, we encourage investors, the media and others interested in our company to review the information we post on the social media channels and blogs listed on our investor relations website. Information contained in, or that can be accessed through, our website is not a part of, and is not incorporated into, this report.

This report includes citations to information published by third parties, including academic and industry research, publications, surveys, and studies. While we believe that such information is reliable, we have not separately verified such information, and such information is not a part of, and is not incorporated into, this report.


Recursion.
ITEM 1A.
Risk Factors

Item 1A. Risk Factors.

You should carefully consider the risks and uncertainties described below, together with all of the other information contained in this Annual Report on Form 10-K and our other public filings with the SEC, before making investment decisions regarding our common stock. The risks described below are not the only risks we face. The occurrence of any of the following risks, or of additional risks and uncertainties not presently known to us or that we currently believe to be immaterial, could cause our business, prospects, operating results, and financial condition to be materially and adversely affected.

RISKS RELATED TO OUR LIMITED OPERATING HISTORY, FINANCIAL POSITION, AND NEED FOR ADDITIONAL CAPITAL

We are a clinical-stage biotechnology company with a limited operating history and no products approved by regulators for commercial sale, which may make it difficult to evaluate our current and future business prospects.

Since our inception in November 2013, we have focused substantially all of our efforts and financial resources on building our drug discovery platform and developing our initial drug candidates. All of our drug candidates are still in the discovery, preclinical development, or clinical stages. Before we can commercialize our drug candidates, they require, among other steps, clinical success; development of internal or external manufacturing capacity and marketing expertise; and regulatory approval by the U.S. Food and Drug Administration (FDA) and other applicable jurisdictions. We have no products approved for commercial sale and we can provide no assurance that we will obtain regulatory approvals to market and sell any drug products in the future. We therefore have never generated any revenue from drug product sales, and we do not expect to generate any revenue from drug product sales in the foreseeable future. Until we successfully develop and commercialize drug candidates, which may never occur, we expect to finance our operations through a combination of equity offerings, debt financings, and strategic collaborations or similar arrangements. Biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of risk. For these and other reasons discussed elsewhere in this Risk Factors section, it may be difficult to evaluate our current business and our future prospects.

We have incurred significant operating losses since our inception and anticipate that we will incur continued losses for the foreseeable future.

We have incurred net losses in each year since our inception. We had an accumulated deficit of $639.6 million as of December 31, 2022. Substantially all of our operating losses have resulted from costs incurred in connection with research and development efforts, including clinical studies, and from general and administrative costs associated with our operations. We expect our operating expenses to significantly increase as we continue to invest in research and development efforts and the commencement and continuation of clinical trials of our existing and future drug candidates. We also continue to incur additional costs associated with operating as a public company. As a result, we expect to continue to incur substantial and increasing operating losses for the foreseeable future. Our prior losses, combined with expected future losses, have had, and will continue to have, an adverse effect on our stockholders' deficit and working capital. Because of the numerous risks and uncertainties associated with developing pharmaceutical products and new technologies, we are unable to predict the extent of any future losses or when we will become profitable, if at all. Even if we do become profitable, we may not be able to sustain or increase our profitability on a quarterly or annual basis.

We will need to raise substantial additional funding. If we are unable to raise capital when needed, we would be forced to delay, reduce, or eliminate at least some of our product development programs, business development plans, strategic investments, and potential commercialization efforts, and to possibly cease operations.

Our mission, to decode biology and deliver new drugs to the patients who need them, is broad, expensive to achieve, and will require substantial additional capital in the future. We have programs throughout the stages of development including clinical, preclinical, late discovery and early discovery. We expect our expenses to increase in connection with our ongoing activities as we continue the research and development of, initiate clinical trials of, and potentially seek marketing approval for, our current drug candidates, and as we add to our pipeline what we believe will be an accelerating number of additional programs. Preclinical and clinical testing is expensive and can take many years, so we will need supplemental funding to complete these undertakings. If our drug candidates are

eventually approved by regulators, we will require significant additional funding in order to launch and commercialize our products.

Our future capital requirements will depend on, and could increase significantly as a result of, many factors, including but not limited to the following:

- the number of drug candidates that we pursue and their development requirements;
- the scope, progress, results, and costs of our current and future preclinical and clinical trials;
- the costs, timing, and outcome of regulatory review of our drug candidates;
- if we obtain marketing approval for any current or future drug candidates, expenses related to product sales, marketing, manufacturing, and distribution;
- our ability to establish and maintain collaborations, licensing, and other strategic arrangements on favorable terms, and the success of such collaborations, licensing, and strategic arrangements;
- the impact of any business interruptions to our operations or to the operations of our manufacturers, suppliers, or other vendors, including the timing and enrollment of participants in our planned clinical trials, resulting from the COVID-19 pandemic, global supply chain issues or other force majeure events;
- the extent to which we acquire or invest in businesses, products, and technologies;
- the costs of preparing, filing, and prosecuting patent and other applications covering our intellectual property; maintaining, protecting, and enforcing our intellectual property rights; and defending intellectual property-related claims of third parties;
- our headcount growth and associated costs as we expand our business operations and our research and development activities, including into new geographies;
- the increase in salaries and wages and the extension of benefits required to retain, attract and motivate qualified personnel;
- the increases in costs of components necessary for our business;
- inflation;
- the costs of any commitments to become carbon neutral by 2030 and other environmental, social and governance goals;
- the costs of operating as a public company.

We historically have financed our operations primarily through private placements of our convertible preferred stock, through the net proceeds from our initial public offering completed on April 20, 2021, and through a private placement completed on October 24, 2022. We expect that our existing cash position and short-term investments as of the date of this Annual Report on Form 10-K will be sufficient to fund our operating expenses and capital expenditures for at least the next 12 months. However, identifying potential drug candidates and conducting preclinical development testing and clinical trials is a time-consuming, expensive, and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our drug candidates, even if approved, may not achieve commercial success. We do not anticipate that our commercial revenues, if any, will be derived from sales of products for at least several years. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives, and we may need to raise substantial additional funds sooner than expected.

Until such time, if ever, as we can generate substantial revenues, we expect to finance our cash needs potentially through a combination of private and public equity offerings and debt financings, as well as strategic collaborations, partnerships, and licensing arrangements. We do not have any committed external source of funds other than amounts payable by Takeda Pharmaceutical Company Limited (Takeda), by Bayer AG (Bayer) under and by Genentech, Inc. and F. Hoffmann-La Roche Ltd (together, Roche Genentech) collaboration agreements. Disruptions in the financial markets in general, due to the COVID-19 pandemic, U.S. debt ceiling and budget deficit concerns, and other geo-political issues such as the Ukraine/Russia conflict and political and trade uncertainties in the greater China region, may make equity and debt financing more difficult to obtain. We cannot be certain that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. If we are unable to raise additional funds through equity or debt financings, or strategic collaborations or similar arrangements, on a timely basis and satisfactory terms, we may be required to significantly curtail, delay, or discontinue one or more of our research and development programs or the future commercialization of any drug candidate, or we may be unable to expand our operations or otherwise capitalize on our business opportunities as desired. Any of these circumstances could materially and adversely affect our business and results of operations and may cause us to cease operations.

Raising additional capital may cause dilution to our stockholders, restrict our operations, require us to relinquish rights to our technologies or drug candidates, and divert management's attention from our core business.

The terms of any financing we obtain may adversely affect the holdings or rights of our stockholders, and the issuance of additional securities, whether equity or debt, or the possibility of such issuance, may cause the market price of our shares to decline. To the extent that we raise additional capital through the sale of Class A common stock or securities convertible or exchangeable into Class A common stock, our stockholders' ownership interests will be diluted. For example, in October 2022, we issued 15,336,734 shares of our Class A common stock for gross proceeds of approximately $150 million. Moreover, as a condition to providing additional funds to us, future investors may demand, and may be granted, favorable terms that may include liquidation, preferences, dividend payments, voting rights or other preferences that materially and adversely affect the rights of common stockholders. Debt financing, if available, would result in increased fixed payment obligations. In addition, we may be required to agree to certain restrictive covenants, which could adversely impact our ability to make capital expenditures, declare dividends, or otherwise conduct our business. We also may need to raise funds through additional strategic collaborations, partnerships, or licensing arrangements with third parties at an earlier stage than would be desirable. Such arrangements could require us to relinquish rights to some of our technologies or drug candidates, future revenue streams, or research programs, or otherwise agree to terms unfavorable to us. Fundraising efforts have the potential to divert our management's attention from our core business or create competing priorities, which may adversely affect our ability to develop and commercialize our drug candidates and technologies.

We are engaged in strategic collaborations and we intend to seek to establish additional collaborations, including for the clinical development or commercialization of our drug candidates. If we are unable to establish collaborations on commercially reasonable terms or at all, or if current and future collaborations are not successful, we may have to alter our development and commercialization plans.

Our product development programs and the potential commercialization of our drug candidates will require substantial additional cash to fund expenses. To date our operating revenue has primarily been generated through funded research and development agreements with Roche Genentech, Takeda, and Bayer. For example, in December 2021, we entered into a Collaboration and License Agreement with Roche Genentech (the Roche Genentech Agreement) for discovery of small molecule drug candidates with the potential to treat key areas of neuroscience and an oncology indication, and we received a non-refundable upfront payment of $150.0 million in January 2022. We intend to seek additional strategic collaborations, partnerships, and licensing arrangements with pharmaceutical and biotechnology companies. In the near term, the value of our company will depend in part on the number and quality of the collaborations and similar arrangements that we negotiate. Whether we reach a definitive agreement for a collaboration will depend, among other things, on our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration, and the potential collaborator's evaluation of a number of factors. Those factors may include, among others, (i) our technologies and capabilities; (ii) our intellectual property position with respect to the subject drug candidate; (iii) the design or results of clinical trials; (iv) the likelihood of approval by the FDA and similar regulatory authorities outside the U.S.; (v) the potential market for the subject drug candidate; (vi) potential competing products; and (vii) industry and market conditions generally. In addition, the significant number of business combinations among large pharmaceutical companies has reduced the number of potential future collaborators with whom we can partner.

Collaborations and similar arrangements are complex and time-consuming to negotiate and document. We may have to relinquish valuable rights to our product candidates, intellectual property, or future revenue streams, or grant licenses on terms that are not favorable to us or in instances where it would have been more advantageous for us to retain sole development and commercialization rights. We may be restricted under collaboration agreements from entering into future agreements on certain terms with other potential collaborators. In addition, management of our relationships with collaborators requires (i) significant time and effort from our management team; (ii) coordination of our marketing and research and development programs with the marketing and research and development priorities of our collaborators; and (iii) effective allocation of our resources across multiple projects.

Collaborations and similar arrangements may never result in the successful development or commercialization of drug candidates or the generation of sales revenue. The success of these arrangements will depend heavily on the efforts and activities of our collaborators. Collaborators generally have significant discretion in determining the efforts and resources that they will apply to these collaborations, and they may not pursue or prioritize the

development and commercialization of partnered drug candidates in a manner that is in our best interests. Product revenues arising from collaborations are likely to be lower than if we directly marketed and sold products. Disagreements with collaborators regarding clinical development or commercialization matters can lead to delays in the development process or commercialization of the applicable drug candidate and, in some cases, the termination of the collaboration arrangement. These disagreements can be difficult to resolve if neither of the parties has final decision-making authority. Collaboration agreements are typically terminable by the collaborator, and any such termination or expiration would adversely affect us financially and could harm our business reputation. If we were to become involved in arbitration or litigation with any of our collaborators, it would consume time and divert management resources away from operations, damage our reputation, impact our ability to enter into future collaboration agreements, and may further result in substantial payments from us to our collaborators to settle those disputes.

We may not be able to establish additional strategic collaborations and similar arrangements on a timely basis, on acceptable terms, or at all, and to maintain and successfully conclude them. Collaborative relationships with third parties could cause us to expend significant resources and incur substantial business risk with no assurance of financial return. If we are unable to establish or maintain strategic collaborations and similar arrangements on terms favorable to us and realize the intended benefits of those partnering arrangements, our research and development efforts and potential to generate revenue may be limited and our business and operating results could be materially and adversely impacted.

We have no products approved for commercial sale and have not generated any revenue from product sales. We or our current and future collaborators may never successfully develop and commercialize our drug candidates, which would negatively affect our results of operation and our ability to continue our business operations.

Our ability to become profitable depends upon our ability to generate substantial revenue in an amount necessary to offset our expenses. As of December 31, 2022, we have not generated any revenue from our drug candidates or technologies, other than limited grant revenues, as well as payments under collaboration agreements, including the Roche Genentech Agreement. We expect to continue to derive most of our revenue in the near future from collaborations. We do not expect to generate significant revenue unless and until we progress our drug candidates through clinical trials and obtain marketing approval of, and begin to sell, one or more of our drug candidates, or we otherwise receive substantial licensing or other payments under our collaborations. Even if we obtain market approval for our drug candidates, one or more of them may not achieve commercial success.

Commercialization of our drug candidates depends on a number of factors, including but not limited to our ability to:

- successfully complete preclinical studies;
- obtain approval of Investigational New Drug (IND) applications by the FDA and similar regulatory approvals outside the U.S., allowing us to commence clinical trials;
- successfully enroll subjects in, and complete, clinical trials;
- receive regulatory approvals from applicable regulatory authorities;
- establish commercial manufacturing capabilities or make arrangements with third-party manufacturers for clinical supply and commercial manufacturing;
- obtain patent and trade secret protection or regulatory exclusivity for our drug candidates, and maintain, protect, defend, and enforce such intellectual property rights;
- launch commercial sales of our drug products, whether alone or in collaboration with other parties;
- obtain and maintain acceptance of our drug products by patients, the medical community, and third-party payors, and effectively compete with other therapies;
- obtain and maintain coverage of and adequate reimbursement for our drug products, if and when approved, by medical insurance providers; and
- demonstrate a continued acceptable safety profile of drug products following marketing approval.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our drug candidates, which would materially harm our business.

Our current or future collaborators would similarly need to be effective in the above activities as they pertain to the collaborators in order to successfully develop drug candidates. We and they may never succeed in

developing and commercializing drug candidates. And even if we do, we may never generate revenues that are significant enough to achieve profitability; or even if our collaborators do, we may not receive option fees, milestone payments, or royalties from them that are significant enough for us to achieve profitability. Even if we achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would eventually depress our value and could impair our ability to raise capital, expand our business, maintain our research and development efforts, develop a pipeline of drug candidates, enter into collaborations, or even continue our operations.

Our quarterly and annual operating results may fluctuate significantly due to a variety of factors and could fall below our expectations or the expectations of investors or securities analysts, which may cause our stock price to fluctuate or decline.

The amount of our future losses, and when we might achieve profitability, is uncertain, and our quarterly and annual operating results may fluctuate significantly for various reasons, including, but not limited to, the following:

- the timing of, and our levels of investment in, research and development activities relating to our drug candidates;
- the timing of, and status of staffing and enrollment for, clinical trials;
- the results of clinical trials for our drug candidates, including whether there are any unexpected health or safety concerns with our drug candidates and whether we receive marketing approval for them;
- commercialization of competing drug candidates or any other change in the competitive landscape of our industry, including consolidation among our competitors or partners;
- the timing and cost of manufacturing our drug candidates;
- additions and departures of key personnel;
- the level of demand for our drug candidates should they receive approval, which may vary significantly;
- changes in the regulatory environment or market or general economic conditions;
- the increase in salaries and wages and the extension of benefits required to retain, attract and motivate qualified personnel;
- the increases in costs of components necessary for our business; and
- inflation.

The occurrence of one or more of these or other factors could result in large fluctuations and unpredictability in our quarterly and annual operating results. As a result, comparing our operating results on a period-to-period basis may not be meaningful. This variability and unpredictability could also result in our failing to meet any forecasts we provide to the market, or the expectations of industry or financial analysts or investors, for any period. If one or more of these events occur, the price of our Class A common stock could decline substantially.

If we engage in future acquisitions or strategic partnerships, this may increase our capital requirements, dilute our stockholders' equity, cause us to incur debt or assume contingent liabilities, and subject us to other risks.

We may engage in acquisitions and strategic partnerships in the future, including by licensing or acquiring complementary products, intellectual property rights, technologies, or businesses. Any acquisition or strategic partnership may entail numerous risks, including but not limited to the following:

- increased operating expenses and cash requirements;
- the assumption of indebtedness or contingent liabilities;
- the issuance of our equity securities, which would result in dilution to our stockholders' equity;
- difficulties in assimilating operations, intellectual property, products, and drug candidates of an acquired company, and with integrating new personnel;
- the diversion of our management's attention from our existing product programs and initiatives, even if we are unable to complete such proposed transaction;
- our ability to retain key employees and maintain key business relationships;
- uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing products or drug candidates and ability to obtain regulatory approvals; and
- our inability to generate revenue from acquired intellectual property, technology, and/or products sufficient to meet our objectives or even to offset the associated transaction and maintenance costs.

In addition, if we undertake such a transaction, we may assume or incur debt obligations, incur a large one-time expense, or acquire intangible assets, which could result in significant future amortization expenses and adversely impact our results of operations.

Costs of components necessary for our business increasing more rapidly could reduce profitability.

The costs of components necessary for our business have risen significantly in recent years and will likely continue to increase given stringency of demands. Competition and fixed price contracts may limit our ability to maintain existing operating margins. Costs increasing more rapidly than market prices may increase our net losses and may have a material adverse impact on our business and results of operations.

RISKS RELATED TO THE DISCOVERY AND DEVELOPMENT OF DRUG CANDIDATES

Our approach to drug discovery is unique and may not lead to successful drug products for various reasons, including, but not limited to, challenges identifying mechanisms of action for our candidates.

We image cells and use cell morphology to understand how a diseased cell responds to drugs and if or when it appears normal. If studying the shape, structure, form, and size of cells does not prove to be an accurate way to better understand diseases or does not lead to the biological insights or viable drug candidates we anticipate, our drug discovery platform may not be useful or may not lead to successful drug products, or we may have to move to a new business model, any of which could have an adverse effect on our reputation and results of operations. If the mechanism of action of a drug candidate is unknown, it may be more difficult to choose the best lead to optimize from an efficacy standpoint and to avoid potential off-target side effects that could affect safety. Such uncertainty could make it more difficult to form partnerships with larger pharmaceutical companies, as the expenses involved in late-phase clinical trials increase the level of risk related to potential efficacy and/or safety concerns and may pose challenges to IND and/or New Drug Application (NDA) approval by the FDA or other regulatory agencies.

Our drug candidates are in preclinical or clinical development, which are lengthy and expensive processes with uncertain outcomes and the potential for substantial delays.

Our current drug candidates are in preclinical or clinical development. Before we can bring any drug candidate to market, we must, among other things, successfully complete preclinical studies, have the candidate manufactured to appropriate specifications, conduct extensive clinical trials to demonstrate safety and efficacy in humans, and obtain marketing approval from the FDA and other appropriate regulatory authorities, which we have not yet demonstrated our ability to do. Clinical testing is expensive, difficult to design and implement, can take many years to complete, and is uncertain as to outcome. A failure of a clinical trial can occur at any stage of testing. The outcome of preclinical development testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. We may accelerate development from cell models in our drug discovery platform directly to patients without validating results through animal studies or validate results in animal studies at the same time as we conduct Phase 1 clinical trials. This approach could pose additional risks to our success if the effect of certain of our drug candidates on diseases has not been tested in animals prior to testing in humans.

We have several clinical-stage drug candidates focused on rare, monogenic diseases, and we anticipate filing IND applications with the FDA or other regulators for Phase 1 or Phase 2 studies, as applicable, for these drug candidates. We may not be able to file such INDs, or INDs for any other drug candidates, and begin such studies, on the timelines we expect, if at all, and any such delays could impact any additional product development timelines. Moreover, we cannot be sure that submission of an IND will result in the FDA or other regulators allowing further clinical trials to begin or that, once begun, issues will not arise that require us to suspend or terminate these trials. Commencing each of these clinical trials is subject to finalizing the trial design based on discussions with the FDA and other regulatory authorities. The requirements imposed by these regulatory authorities, or their governing statutes, could change at any time, which may result in stricter approval conditions than we currently expect and/or necessitate completion of additional or longer clinical trials. Successful completion of our clinical trials is a prerequisite to submitting NDAs to the FDA, as well as Marketing Authorization Applications (MAAs) to the European Medicines Agency (EMA) and the Medicines and Healthcare Products Regulatory Agency (MHRA) for each drug candidate and, consequently, to the ultimate approval and commercial marketing of each drug candidate. We do not know whether any of our future clinical trials will begin on time or be completed on schedule, if at all.

We may experience delays in completing our preclinical studies and initiating or completing clinical trials, or numerous unforeseen events during, or as a result of, any clinical trials, that could require us to incur additional costs or delay or prevent our ability to receive marketing approval or to commercialize our drug candidates, including but not limited to those related to one or more of the following:

- regulators, Institutional Review Boards (IRBs), or ethics committees may not authorize us or our investigators to commence a clinical trial or to conduct a clinical trial at prospective trial sites;
- we may have difficulty reaching, or fail to reach, agreement on acceptable terms with prospective trial sites and prospective Contract Research Organizations (CROs), the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- the number of participants required for clinical trials of our drug candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate, or participants may drop out of clinical trials or fail to return for post-treatment follow-up at a higher rate than we anticipate;
- we or our third-party contractors may fail to comply with regulatory requirements, fail to meet their contractual obligations to us in a timely manner or at all, deviate from the clinical trial protocol, or drop out of a trial, which may require that we add new clinical trial sites or investigators;
- the supply or quality of our drug candidates or the other materials necessary to conduct clinical trials of our drug candidates may be insufficient, delayed, or inadequate;
- the occurrence of delays in the manufacturing of our drug candidates;
- reports may arise from preclinical or clinical testing of other therapies that raise safety, efficacy, or other concerns about our drug candidates; and
- clinical trials may produce inconclusive or negative results about our drug candidates, including determinations that candidates have undesirable side effects or other unexpected characteristics, in which event, we may decide – or our investigators or regulators, IRBs, or ethics committees may require us — to suspend or terminate the trials.

From time to time as we move through the stages of development, we may publish interim top-line or preliminary data from our clinical trials. Interim data from clinical trials are subject to the risk that one or more of the clinical outcomes may materially change as enrollment of participants continues and more data become available. Preliminary or top-line data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could significantly harm our business prospects.

Our product development costs will increase if we experience delays in testing or regulatory approvals. We do not know whether any of our future clinical trials will begin as planned, or whether any of our current or future clinical trials will need to be restructured or will be completed on schedule, if at all. If we decide or are required to suspend or terminate a clinical trial, we may elect to abandon product development for that program. Significant preclinical study or clinical trial delays, including but not limited to those caused by the COVID-19 pandemic, could also shorten any periods during which we may have the exclusive right to commercialize our drug candidates or could allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our drug candidates. Any delays in or unfavorable outcomes from our preclinical or clinical development programs may significantly harm our business, operating results, and prospects.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.

We may not be able to initiate, continue, and complete clinical trials for current or future drug candidates if we are unable to locate and timely enroll a sufficient number of eligible participants in these trials as required by the FDA or similar regulatory authorities outside the United States. The process of finding potential participants may prove more costly than currently expected and our ability to enroll eligible participants may be limited or may result in slower enrollment than we anticipate due to a number of factors, including but not limited to the following:

- the severity of the disease under investigation;
- the eligibility criteria for the clinical trial in question, such as requirements that participants have specific characteristics or diseases;
- the availability of an appropriate genomic screening test;

- the perceived risks and benefits of the drug candidate under study;
- difficulties in identifying, recruiting, and enrolling a sufficient number of participants to complete our clinical studies;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;
- the referral practices of physicians;
- whether competitors are conducting clinical trials for drug candidates that treat the same indications as ours, and the availability and efficacy of competing therapies;
- our ability to monitor participants adequately during and after the trial and to maintain participant informed consent and privacy;
- the proximity and availability of clinical trial sites for prospective participants;
- pandemics such as the COVID-19 pandemic, natural disasters, global political instability, warfare, or other external events that may limit the availability of participants, principal investigators, study staff, or clinical sites; and
- the risk that enrolled participants will not complete a clinical trial.

If individuals are unwilling to participate in or complete our studies for any reason, or we experience other difficulties with enrollment or participation, the timeline for recruiting participants, conducting studies, and obtaining regulatory approval of potential products may be delayed.

Our planned clinical trials, or those of our current and potential future collaborators, may not be successful or may reveal significant adverse events not seen in our preclinical or nonclinical studies, which may result in a safety profile that could inhibit regulatory approval or market acceptance of any of our drug candidates.

Before obtaining regulatory approvals for the commercial sale of any products, we must demonstrate through preclinical studies and clinical trials that our drug candidates are both safe and effective for use in each target indication. Failure can occur at any time during the clinical trial process. The results of preclinical studies and early clinical trials of our drug candidates may not be predictive of the results of later-stage clinical trials, and initial success in clinical trials may not be indicative of results that will be obtained when such trials are completed. An extremely high rate of drug candidates fail as they proceed through clinical trials. Drug candidates in later stages of clinical trials also may fail to show the desired safety and efficacy profile despite having progressed through nonclinical studies and initial clinical trials. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or unacceptable safety issues, notwithstanding promising results in earlier trials. Most drug candidates that commence clinical trials are never approved for marketing, and there can be no assurance that any of our current or future clinical trials will ultimately be successful or support further clinical development of any of our drug candidates.

As is the case with many treatments for rare diseases and other conditions, there have been, and it is likely that in the future there may be, side effects associated with the use of our drug candidates. If significant adverse events or other side effects are observed in any of our current or future drug candidates, we may have difficulty recruiting participants in our clinical trials, they may drop out of our trials, or we may be required to abandon the trials or our development efforts of one or more drug candidates altogether. Moreover, if we develop drug candidates in combination with one or more disease therapies, it may be more difficult to accurately predict side effects. We, the FDA, other applicable regulatory authorities, or an IRB may suspend or terminate clinical trials of a drug candidate at any time for various reasons, including a belief that subjects in such trials are being exposed to unacceptable health risks or adverse side effects. Some potential therapeutics developed in the biotechnology industry that initially showed therapeutic promise in early-stage trials were later found to cause side effects that prevented their further development. Even if the side effects do not preclude the product from obtaining or maintaining marketing approval, undesirable side effects may inhibit market acceptance of the approved product due to its tolerability versus other therapies. Any of these developments could materially harm our business, operating results, and prospects.

We conduct clinical trials for our drug candidates outside the United States, and the FDA and similar foreign regulatory authorities may not accept data from such trials.

We have started to conduct additional clinical trials outside the United States in the Netherlands and may in the future choose to conduct additional clinical trials outside the United States in locations that may include Australia, Europe, Asia, or other jurisdictions. FDA acceptance of trial data from clinical trials conducted outside the United

States requires that all of FDA's clinical trial requirements be met. In addition, in cases where data from clinical trials conducted outside the United States are intended to serve as the sole basis for marketing approval in the United States, the FDA will generally not approve the application on the basis of foreign data alone unless (i) the data are applicable to the United States population and United States medical practice; (ii) the trials are performed by clinical investigators of recognized competence; and (iii) the data may be considered valid without the need for an on-site inspection by the FDA or, if the FDA considers such an inspection to be necessary, the FDA is able to validate the data through an on-site inspection or other appropriate means. Many foreign regulatory bodies have similar approval requirements, and such foreign trials would be subject to the applicable local laws of the foreign jurisdictions where the trials are conducted. There can be no assurance that the FDA or any similar foreign regulatory authority will accept data from trials conducted outside of the United States or the applicable jurisdiction. If the FDA or any similar foreign regulatory authority does not accept such data, it would result in the need for additional trials, which would be costly and time-consuming and delay aspects of our business plan, and which may result in our drug candidates not receiving approval or clearance for commercialization in the applicable jurisdiction.

Following the United Kingdom's departure from the EU (referred to as Brexit) on January 31, 2020, and the end of the "transition period" on December 31, 2020, the EU and the United Kingdom entered into a trade and cooperation agreement that governs certain aspects of their future relationship, including the assurance of tariff-free trade for certain goods and services. As the regulatory framework for pharmaceutical products in the United Kingdom is derived from EU directives and regulations, Brexit will materially impact the future regulatory regime that applies to products and the approval of drug candidates in the United Kingdom. Longer term, the United Kingdom is likely to develop its own legislation that diverges from that in the EU, which may delay or preclude marketing approval for our drug candidates in one or both jurisdictions.

It is difficult to establish with precision the incidence and prevalence for target patient populations of our drug candidates. If the market opportunities for our drug candidates are smaller than we estimate, or if any approval that we obtain is based on a narrower definition of the patient population, our revenue and ability to achieve profitability will be adversely affected, possibly materially.

Even if approved for commercial sale, the total addressable market for our drug candidates will ultimately depend upon, among other things, (i) the indications and diagnostic criteria included in the final label; (ii) acceptance by the medical community; and (iii) patient access, product pricing, and reimbursement by third-party payors. The number of patients targeted by our drug candidates may turn out to be lower than expected, patients may not be amenable to treatment with our products, or new patients may become increasingly difficult to identify or access, all of which would adversely affect our results of operations and our business. Due to our limited resources and access to capital or for other reasons, we must prioritize development of certain drug candidates, which may prove to be the wrong choices and may adversely affect our business.

Although we intend to explore other therapeutic opportunities in addition to the drug candidates that we are currently developing, we may fail to identify viable new drug candidates for clinical development for a number of reasons.

Research programs to pursue the development of our existing and planned drug candidates for additional indications, and to identify new drug candidates and disease targets, require substantial technical, financial, and human resources whether or not they are ultimately successful. For example, under the Roche Genentech Agreement, we are collaborating with Roche Genentech to develop various projects related to the discovery of small molecule drug candidates with the potential to treat "key areas" of neuroscience and an oncology indication. There can be no assurance that we will find potential targets using this approach, that the conditions targeted will be tractable, or that clinical trials will be successful. Our research programs may initially show promise in identifying potential indications and/or drug candidates, yet fail to yield results for clinical development for a number of reasons, including but not limited to the following:

- the research methodology used may not be successful in identifying potential indications and/or drug candidates, including as a result of the limited patient sample represented in our databases and the validity of extrapolating based on insights from a particular cellular context that may not apply to other, more relevant cellular contexts;
- potential drug candidates may, after further study, be shown to have harmful side effects or other characteristics that indicate they are unlikely to be effective products; or

- it may take greater human and financial resources than we can allocate to identify additional therapeutic opportunities for our drug candidates or to develop suitable potential drug candidates through internal research programs, thereby limiting our ability to develop, diversify, and expand our product portfolio.

Because we have limited financial and human resources, we will have to prioritize and focus on certain research programs, drug candidates, and target indications while forgoing others. As a result, we may forgo or delay pursuit of opportunities with other drug candidates or for other indications that later prove to have greater commercial potential or a greater likelihood of success. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities.

Accordingly, there can be no assurance that we will ever be able to identify additional therapeutic opportunities for our drug candidates or to develop suitable potential drug candidates through internal research programs, which could materially adversely affect our future growth and prospects.

If we are unable to obtain, or if there are delays in obtaining, required regulatory approvals for our drug candidates in the U.S. or other jurisdictions, or if approval is subject to limitations, we will be unable to commercialize, or will be delayed or limited in commercializing, the drug candidates in such jurisdiction and our ability to generate revenue may be materially impaired.

Our drug candidates and the activities associated with their development and commercialization — including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale, distribution, import, and export — are subject to comprehensive regulation by the FDA and other regulatory agencies in the United States and by comparable authorities in other countries. Before we can commercialize any of our drug candidates, we must obtain marketing approval. As of December 31, 2022, all of our drug candidates are in development, and we have not received approval to market any of our drug candidates from regulatory authorities in any jurisdiction. It is possible that our current and future drug candidates will never obtain regulatory and marketing approval.

We have only limited experience in filing and supporting applications to regulatory authorities and expect to rely on CROs and/or regulatory consultants to assist us in this process. Securing regulatory approval requires the submission of extensive preclinical and clinical data and supporting information to the various regulatory authorities for each therapeutic indication to establish the drug candidate's safety and efficacy. It also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Given our novel approach to drug discovery that uses our platform to generate data, regulatory authorities may not approve any of our drug candidates derived from our platform. They may also elect to inspect our platform and facilities and manufacturing and research practices, which may uncover regulatory deficiencies that must be addressed and remedied before research or market authorizations may occur.

The process of obtaining regulatory approvals, both in the United States and abroad, is expensive and often takes many years. If the FDA or a comparable foreign regulatory authority requires that we perform additional preclinical or clinical trials, then approval may be delayed, if obtained at all. The FDA and comparable regulatory authorities in other countries have substantial discretion in the approval process and may refuse to accept any application, or they may decide that our data are insufficient for approval and require additional preclinical, clinical, or other studies. Our drug candidates could be delayed in receiving, or fail to receive, regulatory approval for many reasons, including but not limited to the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may not be able to enroll a sufficient number of patients in our clinical studies;
- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a drug candidate is safe and effective for its proposed indication or that a related companion diagnostic is suitable to identify appropriate patient populations;
- a drug candidate may be only moderately effective or may have undesirable or unintended side effects, toxicities, or other characteristics;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;

- we may be unable to demonstrate that a drug candidate's clinical and other benefits outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our drug candidates may not be sufficient or of sufficient quality to support the submission of an NDA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may find deficiencies with, or fail to approve, our manufacturing processes or facilities, or those of third-party manufacturers with which we contract, for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change such that our clinical or manufacturing data are insufficient for approval.

Even if we obtain approval, regulatory authorities may approve any of our drug candidates for fewer or more limited indications than we request, thereby narrowing the commercial potential of the drug candidate. In addition, regulatory authorities may grant approval contingent on the performance of costly post-marketing clinical trials or may approve a drug candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that drug candidate.

If we are unable to obtain, or experience delays in obtaining, approval of our current and future drug candidates in the U.S. or other jurisdictions, or if approval is subject to limitations, the commercial prospects for the drug candidates may be harmed, and our reputation and ability to generate revenues may be materially impaired.

We may never realize a return on our investment of resources and cash in our drug discovery collaborations.

We conduct drug discovery activities for or with collaborators who are also engaged in drug discovery and development, which include pre-commercial biotechnology companies and large pharmaceutical companies. Under these collaborations, we typically provide, among other resources, the benefit of our drug discovery platform and platform experts who identify molecules that have activity against one or more specified targets. In consideration, we have received, and expect to receive in the future, (i) equity investments; (ii) upfront fees; and/or (iii) the right to receive option fees, cash milestone payments upon the achievement of specified development, regulatory, or commercial sales milestones for the drug discovery targets, and potential royalties. Our ability to receive fees and payments and realize returns from our drug discovery collaborations in a timely manner, or at all, is subject to a number of risks, including but not limited to the following:

- our collaborators may incur unanticipated costs or experience delays in completing, or may be unable to complete, the development and commercialization of any drug candidates;
- collaborators have significant discretion in determining the amount and timing of efforts and resources that they will apply to our collaborations and may not perform their obligations as currently expected;
- collaborators may decide not to pursue development or commercialization of drug candidates for various reasons, including results of clinical trials or other studies, changes in the collaborator's strategic focus or available funding, their desire to develop products that compete directly or indirectly with our drug candidates, or external factors (such as an acquisition or industry slowdown) that divert resources or create competing priorities;
- existing collaborators and potential future collaborators may begin to perceive us to be a competitor more generally, particularly as we advance our internal drug discovery programs, and therefore may be unwilling to continue existing collaborations, or enter into new collaborations, with us;
- a collaborator may fail to comply with applicable regulatory requirements regarding the development, manufacture, distribution, or marketing of a drug candidate or product;
- disagreements with collaborators, including disagreements over intellectual property or proprietary rights, contract interpretation, or the preferred course of development, might cause delays or terminations of the research, development, or commercialization of drug candidates, or might result in litigation or arbitration;
- collaborators may not properly obtain, maintain, enforce, defend, or protect our intellectual property or proprietary rights, or they may use our proprietary information in such a way as to potentially lead to disputes or legal proceedings that could jeopardize or invalidate our or their intellectual property or proprietary rights;
- collaborators may infringe, misappropriate, or otherwise violate the intellectual property or proprietary rights of third parties, which may expose us to litigation and potential liability; and

- drug discovery collaborations may be terminated prior to our receipt of any significant value.

In addition, we may be over-reliant on our partners to provide information for molecules that we in-license, or such molecules may no longer be well-protected because the composition of matter patents that once protected them become expired. Moreover, we may have difficulty obtaining the quality and quantity of active pharmaceutical ingredients (API) for use in drug candidates, or we may be unable to ensure the stability of the molecule, all of which is needed to conduct clinical trials or bring a drug candidate to market. For those molecules that we are attempting to repurpose for other indications, our collaboration partners may not have sufficient data, may have poor quality data, or may not be able to help us interpret data, any of which could cause our collaboration to fail.

If any drug discovery collaborations that we enter into do not result in the successful development and commercialization of drug products that result in option fees, milestone payments, royalties, or other payments to us as expected, we may not receive an adequate return on the resources we have invested in such collaborations, which would have an adverse effect on our business, results of operations and prospects. Further, we may not have access to, or may be restricted from disclosing, certain information regarding development and commercialization of our collaborators' drug candidates and, consequently, may have limited ability to inform our stockholders about the status of, and likelihood of achieving, option fees, milestone payments or royalties under such collaborations.

We face substantial competition, which may result in others discovering, developing, or commercializing products before, or more successfully than, we do.

The development and commercialization of new products in the biopharmaceutical and related industries is highly competitive. There are other companies focusing on technology-enabled drug discovery to identify and develop new chemical entities (NCEs) that have not previously been investigated in clinical trials and/or known chemical entities (KCEs) that have been previously investigated. Some of these competitive companies are employing scientific approaches that are the same as or similar to our approach, and others are using entirely different approaches. These companies include large pharmaceutical companies, specialty pharmaceutical companies, and biotechnology companies of various sizes worldwide. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. Potential competitors also include academic institutions, government agencies, and other public and private research organizations. Many of the companies that we compete against, or which we may compete against in the future, have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals, and marketing approval of products than we do. They may also compete with us in recruiting and retaining qualified scientific and management personnel, in establishing clinical trial sites and patient recruitment for clinical trials, as well as in acquiring technologies complementary to, or necessary for, developing our programs.

Within the field of technology-enabled drug discovery, we believe that our approach utilizing a combination of wet-lab biology to generate our proprietary dataset, and the *in silico* tools in our closed-loop system, sets us apart and affords us a competitive advantage in initiating and advancing drug development programs. We further believe that the principal competitive factors to our business include (i) the accuracy of our computations and predictions; (ii) the ability to integrate experimental and computational capabilities; (iii) the ability to successfully transition research programs into clinical development; (iv) the ability to raise capital; and (v) the scalability of our platform, pipeline, and business.

Any drug candidates that we successfully develop and commercialize will compete with currently-approved therapies, and new therapies that may become available in the future, from segments of the pharmaceutical, biotechnology, and other related industries. The key competitive factors affecting the success of all of our drug candidates, if approved, are likely to be (i) their efficacy, safety, convenience, and price; (ii) the level of non-generic and generic competition; and (iii) the availability and amount of reimbursement from government healthcare programs, commercial insurance plans, and other third-party payors. Our commercial opportunity could be reduced or eliminated if competing products are more effective, have fewer or less severe side effects, are more convenient, or are less expensive than products that we or our collaborators may develop, or if competitors obtain FDA or other regulatory approval more rapidly than us and are able to establish a strong market position before we or our collaborators are able to enter the market.

If our proprietary tools and technology and other competitive advantages do not remain in place and evolve appropriately as barriers to entry in the future, or if we and our collaboration partners are not otherwise able to effectively compete against existing and potential competitors, our business and results of operations may be materially and adversely affected.

Because we have multiple programs and drug candidates in our development pipeline and are pursuing a variety of target indications and treatment modalities, we may expend our limited resources to pursue a particular drug candidate and fail to capitalize on development opportunities or drug candidates that may be more profitable or for which there is a greater likelihood of success.

We currently focus on the development of drug candidates regardless of the treatment modality or the particular target indication. Because we have limited financial and personnel resources, we may forgo or delay pursuit of opportunities with potential target indications or drug candidates that later prove to have greater commercial potential than our current and planned development programs and drug candidates. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and other future drug candidates for specific indications may not yield any future drug candidates that are commercially viable.

We and our collaborators may not achieve projected discovery and development milestones and other anticipated key events in the time frames that we or they announce, which could have an adverse impact on our business and could cause our stock price to decline.

From time to time we have made, and in the future are likely to make, public statements regarding the expected timing of certain milestones and key events, such as the commencement and completion of preclinical and clinical studies in our internal drug discovery programs as well as developments and milestones under our collaborations. Our collaborators, such as Roche Genentech, have also made public statements regarding expectations for the development of programs under collaborations with us and may in the future make additional statements about their goals and expectations for collaborations with us. The actual timing of these events can vary dramatically due to a number of factors, such as (i) delays or failures in our, or our current and future collaborators', drug discovery and development programs; (ii) the amount of time, effort, and resources committed by us and our current and future collaborators; and (iii) the numerous uncertainties inherent in the development of drugs. As a result, there can be no assurance that our, or our current and future collaborators', programs will advance or be completed in the time frames we or they announce or expect. If we or any collaborators fail to achieve one or more of these milestones or other key events as planned and announced, our business and reputation could be materially adversely affected.

RISKS RELATED TO OUR PLATFORM AND DATA

We have invested, and expect to continue to invest, in research and development efforts to further enhance our drug discovery platform, which is central to our mission. If the return on these investments is lower or develops more slowly than we expect, our business and operating results may suffer.

Our drug discovery platform is central to our mission to decode biology by integrating technological innovations across biology, chemistry, automation, data science, and engineering. The platform includes the Recursion Operating System, which combines an advanced infrastructure layer to generate proprietary biological and chemical datasets, and the Recursion Map, a suite of custom software, algorithms, and machine learning tools. Our platform depends upon the continuous, effective, and reliable operation of our software, hardware, databases, and related tools and functions, as well as the integrity of our data. Our ability to develop drug candidates and increase revenue depends in large part on our ability to enhance and improve our platform. The success of any enhancement to our platform depends on several factors, including (i) innovation in hardware solutions; (ii) increased computational storage and processing capacity; (iii) development of more advanced algorithms; and (iv) generation of additional biological and chemical data, such as that which is necessary to our ability to identify important and emerging use cases and quickly develop new and effective innovations to address those use cases.

We have invested, and expect to continue to invest, in research and development efforts that further enhance our platform. These investments may involve significant time, risks, and uncertainties, including the risks that any new software or hardware enhancement may not be introduced in a timely or cost-effective manner; may not keep pace with technological developments; or may not achieve the functionality necessary to generate significant revenues.

Our proprietary software tools, hardware, and data sets are inherently complex. We have from time to time found defects, vulnerabilities, or other errors in our software and hardware that produce the data sets we use to discover new drug candidates, and new errors with our software and hardware may be detected in the future. The risk of errors is particularly significant when new software or hardware is first introduced or when new versions or enhancements of existing software or hardware are implemented. Errors may also result from the interface of our proprietary software and hardware tools with our data or with third-party systems and data.

If we are unable to successfully enhance our drug discovery platform, or if there are any defects or disruptions in our platform that are not timely resolved, our ability to develop new innovations and ultimately gain market acceptance of our products and discoveries could be materially and adversely impacted, and our reputation, business, operating results and prospects could be materially harmed.

Our information technology systems and infrastructure may fail or experience security breaches and incidents that could adversely impact our business and operations and subject us to liability.

We have experienced significant growth in the complexity of our data and the software tools that our hardware infrastructure supports. We rely significantly upon information technology systems and infrastructure owned and maintained by us or by third party providers to generate, collect, store, and transmit confidential and proprietary information and data (including but not limited to intellectual property, proprietary business information, and personal information) and to operate our business. We also outsource elements of our operations to, and obtain products and services from, third parties and engage in collaborations for drug discovery with third parties, each of which has or could have access to our confidential or proprietary information.

We deploy and operate an array of technical and procedural controls to reduce the risks to our information technology systems, infrastructure and data and to work to maintain the availability, confidentiality and integrity of our data, and we expect to continue to incur significant costs on such detection and prevention efforts. Despite these measures, our information technology and other internal infrastructure systems face the risk of failures, interruptions, security breaches and incidents, or other harm from various causes or sources, and third parties with whom we share confidential or proprietary information face similar risks and may experience similar events that materially impact us. These causes or sources include but are not limited to the following:

- service interruptions;
- system malfunctions;
- computer viruses and other malicious code;
- natural disasters;
- global political instability;
- warfare;
- telecommunication and electrical failures;
- inadvertent or intentional actions by our employees or third-party providers; and
- cyber-attacks by malicious third parties, including the deployment of ransomware and malware, denial-of-service attacks, social engineering, and other means to affect service reliability and threaten the confidentiality, integrity, and availability of information.

With respect to cyber-attacks, the techniques used by cyber criminals change frequently, may not be recognized until launched, and can originate from a wide variety of sources, including outside groups and individuals with a range of motives (including industrial espionage) and expertise, such as organized crime affiliates, terrorist organizations, or hostile foreign governments or agencies. These risks may be heightened in connection with the conflict between Russia and Ukraine. The costs to us to investigate and mitigate actual and suspected cybersecurity breaches and incidents could be significant. We may not be able to anticipate all types of security threats and implement preventive measures effective against all such threats. In addition, an increased amount of work is occurring remotely, including through the use of mobile devices. This could increase our cybersecurity risk, create data accessibility concerns, and make us more susceptible to communication disruptions.

We have experienced, and may continue to experience, cyber-attacks, security breaches and incidents, and other system failures, although to our knowledge we have not experienced any material interruption or incident as of December 31, 2022. The loss, corruption, unavailability of, or damage to our data would interfere with and undermine the insights we draw from our platform and could impair the integrity of our clinical trial data, leading to regulatory delays or the inability to get our drug candidates approved. If we do not accurately predict and identify our infrastructure requirements and failures and timely enhance our infrastructure, or if our remediation efforts are

not successful, it could result in a material disruption of our business operations and development programs, including the loss or unauthorized disclosure of our trade secrets, individuals' personal information, or other proprietary or sensitive data. A security breach or incident that leads to unauthorized acquisition, disclosure, or other processing of our intellectual property or other proprietary information could also affect our intellectual property rights and enable competitors to compete with us more effectively. Likewise, as we rely on third parties for the manufacture of our drug candidates and to conduct clinical trials, similar events relating to their systems and operations could also have a material adverse effect on our business and lead to regulatory agency actions.

Moreover, any security breach or other event that leads to loss of, unauthorized access to, disclosure of, or other processing of personal information, including personal information regarding clinical trial subjects, contractors, directors, or employees, or the perception any of these has occurred, could harm our reputation, compel us to comply with federal and/or state notification laws and foreign law equivalents, subject us to mandatory corrective action, and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information. For more information see "Risk Factors— We are subject to U.S. and foreign laws regarding privacy, data protection, and data security that could entail substantial compliance costs, while the failure to comply could subject us to significant liability" set forth below.

Failures, disruptions, security breaches and incidents, cyber-attacks, and other harmful events impacting data processed or maintained in our business, or information technology systems or infrastructure used in our business, including those resulting in a loss of or damage to our information technology systems or infrastructure, or the loss of or inappropriate acquisition, disclosure, or other processing of confidential, proprietary, or personal information, or the perception any of these has occurred, could expose us to a risk of loss, enforcement measures, regulatory agency investigations, proceedings, and other actions, penalties, fines, indemnification claims, litigation, potential civil or criminal liability, collaborators' loss of confidence, damage to our reputation, and other consequences, which could materially adversely affect our business and results of operations. While we maintain insurance coverage for certain expenses and liabilities related to failures or breaches of our information technology systems, it may not be adequate to cover all losses associated with such events. In addition, such insurance may not be available to us in the future on satisfactory terms or at all. Furthermore, if the information technology systems of third parties with whom we do business become subject to disruptions or security breaches, we may have insufficient recourse against them.

Interruptions in the availability of server systems or communications with internet or cloud-based services, or failure to maintain the security, confidentiality, accessibility, or integrity of data stored on such systems, could harm our business.

We rely on third-party data centers and telecommunications solutions, including cloud infrastructure services such as Google Cloud and Amazon Web Services, to host substantial portions of our technology platforms and to support our business operations. We have no control over these cloud-based service or other third-party providers, although we attempt to reduce risk by minimizing reliance on any single third party or its operations. We have experienced, and expect we may in the future again experience, system interruptions, outages, or delays due to a variety of factors, including infrastructure changes, human or software errors, website hosting disruptions, and capacity constraints. A prolonged service disruption affecting our cloud-based solutions could damage our reputation or otherwise materially harm our business.

Further, if the security measures of our third-party data center or cloud infrastructure providers are breached by cyber-attacks or other means and unauthorized access to our information technology systems or data occurs, it could result in interruptions to our operations and the loss of proprietary or confidential information, which could damage our reputation, cause us to incur substantial costs, divert our resources from other tasks, and subject us to significant legal and financial exposure and liabilities, any one of which could materially adversely affect our business, results of operations, and prospects. Such third-party providers may also be subject to natural disasters, global political instability, warfare, power losses, telecommunications failures, or other disruptive events that could negatively affect our business and require us to incur significant costs to secure alternate cloud-based solutions. In addition, any changes in our third-party providers' service levels or features that we utilize or a termination of our agreements could also adversely affect our business.

Our solutions utilize third-party open source software (OSS), which presents risks that could adversely affect our business and subject us to possible litigation.

Our solutions include software that is licensed from third parties under open source licenses, and we expect to continue to incorporate such OSS in our solutions in the future. We cannot ensure that we have effectively monitored our use of OSS, validated the quality or source of such software, or are in compliance with the terms of the applicable open source licenses or our policies and procedures. Use of OSS may entail greater risks than use of third-party commercial software because open source licensors generally do not provide support, updates, or warranties or other contractual protections regarding infringement claims or the quality of the code. OSS may also be more susceptible to security vulnerabilities. Third-party OSS providers could experience service outages, data loss, privacy breaches, cyber-attacks, and other events relating to the applications and services they provide, which could diminish the utility of these services and harm our business. We also could be subject to lawsuits by third parties claiming that what we believe to be licensed OSS infringes such parties' intellectual property rights, which could be costly for us to defend and require us to devote additional research and development resources to change our solutions.

RISKS RELATED TO OUR OPERATIONS/COMMERCIALIZATION

The COVID-19 pandemic may materially and adversely affect our business and operating results and could disrupt the development of our drug candidates.

The COVID-19 pandemic, and the related adverse public health developments, have disrupted the normal operations of businesses across industries, including the biotechnology and pharmaceutical industries. National, state, and local governments in regions affected by the COVID-19 pandemic have implemented, or may implement or reinstitute, measures such as quarantines, shelter-in-place policies, travel restrictions, and other public safety protocols. The health effects of the pandemic, along with these initiatives, have adversely affected workforces, organizations, government entities, healthcare communities, regional and national economies, and financial markets, leading to economic slowdowns and increased market volatility from time to time.

We continue to monitor applicable government recommendations and have made some modifications to our normal operations. For example, we have instituted a hybrid remote work policy for certain personnel. Although we believe that these and the other safety measures we have taken have not substantially impacted our productivity or business activities, it is not certain that this will continue to be the case. Moreover, the risk of cyber-attacks or other privacy or data security incidents may be heightened as a result of the increased number of personnel working remotely, which may be less secure and lead to the release of confidential or proprietary information that could adversely affect our business. And notwithstanding governmental precautionary measures or those implemented by us, the COVID-19 pandemic or other similar outbreak could affect the health and availability of our workforce, as well as that of the third parties from whom we obtain goods and services. In addition, the global spread of COVID-19 — including any variants that are more contagious, have more severe effects, or are resistant to treatments or vaccinations — could adversely impact our preclinical or clinical trial operations in the U.S. and other countries, including our ability to recruit and retain trial participants as well as principal investigators and site staff. As may be the case with other biopharmaceutical companies, we have experienced difficulties in enrolling participants, and delays in activating new trial sites and in initiating and concluding preclinical and clinical studies, and could experience protocol deviations. Also, the COVID-19 pandemic has made it more difficult or costly to source products needed for the trials, or to engage with CROs and regulatory authorities regarding our drug candidates. Any negative impact COVID-19 has on enrollment in or the execution of our drug trials, or our interactions with CROs or regulatory authorities, could cause costly delays, adversely affect our ability to obtain regulatory approval for and to commercialize our drug candidates, increase our operating expenses, and have material adverse effect on our business, operating results, and prospects. As COVID-19 conditions have improved, the effects noted above have eased but the duration and sustainability of any such improvements is uncertain.

The ultimate direct and indirect impacts of COVID-19 on our operations, including our research and development activities and preclinical and clinical trials, or the operations of our third-party partners, will depend on future developments that are highly uncertain and difficult to predict. If these impacts are more severe than we anticipate or if our countermeasures are insufficient, it could disrupt our ability, or our collaborators' ability, to develop, obtain regulatory approvals for, and commercialize drug candidates, and would have a material adverse effect on our business, results of operations, and prospects. Further, uncertainty around these and related issues could lead to adverse effects on the economies of the U.S. and other countries, which could impact our ability to raise the capital needed to develop and commercialize our drug candidates.

Even if any drug candidates we develop receive marketing approval, they may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors, and others in the medical community necessary for commercial success.

The commercial success of our drug candidates that receive marketing approval will depend upon their degree of market acceptance by physicians, patients, third-party payors, and others in the medical community. The degree of market acceptance will depend on a number of factors, including but not limited to the following:

- their efficacy and safety as demonstrated in pivotal clinical trials and published in peer-reviewed journals;
- their potential and perceived advantages compared to alternative treatments, including any similar generic treatments;
- the prevalence and severity of any side effects or adverse events;
- our ability to offer these products for sale at competitive prices;
- our ability to offer appropriate patient access programs, such as co-pay assistance;
- their convenience and ease of dosing and administration compared to alternative treatments;
- the clinical indications for which the drug candidate is approved by the FDA or comparable regulatory authorities;
- product labeling or product insert requirements of the FDA or other comparable foreign regulatory authorities, including any limitations, contraindications, or warnings;
- restrictions on how the product is distributed;
- the timing of market introduction of competitive products;
- publicity concerning these products or competing products and treatments;
- the strength of marketing and distribution support; and
- favorable third-party coverage and sufficient reimbursement.

Sales of medical products also depend on the willingness of physicians to prescribe treatment with our drug products, which is likely to be based on a determination by these physicians that the products are safe, therapeutically effective, and cost effective. In addition, the inclusion or exclusion of products from treatment guidelines established by various physician groups, as well as the viewpoints of influential physicians, can affect the willingness of other physicians to prescribe treatment with our drug products. We cannot predict whether physicians, physicians' organizations, hospitals, other healthcare providers, government agencies, or private insurers will determine that any product we may develop is safe, therapeutically effective and cost effective as compared with competing treatments. If any drug candidates we develop do not achieve an adequate level of acceptance, we may not generate significant product revenue, and we may not become profitable.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to sell and market any drug candidates we may develop, we may not be successful in commercializing those drug candidates, if and when they are approved.

We do not have a sales or marketing infrastructure and have little experience in the sale, marketing, or distribution of pharmaceutical products. To achieve commercial success for any approved product for which we retain sales and marketing responsibilities, we must either develop a sales and marketing organization, develop sales and marketing software solutions, or outsource these functions to third parties. In the future, we may choose to build a focused sales, marketing, and commercial support infrastructure to market and sell our drug candidates, if and when they are approved. We may also elect to enter into collaborations or strategic partnerships with third parties to engage in commercialization activities with respect to selected drug candidates, indications, or geographic territories, including territories outside the United States, although there is no guarantee we will be able to enter into these arrangements.

There are risks involved with both establishing our own commercial capabilities and entering into arrangements with third parties to perform these services. For example, recruiting and training a sales force or reimbursement specialists is expensive and time-consuming and could delay any product launch. If the commercial launch of a drug candidate for which we recruit a sales force and establish marketing and other commercialization capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition commercialization personnel. Factors that may inhibit our efforts to commercialize any approved product on our own include but are not limited to the following:

- the inability to recruit and retain adequate numbers of effective sales, marketing, reimbursement, customer service, medical affairs, and other support personnel;
- the inability of sales personnel or software tools to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future approved products;
- the inability of reimbursement professionals to negotiate arrangements for formulary access, reimbursement, and other acceptance by payors;
- the inability to price products at a sufficient price point to enable an adequate and attractive level of profitability;
- restricted or closed distribution channels that make it difficult to distribute our products to segments of the patient population;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent commercialization organization.

If we enter into arrangements with third parties to perform sales, marketing, commercial support, and distribution services, they may also experience many of the above challenges. In addition, our product revenue or the profitability of product revenue may be lower than if we were to market and sell any products we may develop internally. We may not be successful in entering into such arrangements, or we may be unable to do so on terms that are favorable to us or them. We also may have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively, or they may expose us to legal and regulatory risk by not adhering to regulatory requirements and restrictions governing the sale and promotion of prescription drug products, including those restricting off-label promotion. If we do not establish commercialization capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing any future approved drug candidates.

We are subject to regulatory and operational risks associated with the physical and digital infrastructure at both our internal facilities and those of our external service providers.

Our facilities in Salt Lake City, Utah have not been reviewed or pre-approved by any regulatory agency, such as the FDA. An inspection by the FDA could disrupt our ability to generate data and develop drug candidates. Our laboratory facilities are designed to incorporate a significant level of automation of equipment, with integration of several digital systems to improve efficiency of research operations. We have attempted to achieve a high level of digitization for a research operation relative to industry standards. While this is meant to improve operational efficiency, this may pose additional risk of equipment malfunction and even overall system failure or shutdown due to internal or external factors including, but not limited to, design issues, system compatibility, or potential cybersecurity breaches. This may lead to delay in potential drug candidate identification or a shutdown of our facility. Any disruption in our data generation capabilities could cause delays in advancing new drug candidates into our pipeline, advancing existing programs, or enhancing the capabilities of our platform, including expanding our data, the occurrence of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

In the future, we may manufacture drug substances or products at our facilities for preclinical and clinical use, and we may face risks arising from our limited prior manufacturing capability and experience.

We do not currently have the infrastructure or capability internally to manufacture drug substances or products for preclinical, clinical, or commercial use. If, in the future, we decide to produce drug substances or products for preclinical and clinical use, the costs of developing suitable facilities and infrastructure and implementing appropriate manufacturing processes may be greater than expected. We may also have difficulty implementing the full operational state of the facility, causing delays to preclinical or clinical supply or the need to rely on third-party service providers, resulting in unplanned expenses.

As we expand our development and commercial capacity, we may establish manufacturing capabilities inside the Salt Lake City area or in other locations or geographies, which may lead to regulatory delays or prove costly. If we fail to select the correct location, complete construction in an efficient manner, recruit the appropriate personnel, and generally manage our growth effectively, the development and production of our drug candidates could be delayed or curtailed.

Recursion, or the third parties upon whom we depend, may be adversely affected by natural disasters, and our business continuity plans and insurance coverage may not be adequate.

Our current operations are located in Salt Lake City, Utah; Milpitas, California; and Montreal, Canada. A natural disaster or other serious unplanned event, such as flood, fire, explosion, earthquake, extreme weather condition, pandemic (including COVID-19), power shortage, telecommunications failure, global political instability, warfare, or man-made incident, could result in us being unable to fully utilize our facilities, delays in the development of our drug candidates, interruption of our business operations, or unexpected increased costs, which may have a material and adverse effect on our business. Our collaboration partners, as well as suppliers to us or our collaboration partners, and our third-party service providers and vendors, are similarly subject to some or all of these events. If a natural disaster, power outage, or other event occurs that (i) prevents us from using all or a significant portion of our headquarters or our datacenters; (ii) damages critical infrastructure or our equipment, such as our research facilities or the manufacturing facilities of our third-party contract manufacturers; or (iii) otherwise significantly disrupts operations, it may be difficult, or in certain cases impossible, for us to continue our business for a substantial period of time.

Furthermore, the disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses, business interruptions, and harm to our research and development programs as a result of the limited nature of our disaster recovery and business continuity plans. As part of our risk management policy, we maintain insurance coverage at levels that we believe are appropriate for our business to the extent it is available on commercially reasonable terms. However, in the event of an accident or incident at these facilities, the amounts of insurance may not be sufficient to cover all of our damages and losses.

In addition, our facilities in Salt Lake City, Utah are located in a busy downtown area. Although we believe we have taken the necessary steps to ensure our operations are safe to the surrounding area, there could be a risk to the public if we were to conduct hazardous material research, including use of flammable chemicals and materials, at our facilities. If the surrounding community perceives our facility as unsafe, it could have a material and adverse effect on our reputation, operations, and prospects.

If we fail to comply with environmental, health and safety, or other laws and regulations, we could become subject to fines, penalties, or personal injury or property damages.

We are subject to numerous environmental, health and safety, and other laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment, and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological and radioactive materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for significant damages for harm to persons or property, as well as civil or criminal fines and penalties. Although we maintain workers' compensation insurance to cover costs and expenses arising from injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against all such potential liabilities.

Our insurance policies are expensive and protect us only from some business risks, which leaves us exposed to significant uninsured liabilities.

We do not carry insurance for all categories of risk that our business may encounter and insurance coverage is becoming increasingly expensive. We do not know if we will be able to maintain existing insurance with adequate levels of coverage in the future, and any liability insurance coverage we acquire in the future may not be sufficient to reimburse us for any expenses or losses we may suffer. If we obtain marketing approval for any drug candidates that we or our collaborators may develop, we intend to acquire insurance coverage to include the sale of commercial products, but we may be unable to obtain such insurance on commercially reasonable terms or in adequate amounts. The coverage or coverage limits currently maintained under our insurance policies may not be adequate. If our losses exceed our insurance coverage, our financial condition would be adversely affected. Clinical trials or regulatory approvals for any of our drug candidates could be suspended, which could adversely affect our results of operations and business, including by preventing or limiting the development and commercialization of any drug candidates that we or our collaborators may identify. Additionally, operating as a public company has made it more expensive for us to obtain directors and officers liability insurance. If we do not maintain adequate levels of directors and officers liability insurance, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors and in our executive team.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

We have substantial federal net operating loss (NOL) carryforwards. To the extent that we continue to generate taxable losses as expected, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire, except the federal NOLs generated during and after fiscal year 2018 are carried forward indefinitely. Under Section 382 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an "ownership change," its ability to use pre-change NOL carryforwards and certain other pre-change tax attributes (such as research tax credits) to offset its post-change income could be subject to an annual limitation. An "ownership change" is generally defined as a greater than 50% change by value in the ownership of the corporation's equity by one or more 5% shareholders over a three-year period. Such annual limitation could result in the expiration of a portion of our NOL carryforwards before full utilization thereof. We may have experienced ownership changes within the meaning of Section 382 in the past and we may experience some ownership changes in the future as a result of subsequent shifts in our stock ownership, such as a result of our follow-on offerings or subsequent shifts in our stock ownership (some of which shifts are outside our control). We have not yet conducted a study to assess whether an ownership change has occurred. Future legislative or regulatory changes could also negatively impact our ability to utilize our NOL carryforwards or other tax attributes. Provisions of state tax law may also suspend or otherwise limit our ability to use NOLs and accumulated state tax attributes. As a result, if we attain profitability, we may be unable to use all or a material portion of our NOL carryforwards and other tax attributes for federal and state tax purposes, which could result in increased tax liability and adversely affect our future cash flows.

Changes in tax laws or regulations that are applied adversely to us may have a material adverse effect on our business, cash flow, financial condition or results of operations.

New income, sales, use or other tax laws or regulations could be enacted at any time, which could affect our tax profile and our business and financial performance. Further, existing tax laws, statutes, rules, regulations or ordinances could be interpreted, changed, modified or applied adversely to us. For example, the Tax Cuts and Jobs Act of 2017 (TCJA) eliminates the option to deduct research and development expenditures currently and requires taxpayers to capitalize and amortize them over five or fifteen years pursuant to Code Section 174, beginning in 2022. Further, the Inflation Reduction Act of 2022 (IRA), among other changes, imposes a one-percent excise tax on stock repurchases made on or after January 1, 2023. Any further changes in tax laws or regulations that are applied adversely to us could have a material adverse effect on our business, cash flow, financial condition or results of operations.

If our estimates or judgments relating to our critical accounting policies prove to be incorrect, or financial reporting standards or interpretations change, our results of operations could be adversely affected.

The preparation of financial statements in conformity with generally accepted accounting principles in the United States (U.S. GAAP) requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our estimates on historical experience, known trends and events, and various other factors that we believe to be reasonable under the circumstances, as provided in "Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Policies and Use of Estimates." The results of these estimates form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Significant assumptions and estimates used in preparing our consolidated financial statements include stock-based compensation and valuation of our equity investments in early-stage biotechnology companies. Our results of operations may be adversely affected if our assumptions change or if actual circumstances differ from those in our assumptions.

Additionally, we regularly monitor our compliance with applicable financial reporting standards and review new pronouncements and drafts thereof that are relevant to us. As a result of new standards, changes to existing standards, or changes in their interpretation, we might be required to change our accounting policies, alter our operational policies, and implement new or enhanced systems so that they reflect new or amended financial reporting standards, or we may be required to restate our published financial statements, which may have an adverse effect on our financial position and reputation.

Product liability lawsuits could cause us to incur substantial liabilities and could limit commercialization of any drug candidates that we may develop.

We face an inherent risk of product liability exposure related to the testing of drug candidates in human clinical trials, and we will face an even greater risk if we commercially sell any medicines that we may develop. If we cannot successfully defend ourselves against claims that our drug candidates or medicines caused injuries, we could incur substantial damages or settlement liability. Regardless of merit or eventual outcome, liability claims may also result in adverse effects including but not limited to the following:

- decreased demand for any drug candidates or therapeutics that we may develop;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue; and
- the inability to commercialize our drug candidates.

Although we maintain product liability insurance, including coverage for clinical trials that we sponsor, it may not be adequate to cover all liabilities that we may incur. We anticipate that we will need to increase our insurance coverage as we commence additional clinical trials and if we successfully commercialize any drug candidates. The market for insurance coverage can be challenging, and the costs of insurance coverage will increase as our clinical programs increase in size. We may not be able to maintain insurance coverage at a reasonable cost and with adequate limits to satisfy any and all liability that may arise.

RISKS RELATED TO OUR RELIANCE ON THIRD PARTIES

Third parties that perform some of our research and preclinical testing or conduct our clinical trials may not perform satisfactorily or their agreements may be terminated.

We currently rely, and expect to continue to rely, on third parties to conduct some aspects of research and preclinical testing and clinical trials. The third parties include CROs, clinical data management organizations, medical institutions, and principal investigators. Any of these third parties may fail to fulfill their contractual obligations, including by not meeting deadlines for the completion of research, testing, or trials, or we or they may terminate their engagements with us. If any of our relationships with these third parties terminate, we may not be able to enter into arrangements with alternative third parties on commercially reasonable terms, or at all. If we need to enter into alternative arrangements, such negotiations could delay product development activities.

Our reliance on third parties for research and development activities reduces our control over these activities, but does not relieve us of our responsibilities. For example, we remain responsible for ensuring that each of our respective clinical trials is conducted in accordance with the general investigational plan and protocols for the trial, as well as applicable legal, regulatory, and scientific standards. We also are required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database within certain timeframes. In addition, the FDA and comparable foreign regulatory authorities require compliance with good clinical practices (GCP) guidelines for conducting, recording, and reporting the results of clinical trials to assure that data and reported results are credible, reproducible, and accurate, and that the rights, integrity, and confidentiality of trial participants are protected. Regulatory authorities enforce GCP compliance through periodic inspections of trial sponsors, principal investigators, and trial sites.

If we or any of the third parties fail to comply with applicable GCP regulations, some or all of the clinical data generated in our clinical trials may be deemed unreliable, and the FDA or comparable foreign regulatory authorities may require us to perform additional nonclinical or clinical trials or to enroll additional patients before approving our marketing applications. In addition, if we or the third parties fail to comply with our stated protocols or applicable laws and regulations during the conduct of clinical trials, we or the third parties could be subject to warning letters or enforcement actions by the FDA and comparable foreign regulatory authorities, which could result in civil penalties or criminal prosecution, as well as adverse publicity that harms our business.

We also will not be able to obtain, or may be delayed in obtaining, marketing approvals for any drug candidates we may develop if these third parties do not successfully carry out their contractual duties, meet expected deadlines, or

conduct clinical trials in accordance with our stated protocols or regulatory requirements. As a result, we may be delayed or unable to successfully commercialize our drug candidates.

Third parties that manufacture our drug candidates for preclinical development, clinical testing, and future commercialization may not provide sufficient quantities of our drug candidates or products at an acceptable cost, which could delay, impair, or prevent our development or commercialization efforts.

We do not currently own or operate any manufacturing facilities and have no manufacturing personnel. We rely, and expect to continue to rely, on third parties for drug supplies for our clinical trials, the manufacture of many of our drug candidates for preclinical development and clinical testing, as well as the commercial manufacture of our products if any of our drug candidates receive marketing approval. We may be unable to establish necessary agreements with third-party manufacturers or to do so on acceptable terms. This reliance on third parties increases the risk that we will not have sufficient quantities of our drug candidates or products, or will not have sufficient quantities at an acceptable cost or quality, which could delay, impair, or prevent our development or commercialization efforts.

In addition, the facilities used by our contract manufacturers to manufacture our drug candidates must be inspected by the FDA pursuant to pre-approval inspections that will be conducted after we submit our marketing applications to the FDA. We do not expect to control the manufacturing process of, and will be completely dependent on, our contract manufacturers for compliance with current good manufacturing practice guidelines (cGMP) in connection with the manufacture of our drug candidates in the near to intermediate term, or possibly the long term. If our contract manufacturers cannot maintain adequate quality control and qualified personnel to successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, including cGMP guidelines, they will not be able to pass regulatory inspections and/or maintain regulatory compliance for their manufacturing facilities.

If the FDA or a comparable foreign regulatory authority finds deficiencies with, does not approve, or withdraws approval of these facilities for the manufacture of our drug candidates, we may need to find alternative manufacturing facilities, which would significantly impact our timelines and ability to develop, obtain regulatory approval for, or market our drug candidates, if approved. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us. Our drug candidates and any other products that we may develop may compete with the drug candidates and approved products of other companies for access to manufacturing facilities or capacity, which may further restrict our ability to secure alternative manufacturing sites.

Further, our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of drug candidates or products that may be approved, operating restrictions, and criminal prosecutions, any of which could significantly and adversely affect our business, supplies of our drug candidates, and prospects.

Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including but not limited to the following:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.
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Any performance failure on the part of our existing or future third-party manufacturers could delay clinical development or marketing approval. If it is necessary to replace any such third-party manufacturer, we may incur added costs and delays in identifying and qualifying any a replacement. In addition, any performance failure on the part of our distributors could delay clinical development or marketing approval of any drug candidates we may develop or seek to commercialize, producing additional losses and depriving us of product revenue.

Our current and anticipated future dependence upon others for the manufacture and distribution of our drug candidates or products may adversely affect our future profit margins and our ability to commercialize any products that receive marketing approval on a timely and competitive basis, if at all.

If we are unable to adequately source clinical and commercial supplies, equipment, and active pharmaceutical ingredients (API) from third party vendors as our drug development pipeline matures, our business could be significantly harmed.

We procure raw materials, components, parts, consumables, reagents, and equipment used in the development and operation of our platform and the development of our drug candidates from third party vendors. We also rely on third party vendors to perform quality testing. Particular risks to our platform include reliance on third-party equipment and instrument suppliers and consumable and reagent suppliers. As we increase development of drug products and commence clinical testing and commercialization, we will require expanded capacity across our supply chain. We face risks regarding our sourcing of products and quality-testing services, including but not limited to the following:

- the inability of suppliers and service providers to grow their capacity to meet demand, whether from us or other drug manufacturers, particularly if the field of technology-enabled drug discovery continues to expand;
- termination or non-renewal of supply and service agreements with third parties in a manner or at a time that is costly or damaging to us;
- disruptions to the operations of these suppliers and service providers caused by conditions unrelated to our business or operations, including the bankruptcy of the supplier or service provider or force majeure events, such as the COVID-19 pandemic, global political instability, natural disasters, supply chain issues, or warfare; and
- inspections of third-party facilities by regulatory authorities that could have a negative outcome and result in delays in, or termination of, their ability to meet our requirements.

Moreover, certain of our specialized equipment, as well as the API used in our drug candidates, are obtained from single-source suppliers. Our ability to successfully develop our drug candidates, and to ultimately supply our commercial products in quantities sufficient to meet the market demand, depends in part on our ability to obtain equipment and the API for these products in accordance with regulatory requirements and in sufficient quantities for clinical testing and commercialization. We do not currently have arrangements in place for a redundant or second-source supply of any such equipment or ingredients in the event any of our current suppliers fails or is unable to meet our requirements. While our single-source suppliers have generally met our demand for their products on a timely basis in the past, we are not certain that they will be able to meet our future demand, whether due to any of the above factors, the nature of our agreements with those suppliers, our limited experience with those suppliers, our relative importance as a customer, or any other reason. For all of our drug candidates, we intend to identify and qualify additional vendors and manufacturers, as available, to provide such equipment and API prior to our submission of an NDA to the FDA and/or an MAA to the EMA, which may require additional regulatory inspection or approval and result in further delay.

Any interruption or delay in the supply of components, materials, specialized equipment, API, and quality-testing sources at acceptable prices and in a timely manner could impede, delay, limit, or prevent our development efforts, which could harm our business, results of operations, and prospects.

RISKS RELATED TO OUR INTELLECTUAL PROPERTY

Our success significantly depends on our ability to obtain patents of adequate scope covering our proprietary technology and products. Obtaining and maintaining patent assets is inherently challenging, and our pending and future patent applications may not issue with the scope we need, if at all.

We protect our products, product candidates, and platform technologies, in both the U.S, and internationally, with patents and patent applications owned by or licensed to us, and we plan to file additional patent applications in the future. Our commercial success will depend in significant part on our ability to obtain, maintain, protect, and enforce our patents and other intellectual property rights in the U.S. and other countries for our drug candidates and our core technologies important to the development and implementation of our business, including our phenomics platform, preclinical and clinical assets, and related know-how.

Patent prosecution is a complex, expensive, and lengthy process, with no guarantee that a patent will issue in a timely fashion or at all, or with sufficiently broad claims to protect our drug candidates and core technologies. Further, the laws and regulations for obtaining and maintaining patents are subject to change by legislative or judicial action in the relevant jurisdictions. The patent positions of pharmaceutical, biotechnology, and other life sciences companies in particular can be highly uncertain and involve complex legal and factual questions for which

important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in biotechnology patents has emerged to date in the U.S., and tests used for determining the patentability of patent claims in all technologies are in flux. The pharmaceutical, biotechnology, and other life sciences patent laws and regulations outside the U.S. can be even more uncertain. The U.S. Patent and Trademark Office (USPTO) and patent offices in other jurisdictions have often required that patent applications concerning pharmaceutical and/or biotechnology-related inventions be limited or narrowed substantially to cover only the specific innovations exemplified in the patent application, thereby limiting the scope of protection against competitive challenges.

The issuance of a patent is not conclusive as to its inventorship, scope, validity, or enforceability, and our owned and licensed patents may be challenged in the patent offices and courts in the United States and abroad. Third parties may invent, publish, or file patents of their own in ways which overlap or conflict with our patent rights. Moreover, even if unchallenged, our owned patent portfolio and any patent portfolio we license may not provide us with any meaningful protection or prevent competitors from designing around our patent claims to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner. For example, a third party may develop a competitive product that provides benefits similar to one or more of our drug candidates, but that has a different composition that falls outside the scope of our patent protection. In addition, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its first effective, non-provisional filing date, and patents protecting drug candidates might expire before or shortly after the candidates are commercialized given the amount of time required for development, testing, and regulatory review. The various governmental patent agencies also require compliance with extensive rules and fee obligations. Failure to do so can, under certain circumstances, result in the abandonment of a patent application or the termination of patent rights. Non-compliance events that could result in abandonment or lapse of a patent or patent application include a failure to respond to official actions within prescribed time limits, non-payment of fees, and failure to properly legalize and submit formal documents.

We have patent applications pending before the USPTO and other patent offices, and we plan to file new applications in the future. Patent offices may require us to significantly narrow our claims based upon prior art discovered by the USPTO or through third-party submissions. Moreover, we do not always have the right to control the preparation, filing, prosecution, and maintenance of licensed patents and applications under arrangements with collaborators or licensors. We may become involved in procedural challenges, including *inter partes* review, which could result in the narrowing or elimination of our patent rights or those of our licensors. This could limit our ability to stop others from freely using or commercializing similar or identical technology and products, or limit the duration of the patent protection covering our technology and drug candidates. Such challenges may also result in our inability to manufacture or commercialize our drug candidates without infringing third-party patent rights. Further, inadvertent or intentional public disclosures of our inventions prior to the filing of a patent application have precluded us, and in the future may preclude us, from obtaining patent protection in certain jurisdictions. We also could fail to identify patentable aspects of our technology and research and development output in time to obtain patent protection.

We also currently own a number of U.S. provisional patent applications. These provisional applications are not eligible to become issued patents until, among other things, we file a non-provisional patent application within 12 months of filing one or more of our related provisional patent applications. If we do not timely file any non-provisional patent applications, we may lose our priority dates with respect to our provisional patent applications and any patent protection on the inventions disclosed in such applications.

We presently do not own or in-license any issued patents with respect to certain of our programs, including our lead molecules for the treatment of C. difficile colitis (REC-163964, REC-164014, and REC-164067); lead molecules for the treatment of STK11-mutant immune checkpoint resistance in non-small cell lung cancer (REC-64151); and MYC inhibitory molecules for the treatment of solid and hematological malignancies.

We cannot provide any assurances that any of our or our licensors' pending or future patent applications will issue, or that any pending or future patent applications that mature into issued patents will include claims with a scope sufficient to protect our drug candidates from competition. If we fail to obtain and maintain adequate intellectual property protection covering any technology, invention, or improvement that is important to our business, or if the scope of the patent protection obtained is not sufficiently broad, we may not be able to prevent third parties from launching generic versions of our products, from using our proprietary technologies, or from marketing products that are very similar or identical to ours. If the breadth or strength of protection provided by our patents and patent applications are threatened, it could also dissuade companies from collaborating with us to license, develop, or

commercialize current or future drug candidates. This could have a material, adverse effect on our ability to successfully commercialize our technology and products, and on our business, results of operations, and prospects.

Our current proprietary position for certain drug candidates depends upon our owned or in-licensed patent filings covering components of such drug candidates, manufacturing-related methods, formulations, and/or methods of use, which may not adequately prevent a competitor or other third party from using the same drug candidate for the same or a different use.

Composition of matter patent protection is generally considered to be desirable for drug products because it provides protection without regard to any particular method of use or manufacturing, or formulation. For some of the molecules that we in-license from our collaboration partners, we cannot rely on composition of matter patent protection as the term on those patents has already expired or is close to expiring.

Method of use patents protect the use of a product for the specified method and formulation patents cover formulations to deliver therapeutics. While we file applications covering method of use for our programs at appropriate times in the development process, we cannot be certain that claims in any future patents issuing from these applications will cover all commercially-relevant applications of molecules in competing uses. These types of patents do not prevent a competitor or other third party from developing, marketing, or commercializing a similar or identical product for an indication that is outside the scope of the patented method, or from developing a different formulation that is outside the scope of the patented formulation. Moreover, with respect to method of use patents, even if competitors or other third parties do not actively promote their product for our targeted indications or uses for which we may obtain patents, physicians may recommend that patients use these products off-label, or patients may do so themselves. Although off-label use may infringe or contribute to the infringement of method of use patents, the practice is common and this type of infringement is difficult to prevent or enforce. Additionally, some commercially-relevant jurisdictions do not allow for patents covering a new method of use of an otherwise-known molecule. Consequently, we may not be able to prevent third parties from practicing our inventions in the United States or abroad, which may have a material adverse effect on our business.

If we do not obtain patent term extension and data exclusivity for any drug candidates we may develop, our business may be materially harmed.

Depending upon the timing, duration, and specifics of any FDA marketing approval of any drug candidates we may develop, one or more of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Action of 1984, referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent extension term of up to five years as compensation for patent term lost during the FDA regulatory review process. A patent term extension cannot extend the remaining term of a patent beyond 14 years from the date of product approval. Only one patent may be extended and only those claims covering the approved drug, a method for using it, or a method for manufacturing it may be extended. However, we may not be granted an extension because of, for example, failing to exercise due diligence during the testing phase or regulatory review process, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents, or otherwise failing to satisfy applicable requirements. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our business, financial condition, results of operations and prospects could be materially harmed.

We may need to license certain intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.

A third party may hold intellectual property that are important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties on commercially reasonable terms, or our business could be harmed, possibly materially. For example, when we explore repurposing molecules owned by our collaboration partners or other third parties, we in-license the rights to use those molecules for our use. If we are not able to obtain a license, or to obtain one on commercially reasonable terms and with sufficient breadth to cover the intended use of third-party intellectual property, our business could be materially harmed.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights, and particularly those arising from patents, is uncertain because these rights have limitations and may not adequately protect our business or permit us to maintain our competitive advantage. Examples where our intellectual property rights may not further our competitive advantage include but are not limited to the following:

- others may be able to duplicate or utilize similar technology in a manner that infringes our patents but is undetectable or done in a jurisdiction where we have not secured, or cannot secure or enforce, patent rights;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our owned or licensed intellectual property rights;
- our competitors or other third parties might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we may not develop additional proprietary technologies that are patentable; and
- we may choose not to file a patent in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property.

Should any of these events occur, they could have a material, adverse effect on our business, results of operations, and prospects.

If we are unable to protect the confidentiality of our trade secrets and know-how, our business and competitive position may be harmed.

In addition to the protection afforded by patents, we rely on trade secret protection and contractual arrangements to protect proprietary know-how, information, and technology that is not covered by our patents. With respect to curating our data and our library of small molecules generally, we consider trade secrets and know-how to be our primary intellectual property. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our collaborators, scientific advisors, employees, and consultants. Our agreements with our employees and consultants also require them to acknowledge ownership by us of inventions they may conceive as a result of their work for us and to perfect such ownership by assignment. However, we may not be able to prevent the unauthorized disclosure or use of our trade secrets or other confidential information through these agreements or other preventative measures. In addition, third parties, including our competitors, could independently develop and lawfully use the same or substantially equivalent trade secrets and know-how. Unpatented proprietary rights, including trade secrets and know-how, can be difficult to protect and may lose their value if their secrecy is lost or if they are independently developed by a third party. Any loss of trade secret protection or other unpatented proprietary rights could harm our business, results of operations, financial condition, and prospects.

We may be subject to claims that we or our employees have wrongfully used or disclosed alleged trade secrets of third parties or are in breach of their non-competition or non-solicitation agreements with third parties.

We take efforts intended to ensure that our employees and consultants do not use the intellectual property, proprietary information, know-how, or trade secrets of others in their work for us, or breach any applicable non-competition or non-solicitation agreement. However, we may in the future be subject to claims that we or these individuals have, inadvertently or otherwise, used or disclosed the alleged trade secrets or other proprietary information of a third party, including a former employer or competitor, or that we caused an employee or contractor to breach the terms of their non-competition or non-solicitation agreement with a third party. In addition, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in obtaining such agreements or an assignment of rights to us.

Litigation may be necessary to defend against or enforce these claims, which may be costly, a distraction to management, and of uncertain outcome. If we are found liable for disclosure or misuse of a third party's proprietary information, or if we are unable to secure rights to intellectual property developed by an employee or contractor a court could prohibit us from using technologies or features that may be essential to our drug candidates that incorporate or are derived from such proprietary information, in addition to awarding damages. Moreover, any such litigation could also adversely affect our ability to hire or retain employees or contractors. If we are unable to

establish our rights to valuable intellectual property or retain key personnel, this failure may prevent us from successfully commercializing our drug candidates and have an adverse effect on our business, financial condition, and results of operation.

Litigation to defend against third party claims that we are infringing their intellectual property rights, or to enforce our intellectual property rights, presents numerous risks.

The biotechnology and pharmaceutical industries are characterized by extensive and frequent litigation regarding patents and other intellectual property rights. Intellectual property litigation or other legal proceedings, with or without merit, is generally expensive and time consuming, potentially distracting to technical and management personnel, and subject to uncertain outcomes. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios.

Our commercial success depends upon our ability, and collaborators' abilities, to develop, manufacture, market, and sell our drug candidates, and to use our proprietary technologies, without infringing, misappropriating, or otherwise violating the intellectual property or proprietary rights of third parties. Given the vast and continually increasing number of patents in our field of technology, we cannot be certain that we do not infringe existing patents or that we will not infringe patents granted in the future. We may in the future become party to, or threatened with, litigation or adversarial proceedings initiated by our competitors or other third parties alleging that our products or technologies are covered by their patents.

Many companies have obtained patents or filed patent applications in areas important to our business, including artificial intelligence and deep learning, technology-aided drug discovery, CRISPR, high-throughput screening, and combinations of any or all of these fields. For example, we sublicense CRISPR-Cas9 gene editing technology from a licensed vendor, which provides critical tools upon which portions of our drug discovery process relies. CRISPR-Cas9 gene editing is a field that is highly active for patent filings and there are ongoing disputes between third parties, which we are not party to, regarding the ownership of and licensing rights related to the technology. The extensive patent filings related to CRISPR and Cas make it difficult for us to assess the full extent of relevant patents and pending applications that may cover this technology, and there may be third-party patents, or pending patent applications with claims that may issue in the future, covering our use of CRISPR-Cas9.

If we or our collaborators are found to infringe a third party's patent or other intellectual property rights, such determination could result in significant damages and costs. In addition, we could be required to obtain a license from such third party to continue developing and marketing our drug candidates and technology, which may not be available on commercially reasonable terms or at all, or to cease developing and commercializing the infringing technology or drug candidates altogether. If we are prevented from commercializing our drug candidates or forced to cease some of our business operations, this restriction could materially harm our reputation and have a significant adverse impact on our business, results of operations, and prospects.

Alternatively or additionally, we may initiate litigation, or file counterclaims, to protect or enforce our patents and other intellectual property rights if we believe competitors or other third parties have infringed, misappropriated, or otherwise violated our rights. Our ability to enforce our intellectual property rights is subject to litigation risks, including that the opposing party may seek counterclaims against us, as well as uncertainty as to the protection and enforceability of those rights in some countries. If we seek to enforce our intellectual property rights, we may be subject to findings that our patents should be interpreted narrowly and do not cover the technology at issue, or that our patents are invalid or unenforceable. If we are unable to enforce and protect our intellectual property rights, or if they are circumvented, invalidated, or rendered obsolete by the rapid pace of technological change, it could have an adverse impact on our competitive position, business, financial position, and prospects.

Competing products may also be sold in other countries in which our patent coverage might not exist or might not be as strong. The legal systems of some countries do not favor the enforcement of patents and other intellectual property rights, and other jurisdictions may have limited enforcement rights for patent holders. This could make it difficult for us to stop the infringement of our patents, if obtained, or the misappropriation of our other intellectual property rights in other countries. Consequently, we and our licensors may have limited remedies in those foreign countries if patents are infringed, or we or our licensors may be compelled to grant a license to a third party, which could materially diminish the value of those patents and could limit our potential

revenue opportunities. In addition, competitors may use our technologies to develop their own products that compete with ours in jurisdictions where we have not obtained patent protection or where we have patent protection but limited enforcement rights. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate to obtain a significant commercial advantage from the intellectual property that we own or license.

If we fail to comply with our obligations in the agreements under which we collaborate with or license intellectual property rights from third parties, or otherwise experience disruptions to our business relationships with our collaborators or licensors, we could lose rights that are important to our business.

We license certain intellectual property that is important to our business and, in the future, we may enter into additional agreements that provide us with licenses to valuable intellectual property or technology. Our current license agreements impose, and we expect our future license agreements will impose, various development, diligence, commercialization, and other obligations on us in order to maintain the licenses. In spite of our efforts, a licensor might conclude that we have materially breached our obligations under a license agreement and seek to terminate the agreement, thereby removing or limiting our ability to develop and commercialize products and technology covered by the agreement. If these in-licenses are terminated, or if the underlying patent rights licensed thereunder fail to provide the intended exclusivity, competitors or other third parties would have the freedom to seek regulatory approval of, and to market, products identical to ours and we may be required to cease development and commercialization of certain of our drug candidates. Any of the foregoing could have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

Moreover, disputes may arise regarding intellectual property subject to a licensing agreement, including but not limited to the following:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

The agreements under which we license intellectual property or technology from third parties are, and future agreements are likely to be, complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or it could increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations, and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected drug candidates, which could have a material adverse effect on our business, financial conditions, results of operations, and prospects.

These and similar issues may arise with respect to our collaboration agreements, such as the Bayer Agreement and the Roche Genentech Agreement. The Bayer Agreement and the Roche Genentech Agreement are two of our key collaborations, and there is no assurance that these collaborations will continue past their current terms, on favorable terms or at all, or that at any time while the collaborations are in effect the parties will operate under the agreements without disputes.

Some of our intellectual property has been, and in the future may be, discovered through government-funded programs and thus may be subject to federal regulations such as "march-in" rights, certain reporting requirements, and a preference for U.S.-based companies, and compliance with such regulations may limit our exclusive rights and our ability to contract with non-U.S. manufacturers.

Our intellectual property rights may be subject to a reservation of rights by one or more third parties. For example, certain intellectual property rights that we have licensed, or may in the future license, have been generated

through the use of U.S. government funding. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future processes and related products and services. These U.S. government rights include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right, under certain limited circumstances, to require the licensor to grant exclusive, partially exclusive, or non-exclusive licenses to any of these inventions to a third party if the U.S. government determines that (1) adequate steps have not been taken to commercialize the invention and achieve practical application of the government-funded technology, (2) government action is necessary to meet public health or safety needs, (3) government action is necessary to meet requirements for public use under federal regulations or (4) we have failed to meet requirements of federal regulations (also collectively referred to as “march-in rights”).

The U.S. government also has the right to take title to these inventions if we or our licensors fail to disclose the invention to the government or fail to file an application to register the intellectual property within specified time limits. These rights may permit the U.S. government to disclose our confidential information to third parties. In addition, our rights in such inventions may be subject to requirements to manufacture products embodying such inventions in the United States. Intellectual property generated under a government-funded program is also subject to certain reporting requirements, compliance with which may require us to expend substantial resources.

Any exercise by the U.S. government of such rights could have a material adverse effect on our competitive position, business, results of operations, financial condition, and prospects.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our registered or unregistered trademarks or trade names may be challenged, infringed, circumvented, declared generic, or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition among potential collaborators or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other trademarks or trademarks that incorporate variations of our registered or unregistered trademarks or trade names. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to our intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely affect our business, financial condition, results of operations, and prospects.

RISKS RELATED TO GOVERNMENT REGULATION

Even if we receive FDA or other regulatory approval for any of our drug candidates, we will be subject to ongoing regulatory obligations and other conditions that may result in significant additional expense, as well as the potential recall or market withdrawal of an approved product if unanticipated safety issues are discovered.

Even if the FDA or a comparable foreign regulatory authority approves any of our drug candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, and recordkeeping for the product will be subject to extensive and ongoing regulatory requirements. These requirements also include submission of safety and other post-marketing information and reports, establishment registration and listing, as well as continued compliance with cGMPs for manufacturing processes and GCPs for any clinical trials that we conduct post-approval. Any regulatory approvals that we receive for our drug candidates may also be subject to limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or they may contain requirements for potentially costly post-marketing studies and surveillance to monitor the safety and efficacy of the drug product.

Any failure to comply with regulatory requirements, or any discovery of previously unknown problems with a drug product — including adverse events of unanticipated severity or frequency — or with our third-party manufacturers or manufacturing processes, may result in, among other things:

- restrictions on the marketing or manufacturing of the drug product, withdrawal of the product from the market, or voluntary or mandatory product recalls;

- clinical trial holds;
- fines, warning letters or other regulatory enforcement action;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us;
- product seizure or detention, or refusal to permit the import or export of drug products; and
- injunctions or the imposition of civil or criminal penalties.

The occurrence of any of the foregoing actions could materially and adversely affect our reputation, business, results of operation, and prospects.

Though we have been granted orphan drug designation for certain of our drug candidates, we may be unsuccessful or unable to maintain the benefits associated with such a designation, including the potential for market exclusivity.

As part of our business strategy, we have sought orphan drug designation for certain of our drug candidates and may do so for other drug candidates in the future. Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. The FDA may designate a drug as an orphan drug if it is intended to treat a rare disease or condition. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers.

Similarly in Europe, the European Commission, upon the recommendation of the EMA's Committee for Orphan Medicinal Products, grants orphan drug designation for drugs intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition when, without incentives, it is unlikely that sales of the drug in Europe would be sufficient to justify the necessary investment in developing the drug. In Europe, orphan drug designation entitles a party to financial incentives such as reduction of fees or fee waivers. We have received orphan drug designation from the FDA and European Commission for REC-4881 for the potential treatment of FAP, but we may be unsuccessful with respect to other drug candidates in the future.

Generally, if a drug with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the drug is entitled to a period of marketing exclusivity, which precludes the FDA or the EMA from approving another marketing application for the same drug and indication for that time period, except in limited circumstances. The applicable period is seven years in the United States and ten years in Europe. The European exclusivity period can be reduced to six years if a drug no longer meets the criteria for orphan drug designation or if the drug is sufficiently profitable so that market exclusivity is no longer justified. Even if we obtain orphan drug exclusivity for a drug, that exclusivity may not effectively protect the drug from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve a different drug for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective, or makes a major contribution to patient care. In addition, a designated orphan drug may not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. Moreover, orphan drug exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition or if another drug with the same active part of the molecule is determined to be safer, more effective, or represents a major contribution to patient care. Orphan drug designation neither shortens the development time or regulatory review time of a drug, nor gives the drug any advantage in the regulatory review or approval process. While we may seek orphan drug designation for our drug candidates, we may never receive such designations. Even if we do receive such designations, there is no guarantee that we will enjoy the benefits of those designations.

Obtaining and maintaining regulatory approval of our drug candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of our drug candidates in other jurisdictions.

We may submit marketing applications in countries other than the United States. Regulatory authorities in jurisdictions outside of the United States have requirements for approval of drug candidates with which we must comply prior to marketing in those jurisdictions. For example, our trials to date have consisted of small patient populations and some international regulatory filings may require larger patient populations or additional nonclinical studies or clinical trials.

Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties, and costs for us and could delay or prevent the introduction of our products in certain countries. If we fail to comply with the regulatory requirements in international markets and/or fail to receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our drug candidates will be harmed.

Obtaining and maintaining regulatory approval of our drug candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction, although a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. For example, even if the FDA grants marketing approval of a drug candidate, comparable regulatory authorities in foreign jurisdictions must also approve the manufacturing, marketing, and promotion of the drug candidate in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and greater than, those in the United States. These may include additional nonclinical studies and clinical trials since clinical trials conducted in one jurisdiction may not be accepted by regulatory authorities in other jurisdictions. In short, the foreign regulatory approval process involves all of the risks associated with FDA approval. In many jurisdictions outside the United States, a drug candidate must be approved for reimbursement before it can be approved for sale in that jurisdiction. In some cases, the price that we may intend to charge for our drug products will also be subject to regulatory approval.

As we expand our operations outside the United States, we will be exposed to various risks related to the global regulatory environment.

We have expanded our operations into Canada and use service providers in many regions outside the U.S. and expect our foreign activities to increase in the future. If we continue expanding our operations outside of the United States, we must dedicate additional resources to comply with U.S. laws governing activities in other countries, as well as numerous laws and regulations in each jurisdiction in which we plan to operate, such as the U.S. Foreign Corrupt Practices Act (FCPA) and U.S. and foreign anti-money laundering, export control, sanctions, and other trade laws and regulations (collectively, Trade Laws).

Compliance with the FCPA is expensive and difficult, particularly in countries in which corruption is a recognized problem. In addition, the FCPA presents particular challenges in the pharmaceutical industry, because, in many countries, hospitals are operated by the government, and doctors and other hospital employees are considered foreign officials. Certain payments to hospitals in connection with clinical trials and other work have been deemed to be improper payments to government officials and have led to FCPA enforcement actions.

Violations of Trade Laws can result in substantial consequences. We have direct or indirect interactions with officials and employees of governmental agencies or government-affiliated hospitals, universities or other organizations. We plan to engage third parties for clinical trials and/or to obtain necessary permits, licenses, patent registrations, and other regulatory approvals and we can be held liable for the corrupt or other illegal activities of our personnel, agents, or partners, even if we do not explicitly authorize or have prior knowledge of such activities.

Changing, inconsistent, or conflicting laws, rules and regulations governing international business practices, and ambiguities in their interpretation and application, create uncertainty and challenges. The failure to comply with any such laws or regulations may result in substantial civil and criminal penalties and suspension or debarment from government contracting. The SEC also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the FCPA's accounting provisions.

Though we have been granted priority review designation for one of our drug candidates, such designation may not lead to a faster regulatory review or regulatory approval process, and we might not receive such designation for additional drug candidates in the future.

If the FDA determines that a drug candidate offers a treatment for a serious condition and, if approved, the drug product would provide a significant improvement in safety or effectiveness, the FDA may designate the drug candidate for priority review. The FDA has broad discretion with respect to whether or not to grant priority review status to a drug candidate, so even if we believe a particular drug candidate is eligible for such designation or status, the FDA may decide not to grant it. While we have been granted priority review designation for REC-4881 for the potential treatment of FAP, a priority review designation does not necessarily result in an expedited regulatory review or regulatory approval process or necessarily confer any advantage with respect to regulatory approval compared to conventional FDA procedures. Receiving priority review from the FDA does not guarantee regulatory

approval within the six-month review cycle or at all. We may request priority review for additional drug candidates from time to time.

Breakthrough therapy designation and fast track designation by the FDA, even if granted for any of our drug candidates, may not lead to a faster development, regulatory review, or regulatory approval process, and each designation does not increase the likelihood that any of our drug candidates will receive marketing approval in the United States.

We may seek a breakthrough therapy designation for some of our drug candidates. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA may also be eligible for priority review and accelerated approval. Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe one of our drug candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a drug candidate may not result in a faster development process, review or approval compared to therapies considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our drug candidates qualify as breakthrough therapies, the FDA may later decide that such drug candidates no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

We may seek fast track designation for some of our drug candidates from time to time. If a drug candidate is intended for the treatment of a serious or life-threatening condition and the drug candidate demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for fast track designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular drug candidate is eligible for this designation, we cannot ensure that the FDA would decide to grant it. Even if we do receive fast track designation, we may not experience a faster development process, regulatory review or regulatory approval compared to conventional FDA procedures. The FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program. Fast track designation alone does not guarantee qualification for the FDA's priority review procedures.

The FDA, EMA, and other regulatory authorities may implement additional regulations or restrictions on the development and commercialization of our drug candidates.

The FDA, other agencies at both the federal and state level, and U.S. Congressional committees have expressed interest in further regulating the small molecule pharmaceutical industry, as have the EMA and regulatory authorities in other countries. Such action may delay or prevent commercialization of some or all of our drug candidates. Adverse developments in clinical trials conducted by others may cause the FDA or other oversight bodies to change the requirements for regulatory approval of any of our drug candidates. These regulatory review agencies and committees, and any new requirements or guidelines they promulgate, may lengthen the regulatory review process, require us to perform additional studies or trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent regulatory approval and commercialization of our drug candidates, or lead to significant post-approval limitations or restrictions. As we advance our drug candidates, we will be required to consult with these regulatory authorities and comply with applicable regulatory requirements and guidelines. If we fail to do so, we may be required to delay or discontinue development of such drug candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delays as a result of a more stringent or lengthier regulatory approval process, or further restrictions on the development of our drug candidates, could be costly and could negatively impact our ability to complete clinical trials and commercialize our current and future drug candidates in a timely manner, if at all.

Healthcare legislative reform measures in the U.S. and abroad, such as changes in healthcare spending and policy, may have a material adverse effect on our business, results of operations, and prospects.

We operate in a highly regulated industry, and new laws and regulations, or new interpretations of laws and regulations by regulatory authorities or the courts, related to healthcare availability and the method of delivery of, or payment for, healthcare products and services could negatively impact our business. The U.S. and many foreign jurisdictions have enacted or proposed legislative and regulatory changes affecting the healthcare system that could impact our clinical trials; prevent or delay marketing approval of our current or future drug candidates; restrict or regulate potential post-approval activities; and/or affect our ability to profitably sell a drug product for which we obtain marketing approval. For any of our drug candidates that receive marketing approval, such laws and regulations could require, for example, (i) changes to our manufacturing arrangements; (ii) additions or modifications to drug product labeling; (iii) the recall or discontinuation of our drug products; and/or (iv) additional record-keeping and data transfer requirements.

There have been, and likely will continue to be, legislative and regulatory proposals at the U.S. federal and state levels and abroad directed at increasing the availability of healthcare and containing or lowering healthcare costs. For example, the Affordable Care Act (ACA) substantially changed the way healthcare is financed by both governmental and private insurers in the U.S., and significantly impacted the pharmaceutical industry. The ACA, among other things, (i) subjected biological products to potential competition by lower-cost biosimilars; (ii) addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected; (iii) increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations; (iv) established annual fees and taxes on manufacturers of certain branded prescription drugs; and (v) created a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer specified point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D. Since the ACA was enacted, there continue to be changes to certain aspects of the law by Congress, Executive Order and court decisions.

There also have been U.S. Congressional inquiries and proposed federal and state legislation designed to, among other things, (i) bring more transparency to drug pricing, including that of specialty drugs; (ii) reduce the cost of prescription drugs under Medicare, which may result in a similar reduction in payments from private payors; (iii) review the relationship between pricing and manufacturer patient programs; and (iv) reform government program reimbursement methodologies for drugs. For example, the recently enacted federal Inflation Reduction Act (IRA) contains provisions that could have an adverse effect on our ability to generate revenue, attain profitability, or commercialize our drug candidates if approved, as the statute includes provisions intended to reduce the cost of prescription drugs under Medicare. In addition to the direct impact of the IRA on federal drug reimbursement, the statute may also lead to similar reductions in payments from private payors. The continuing efforts of the government, insurance companies, managed care organizations, and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect, among other things:

- the demand for our current or future drug candidates if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our drug products;
- our ability to obtain coverage and reimbursement approval for a drug product;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any such legislative or other reform measures and changes in healthcare spending and policy could result in increased costs to us, reduced demand for our current or future drug candidates, and additional pricing pressures, which could have a material adverse effect on our business, results of operations, and prospects.

Our relationships with healthcare providers, other customers, and third-party payors will be subject to applicable anti-kickback, fraud and abuse, and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, exclusion from government healthcare programs, contractual damages, reputational harm, and diminished profits and future earnings.

Although we do not currently have any drug products on the market, once we begin commercializing our drug candidates, we will be subject to additional healthcare statutory and regulatory requirements and enforcement by the federal government and the states and foreign governments in which we conduct our business. Healthcare providers, physicians, and third-party payors play a primary role in the recommendation and prescription of any

drug candidates for which we obtain marketing approval. Our future arrangements with third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell, and distribute our drug candidates for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations include, but are not limited to, the Anti-Kickback Statute, the False Claims Act, the Health Insurance Portability and Accountability Act (HIPAA), and the Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH Act).

Efforts to ensure that our future business arrangements with third parties comply with applicable healthcare laws and regulations could involve substantial costs and may require us to undertake or implement additional policies or measures. We may face claims and proceedings by private parties, and claims, investigations and other proceedings by governmental authorities, relating to allegations that our business practices do not comply with statutes, regulations or case law involving applicable fraud and abuse, privacy or data protection, or other healthcare laws and regulations, and it is possible that courts or governmental authorities may conclude that we have not complied with them, or that we may find it necessary or appropriate to settle any such claims or other proceedings. In connection with any such claims, proceedings, or settlements, we may be subject to significant civil, criminal, and administrative penalties, damages, fines, other damages, imprisonment, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business is found not to be in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

We are subject to U.S. and foreign laws regarding privacy, data protection, and data security that could entail substantial compliance costs, while the failure to comply could subject us to significant liability.

Privacy, data protection, and data security have become significant issues in the U.S., Europe, and other jurisdictions where we conduct or may in the future conduct our operations. The regulatory framework for the collection, use, safeguarding, sharing, and transfer of health and other personal information is rapidly evolving worldwide and is likely to remain in flux for the foreseeable future. The scope and interpretation of the laws that are or may be applicable to us are often uncertain, subject to differing interpretations, and may be inconsistent among different jurisdictions.

In the U.S., HIPAA, as amended by the HITECH Act, imposes on covered entities certain requirements relating to the privacy, security, and transmission of individually identifiable health information. The legislation also increased the civil and criminal penalties that may be assessed for violations and gave state attorneys general the authority to file civil actions in federal courts to enforce the HIPAA rules. In addition, for clinical trials conducted in the U.S., any personal information that is collected is further regulated by the Federal Policy for the Protection of Human Subjects. Privacy laws are also being enacted or considered at the state level, including significant new legislation in California, the California Consumer Privacy Act, as amended by the California Privacy Rights Act. While there is currently an exception for protected health information subject to HIPAA and clinical trial regulations, these and other state privacy laws may impact our business activities, and there continues to be uncertainty about how these laws will be interpreted and enforced. Other states have passed general privacy legislation that also may impact our business activities, in the future and additional states are evaluating similar legislation.

In the event we enroll subjects in clinical trials in the European Union (EU) or other jurisdictions, or otherwise acquire or process personal data of individuals in those jurisdictions, we may be subject to additional restrictions and obligations relating to the collection, use, storage, transfer, and other processing of this data. Clinical trial activities in the European Economic Area (EEA), for example, are governed by the EU General Data Protection Regulation (GDPR).

We may need to take additional steps, such as new contractual negotiations or modifications to our policies or practices relating to cross-border transfers of personal data, to comply with these restrictions and obligations. More generally, laws and regulations governing privacy and data protection exist in many other countries around the world, and these laws (which are evolving and expanding) create complicated and potentially inconsistent obligations that may impact our business.

The increasing number, complexity, and potential inconsistency of current and future laws and regulations relating to privacy, data protection, and data security in the U.S. and other countries make our compliance obligations more difficult and costly. This is particularly true with respect to healthcare data or other personal information acquired as a result of our research activities and clinical trials. If we fail to comply with applicable laws and regulations or

experience a breach of security that results in unauthorized disclosure of personal information – or if a third party with whom we share personal information or who processes such information for us fails to comply with applicable requirements or experiences a security breach – or if any of these is reported or perceived to have occurred, it could lead to government investigations, enforcement actions, and other proceedings, as well as civil claims and litigation against us. We could incur substantial costs to defend against any such claims or proceedings and may also be held liable for significant fines, penalties, and monetary judgments. Any of the foregoing could have a material adverse effect on our business, results of operations, reputation, and prospects.

Our employees, independent contractors, consultants, and vendors may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading laws, which could cause significant liability for us and harm our reputation.

We are exposed to the risk of fraud or other misconduct by our employees, independent contractors, CROs, consultants, and vendors. Misconduct by these parties could include intentional, reckless, or negligent conduct that causes us to fail to comply with, among other things, FDA regulations or similar regulations of comparable foreign regulatory authorities, drug manufacturing standards, and healthcare fraud and abuse laws. Such misconduct could also involve the improper use of information obtained in the course of clinical trials, as well as violations of HIPAA and other privacy laws in the U.S and foreign jurisdictions, including the GDPR. We are also exposed to risks in connection with potential insider trading violations by employees or others affiliated with us. It is not always possible to identify and deter employee or other individual misconduct. The precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses, or in protecting us from governmental investigations or other actions or lawsuits stemming from noncompliance with applicable laws, standards, regulations, or codes of conduct. If any such actions are instituted against us, whether with or without merit, and we are not successful in defending ourselves or asserting our rights, they may result in damages, fines, and other sanctions that could materially and adversely affect our business, results of operations, and reputation.

We are exposed to the risk of fraud or other misconduct by our employees, independent contractors, CROs, consultants, and vendors. Misconduct by these parties could include intentional, reckless, and/or negligent conduct that causes us to fail to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, provide accurate information to the FDA or comparable foreign regulatory authorities, comply with manufacturing standards, comply with federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, report financial information or data accurately, or disclose unauthorized activities to us. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. This could include violations of HIPAA, other U.S. federal and state law, and requirements of foreign jurisdictions, including the GDPR. We are also exposed to risks in connection with any insider trading violations by employees or others affiliated with us, including inadvertent violations such as a sale of pledged shares by a lender when the pledgor is in possession of material nonpublic information.

It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws, standards, regulations, guidance, or codes of conduct. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred and our employees may, from time to time, bring lawsuits against us for employment issues, including injury, discrimination, wage and hour disputes, sexual harassment, hostile work environment, or other employment issues. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could adversely affect our ability to operate our business, results of operations, financial condition, reputation, and prospects.

Climate change-related risks and uncertainties and legal or regulatory responses to climate change could negatively impact our results of operations, financial condition and/or reputation.

We are subject to increasing climate-related risks and uncertainties, many of which are outside of our control. Climate change may result in more frequent severe weather events, potential changes in precipitation patterns, and

extreme variability in weather patterns, which can disrupt our operations as well as those of our vendors, suppliers, and collaborators.

The transition to lower greenhouse gas emissions technology, the effects of carbon pricing, and changes in public sentiment, regulations, taxes, public mandates, or requirements and increases in climate-related lawsuits, insurance premiums, and implementation of more robust disaster recovery and business continuity plans could increase costs to maintain or resume our operations or achieve any sustainability commitments we make, which would negatively impact our results of operations.

We are reviewing our impact on climate change and determining if it is economically feasible for us to be carbon neutral by 2030. We are also working on other environmental, social and governance goals. Execution and achievement of any future commitments or goals are subject to risks and uncertainties. Given the focus on sustainable investing and corporate and social responsibility, if we fail to make a climate change commitment by 2030 and adopt policies and practices to enhance environmental, social and governance initiatives, our reputation and our customer and other stakeholder relationships could be negatively impacted and it may be more difficult for us to compete effectively or gain access to financing on acceptable terms when needed, which would have an adverse effect on our results of operations, financial condition, reputation and prospects.

RISKS RELATING TO EMPLOYEE MATTERS AND MANAGING GROWTH

Our future success depends on our ability to retain key executives and experienced scientists, and to attract, retain, and motivate qualified personnel.

We are highly dependent on the research and development, clinical, and business development expertise of our executive, management, scientific, technological, and clinical teams. Although we have entered into employment agreements with our executive officers, any of them may terminate their employment with us at any time or may not be able to perform the services we need in the future.

Recruiting and retaining qualified scientific, clinical, manufacturing, and sales and marketing personnel is also critical to our success. For example, we rely on our employees to help operate and repair our equipment, and on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategies. Because of the specialized scientific nature of our business, we are highly dependent upon attracting and retaining qualified scientific, technical, and managerial personnel. While we strive to reduce the impact of the potential loss of existing employees by having an established organizational talent review process that identifies successors and potential talent needs, there is still significant competition for qualified personnel in the pharmaceutical and biotechnology fields. Therefore, we may not be able to attract and retain the qualified personnel necessary for the continued development of our business. The loss of the services of existing personnel, as well as the failure to recruit and train additional key scientific, technical, and managerial personnel in a timely manner, could harm our business, results of operations, financial condition, and prospects.

The loss of the services of our executive officers or other key employees or consultants could impede our ability to successfully implement our business strategy. Replacing executive officers and key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of, and commercialize drug products, and because of the competition among numerous pharmaceutical and biotechnology companies for similar personnel. In addition, our consultants and advisors may have commitments or non-competition obligations under consulting or advisory contracts with other entities that may limit their availability to us. We may also experience difficulties recruiting scientific and clinical personnel from universities and research institutions. If one or more of our clinical trials are unsuccessful, it may become more challenging to recruit and retain qualified scientific personnel.

In addition, increases in salaries and wages, extensions of personal and other leave policies, other governmental regulations affecting labor costs, and a diminishing pool of potential qualified personnel when the unemployment rate falls could significantly increase our labor costs and make it more difficult to retain, attract, and motivate qualified personnel, which could materially adversely affect our business, financial performance, and cash reserves. As a result of inflationary pressures and other initiatives, our net losses may increase and we may need to raise capital sooner than otherwise anticipated. Because we employ a large workforce, any salary or wage increase and/or expansion of benefits mandates will have a particularly significant impact on

our labor costs. Our vendors, contractors and business partners are similarly impacted by wage and benefit cost inflation, and many have or will increase their price for goods, construction and services in order to offset their increasing labor costs.

Some of the employees we may want to hire in the future may not reside in Salt Lake City, Utah or other areas where we have operations and may not want to relocate. In addition, many of the other pharmaceutical and biotechnology companies that we compete against for qualified personnel have greater financial and other resources, different risk profiles, and a longer history in the industry than we do. They also may provide more diverse opportunities and better chances for career advancement.

If we are unable to hire, retain, and motivate highly qualified senior executives and personnel, the rate and success with which we can discover and develop drug candidates, our ability to pursue our growth strategy, and our business may be adversely impacted.

We expect to expand our development and regulatory capabilities and potentially implement sales, marketing, and distribution capabilities, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

We expect to experience significant growth in the number of employees and the scope of our operations. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational, and financial systems; expand our facilities; and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

We may acquire additional businesses or products, form strategic alliances, or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing, and marketing any new products resulting from a strategic alliance or acquisition that delay or prevent us from realizing their expected benefits or enhancing our business. We cannot ensure that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

RISKS RELATED TO THE SECURITIES MARKETS AND OWNERSHIP OF OUR CLASS A COMMON STOCK

The dual-class structure of our common stock affects the concentration of voting power, which limits our Class A common stockholders' ability to influence the outcome of matters submitted to our stockholders for approval, including the election of our board of directors, the adoption of amendments to our certificate of incorporation and bylaws, and the approval of any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transactions.

Our Class A common stock offered in our initial public offering has one vote per share, and our Class B common stock has 10 votes per share. As of December 31, 2022, Dr. Gibson, our CEO and a member of our board of directors, and his affiliates held 377,995 shares of our Class A common stock and all of the issued and outstanding shares of our Class B common stock, representing approximately 31.93% of the voting power of our outstanding capital stock, which voting power may increase over time as Dr. Gibson exercises or vests in equity awards. If all such equity awards held by Dr. Gibson had been exercised or vested and exchanged for shares of Class B common stock as of December 31, 2022, Dr. Gibson and his affiliates would hold approximately 32.80% of the voting power of our outstanding capital stock.

As a result, Dr. Gibson may be able to significantly influence any action requiring the approval of our stockholders, including the election of our board of directors, the adoption of amendments to our certificate of incorporation and bylaws, and the approval of any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction. Dr. Gibson may have interests that differ from our Class A common stockholders and may vote in a way with which our Class A stockholders disagree and which may be adverse to our Class A stockholders' interests. The concentrated control of Dr. Gibson may have the effect of delaying, preventing, or deterring a change in control of our company, could deprive our stockholders of an opportunity to

receive a premium for their capital stock as part of a sale in our company, and, thus, may affect the market price of our Class A common stock.

Future transfers by the holders of Class B common stock will generally result in those shares automatically converting into shares of Class A common stock, subject to limited exceptions, such as certain transfers for estate planning. Transfers or exchanges of shares of Class B common stock may result in the issuance of additional shares of Class A common stock and such issuances will be dilutive to holders of our Class A common stock. In addition, each share of Class B common stock will convert automatically into one share of Class A common stock upon the earliest of (i) April 16, 2028; (ii) the date specified by written consent or agreement of the holders of 66 2/3% of our then outstanding shares of Class B common stock; (iii) nine months after Dr. Gibson ceases to hold any positions as an officer or director with us; or (iv) nine months after the death or disability of Dr. Gibson. We refer to the date on which such final conversion of all outstanding shares of Class B common stock pursuant to the terms of amended and restated certificate of incorporation occurs as the Final Conversion Date.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

As of December 31, 2022, our executive officers, directors, holders of 5% or more of our capital stock, and their respective affiliates, including Dr. Gibson and his affiliates, beneficially owned shares representing more than 50% of our voting power. These stockholders, acting together, may be able to impact matters requiring stockholder approval, including the elections of directors; amendments of our organizational documents; and approval of any merger, sale of all or substantially all of our assets, or other major corporate transaction. This concentrated control may also have the effect of deterring, delaying, or preventing unsolicited acquisition proposals or offers for our capital stock that other stockholders may feel are in their best interest. The interests of this group of stockholders may not always coincide with each other's interests or the interests of other stockholders, and this group may act in a manner that advances its best interests and not necessarily those of other stockholders generally, including seeking a premium value for their common stock, which might therefore affect the market price for our common stock.

The price of our Class A common stock may be volatile and fluctuate substantially, which could result in substantial losses for holders of our common stock.

The trading price of our Class A common stock has been volatile since our initial public offering and it is likely that the price will fluctuate substantially in the future. The stock price may be influenced by many factors, a number of which are beyond our control, which factors include but are not limited to the following:

- the success of competitive products or technologies;
- results of clinical trials of our drug candidates or those of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents, or other proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to any of our drug candidates or clinical development programs;
- the results of our efforts to discover, develop, acquire, or in-license additional drug candidates or drug products;
- actual or anticipated changes in estimates as to financial results, development timelines, or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- inflation, general supply chain matters, global political instability, or warfare;
- performance of the overall stock market and shares of biotechnology companies in particular, as well as general economic conditions; and
- the other factors described in this "Risk Factors" section.

As a result of this volatility, holders of our Class A common stock may not be able to sell their stock at or above the price they originally paid for it, which could result in the loss of a part or all of their investment.

Sales of a substantial number of shares of our Class A common stock in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our Class A common stock in the public market could occur at any time. These sales, or the perception in the market that one or more holders of a large number of shares intend to sell their shares, could cause the market price of our Class A common stock to decline.

Also, shares of Class A common stock that are either subject to outstanding options and warrants or that are reserved for future issuance under our equity compensation plans are eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules and Rule 144 and Rule 701 under the Securities Act. Some holders of shares of our Class A common stock issued and issuable upon conversion of Class B common stock are entitled to rights with respect to the registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act, except for shares purchased by affiliates.

In the future we may also issue our securities in connection with any financings, investments, or acquisitions, and the number of shares issued could constitute a material portion of our then-outstanding common stock. For example, in connection with our October 2022 private placement, we entered into a registration rights agreement with the private placement investors that required us to prepare and file a resale prospectus supplement to the automatic shelf registration statement filed May 10, 2022, which permits the resale by the private placement investors of approximately 15.3 million shares of our Class A common stock. Such resale prospectus supplement was filed on October 28, 2022.

The sale of a significant number of shares of our Class A common stock under any of the above circumstances, or otherwise, in the public market at any time, or the perception that they may be sold, could have a material adverse effect on the market price of our Class A common stock. In that event, holders of our Class A common stock may not be able to sell their stock at or above the price they originally paid for it, which could result in the loss of part or all of their investment.

Provisions in our amended and restated certificate of incorporation and amended and restated bylaws and Delaware law might discourage, delay, or prevent a change in control of our company or changes in our management and, therefore, depress the market prices of our Class A common stock.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could depress the market prices of our Class A common stock by acting to discourage, delay or prevent a change in control of our company or changes in our management that the stockholders of our company may deem advantageous. These provisions, among other things:

- establish a classified board of directors so that not all members of our board are elected at one time;
- permit only the board of directors to establish the number of directors and fill vacancies on the board;
- authorize the issuance of “blank check” preferred stock that our board could use to implement a stockholder rights plan (also known as a “poison pill”);
- eliminate the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- prohibit cumulative voting;
- authorize our board of directors to amend the bylaws;
- establish advance notice requirements for nominations for election to our board or for proposing matters that can be acted upon by stockholders at annual stockholder meetings; and
- require a super-majority vote of stockholders to amend some provisions described above.

In addition, Section 203 of the General Corporation Law of the State of Delaware (DGCL) prohibits a publicly-held Delaware corporation from engaging in a business combination with an interested stockholder, generally a person which together with its affiliates owns, or within the last three years has owned, 15% of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

Any provision of our amended and restated certificate of incorporation, amended and restated bylaws, or DGCL that has the effect of delaying or preventing a change in control could limit the opportunity for our stockholders to receive a premium for their shares of Class A common stock and could also affect the price that some investors are willing to pay for our stock.

Our actual operating results may differ significantly from any guidance that we provide.

From time to time, we may provide guidance in our quarterly earnings releases, or otherwise, regarding our future performance that represents our management's estimates as of the date of release. This guidance, which would include forward-looking statements, would be based on projections prepared by our management. Neither our registered public accountants nor any other independent expert or outside party would compile or examine the projections. Accordingly, no such person would express any opinion or any other form of assurance with respect to the projections.

Projections are based upon a number of assumptions and estimates that, while presented with numerical specificity, are inherently subject to significant business, economic, and competitive uncertainties and contingencies, many of which are beyond our control and are based upon specific assumptions with respect to future business decisions, some of which will change. The principal reason that we would release guidance is to provide a basis for our management to discuss our business outlook with analysts and investors. We do not accept any responsibility for any projections or reports published by any such third parties. Guidance is necessarily speculative in nature, and it can be expected that some or all of the assumptions underlying any guidance furnished by us will not materialize or will vary significantly from actual results. Accordingly, our guidance would be only an estimate of what management believes is realizable as of the date of release. Actual results may vary from our guidance and the variations may be material.

As a public company, we are obligated to develop and maintain a proper and effective system of disclosure controls and internal controls over financial reporting. Any failure to maintain the adequacy of this system and these internal controls may adversely affect investor confidence in our company and, as a result, the value of our Class A common stock.

We are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act and the rules and regulations of the applicable listing standards of The Nasdaq Stock Market. We expect that the requirements of these rules and regulations will continue to increase our legal, accounting, and financial compliance costs; make some activities more difficult, time-consuming, and costly; and place significant strain on our personnel, systems, and resources.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We are continuing to develop and refine our disclosure controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we will file with the SEC is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms and that information required to be disclosed in reports under the Exchange Act is accumulated and communicated to our principal executive and financial officers. We are also continuing to improve our internal control over financial reporting. In order to maintain and improve the effectiveness of our disclosure controls and procedures and internal control over financial reporting, we have expended, and anticipate that we will continue to expend, significant resources, including accounting-related costs and significant management oversight.

Our current controls and any new controls that we develop may become inadequate because of changes in conditions in our business. In addition, changes in accounting principles or interpretations could also challenge our internal controls and require that we establish new business processes, systems, and controls to accommodate such changes. We have limited experience with implementing the systems and controls that are necessary to operate as a public company, as well as adopting changes in accounting principles or interpretations mandated by the relevant regulatory bodies. Our chief financial officer has only been the chief financial officer of a publicly traded company since our initial public offering and our chief executive officer has only been the chief executive officer of a publicly traded company since our initial public offering. Neither has been involved in the long-term operations of a public company. Additionally, if these new systems, controls, or standards and the associated process changes do not give rise to the benefits that we expect or do not operate as intended, it could adversely affect our financial reporting systems and processes, our ability to produce timely and accurate financial reports, or the effectiveness of internal control over financial reporting. Moreover, our business may be harmed if we experience problems with any new systems and controls that result in delays in their implementation or increased costs to correct any post-implementation issues that may arise.

Pursuant to Section 404 of the Sarbanes-Oxley Act, we are required to furnish a report by our management on our internal control over financial reporting. This assessment must include disclosure of any material weaknesses identified by our management in our internal control over financial reporting. During our evaluation of our internal controls, if we identify one or more material weaknesses in our internal control over financial reporting, we will be

unable to assert that our internal control over financial reporting is effective. We cannot assure you that there will not be material weaknesses or significant deficiencies in our internal control over financial reporting in the future.

In addition, our independent registered public accounting firm is required to formally attest to the effectiveness of our internal control over financial reporting. Our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our internal control over financial reporting is documented, designed, or operating.

Any failure to maintain effective disclosure controls and internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, or results of operations. If we are unable to conclude that our disclosure controls and internal control over financial reporting are effective, or if our independent registered public accounting firm determines we have a material weakness or significant deficiency in our internal control over financial reporting, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of shares of our Class A common stock could decline, and we could be subject to sanctions or investigations by the Nasdaq Stock Market, the SEC, or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

GENERAL RISKS

Unfavorable global economic conditions could adversely affect our business.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. For example, the COVID-19 pandemic, global political instability, supply chain issues, and inflation have caused significant volatility and uncertainty in U.S. and international markets. Uncertainty in the U.S. regarding the federal government's debt ceiling and related budgetary matters may also cause volatility and uncertainty in the global markets. A severe or prolonged economic downturn could result in a variety of risks to our business, including weakened demand for our drug candidates and impaired ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our suppliers or result in supply disruption. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business, results of operations, financial condition, and prospects.

We are subject to the risks of litigation that may arise in the ordinary course of our business, which could be costly and time-consuming to pursue or defend.

We periodically are, and in the future may be, involved in legal proceedings or claims that arise in the ordinary course of business, such as those regarding commercial or contractual disputes, intellectual property rights, employment matters, product liability, or data privacy.

As a public company, we and our directors and officers are also subject to potential securities class action litigation, particularly if the market price of our Class A common stock is volatile. The stock market in general, and Nasdaq-listed and biotechnology companies in particular, experience significant price and volume fluctuations from time to time that often are unrelated or disproportionate to the operating performance of these companies. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action lawsuits, and we may be the target of such litigation in the future.

Litigation, whether with or without merit, may be expensive to pursue or defend; divert management's attention; result in adverse judgments for damages, injunctive relief, penalties, and fines; and harm our business and reputation. Some third parties may be able to sustain the costs of litigation more effectively than we can because they have substantially greater resources. Insurance may not cover all claims or may cover only a portion of our expenses and losses, and may not continue to be available on terms acceptable to us.

If securities analysts do not publish research or reports about our business or if they publish negative evaluations of our stock, the price of our stock could decline.

The trading market for our Class A common stock relies, in part, on the research and reports that industry or financial analysts publish about us or our business. If only a small number of analysts maintain coverage of us, the trading price of our stock would likely decrease. If an analyst covering our stock downgrade their evaluations of our

stock, the price of our stock could decline. If one or more of these analysts cease to cover our stock, we could lose visibility in the market for our stock, which in turn could cause our stock price to decline.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Recursion's corporate offices are located at 41 S Rio Grande Street, Salt Lake City, Utah 84101 where we lease 105,419 square feet of office, research and laboratory space. The laboratories include both traditional and automated laboratories for drug research. The current term of our lease expires in May 2028. We have entered into a lease for an additional 103,634 square feet of office, research and laboratory space adjacent to our corporate offices under a lease that expires in May 2032. Certain sections of this space are in use and other sections are currently under construction. We also lease a 24,974 square foot property in Milpitas, California that includes lab and technological services and is used for research, design and development under a lease that expires in May 2028. We believe our facilities are adequate and suitable for our current needs and that, should it be needed, suitable additional or alternative space will be available to accommodate our operations.

Item 3. Legal Proceedings.

The Company is not currently a party to any material litigation or other material legal proceedings. The Company may, from time to time, be involved in various legal proceedings arising in the normal course of business. An unfavorable resolution of any such matter could materially affect the Company's future financial position, results of operations or cash flows.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

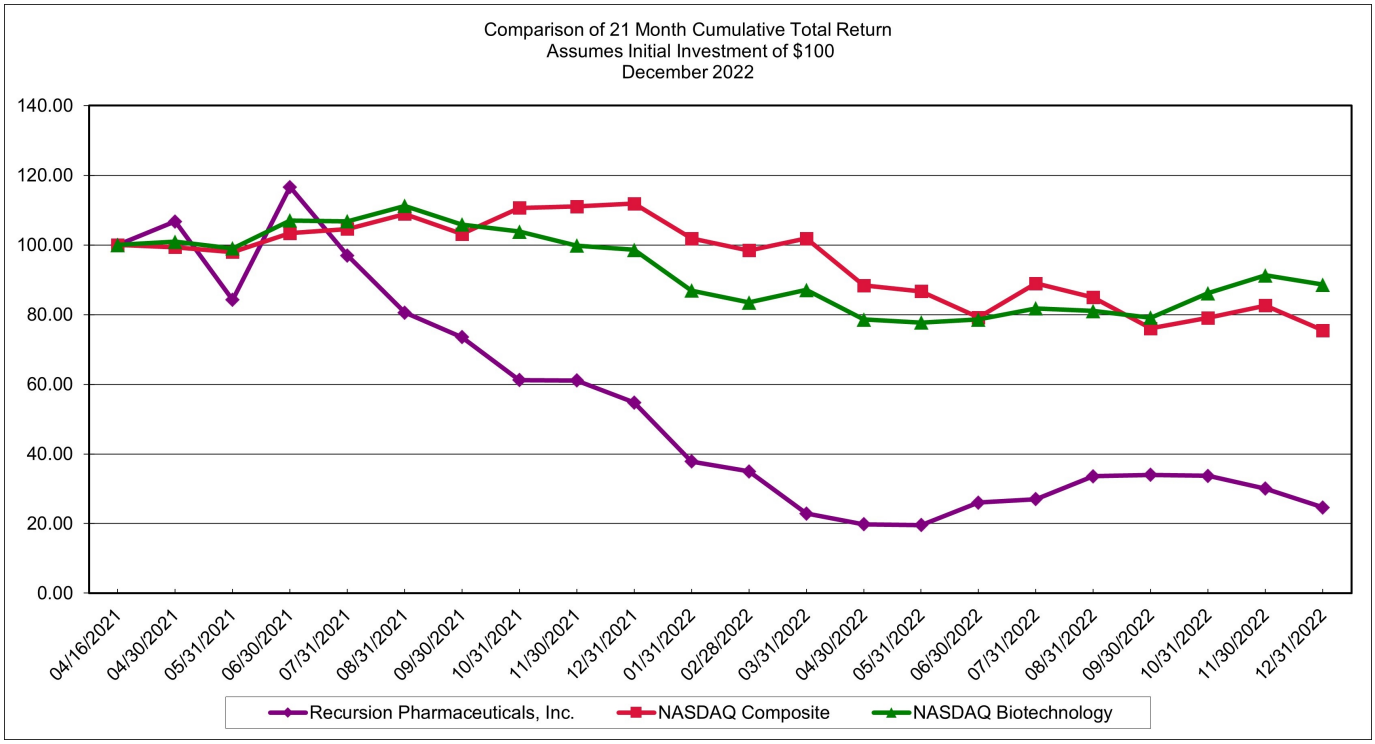
Principal market

The principal market for Recursion's Class A common stock is the Nasdaq Global Select Market (Symbol: RXRX). Our common stock began trading on April 16, 2021. Prior to that date, there was no public market for our common stock.

Recursion's Class B common stock is not listed on any stock exchange nor traded on any public market.

Stock performance graph

The following graph compares the cumulative total returns of Recursion, the Nasdaq Composite Index and the Nasdaq Biotechnology Index from our April 16, 2021 closing stock price (the date on which our common stock first began trading on the Nasdaq Global Select Market) through December 31, 2022. This graph assumes $100 was invested and the reinvestment of dividends, if any. The comparisons shown in the graph below are based upon historical data and are not necessarily indicative of future performance.



This performance graph is furnished and shall not be deemed "filed" with the SEC or subject to Section 18 of the Securities Exchange Act of 1934, as amended, nor shall it be deemed incorporated by reference in any of Recursion's filings under the Securities Act of 1933, as amended.

Stockholders

There were 27 stockholders of record of Recursion Class A common stock as of January 31, 2023. The actual number of stockholders of our Class A common stock is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

Dividend policy

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain any future earnings and do not expect to pay any dividends in the foreseeable future. Any future determination to declare cash dividends will be made at the discretion of our Board of Directors, subject to applicable laws, and will depend on a number of factors, including our financial condition, results of operations, capital requirements, contractual restrictions, general business conditions, and other factors that our Board of Directors may deem relevant, including restrictions in our current and future debt instruments, our future earnings, capital requirements, financial condition, prospects, and applicable Delaware law, which provides that dividends are only payable out of surplus or current net profits.

Securities authorized for issuance under equity compensation plans

Information about our equity compensation plans in Item 12 of Part III of this Annual Report on Form 10-K is incorporated herein by reference.

Recent sales of unregistered securities

(a) Sales of Unregistered Securities

Private Placement
On October 27, 2022, we issued an aggregate of 15,336,734 shares (the "Shares") of the Company's Class A common stock at a purchase price of $9.80 per share in a private placement (the "Private Placement") to qualified institutional buyers and institutional accredited investors (collectively the "Purchasers") for an aggregate purchase price of approximately $150.3 million, and after deducting fees and offering costs of $6.6 million, net proceeds were approximately $143.7 million. The sale was made pursuant to the exemption from registration contained in Section 4(a)(2) of the Securities Act. In connection with the Private Placement, the Company and the investors entered into a registration rights agreement, dated October 27, 2022, providing for the registration for resale of the Shares. A prospectus supplement to a registration statement (File No. 333-264845) was subsequently filed pursuant to Rule 424(b) on October 28, 2022, to register the resale of the Shares by the Purchasers.

Morgan Stanley & Co. LLC acted as the lead placement agent and Berenberg Capital Markets LLC, KeyBanc Capital Markets Inc., and Needham & Company, LLC acted as co-placement agents for the Private Placement.

Stock Option Exercises
For the year ended December 31, 2022, we issued 169,950 shares of our Class A common stock to our employees, advisors and consultants upon the exercise of stock options under our Key Personnel Incentive Stock Plans for aggregate consideration of approximately $50 thousand, in reliance on the exemption provided by Rule 701(b)(2) promulgated under the Securities Act, or pursuant to Section 4(a)(2) under the Securities Act, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required.

(b) Use of Proceeds from Public Offering of Class A Common Stock

On April 15, 2021, the Registration Statement on Form S-1 (File No. 333-254576) for the initial public offering of our Class A common stock was declared effective by the SEC. Shares of our Class A common stock began trading on the Nasdaq Global Select Market on April 16, 2021. The offering closed on April 20, 2021. We issued 27,878,787 shares of our Class A common stock at a price of $18.00 per share for net proceeds of $462.4 million, after deducting underwriting discounts and commissions of $35.1 million and other offering costs of $4.3 million.

We are holding a significant portion of the balance of the net proceeds in cash and cash equivalents including bank deposits held in checking accounts and money market funds. There has been no material change in the planned use of proceeds from our IPO from those that were described in the final prospectus filed pursuant to Rule 424(b) under the Securities Act and other periodic reports previously filed with the SEC.

(c) Issuer Purchases of Equity Securities

None.

Item 6. [Reserved]

Recursion.

ITEM 7.

Management's Discussion and Analysis of Financial Condition and Result of Operations

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

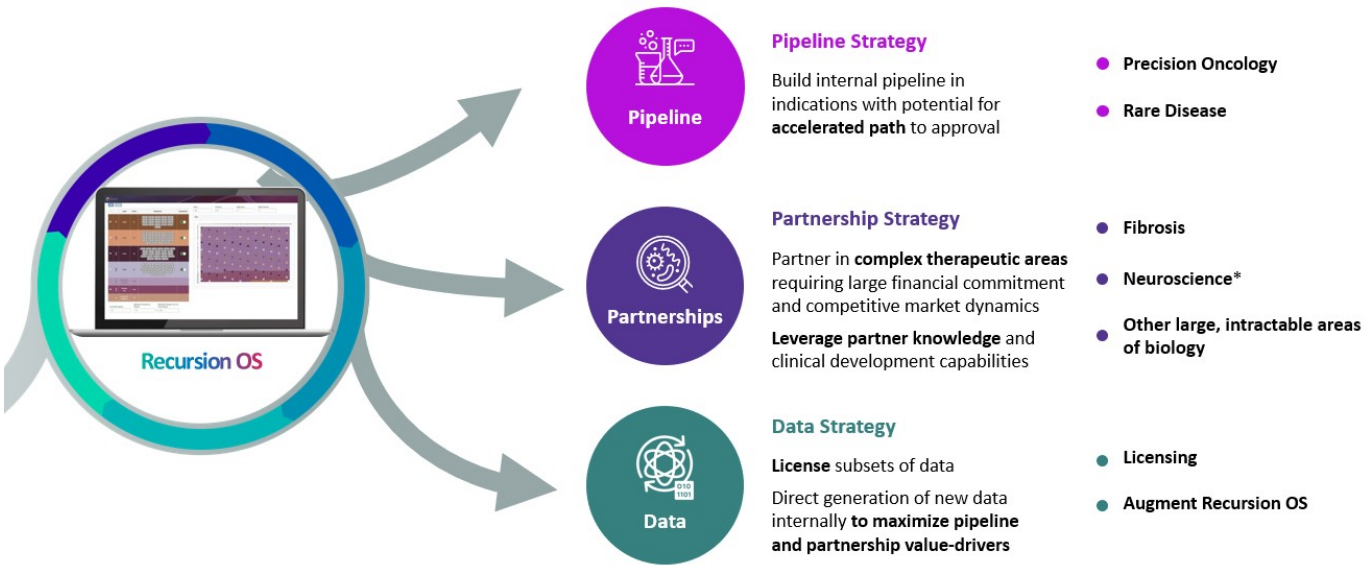
The following is a discussion and analysis of the financial condition of Recursion Pharmaceuticals, Inc. (Recursion, the Company, we, us or our) and the results of our operations. This commentary should be read in conjunction with the Consolidated Financial Statements and accompanying notes appearing in Item 8, "Financial Statements." This discussion, particularly information with respect to our future results of operations or financial condition, business strategy and plans and objectives of management for future operations, includes forward-looking statements that involve risks and uncertainties as described under the heading "Note About Forward-Looking Statements" in this Annual Report on Form 10-K. You should review the disclosure under the heading "Risk Factors" in our Annual Report on Form 10-K for a discussion of important factors that could cause our actual results to differ materially from those anticipated in these forward-looking statements.

Overview

Recursion is a clinical stage TechBio company leading this burgeoning space by decoding biology to industrialize drug discovery. Central to our mission is the Recursion Operating System (OS), a platform built across diverse technologies that enables us to map and navigate trillions of biological and chemical relationships within the Recursion Data Universe, one of the world's largest proprietary biological and chemical datasets. We frame this integration of the physical and digital components as iterative loops of atoms and bits. Scaled 'wet-lab' biology and chemistry data built in-house (atoms) are organized into virtuous cycles with 'dry-lab' computational tools (bits) to rapidly translate *in silico* hypotheses into validated insights and novel chemistry. Our focus on mapping and navigating the complexities of biology and chemistry beyond the published literature and in a target-agnostic way differentiates us from other companies in our space and leads us to confront a fundamental cause of failure for the majority of clinical-stage programs - the wrong target is chosen due to an incomplete and reductionist view of biology. Our balanced team of life scientists and computational and technical experts creates an environment where empirical data, statistical rigor, and creative thinking are brought to bear on our decisions.

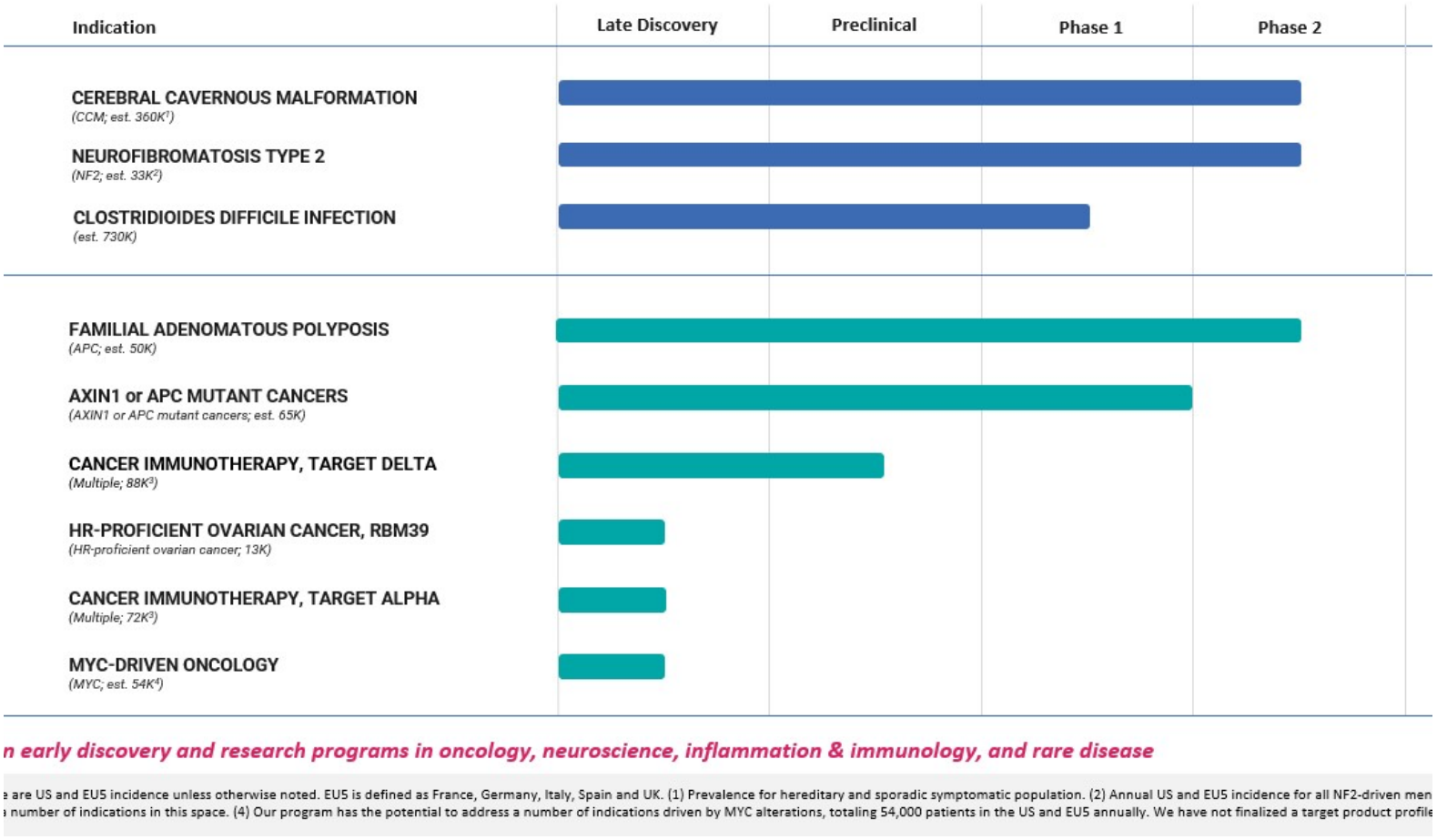
We leverage our Recursion OS to enable three key value drivers:

1. An expansive **pipeline** of internally-developed clinical and preclinical programs focused on genetically-driven rare diseases and oncology with significant unmet need and market opportunities in some cases potentially in excess of $1 billion in annual sales
2. Transformational **partnerships** with leading biopharma companies to map and navigate intractable areas of biology, identify novel targets, and develop potential new medicines that are further developed in resource-heavy clinical trials overseen by our partners
3. Development of one of the largest fit-for-purpose proprietary biological and chemical **datasets** in the world at a time when advances in AI paired with the right training data are creating disruptive value.



Recursion finished the fourth quarter of 2022 with a portfolio of clinical-stage, preclinical and discovery programs and continued scaling the total number of experiments to over 175 million, size of its proprietary data to over 21

petabytes and number of biological and chemical relationships to over 3 trillion. Data have been generated by the Recursion OS across 48 human cell types, an in-house chemical library of approximately 1.7 million compounds, and an *in silico* library of over 1 trillion small molecules, by a team of approximately 500 Recursionauts that is balanced between life scientists and computational and technical experts.



Summary of Business Highlights

Internal Pipeline

- **Cerebral Cavernous Malformation (CCM) (REC-994):** Our Phase 2 SYCAMORE clinical trial is a double-blind, placebo-controlled safety, tolerability and exploratory efficacy study of this drug candidate in 60 participants with CCM. At this time, we continue to actively enroll participants. We expect to share top-line data in 2H 2024.
- **Neurofibromatosis Type 2 (NF2) (REC-2282):** Our Phase 2/3 POPLAR clinical trial is a parallel group, two stage, randomized, multicenter study of this drug candidate in approximately 90 participants with progressive NF2-mutated meningiomas. At this time, we continue to actively enroll participants. We expect to share a Phase 2 interim safety analysis in 2024.
- **Familial Adenomatous Polyposis (FAP) (REC-4881):** Our Phase 2 TUPELO clinical trial is a multicenter, randomized, double-blind, placebo-controlled two-part clinical trial to evaluate efficacy, safety, and pharmacokinetics of this drug candidate in patients with FAP. Recent protocol amendments are aimed at accelerating the quality and pace of the trial.
- ***AXIN1* or *APC* Mutant Cancers (REC-4881):** In October 2022, we announced the nomination of REC-4881 for the potential treatment of *AXIN1* or *APC* mutant cancers with an initial focus on hepatocellular carcinoma and ovarian cancer. We expect to initiate a Phase 1b/2 biomarker enriched basket study across select *AXIN1* or *APC* mutant tumors in early 2024.

- ***Clostridioides difficile* Colitis (REC-3964):** Our Phase 1 clinical trial is a first-in-human protocol evaluating single and multiple doses of REC-3964 in healthy volunteers and will assess the safety, tolerability and pharmacokinetic profile of REC-3964. At this time, we continue to actively enroll participants. We expect to share safety and PK data in 2H 2023.
- **HR-Proficient Ovarian Cancer:** In January 2023, we disclosed that RBM39 (previously identified as Target Gamma) is the novel CDK12-adjacent target identified by the Recursion OS. We believe that modulating RBM39 could lead to a potential treatment of HR-proficient ovarian cancer. We expect this program to reach IND-enabling studies in 2023.
- **Enhancing Anti-PD-(L)1 Response by Inhibiting Novel Targets (Target Alpha):** This program is a potential first-in-class novel chemical entity with a novel polypharmacologic mechanism of action for which we have not yet disclosed the targets. We expect this program to reach IND-enabling studies in 2023.

Transformational Collaborations

We continue to advance efforts to discover potential new therapeutics with our strategic partners in the areas of fibrotic disease (Bayer) as well as neuroscience and a single indication in gastrointestinal oncology (Roche-Genentech). In the near-term, there is the potential for option exercises associated with partnership programs, option exercises associated with map building initiatives or data sharing, and additional partnerships in large, intractable areas of biology or technological innovation.

Recursion OS

- **Cell and Tissue Culturing:** In 2022, we industrialized stem cell production and produced over 500 billion hiPSC-derived cells in-house to enable neurology research. We believe that this volume of biological material could make Recursion one of the largest producers of neural hiPSC-derived cells in the world and could give Recursion flexibility around its consumables and collaboration activities.
- **Chemical Technology:** We have begun configuring our automated drug metabolism and pharmacokinetics (DMPK) wet-lab module into the Recursion OS. Once fully onboarded, this module will enable scaled, automated processing and evaluation of compounds for plasma protein binding, microsomal stability and cell permeability. With an operational capacity of up to 500 compounds per week, this module lays the foundation for us to generate additional proprietary data moats that enable the training of ML and AI algorithms.
- **Publicly Available Dataset and Application:** In January 2023, Recursion released RxRx3, its largest open-source cellular imaging dataset to date, as well as MolRec™, an interactive application to explore compound and gene relationships. Both of these offerings are free to the public and can be found at www.rxrx.ai.

Additional Corporate Updates

- **Letter to Shareholders:** Recursion Co-Founder & CEO Chris Gibson, Ph.D. wrote an annual letter to shareholders which may be found in this 10-K report ahead of Part I.
- **Download Day:** In January 2023, Recursion hosted Download Day, a R&D-focused event highlighting aspects of Recursion's platform, data, programs, partnerships, and culture. Materials from this event can be found at www.Recursion.com/download-day.
- **Facilities:** Recursion completed an expansion of its headquarters in Salt Lake City, making room for research and development activities related to expanding our human tissue culture and chemical compound handling capabilities, enabling new biological contexts for map building and scaling sequencing and automated DMPK assays.
- **ESG Reporting:** In October 2022, Sustainalytics ranked Recursion in the top 100 of pharmaceutical companies with respect to its ESG efforts (approximately top 10%). In March 2023, Recursion plans to release an updated ESG report.
- **Annual Shareholder Meeting:** The Recursion Annual Shareholder Meeting will be held on June 16, 2023 at 12:00 pm Mountain Time.

Financing and Operations

We were incorporated in November 2013. In October 2022, we issued 15,336,734 shares of our Class A common stock at a purchase price of $9.80 per share in a private placement (the Private Placement) to qualified institutional buyers and institutional accredited investors (the Purchasers) for net proceeds of $143.7 million, after deducting fees and offering costs of $6.6 million. On April 20, 2021, we closed our Initial Public Offering (IPO) and issued 27,878,787 shares of Class A common stock at a price of $18.00 per share, raising net proceeds of $462.4 million. Prior to our IPO, we had raised approximately $448.9 million in equity financing from investors in addition to $30.0 million in an upfront payment from our collaboration with Bayer AG (Bayer). In December 2021, we announced a collaboration with Roche and received an upfront payment of $150.0 million in January 2022. See Note 12, “Collaborative Development Contracts” to the Consolidated Financial Statements for additional information on the collaborations.

We use the capital we have raised to fund operations and investing activities across platform research operations, drug discovery, clinical development, digital and other infrastructure, creation of our portfolio of intellectual property and administrative support. We do not have any products approved for commercial sale and have not generated any revenues from product sales. We had unrestricted cash and cash equivalents of $549.9 million as of December 31, 2022. Based on our current operating plan, we believe that our cash and cash equivalents and will be sufficient to fund our operations for at least the next twelve months.

Since inception, we have incurred significant operating losses. Our net losses were $239.5 million, $186.5 million and $87.0 million during the years ended December 31, 2022, 2021 and 2020, respectively. As of December 31, 2022, our accumulated deficit was $639.6 million. We anticipate that our expenses and operating losses will remain flat or increase moderately over the near term.

We anticipate that we will need to raise additional financing in the future to fund our operations, including the potential commercialization of any approved product candidates. Until such time, if ever, as we can generate significant product revenue, we expect to finance our operations with our existing cash and cash equivalents, any future equity or debt financings and upfront, milestone and royalty payments, if any, received under current or future license or collaboration agreements. We may not be able to raise additional capital on terms acceptable to us or at all. If we are unable to raise additional capital when desired, our business, results of operations and financial condition may be adversely affected.

Components of Operating Results

Revenue

Operating revenue is generated through research and development agreements derived from strategic alliances. We are entitled to receive variable consideration as certain milestones are achieved. The timing of revenue recognition is not directly correlated to the timing of cash receipts.

Cost of Revenue

Cost of revenue consists of the Company’s costs to provide services for drug discovery required under performance obligations with partnership customers. These primarily include materials costs, service hours performed by our employees and depreciation of property and equipment.

Research and Development

Research and development expenses account for a significant portion of our operating expenses. We recognize research and development expenses as they are incurred. Research and development expenses consist of costs incurred in performing activities including:

- costs to develop and operate our platform;
- costs of discovery efforts which may lead to development candidates, including research materials and external research;
- costs for clinical development of our investigational products;

- costs for materials and supplies associated with the manufacture of active pharmaceutical ingredients, investigational products for preclinical testing and clinical trials;
- personnel-related expenses, including salaries, benefits, bonuses and stock-based compensation for employees engaged in research and development functions;
- costs associated with operating our digital infrastructure; and
- other direct and allocated expenses incurred as a result of research and development activities, including those for facilities, depreciation, amortization and insurance.

We recognize expenses associated with third-party contracted services as they are incurred. Upon termination of contracts with third parties, our financial obligations are generally limited to costs incurred or committed to date. Any advance payments for goods or services to be used or rendered in future research and product development activities pursuant to a contractual arrangement are classified as prepaid expenses until such goods or services are rendered.

General and Administrative

We expense general and administrative costs as incurred. General and administrative expenses consist primarily of salaries; employee benefits; stock-based compensation; and outsourced labor for personnel in executive, finance, human resources, legal and other corporate administrative functions. General and administrative expenses also include legal fees for corporate and patent matters; professional fees for accounting, auditing, tax and administrative consulting services, insurance costs, facilities and depreciation expenses.

Other Income (Loss), net

Other income (loss), net consists of interest earned primarily from investments, interest expense incurred under our loan agreements, gains and losses from investments, changes in the fair value of warrant liabilities and debt extinguishment costs.

Results of Operations

The following table summarizes our results of operations:

	Years ended December 31,			2022 compared to 2021		2021 compared to 2020	
(in thousands, except percentages)	**2022**	**2021**	**2020**	**$**	**%**	**$**	**%**
Revenue							
Operating revenue	$ 39,681	$ 10,000	$ 3,413	$ 29,681	>100%	$ 6,587	>100%
Grant revenue	162	178	549	(16)	(9.0)%	(371)	(67.4)%
Total revenue	39,843	10,178	3,962	29,665	>100%	6,216	>100%
Operating costs and expenses							
Cost of revenue	48,275	—	—	48,275	n/m	—	n/m
Research and development	155,696	135,271	63,319	20,425	15.1 %	71,951	>100%
General and administrative	81,599	57,682	25,258	23,917	41.5 %	32,423	>100%
Total operating costs and expenses	285,570	192,953	88,577	92,617	48.0 %	104,374	>100%
Loss from operations	(245,727)	(182,775)	(84,615)	(62,952)	34.4 %	(98,158)	>100%
Other income (loss), net	6,251	(3,704)	(2,391)	9,955	n/m	(1,313)	54.9 %
Net loss	$ (239,476)	$ (186,479)	$ (87,006)	$ (52,997)	28.4 %	$ (99,471)	>100%

n/m = Not meaningful

Summary

Our financial performance during the year ended December 31, 2022 compared to 2021 included: (i) a decrease in platform research and development costs due to a reallocation of spending to cost of revenue for our strategic partnerships; (ii) an increase in revenue recognized due to our strategic partnership with Roche; and (iii) the incurrence of cost of revenue due to our strategic partnerships. Additionally, our financial results reflected added funding to support our emerging early- and mid-stage pipeline assets.

Our financial performance during the year ended December 31, 2021 compared to 2020 included: (i) an increase in revenue recognized due to our strategic partnership with Bayer; and (ii) increased operating costs due to growth in size of the Company's operations.

Revenue

The following table summarizes our components of revenue:

	Years ended December 31,			2022 compared to 2021		2021 compared to 2020	
(in thousands, except percentages)	2022	2021	2020	$	%	$	%
Revenue							
Operating revenue	$ 39,681	$ 10,000	$ 3,413	$ 29,681	>100%	$ 6,587	>100%
Grant revenue	162	178	549	(16)	(9.0)%	(371)	(67.4)%
Total revenue	$ 39,843	$ 10,178	$ 3,962	$ 29,665	>100%	$ 6,216	>100%

For the year ended December 31, 2022, the increase in revenue compared to prior year was due to revenue recognized from our strategic partnership with Roche, which commenced in January 2022. For the year ended December 31, 2021, the increase in revenue compared to prior year was due to revenue recognized from our strategic partnership with Bayer, which commenced in August 2020.

Cost of Revenue

The following table summarizes our cost of revenue:

	Years ended December 31,			2022 compared to 2021		2021 compared to 2020	
(in thousands, except percentages)	2022	2021	2020	$	%	$	%
Total cost of revenue	$ 48,275	$ —	$ —	$48,275	n/m	$ —	n/m

n/m = Not meaningful

For the year ended December 31, 2022, the increase in cost of revenue compared to prior year was due to our strategic partnerships. For the years ended December 31, 2021 and 2020, cost of revenue was insignificant and was included within "Research and development" in the Consolidated Statement of Operations.

Research and Development

The following table summarizes our components of research and development expense:

	Years ended December 31,			2022 compared to 2021		2021 compared to 2020	
(in thousands, except percentages)	**2022**	**2021**	**2020**	**$**	**%**	**$**	**%**
Research and development expenses							
Platform	$ 41,765	$ 55,959	$ 29,651	$ (14,194)	(25.4)%	$ 26,308	88.7 %
Discovery	52,358	48,984	17,670	3,374	6.9 %	31,314	>100%
Clinical	46,820	21,841	10,003	24,979	>100%	11,838	>100%
Stock based compensation	10,524	4,979	1,777	5,545	>100%	3,202	>100%
Other	4,229	3,508	4,218	721	20.6 %	(710)	(16.8)%
Total research and development expenses	$ 155,696	$ 135,271	$ 63,319	$ 20,425	15.1 %	$ 71,952	>100%

Significant components of research and development expense include the following allocated by development phase: Platform, which refers primarily to expenses related to screening of product candidates through hit identification; Discovery, which refers primarily to expenses related to hit identification through development of candidates; and Clinical, which refers primarily to expenses related to development of candidates and beyond.

For the year ended December 31, 2022, the increase in research and development expenses compared to the prior year was primarily due to increased clinical costs as studies progressed. The Company initiated three Phase 2 or Phase 2/3 studies and two Phase 1 studies in 2022, which includes a Phase 1 study for REC-4881. These increases were partially offset by a decrease in platform costs due to a reallocation of spending to cost of revenue for our strategic partnerships.

For the year ended December 31, 2021, the increase in research and development expenses compared to the prior year was due to an increased number of experiments screened on our platform, an increased number of pre-clinical assets being validated and increased clinical costs as studies progressed.

General and Administrative Expense

The following table summarizes our general and administrative expense:

	Years ended December 31,			2022 compared to 2021		2021 compared to 2020	
(in thousands, except percentages)	**2022**	**2021**	**2020**	**$**	**%**	**$**	**%**
Total general and administrative expenses	$ 81,599	$ 57,682	$ 25,258	$ 23,917	41.5 %	$ 32,423	>100%

For the year ended December 31, 2022, the increase in general and administrative expense compared to the prior year was due to the growth in size of the Company's operations including increased salaries and wages of $14.3 million, a fixed asset write-down of $2.8 million, increased rent expense of $2.4 million and increases in other administrative costs associated with operating a growing company.

For the year ended December 31, 2021, the increase in general and administrative expense compared to prior year was due to the growth in size of the Company's operations including increased salaries and wages of $16.4 million, equipment costs, human resources costs, facilities costs and other administrative costs associated with operating a growth-stage company.

Other Income (Loss), Net

The following table summarizes our components of other income (loss), net:

(in thousands, except percentages)	Years ended December 31, 2022	2021	2020	2022 compared to 2021 $	2022 compared to 2021 %	2021 compared to 2020 $	2021 compared to 2020 %
Interest expense	$ (55)	$ (2,952)	$ (1,360)	$ 2,897	(98.1)%	$ (1,592)	>100%
Interest income	6,254	73	336	6,181	>100%	(263)	(78.3)%
Loss on debt extinguishment	—	(827)	(883)	827	(100.0)%	56	(6.3)%
Derivative fair value adjustment	—	—	(484)	—	n/m	484	(100.0)%
Other	52	2	—	50	>100%	2	n/m
Other income (loss), net	$ 6,251	$ (3,704)	$ (2,391)	$ 9,955	n/m	$ (1,313)	54.9 %

n/m = Not meaningful

For the year ended December 31, 2022, the increase in other income (loss), net compared to the prior year was driven by a decrease in interest expense from the 2021 Midcap loan settlement and an increase in interest income from our investment portfolio. See Note 5, “Investments” to the Consolidated Financial Statements for additional details on the investment portfolio.

For the year ended December 31, 2021, the increase in expense compared to the prior year was primarily due to an increase in interest expense due to the fair value of the Series A and B warrants. See Note 13, “Stock-Based Compensation” to the Consolidated Financial Statements for additional details on the warrants.

Liquidity and Capital Resources

Sources of Liquidity

We have not yet commercialized any products and do not expect to generate revenue from the sales of any product candidates for at least several years. Unrestricted cash, cash equivalents and investments totaled $549.9 million and $516.6 million as of December 31, 2022 and 2021, respectively.

We have incurred operating losses and experienced negative operating cash flows and we anticipate that the Company will continue to incur losses for at least the foreseeable future. Our net loss was $239.5 million, $186.5 million and $87.0 million during the years ended December 31, 2022, 2021 and 2020, respectively. As of December 31, 2022 and December 31, 2021, we had an accumulated deficit of $639.6 million and $400.1 million, respectively.

We have financed our operations through the private placements of preferred stock and Class A common stock issuances. As of December 31, 2022, we have received net proceeds of $448.9 million from the sale of preferred stock and $606.1 million from Class A common stock issuances. See Note 11, “Common Stock” to the Consolidated Financial Statements for additional details on the Class A common stock issuances. Additionally, as of December 31, 2022, we have received proceeds of $180.0 million from our strategic partnerships. See Note 12, “Collaborative Development Contracts” to the Consolidated Financial Statements for additional details on the collaborations.

Midcap Credit and Security Agreement

In September 2019, the Company entered into a Credit and Security Agreement with Midcap Financial Trust (Midcap) and the other lenders party thereto (the Midcap loan agreement). The Midcap loan agreement provided for a term loan facility that included an initial tranche of $11.9 million. In July 2021, the Company paid the balance due on the loan outstanding with Midcap. See Note 8, “Notes Payable” to the Consolidated Financial Statements for additional details.

Cash Flows

The following table is a summary of the Consolidated Statements of Cash Flows:

	Years ended December 31,		
(in thousands)	**2022**	**2021**	**2020**
Cash used in operating activities	$ (83,524)	$ (158,614)	$ (45,399)
Cash provided by (used in) investing activities	193,249	(271,744)	(8,740)
Cash provided by financing activities	154,345	458,540	246,135

Operating Activities
Cash used by operating activities decreased during the year ended December 31, 2022 compared to the prior year as we received an upfront payment of $150.0 million from our strategic partnership with Roche. That cash inflow was offset by cash used for cost of revenue, research and development and general and administrative expenses.

Cash used by operating activities during the year ended December 31, 2021 increased compared to the prior year as a result of higher costs incurred for research and development and general and administrative expenses due to the Company's growth.

Investing Activities
Cash provided by investing activities during the year ended December 31, 2022 was driven by sales and maturities of investments of $230.6 million, partially offset by the purchases of property and equipment of $37.1 million.

Cash used by investing activities during the year ended December 31, 2021 primarily consisted of investment purchases of $301.1 million and property and equipment purchases of $39.8 million, which included $17.9 million for the purchase of a Dell EMC supercomputer. The cash outflows were partially offset by proceeds of $69.2 million from the sales and maturities of investments.

Cash used by investing activities during the year ended December 31, 2020 included $2.6 million for the acquisition of Vium, Inc (Vium) and $5.8 million of capital expenditures primarily for the purchase of lab equipment and leasehold improvements. Additionally, the Company purchased other intangible assets for $904 thousand. The cash outflows were partially offset by the proceeds from the note receivable. See Note 3, "Acquisitions" to the Consolidated Financial Statements for additional details on the Vium acquisition.

Financing Activities
Cash provided by financing activities during the year ended December 31, 2022 primarily included $143.7 million of net proceeds from the Private Placement. Financing cash flows also included proceeds from equity incentive plans of $10.7 million.

Cash provided by financing activities during the year ended December 31, 2021 primarily included $462.4 million of net proceeds from the IPO. Financing cash flows also included an outflow of $12.7 million for the repayment of long-term debt on the Midcap loan.

Cash provided by financing activities during the year ended December 31, 2020 primarily included proceeds from the sale of preferred stock of $239.1 million. Financing cash flows also included $6.4 million of proceeds from the issuance of convertible notes.

Contractual Obligations

The Company's material cash requirements include the following contractual obligations:

As of December 31, 2022, the Company had $633 thousand of debt outstanding. This balance is related to notes payable for tenant improvement allowances. See Note 8, "Notes Payable" to the Consolidated Financial Statements for additional details.

As of December 31, 2022, the Company had $68.5 million of future lease commitments. See Note 6 "Leases" to the Consolidated Financial Statements for additional detail on future lease commitments. In addition to leases that have commenced, the Company has $11.0 million for leases that have been executed but not yet commenced.

As of December 31, 2022, the Company had $68.0 million of future purchase obligations, $49.8 million of which are expected to be payable within the next year. These commitments primarily related to third-party research services, materials and supplies for research and development activities and capital expenditures.

Critical Accounting Estimates and Policies

Our management's discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles (GAAP). The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, expenses and the disclosure of contingent assets and liabilities in our financial statements. We base our estimates on historical experience, known trends and events, and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in the notes to our consolidated financial statements, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

We have generated revenue from our strategic alliances. Our alliances with strategic collaborators may contain multiple elements, including research and development services, licenses, options to obtain development and commercialization rights, obligations to develop and manufacture preclinical and clinical material and options to obtain additional research and development services, preclinical and clinical material. Such arrangements may provide for various types of payments to us, including upfront fees, funding of research and development services and preclinical and clinical material, technical, development, regulatory and commercial milestone payments, licensing fees, option exercise fees and royalty and milestone payments on product sales. These payments are often not commensurate with the timing of revenue recognition and therefore result in the deferral of revenue recognition.

Our operating revenue has primarily been generated through funded research and development agreements. Revenue for research and development agreements is recognized as the Company satisfies a performance obligation by transferring the promised services to the customer. The Company recognizes revenue over time by measuring the progress toward complete satisfaction of the relevant performance obligation using an appropriate input or output method based on the services promised to the customer. This method of recognizing revenue requires the Company to make estimates to determine the progress towards completion. A significant change in these estimates could have a material effect on the timing and amount of revenue recognized in future periods.

Accrued Research and Development Expenses

As part of the process of preparing our financial statements, we are required to estimate our expenses resulting from our obligations under contracts with vendors, clinical research organizations and consultants. The financial terms of these contracts are subject to negotiations, which vary from contract to contract and may result in payment terms that do not match the periods over which materials or services are provided under such contracts. Our objective is to reflect the appropriate expenses in our financial statements by matching those expenses with the period in which services are performed and efforts are expended. We account for these expenses according to the timing of various aspects of the expenses and determine accrual estimates by taking into account discussion with applicable personnel and outside service providers as to the progress of clinical trials, or the services completed. During the course of a clinical trial, we adjust our clinical expense recognition if actual results differ from estimates. We make estimates of our accrued expenses as of each balance sheet date based on the facts and circumstances known to us at that time. Our clinical trial accruals are dependent upon the timely and accurate reporting of contract research organizations and other third-party vendors. Although we do not expect estimates to be materially different from amounts actually incurred, our understanding of the anticipated status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low for any particular period.

Stock-Based Compensation

We measure stock options and other stock-based awards granted to employees, directors and non-employees based on their fair value on the date of grant and recognize the compensation expense over the requisite service period. We recognize the impact of forfeitures on stock-based compensation expenses as forfeitures occur. We generally apply the straight-line method of expense recognition to awards.

The grant date fair value of stock options is estimated using the Black-Scholes option-pricing model, which requires inputs for the expected term, stock price volatility, dividend yield and the risk-free interest rate of the options. If any assumptions used in the Black-Scholes option-pricing model change significantly, stock-compensation for future awards may differ materially compared with the awards granted previously.

Recently Issued and Adopted Accounting Pronouncements

See Note 2, “Summary of Significant Accounting Policies” to the Consolidated Financial Statements for information regarding recently issued and adopted accounting pronouncements.

Item 7a. Quantitative and Qualitative Disclosures About Market Risk.

Interest rate risk

We are exposed to market risk related to changes in interest rates of our investment portfolio of cash and cash equivalents. As of December 31, 2022, our cash and cash equivalents consisted of money market funds. Our primary exposure to market risk is interest income sensitivity, which is affected by changes in U.S. interest rates. A hypothetical 100 basis point decrease in interest rates as of December 31, 2022 would have an insignificant effect on net loss in the ensuring year.

Foreign currency exchange risk

Our employees and our operations are primarily located in the United States and Canada and our expenses are generally denominated in U.S. and Canadian dollars. We also have entered into a limited number of contracts with vendors for research and development services that have underlying payment obligations denominated in foreign currencies. We are subject to foreign currency transaction gains or losses on our contracts denominated in foreign currencies. To date, foreign currency transaction gains and losses have not been material to our financial statements, and we do not have a formal hedging program with respect to foreign currency. A 10% increase or decrease in current exchange rates would not have had a material effect on our financial results during the years ended December 31, 2022, 2021 and 2020.

Inflation Risk and Market Volatility

In recent months, inflation has continued to increase significantly in the U.S. and overseas resulting in rising costs for transportation, wages, construction and other goods and services. Inflation and supply chain disruptions have increased our overall operating expenses. In addition, the capital and credit markets have been experiencing volatility and disruption, which has exerted downward pressure on stock prices and credit capacity. There is no assurance that such markets will be a source of future financing for Recursion, nor that other funding sources would be available or sufficient, particularly if current levels of market disruption and volatility continue or worsen. Although we do not believe that the above conditions have materially changed our overall financial position, if our costs continue to increase, we may not be able to fully offset those increased costs through reduced spending or additional financing efforts and failure to do so could harm our business, financial condition and results of operations.


Recursion.
ITEM 8.
Financials

Item 8. Financial Statements and Supplementary Data.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Recursion Pharmaceuticals Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Recursion Pharmaceuticals, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Revenue Recognition – Operating Revenue

Description of the Matter	In connection with the Company's collaboration and license agreement with Roche and Genentech to perform research and development services, revenue is recognized based on costs incurred relative to total expected costs to perform the research and development services. Significant inputs used to determine expected contract costs include the length of time required, service hours performed by Company employees, and materials costs. Accounting for the agreement involves judgment, particularly as it relates to estimating total costs to be incurred based on the scope of work, industry information, and historical experience, among other factors. Given the judgment necessary to estimate total costs, which is a significant factor in calculating the amount of revenue to recognize under the agreement during a period, auditing the Company's total cost estimate required significant audit effort.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's process to estimate total costs to be incurred under the agreement. To test the Company's estimate of total costs, we obtained the agreement and evaluated the terms and conditions to understand the nature of the Company's performance obligations under the agreement. We obtained and evaluated management's estimate of total costs to be incurred for each performance obligation by performing corroborating inquiries with the Company's project scientists and financial analysts. We compared current costs incurred against the initial estimate of total costs. We tested the mathematical accuracy of the costs to be incurred for each performance obligation. We also tested the reasonableness of costs underlying the total estimate for each performance obligation by comparing the cost estimates to actual costs incurred.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2017.

Salt Lake City, Utah
February 27, 2023

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Recursion Pharmaceuticals, Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Recursion Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Recursion Pharmaceuticals, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of Recursion Pharmaceuticals, Inc. as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2022, and the related notes and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Salt Lake City, Utah
February 27, 2023

Recursion Pharmaceuticals, Inc.
Consolidated Balance Sheets
(in thousands, except share and per share amounts)

	December 31, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 549,912	$ 285,116
Restricted cash	1,280	1,552
Accounts receivable	—	34
Other receivables	2,753	9,056
Investments	—	231,446
Other current assets	15,869	7,514
Total current assets	569,814	534,718
Restricted cash, non-current	7,920	8,681
Property and equipment, net	88,192	64,725
Operating lease right-of-use assets	33,255	—
Intangible assets, net	1,306	1,385
Goodwill	801	801
Other non-current assets	—	35
Total assets	$ 701,288	$ 610,345
Liabilities and stockholders' equity		
Current liabilities		
Accounts payable	$ 4,586	$ 2,819
Accrued expenses and other liabilities	32,904	32,333
Unearned revenue	56,726	10,000
Notes payable	97	90
Operating lease liabilities	5,952	—
Lease incentive obligation	—	1,416
Total current liabilities	100,265	46,658
Deferred rent	—	4,110
Unearned revenue, non-current	70,261	6,667
Notes payable, non-current	536	633
Operating lease liabilities, non-current	44,420	—
Lease incentive obligation, non-current	—	9,339
Total liabilities	215,482	67,407
Commitments and contingencies (Note 9)		
Stockholders' equity		
Common stock, $0.00001 par value; 2,000,000,000 shares (Class A 1,989,032,117 and Class B 10,967,883) authorized as of December 31, 2022 and December 31, 2021, respectively; 191,022,864 shares (Class A 183,209,655 and Class B 7,813,209) and 170,272,462 (Class A 160,906,245 and Class B 9,366,217) issued and outstanding as of December 31, 2022 and December 31, 2021, respectively	2	2
Additional paid-in capital	1,125,360	943,142
Accumulated deficit	(639,556)	(400,080)
Accumulated other comprehensive loss	—	(126)
Total stockholders' equity	485,806	542,938
Total liabilities and stockholders' equity	$ 701,288	$ 610,345

See the accompanying notes to these consolidated financial statements.

Recursion Pharmaceuticals, Inc.
Consolidated Statements of Operations
(in thousands, except share and per share amounts)

	Years ended December 31,		
	2022	**2021**	**2020**
Revenue			
Operating revenue	$ 39,681	$ 10,000	$ 3,413
Grant revenue	162	178	549
Total revenue	39,843	10,178	3,962
Operating costs and expenses			
Cost of revenue	48,275	—	—
Research and development	155,696	135,271	63,319
General and administrative	81,599	57,682	25,258
Total operating costs and expenses	285,570	192,953	88,577
Loss from operations	(245,727)	(182,775)	(84,615)
Other income (loss), net	6,251	(3,704)	(2,391)
Net loss	$ (239,476)	$ (186,479)	$ (87,006)
Per share data			
Net loss per share of Class A and B common stock, basic and diluted	$ (1.36)	$ (1.49)	$ (3.99)
Weighted-average shares (Class A and B) outstanding, basic and diluted	175,537,487	125,348,110	21,781,386

See the accompanying notes to these consolidated financial statements.

Recursion Pharmaceuticals, Inc.
Consolidated Statements of Comprehensive Loss
(in thousands)

	Years ended December 31,		
	2022	**2021**	**2020**
Net loss	$ (239,476)	$ (186,479)	$ (87,006)
Unrealized gain (loss) on investments	87	(162)	—
Net realized loss on investments reclassified into net loss	39	36	—
Other comprehensive income (loss)	126	(126)	—
Comprehensive loss	$ (239,350)	$ (186,605)	$ (87,006)

See the accompanying notes to these consolidated financial statements.

Recursion Pharmaceuticals, Inc.
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)
(in thousands, except share amounts)

	Convertible Preferred Stock		Common Stock (Class A and B)		Additional Paid-in-Capital	Accumulated Deficit	Accumulated other comprehensive loss	Stockholders' Equity
	Shares	Amount	Shares	Amount				
Balance as of December 31, 2019	75,189,517	$ 201,109	21,637,609	$ —	$ 2,330	$ (126,595)	$ —	$ (124,265)
Net loss	—	—	—	—	—	(87,006)	—	(87,006)
Vesting of stock options exercised early	—	—	—	—	9	—	—	9
Stock option exercises	—	—	677,076	—	681	—	—	681
Issuance of Series D convertible preferred stock inclusive of the convertible notes, net of issuance costs	36,898,548	247,203	—	—	—	—	—	—
Stock-based compensation	—	—	—	—	4,292	—	—	4,292
Balance as of December 31, 2020	112,088,065	448,312	22,314,685	—	7,312	(213,601)	—	(206,289)
Net loss	—	—	—	—	—	(186,479)	—	(186,479)
Other comprehensive loss	—	—	—	—	—	—	(126)	(126)
Common stock issuance for initial public offering, net of issuance costs	—	—	27,878,787	1	462,353	—	—	462,354
Conversion of preferred stock to common stock	(112,088,065)	(448,312)	115,598,018	1	448,311	—	—	448,312
Stock warrant exercises	—	—	343,609	—	3,512	—	—	3,512
Stock option exercises and other	—	—	4,137,363	—	6,812	—	—	6,812
Stock-based compensation	—	—	—	—	14,842	—	—	14,842
Balance as of December 31, 2021	—	—	170,272,462	2	943,142	(400,080)	(126)	542,938
Net loss	—	—	—	—	—	(239,476)	—	(239,476)
Other comprehensive income	—	—	—	—	—	—	126	126
Common stock issuance for private placement, net of issuance costs	—	—	15,336,734	—	143,711	—	—	143,711
Stock option exercises and other	—	—	5,413,668	—	10,598	—	—	10,598
Stock-based compensation	—	—	—		27,909	—	—	27,909
Balance as of December 31, 2022	—	$ —	191,022,864	$ 2	$1,125,360	$ (639,556)	$ —	$ 485,806

See the accompanying notes to these consolidated financial statements.

Recursion Pharmaceuticals, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Years ended December 31,		
	2022	**2021**	**2020**
Cash flows from operating activities			
Net loss	$ (239,476)	$ (186,479)	$ (87,006)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	11,756	8,405	3,943
Stock-based compensation	27,909	14,842	4,292
Asset impairment	2,806	—	874
Lease expense	7,730	—	—
Loss on debt extinguishment	—	827	883
Other, net	830	4,097	781
Changes in operating assets and liabilities:			
Other receivables and assets	(2)	(5,376)	(1,119)
Unearned revenue	110,320	(10,000)	26,667
Accounts payable	1,767	1,745	(185)
Accrued development expense	522	561	1,348
Accrued expenses, deferred rent and other current liabilities	(576)	12,764	4,123
Operating lease liabilities	(7,110)	—	—
Net cash used in operating activities	(83,524)	(158,614)	(45,399)
Cash flows from investing activities			
Purchases of property and equipment	(37,059)	(39,798)	(5,831)
Acquisition of a business	—	—	(2,600)
Purchase of an intangible asset	(300)	—	(904)
Purchases of investments	—	(301,137)	—
Sales and maturities of investments	230,608	69,191	—
Proceeds from note receivable	—	—	595
Net cash provided by (used in) investing activities	193,249	(271,744)	(8,740)
Cash flows from financing activities			
Proceeds from private placement of common stock, net of issuance costs	143,711	—	—
Proceeds from initial public offering of common stock, net of issuance costs	—	462,901	—
Proceeds from sale of preferred stock, net of issuance costs	—	—	239,131
Proceeds from equity incentive plans and warrants	10,724	8,437	681
Repayment of long-term debt	(90)	(12,798)	(77)
Proceeds from convertible notes	—	—	6,400
Net cash provided by financing activities	154,345	458,540	246,135
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(307)	—	—
Net change in cash, cash equivalents and restricted cash	263,763	28,182	191,996
Cash, cash equivalents and restricted cash, beginning of period	295,349	267,167	75,171
Cash, cash equivalents and restricted cash, end of period	$ 559,112	$ 295,349	$ 267,167
Supplemental disclosure of non—cash investing and financing information			
Conversion of preferred stock to common stock	$ —	$ 448,312	$ —
Conversion of convertible notes to equity	—	—	8,071
Accrued property and equipment	591	7,749	1,400
Right-of-use asset additions and modifications	3,950	—	—
Deferred issuance costs recorded in equity	—	547	547
Supplemental disclosure of cash flow information			
Cash paid for interest	$ 55	$ 680	$ 989
Cash paid for operating leases	7,110	—	—

See the accompanying notes to these consolidated financial statements.

Recursion Pharmaceuticals, Inc.
Notes to Consolidated Financial Statements

Note 1. Description of the Business

Recursion Pharmaceuticals, Inc. (Recursion, the Company, we or our) was originally formed as a limited liability company on November 4, 2013 under the name Recursion Pharmaceuticals, LLC. In September 2016, the Company converted to a Delaware corporation and changed its name to Recursion Pharmaceuticals, Inc.

Recursion is a clinical stage TechBio company decoding biology to industrialize drug discovery. The Recursion Operating System (OS), a platform built across diverse technologies, enables the Company to map and navigate trillions of biological and chemical relationships within the Recursion Data Universe, one of the world's largest proprietary biological and chemical datasets. The Company integrates physical and digital components as iterative loops of atoms and bits scaling wet lab biology and chemistry data organized into virtuous cycles with computational tools to rapidly translate *in silico* hypotheses into validated insights and novel chemistry.

As of December 31, 2022, the Company had an accumulated deficit of $639.6 million. The Company expects to incur substantial operating losses in future periods and will require additional capital to advance its drug candidates. The Company does not expect to generate significant revenue until the Company successfully completes significant drug development milestones with its subsidiaries or in collaboration with third parties, which the Company expects will take a number of years. There is no assurance that these milestones will be completed successfully. In order to commercialize its drug candidates, the Company or its partners need to complete clinical development and comply with comprehensive regulatory requirements. The Company is subject to a number of risks and uncertainties similar to those of other companies of the same size within the biotechnology industry, such as the uncertainty of clinical trial outcomes, uncertainty of additional funding and a history of operating losses.

The Company has funded its operations to date primarily through the issuance of convertible preferred stock (see Note 10, "Convertible Preferred Stock" for additional details) and the issuance of Class A common stock (see Note 11, "Common Stock" for additional details). Additionally, we have received payments of $180.0 million from our strategic partnerships (see Note 12, "Collaborative Development Contracts" for additional details). Recursion will likely be required to raise additional capital. As of December 31, 2022, the Company did not have any unconditional outstanding commitments for additional funding. If the Company is unable to access additional funds when needed, it may not be able to continue the development of its products or the Company could be required to delay, scale back or abandon some or all of its development programs and other operations. The Company's ability to access capital when needed is not assured and, if not achieved on a timely basis, could materially harm its business, financial condition and results of operations.

Recursion believes that the Company's existing cash and cash equivalents will be sufficient to fund the Company's operating expenses and capital expenditures for at least the next 12 months.

Note 2. Summary of Significant Accounting Policies

Use of Estimates

The consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles (GAAP), which requires the Company to make estimates and assumptions that affect reported amounts and related disclosures. Actual results could differ from those amounts. Significant estimates and assumptions include the estimated progress towards the satisfaction of performance obligations to record revenue, accrued research and development expenses and the fair value of stock-based awards issued.

Basis of Presentation

The consolidated financial statements include the accounts of Recursion and its majority-owned subsidiaries that the Company controls. Intercompany balances and transactions have been eliminated in consolidation.

In April 2021, the Company completed a 1.5-for-1 forward stock split of common and convertible preferred stock. All shares presented within these consolidated financial statements were adjusted to reflect the forward stock split for all periods presented. See Note 11, "Common Stock" for additional details.

In April 2021, the Company's Board of Directors authorized two classes of common stock, Class A and Class B. Certain shares of Class A were exchanged for Class B on a one-for-one basis. The creation and issuance of the Class B common stock did not affect the loss per share for the Class A or Class B shares for any period. The Company presented the 2021 net loss per share amounts as if the authorization and exchange occurred as of the start of the 2021 reporting period. All share amounts presented prior to the authorization are referred to as Class A common stock. See Note 11, "Common Stock" for additional details.

Segment Information

Recursion operates as a single operating segment. The Company's chief operating decision maker is its chief executive officer, who allocates resources and assesses performance at the consolidated level.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash, cash equivalents and marketable securities. These financial instruments are primarily held at two U.S. financial institutions that management believes are of high credit quality. Recursion's primary bank accounts significantly exceed the federally insured limits.

The Company is dependent on third-party suppliers for certain research and development activities including preclinical and clinical testing. In particular, the Company relies and expects to continue to rely on a small number of these suppliers. These activities could be adversely affected by a significant interruption to Recursion's third-party suppliers including a delay in the Company's preclinical and clinical testing and the supply of certain consumable products and compounds.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents includes bank deposits held in checking accounts, money market funds, commercial paper, corporate bonds and certificates of deposits with maturities of three months or less at the time of purchase.

The Company is required to maintain a cash balance in a collateralized account to secure the Company's credit cards. Additionally, the Company holds restricted cash related to an outstanding letter of credit issued by J.P. Morgan, which was obtained to secure certain Company obligations relating to tenant improvements.

Investments

Investments consist primarily of marketable debt securities including corporate debt securities, government debt securities, commercial paper and certificates of deposit. Investments that have a readily determinable fair value are recorded at fair value. Investments in marketable debt securities are classified as available-for-sale and are recorded at fair value with any unrealized holding gains or losses, net of tax, included in accumulated other comprehensive loss on the Consolidated Balance Sheets. Once realized, the gains and losses are recognized in earnings and included in other income (loss), net in the Consolidated Statements of Operations. Realized gains and losses on sales of investments are computed using the first-in, first-out method.

The Company reviews investments for declines in fair value below cost basis each quarter or whenever circumstances indicate the cost basis of an asset may not be recoverable and assesses whether the decline was due to credit-related or other factors. The evaluation is based on a number of factors, including the extent to which fair value is below cost basis; adverse conditions related specifically to the security, such as any changes to the credit rating of the security; and the intent to sell, or whether Recursion will more likely than not be required to sell the security before recovery of its amortized cost basis. The assessment of whether a security is impaired could change in the future based on new developments or changes in assumptions related to that particular security.

Property and Equipment

Property and equipment is carried at acquisition cost less accumulated depreciation. The cost of normal, recurring, or periodic repairs and maintenance activities related to property and equipment are expensed as incurred. Depreciation is computed using the straight-line method based on the estimated useful lives of the assets. The estimated useful lives by asset classification are generally as follows:

Software/Licenses	3 years
Office Equipment	5 years
Computer Equipment	5 years
Lab Equipment	7 years
Leasehold Improvements	Lesser of 15 years or the remainder of the lease

Property and equipment are reviewed for impairment as discussed below under Accounting for the Impairment of Long-Lived Assets.

Accounting for the Impairment of Long-Lived Assets

The Company reviews the carrying amounts of long-lived assets, other than goodwill and intangible assets not subject to amortization, for potential impairment when events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. In evaluating recoverability, Recursion groups assets and liabilities at the lowest level such that the identifiable cash flows relating to the group are largely independent of the cash flows of other assets and liabilities. The Company then compares the carrying amount of the asset or asset group with the projected undiscounted future cash flows to be generated by the asset or asset group. In the event impairment exists, an impairment charge is recorded as the amount by which the carrying amount of the asset or asset group exceeds the fair value.

Accruals for Research and Development Expenses and Clinical Trials

As part of the process of preparing its financial statements, the Company is required to estimate its expenses resulting from obligations under contracts with vendors, clinical research organizations and consultants. The financial terms of these contracts are subject to negotiations, which vary from contract to contract and may result in payment terms that do not match the periods over which materials or services are provided for under such contracts. The Company's policy is to record these expenses during the period in which services are performed and efforts are expended. The Company determines accrual estimates by taking into account discussion with applicable personnel and outside service providers as to the progress of clinical trials, or the services completed. During the course of a clinical trial, the Company adjusts its clinical expense recognition if actual results differ from its estimates. The Company makes estimates of its accrued expenses as of each Consolidated Balance Sheet date based on the facts and circumstances known to it at that time. The actual expenses could be different from the amounts accrued.

Leases

The Company rents facilities under operating lease agreements and recognizes rent expense on a straight-line basis over the term of the lease. Certain lease agreements contain tenant improvement allowances, rent holidays, scheduled rent increases and renewal options. Rent holidays and scheduled rent increases are included in the determination of rent expense. Renewals are generally not included in the determination of the lease term unless they are determined to be reasonably certain to be exercised at the commencement date of the lease. Right-of-use assets and lease liabilities are recognized based on the present value of lease payments over the lease term at the lease commencement date. Present value is determined using an incremental borrowing rate when the rate implicit in the lease is not readily determinable. Right-of-use assets are adjusted for lease incentives. Short-term leases with a term of 12 months or less are not recorded on the balance sheet. Right-of-use assets and lease liabilities are remeasured upon certain remeasurement events using the present value of remaining lease payments and estimated incremental borrowing rate upon lease modification. The Company recognizes rent expense beginning on the date the Company obtains the legal right to use and control the leased space.

Revenue Recognition

Operating revenue has primarily been generated through funded research and development agreements (see Note 12, “Collaborative Development Contracts” for additional details). Revenue for research and development agreements is recognized as the Company satisfies a performance obligation by transferring the promised services to the customer. The Company recognizes revenue over time by measuring the progress toward complete satisfaction of the relevant performance obligation using an appropriate input or output method based on the services promised to the customer. This method of recognizing revenue requires the Company to make estimates to determine the progress towards completion. A significant change in these estimates could have a material effect on the timing and amount of revenue recognized in future periods.

The Company may also provide options in our agreements under which a partner could request that Recursion provide additional services in the future. Recursion evaluates whether these options are material rights at the inception of the agreement. If the Company determines an option is a material right, Recursion will consider the option a separate performance obligation. Historically, the Company has concluded that options granted to license in the future or to provide additional services are not material rights because these items are contingent upon future events that may not occur and are not priced at a significant discount.

Cost of Revenue

Cost of revenue consists of the Company’s costs to provide services for drug discovery required under performance obligations with partnership customers. These primarily include materials costs, service hours performed by our employees and depreciation of property and equipment. Consumables purchased to be used in the future to satisfy performance obligations are recognized on the Consolidated Balance Sheet until consumed.

Research and Development

Research and development expenses comprise of costs incurred in performing research and development activities, including drug discovery and development studies, external research and the purchase of laboratory supplies. The Company recognizes expenses associated with third-party contracted services based on the completion of activities as specified in the applicable contracts. Upon the termination of contracts with third-parties, the Company’s financial obligations are generally limited to costs incurred or committed to date. Any advance payments for goods or services to be used or rendered in future research and product development activities are classified as prepaid expenses until the goods or services are rendered.

Stock-Based Compensation

The Company issues stock-based awards to employees and non-employees, generally in the form of stock options and restricted stock units (RSUs). Most of the Company’s stock-based awards have been made to employees. Recursion measures compensation expense for equity awards at their grant-date fair value and recognizes compensation expense over the requisite service period, generally on a straight-line basis. For stock-based awards with a performance condition, Recursion recognizes stock-based compensation expense based on the probable outcome of the performance condition. Awards generally vest over four years for employees. Recursion recognizes the impact of forfeitures on stock-based compensation expense as they occur.

The grant date fair value of stock options is estimated using the Black-Scholes option pricing model, which requires inputs for the expected term, stock price volatility, dividend yield and the risk-free interest rate of the options. The expected term is based on the simplified method since the Company does not have sufficient historical exercise data to estimate the expected term. The volatility is based on an average peer historical volatility over the expected term of the option. The expected dividend yield is assumed to be zero as Recursion has never paid dividends and does not have current plans to pay dividends. The risk-free interest rate is based on the rates available at the time of the grant for zero-coupon U.S. government issues with a remaining term equal to the option's expected term.

The grant date fair value of RSUs is determined using the market price of the Company’s common stock at grant date. For stock-based awards with a market condition, the grant date fair value is determined using a Monte Carlo simulation and stock-based compensation expense is recognized using the accelerated attribution method over the implied service period. When a market condition is satisfied in a period before the end of the implied service period, any remaining unrecognized compensation cost is recognized. Stock-based compensation is recorded in cost of

revenue, research and development expense and general and administrative expense based on the role of the employee and non-employee.

Income Taxes

Income taxes are accounted for under the asset and liability method. Provisions for federal, state and foreign income taxes are calculated on reported pretax losses based on current tax laws. Deferred taxes are recognized using enacted tax rates on the future tax consequences of temporary differences, which are the differences between the financial statement carrying amounts of assets and liabilities and their respective tax bases and the tax benefits of carryforwards. A valuation allowance is established or maintained when, based on currently available information, it is more likely than not that all or a portion of a deferred tax asset will not be realized.

For uncertain tax positions, Recursion determines whether the position is more-likely-than-not to be sustained upon examination based on the technical merits of the position. Any tax position that meets the more-likely-than-not recognition threshold is measured and recognized in the Consolidated Financial Statements at the largest amount that is greater than 50% likely of being realized upon ultimate settlement.

Recent Accounting Pronouncements

On January 1, 2022, Recursion adopted Accounting Standards Update (ASU) No. 2016-02, Leases (Topic 842). Under Topic 842, lessees are required to recognize a right-of-use asset and a lease liability on the balance sheet for all leases with terms greater than 12 months. The guidance also expanded the disclosure requirements of lease arrangements. The Company adopted Topic 842 using the modified retrospective method. Recursion elected the following practical expedients when assessing the transition impact: i) not to reassess whether any expired or existing contracts as of the adoption date are or contain leases; ii) not to reassess the lease classification for any expired or existing leases as of the adoption date; and iii) not to reassess initial direct costs for any existing leases as of the adoption date.

Results for reporting periods beginning after December 31, 2021 are presented in accordance with the standard, while results for prior periods are not adjusted and continue to be reported in accordance with Recursion's historical accounting. The January 1, 2022 adjustment to record lease right-of-use assets and lease liabilities was $32.9 million and $47.8 million, respectively. The impact to the consolidated statements of operations and cash flows was insignificant.

Note 3. Acquisitions

Acquisition of Vium, Inc.

In July 2020, the Company entered into an asset purchase agreement to purchase 100% of the assets of Vium, Inc. (Vium) for a total cash consideration of $2.6 million. The primary purpose of the acquisition was to obtain Vium's technology. This was a related party transaction due to the fact that Vium was affiliated with certain investors of the Company. The acquisition of Vium has been accounted for as a business combination using the acquisition method of accounting.

The following table summarizes fair values of assets acquired as of the July 2020 acquisition date:

(in thousands)		
Inventory	$	232
Property and equipment		14
Technology intangible asset		911
Other intangibles assets		642
Total identifiable net assets		1,799
Goodwill		801
Total assets acquired	$	2,600

The results of operations of Vium have been included in our Consolidated Statements of Operations since the date the business was acquired and were not significant. The technology intangible asset is being amortized on a straight-line basis over its three-year useful life. The inventory and other intangible assets were fully impaired at the time they were acquired as the Company did not intend to use them.

The goodwill includes the value of potential future technologies as well as the overall strategic benefits provided to the business.

Intangible Asset Acquisition

In December 2020, the Company purchased the Recursion domain name for cash consideration of $904 thousand. The purchase price was capitalized as an intangible asset with an indefinite useful life.

Note 4. Supplemental Financial Information

Property and Equipment

	December 31,	
(in thousands)	**2022**	**2021**
Lab equipment	$ 47,524	$ 33,076
Leasehold improvements	41,872	13,936
Office equipment	20,164	20,005
Construction in progress	8,747	16,445
Property and equipment, gross	118,307	83,462
Less: Accumulated depreciation	(30,115)	(18,737)
Property and equipment, net	$ 88,192	$ 64,725

Depreciation expense on property and equipment was $11.4 million, $8.8 million and $4.2 million during the years ended December 31, 2022, 2021 and 2020, respectively. The Company recorded an impairment of $2.8 million during the year ended December 31, 2022 related to a construction project for leasehold improvements as the Company no longer intended to use them. The impairment was recorded in “General and Administrative” in the Consolidated Statements of Operations.

For the year ended December 31, 2022, the increase in lab equipment from the prior year was driven by investments in the Company’s chemical technology, machine learning and transcriptomics platform. The increase in leasehold improvements from the prior year was primarily driven by the completion of the headquarters expansion. The construction in progress balance primarily relates to lab equipment under construction.

For the year ended December 31, 2021, the Company purchased a Dell EMC supercomputer for $17.9 million. The purchase was classified as office equipment in the above table.

Accrued Expenses and Other Liabilities

(in thousands)	December 31, 2022	2021
Accrued compensation	$ 20,433	$ 11,738
Accrued development expenses	3,372	4,682
Accrued early discovery expenses	3,192	2,114
Accrued construction	591	4,665
Accrued professional fees	151	1,793
Accrued other expenses	5,165	7,341
Accrued expense and other liabilities	$ 32,904	$ 32,333

Interest Income (Expense), net

(in thousands)	Years ended December 31, 2022	2021	2020
Interest expense	$ (55)	$ (2,952)	$ (1,360)
Interest income	6,254	73	336
Interest income (expense), net	$ 6,199	$ (2,879)	$ (1,024)

For the year ended December 31, 2022, interest income primarily related to the investment portfolio. See Note 5, “Investments” for additional details on the investment portfolio. For the year ended December 31, 2021, interest expense primarily related to changes in fair value of the Series A and B warrants (see Note 13, “Stock-based Compensation” for additional details on the warrants). For the year ended December 31, 2020, interest expense included expenses for the Midcap loan, convertible notes and tenant improvement allowance notes. Interest income and expense were included in “Other income (loss), net” on the Consolidated Statements of Operations.

Note 5. Investments

In August 2021, the Company invested cash in an investment portfolio. The primary objectives of the investment portfolio are to preserve principal, maintain prudent levels of liquidity and obtain investment returns. Recursion’s investment policy limits investments to certain types of debt and money market instruments issued by institutions with investment-grade credit ratings and it places restrictions on maturities and concentration by asset class and issuer.

The following table summarizes the Company’s investment portfolio by type of security:

(in thousands)	December 31, 2022 Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair values
Money market funds	$ 404,613	$ —	$ —	$ 404,613
Total	$ 404,613	$ —	$ —	$ 404,613

	December 31, 2021			
(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair values
Money market funds	$ 155,731	$ —	$ —	$ 155,731
U.S. government debt	19,960	—	(33)	19,927
Corporate bonds	61,451	—	(74)	61,377
Certificates of deposit	21,450	—	(10)	21,440
Commercial paper	140,911	3	(12)	140,902
Total	$ 399,503	$ 3	$ (129)	$ 399,377

The following table summarizes the classification of the Company's investment portfolio on the Consolidated Balance Sheet:

(in thousands)	December 31, 2022	December 31, 2021
Cash and cash equivalents	$ 404,613	$ 167,931
Investments	—	231,446
Total	$ 404,613	$ 399,377

As of December 31, 2022, the Company's did not have any available-for-sale investments outstanding. As of December 31, 2021, all of the Company's available-for-sale investments mature in one year or less.

There were no significant realized or unrealized losses during years ended December 31, 2022 and 2021. No impairments were recorded during the years ended December 31, 2022 and 2021. Realized gains and losses on interest-bearing securities are recorded in "Other income (loss), net", in the Consolidated Statements of Operations.

Note 6. Leases

The Company has entered into various long-term real estate leases primarily related to office, research and development and operating activities. The Company has elected to utilize the package of practical expedients under the transition guidance of Accounting Standards Codification (ASC) Topic 842, *Leases*, which allows Recursion to not reassess whether any existing contract contains a lease, the classification of any existing leases and initial direct costs for any existing leases. The Company's leases have remaining terms from 1 to 10 years and some of those leases include options that provide Recursion with the ability to extend the lease term for five years. Such options are included in the lease term when it is reasonably certain that the option will be exercised.

Certain leases include provisions for variable lease payments which are based on, but not limited to, maintenance, insurance, taxes and usage-based amounts. Recursion will recognize these costs as they are incurred. The Company has also elected to apply the practical expedient for short-term leases whereby Recursion does not recognize a lease liability and right-of-use asset for leases with a term of less than 12 months. The Company has also elected to not separate consideration in the contract between lease and non-lease components of a contract that contains a lease.

Recursion classifies leases as operating or finance at the lease commencement date. All outstanding leases are operating leases. Certain leases have free rent periods or escalating rent payment provisions. The Company recognizes lease cost on a straight-line basis over the term of the lease.

Lease liabilities and right-of-use assets are calculated and recognized at the lease commencement date based on the present value of minimum lease payments over the lease term. The incremental borrowing rate is equal to the rate of interest that Recursion would have to pay to borrow on a collateralized basis over a similar term in an amount equal to the lease payments in a similar economic environment. For operating leases that commenced prior to the Company's adoption of Topic 842, Recursion measured the lease liabilities and right-of-use assets using the incremental borrowing rate as of January 1, 2022.

For the year ended December 31, 2022, Recursion entered into several lease modifications resulting in a decrease to the right-of-use assets and lease liabilities of $2.7 million and $2.8 million, respectively. The modifications resulted in an insignificant impact to the Consolidated Statements of Operations.

In February 2021, the Company entered into a lease agreement for laboratory and office space with approximately 51,869 square feet (the “Industry Lease”). This lease was separated into multiple lease components based on the intended use of the portions of the space. The right of use asset is expected to begin in the first quarter of 2023. The Industry Lease term is five years with a five-year renewal option. The lease includes provisions for escalating rent payments and a tenant improvement allowance of up to $2.1 million. Total fixed lease payments are expected to be approximately $7.6 million with additional variable expenses, including building and amenity expenses. The Company did not control the space or any of the assets being constructed as of December 31, 2022 and therefore no right of use asset or lease liability was recorded on the Consolidated Balance Sheet as of December 31, 2022.

In May 2022, the Company entered into a lease agreement for laboratory and office space in Toronto, Ontario with approximately 26,320 square feet (the “Toronto Lease”). This lease was separated into multiple lease components based on the intended use of the portions of the space. For some of those components, the right of use began May 2022 when the control of the assets were obtained. The right of use asset for the remaining lease component is expected to begin in the second quarter of 2023. The Toronto Lease terms for each component are ten years with a five-year renewal option. The Toronto Lease includes provisions for escalating rent payments and a tenant improvement allowance of up to $1.5 million. Total fixed payments are expected to be approximately $10.8 million with additional variable expenses, including building expenses.

The components of the lease cost are as follows:

(in thousands)	Year ended December 31, 2022
Operating lease cost	$ 7,793
Variable lease cost	1,070
Lease cost	$ 8,863

Lease term and discount rates as of December 31, 2022 were:

(in thousands)	
Operating leases	
Weighted-average remaining lease term (years)	7.6
Weighted-average discount rate	7.3%

Maturities of operating lease liabilities as of December 31, 2022 were:

(in thousands)	Operating leases
2023	$ 9,500
2024	8,438
2025	8,622
2026	8,873
2027	9,131
Thereafter	23,896
Total lease payments	68,460
Less: imputed interest	(18,088)
Present value of lease liabilities	$ 50,372

Prior to adoption of ASC 842, future minimum lease payments as of December 31, 2021, as disclosed in our 2021 Annual Report, were:

(in thousands)	Amount
2022	$ 3,977
2023	7,053
2024	7,325
2025	7,513
2026	7,739
Thereafter	26,448
Total minimum payments	$ 60,055

Total rent expense was $6.4 million and $3.7 million during the years ended December 31, 2021 and 2020, respectively.

Note 7. Goodwill and Intangible Assets

Goodwill

There were no changes to the carrying amount of goodwill during the years ended December 31, 2022 and 2021. No goodwill impairment was recorded during the years ended December 31, 2022, 2021 and 2020.

Intangible Assets, Net

The following table summarizes intangible assets:

	December 31, 2022			December 31, 2021		
(in thousands)	Gross carrying amount	Accumulated Amortization	Net carrying amount	Gross carrying amount	Accumulated Amortization	Net carrying amount
Definite-lived intangible asset	$ 1,211	$ (809)	$ 402	$ 911	$ (430)	$ 481
Indefinite-lived intangible asset	904	—	904	904	—	904
Intangible assets, net	$ 2,115	$ (809)	$ 1,306	$ 1,815	$ (430)	$ 1,385

Amortization expense was $379 thousand, $304 thousand and $126 thousand during the years ended December 31, 2022, 2021 and 2020, respectively. Amortization expense was included in research and development in the Consolidated Statements of Operations. Amortization expense for the definite-lived intangible assets will be recognized over approximately the next year.

The indefinite-lived intangible asset represents the Recursion domain name that the Company purchased. No indefinite-lived intangible asset impairment charges were recorded during the years ended December 31, 2022, 2021 and 2020.

Note 8. Notes Payable

Midcap Financial

In September 2019, the Company entered into a lending agreement with Midcap Financial Trust (Midcap) and the other lenders party thereto (the Midcap loan agreement) for borrowing $11.9 million. In July 2021, the Company paid the balance due under the Midcap loan agreement. The total amount paid was $12.7 million. The Company recorded an early extinguishment loss of $996 thousand, which was included in “Other income (loss), net” on the Consolidated Statements of Operations.

Convertible Notes

In March 2020 and April 2020, the Company issued convertible promissory notes for an aggregate principal amount of $6.4 million. Under certain conditions, the principal was convertible into an amount of equity with a fair value that exceeded the amount of the notes' principal on the conversion date. This feature of the notes was accounted for separately at fair value as a derivative liability. These notes converted to 1,203,231 shares of Series D Preferred Stock in September 2020. Upon conversion of the notes, the Company recorded the $1.6 million fair value of the derivative liability as equity on the Consolidated Balance Sheet. Changes in the fair value of the derivative were recorded in "Other income (loss), net" in the Consolidated Statements of Operations at a loss of $484 thousand during the year ended December 31, 2020.

Notes Payable for Tenant Improvement Allowance

In 2018, the Company borrowed $992 thousand, which was available as part of a lease agreement for use on tenant improvements. Under the terms of the lease, the note will be repaid over a 10-year period at an 8% interest rate. The balance outstanding as of December 31, 2022 is $633 thousand.

Note 9. Commitments and Contingencies

Indemnification

The Company has agreed to indemnify its officers and directors for certain events or occurrences, while the officer or director is or was serving at the Company's request in such capacity. The Company purchases directors and officers liability insurance coverage that provides for reimbursement to the Company for covered obligations and this is intended to limit the Company's exposure and enable it to recover a portion of any amounts it pays under its indemnification obligations. The Company had no liabilities recorded for these agreements as of December 31, 2022 and December 31, 2021, as no amounts are probable or estimable.

Employee Agreements

The Company has signed employment agreements with certain key employees pursuant to which, if their employment is terminated following a change of control of the Company, the employees are entitled to receive certain benefits, including accelerated vesting of equity incentives.

Legal Matters

The Company is not currently a party to any material litigation or other material legal proceedings. The Company may, from time to time, be involved in various legal proceedings arising in the normal course of business. An unfavorable resolution of any such matter could materially affect the Company's future financial position, results of operations or cash flows.

Note 10. Convertible Preferred Stock

The Company has issued preferred stock as part of various financing events. In April 2021, all outstanding shares of convertible preferred stock converted into 115,598,018 shares of Class A common stock as part of the initial public offering (IPO) (see Note 11, "Common Stock" for additional details on the IPO). There was no convertible preferred stock outstanding as of December 31, 2022 and 2021.

No convertible preferred stock was issued during the year ended December 31, 2022 and 2021. The Company issued 36,898,548 shares of Series D convertible preferred stock for an aggregate purchase price of $245.9 million ($6.71 per purchased share and $5.37 per converted share) during the year ended December 31, 2020. As part of the Series D issuance, outstanding convertible notes were converted into Series D shares. See "Note 8, Notes Payable" for additional details on the convertible notes. As of December 31, 2020, there were no cumulative dividends owed or in arrears on the preferred stock.

Convertible preferred stock consisted of the following as of December 31, 2020:

(in thousands except share data)	Preferred Shares Authorized	Preferred Shares Issued and Outstanding	Carrying Value	Liquidation Preferences	Shares of Common Stock Issuable Upon Conversion
Series A	30,078,402	29,965,754	$ 21,281	$ 21,281	29,965,754
Series A-1	4,975,521	4,975,520	—	—	4,975,520
Series B	21,497,667	21,471,898	59,913	60,000	21,471,898
Series C	18,956,354	18,776,345	119,915	122,058	22,286,298
Series D	45,926,769	36,898,548	247,203	247,511	36,898,548
Total convertible preferred stock	121,434,713	112,088,065	$ 448,312	$ 450,850	115,598,018

The Company's convertible preferred stock was classified outside of stockholders' equity on the Consolidated Balance Sheets because the holders of such shares have liquidation rights in the event of a deemed liquidation that, in certain situations, are not solely within the control of the Company and would require the redemption of the then-outstanding convertible preferred stock. The convertible preferred stock was not redeemable, except in the event of a deemed liquidation event.

Note 11. Common Stock

Each share of Class A common stock entitles the holder to one vote per share and each share of Class B common stock entitles the holder to 10 votes per share on all matters submitted to a vote of the Company's stockholders. Common stockholders are entitled to receive dividends, as may be declared by the Company's board of directors. As of December 31, 2022 and December 31, 2021, no dividends had been declared.

Private Placement

In October 2022, Recursion issued 15,336,734 shares of the Company's Class A common stock at a purchase price of $9.80 per share in a private placement (the Private Placement) to qualified institutional buyers and institutional accredited investors (the Purchasers) for net proceeds of $143.7 million, after deducting fees and offering costs of $6.6 million.

Registration Rights Agreement

In connection with the Private Placement, in October 2022, the Company entered into a Registration Rights Agreement ("the Agreement") providing for the registration for resale of the shares sold in the Private Placement. A prospectus supplement to a registration statement (File No. 333-264845) was subsequently filed in October 2022 to register the resale of the Shares by the Purchasers. The Agreement must remain effective until registrable securities covered by the Agreement have been publicly sold by the holders or all shares cease to be registrable securities. In the event the holders cannot sell their shares due to certain circumstances causing the Agreement to be ineffective, the Company must pay each holder of shares outstanding on the date and each month thereafter 1.0% of the aggregate purchase price paid by the holder without limit until the Agreement is cured. As of December 31, 2022, there was no accrued liability related to this agreement, as it was not probable or reasonably possible that a payment would be required.

Initial Public Offering

On April 20, 2021, the Company closed its IPO and issued 27,878,787 shares of its Class A common stock at a price of $18.00 per share for net proceeds of $462.4 million, after deducting underwriting discounts and commissions of $35.1 million and other offering costs of $4.3 million. In connection with the IPO, all shares of convertible preferred stock converted into 115,598,018 shares of Class A common stock.

Stock Split

In April 2021, the Board of Directors approved a 1.5-for-1 forward stock split of the Company's common and convertible preferred stock. Each shareholder of record on April 9, 2021 received 1.5 shares for each then-held share. The split proportionally increased the authorized shares and did not change the par values of the Company's stock. The split affected all stockholders uniformly and did not affect any stockholder's ownership percentage of the Company's shares of common stock. All shares and per share amounts presented within these Consolidated Financial Statements were adjusted to reflect the forward stock split for all periods presented.

Class A and B Common Shares Authorization

In April 2021, the Company's Board of Directors authorized two classes of common stock, Class A and Class B. The rights of the holders of Class A and B common stock are identical, except with respect to voting and conversion. Each share of Class A common stock is entitled to one vote per share. Each share of Class B common stock is entitled to 10 votes per share and is convertible at any time into one share of Class A common stock.

All Class B common stock is held by Christopher Gibson, Ph.D., the Company's Chief Executive Officer (CEO), or his affiliates. As of December 31, 2022, Dr. Gibson and his affiliates held outstanding shares of Class B common stock representing approximately 32% of the voting power of the Company's outstanding shares. This voting power may increase over time as Dr. Gibson vests in and exercises equity awards outstanding. If all the exchangeable equity awards held by Dr. Gibson had been fully vested, exercised and exchanged for shares of Class B common stock as of December 31, 2022, Dr. Gibson and his affiliates would hold approximately 33% of the voting power of the Company's outstanding shares. As a result, Dr. Gibson will be able to significantly influence any action requiring the approval of Recursion stockholders, including the election of the Board of Directors; the adoption of amendments to the Company's certificate of incorporation and bylaws; and the approval of any merger, consolidation, sale of all or substantially all of the Company's assets, or other major corporate transaction.

Note 12. Collaborative Development Contracts

Roche and Genentech

Description
In December 2021, Recursion entered into a collaboration and license agreement with Roche and Genentech (collectively referred to as Roche). Recursion is constructing, using the Company's imaging technology and proprietary machine-learning algorithms, unique maps of the inferred relationships amongst perturbation phenotypes in a given cellular context with the goal to discover and develop therapeutic small molecule programs in a gastrointestinal cancer indication and in key areas of neuroscience. Roche and Recursion will collaborate to select certain novel inferences with respect to small molecules or targets generated from the Phenomaps for further validation and optimization as collaboration programs. Roche and Recursion may also combine sequencing datasets from Roche with Recursion's Phenomaps and collaborate to generate new algorithms to produce multi-modal maps from which additional collaboration programs may be initiated. For every collaboration program that successfully identifies potential therapeutic small molecules or validates a target, Roche will have an option to obtain an exclusive license to develop and commercialize such potential therapeutic small molecules or to exploit such target in the applicable exclusive field.

Pricing
In January 2022, Recursion received a $150.0 million non-refundable upfront payment from the Company's collaboration with Roche. Recursion is eligible for additional milestone payments based on performance progress of the collaboration. Each of the Phenomaps requested by Roche and created by Recursion may be subject to either an initiation fee, acceptance fee or both. Such fees could exceed $250.0 million for 16 accepted Phenomaps. In addition, for a period of time after Roche's acceptance of certain Phenomaps, Roche will have the option to obtain, subject to payment of an exercise fee, rights to use outside the collaboration the raw images generated in the course of creating those Phenomaps. If Roche exercises its external use option for all 12 eligible Phenomaps, Roche's associated exercise fee payments to Recursion could exceed $250.0 million. Under the collaboration, Roche may initiate up to 40 programs, each of which, if successfully developed and commercialized, could yield more than $300.0 million in development, commercialization and net revenue milestones for Recursion, as well as tiered royalties on net revenue.

Accounting
This agreement represents a transaction with a customer and therefore will be accounted for in accordance with ASC 606. Recursion has determined that it has three performance obligations, one related to gastrointestinal cancer and two in neuroscience. These performance obligations are for performing research and development services for Roche to identify targets and medicines. The performance obligations also include potential licenses related to the intellectual property. The Company concluded that licenses within the contract are not distinct from the research and development services as they are interrelated due to the fact that the research and development services significantly impact the potential licenses. Any additional services are considered customer options and will be considered as separate contracts for accounting purposes.

The Company has determined the transaction price to be $150.0 million, comprised of the upfront payment. Recursion will fully constrain the amounts of variable consideration to be received from potential milestones considering the stage of development and the risks associated with the remaining development required to achieve each milestone. Recursion will re-evaluate the transaction price each reporting period.

The transaction price was allocated to the performance obligations based on the estimated relative stand-alone selling price of each performance obligation as determined using an expected cost plus margin approach. The Company recognizes revenue over time based on costs incurred relative to total expected costs to perform the research and development services. Recursion determined that this method provides a faithful depiction of the transfer of control to the customer. This method of recognizing revenue requires the Company to make estimates of total costs to provide the services required under the performance obligations. Significant inputs used to determine the total costs included the length of time required, service hours performed by Company employees and materials costs. A significant change in these estimates could have a material effect on the timing and amount of revenue recognized in future periods. Recursion has estimated the completion of the performance obligations by 2025.

Bayer AG

Description
In August 2020, the Company entered into a Research Collaboration and Option Agreement (the Bayer Agreement) with Bayer AG (Bayer) for a five-year term pursuant to which the Company and Bayer may initiate approximately 10 research projects related to fibrosis across multiple organ systems, including the lung, liver and heart. Under the agreement, the Company contributed compounds from its proprietary library and Bayer contributed compounds from its proprietary library and will contribute scientific expertise throughout the collaboration.

Under each research project, the Company will work with Bayer to identify potential candidates for development. Under the agreement, Bayer has the first option for licenses to potential candidates.

Pricing
In October 2020, the Company received a $30.0 million non-refundable upfront payment. Each such license could potentially result in option exercise fees and development and commercial milestone payments payable to the Company, with an aggregate value of up to approximately $100.0 million (for an option on a lead series) or up to approximately $120.0 million (for an option on a development candidate), as well as tiered royalties for each such license, ranging from low- to mid-single digit percentages of sales, depending on commercial success.

Accounting
The Company determined that it has one performance obligation under the agreement, which is to perform research and development services for Bayer. Recursion determined the transaction price to be $30.0 million, comprised of the upfront payment. The Company allocated the amount to the single performance obligation. The Company is recognizing revenue over time as it makes progress towards completion of the performance obligation. For the years ended December 31, 2021 and 2020, the costs of providing the services for this agreement were insignificant and were included within “Research and development” in the Consolidated Statement of Operations. Recursion has estimated the completion of performance obligation by 2023.

Additional Revenue Disclosures

Recursion recognized $39.7 million, $10.0 million and $3.3 million of operating revenue during the years ended December 31, 2022, 2021 and 2020, respectively. Revenues from two customers exceeded 10% of total revenues

and those two customers represent all of our operating revenue during the year ended December 31, 2022. Revenues from one customer exceeded 10% of total revenues and that one customer represents all of our operating revenue during the years ended December 31, 2021 and December 31, 2020. Of the revenue recognized during the year ended December 31, 2022, $10.0 million was included in the unearned revenue balance as of December 31, 2021. All revenue recognized during the year ended December 31, 2021 was included in the unearned revenue balance as of December 31, 2020. Revenue recognized was from upfront payments received at the inception of the related contracts, which decreased the initial unearned revenue recognized. Unearned revenue of $150.0 million was recorded on the Consolidated Balance Sheet during the year ended December 31, 2022 related to the upfront payment from the Roche collaboration. As of December 31, 2022, the Company had $8.1 million of costs incurred to fulfill a contract on its Consolidated Balance Sheet within “Other current assets.”

Unearned revenue was classified as short-term and long-term on the Consolidated Balance Sheets based on the Company’s estimate of revenue that will be recognized during the next twelve months.

Note 13. Stock-Based Compensation

In April 2021, the Board of Directors and the stockholders of the Company adopted the 2021 Equity Incentive Plan (the 2021 Plan). Under the 2021 Plan, 16,186,000 shares of Class A common stock were reserved. Additionally, shares were reserved for all outstanding awards under the previous 2016 Plan. The Company may grant stock options, RSUs, stock appreciation rights, restricted stock awards and other forms of stock-based compensation.

As of December 31, 2022, 14,912,815 shares of Class A common stock were available for grant.

The following table presents the classification of stock-based compensation expense for stock options and RSUs for employees and non-employees within the Consolidated Statements of Operations:

	Years ended December 31,		
(in thousands)	2022	2021	2020
Cost of revenue	$ 2,755	$ —	$ —
Research and development	10,065	4,841	1,777
General and administrative	14,052	8,989	2,059
Total	$ 26,872	$ 13,830	$ 3,836

Stock Options

Stock options generally vest over four years and expire no later than 10 years from the date of grant. Stock option activity during the year ended December 31, 2022 was as follows:

(in thousands except share data)	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (In Years)	Aggregate Intrinsic Value
Outstanding as of December 31, 2021	19,191,714	$ 3.78	8.1	$ 260,867
Granted	2,483,336	11.10		
Cancelled	(1,494,036)	6.15		
Exercised	(4,026,090)	2.11		28,018
Outstanding as of December 31, 2022	16,154,924	$ 5.10	7.5	$ 67,997
Exercisable as of December 31, 2022	8,745,444	$ 3.66	6.7	$ 45,401

The fair value of options granted to employees is calculated on the grant date using the Black-Scholes option valuation model. The weighted-average grant-date fair values of stock options granted during the years ended December 31, 2022, 2021 and 2020 were $6.57, $7.66 and $1.50, respectively.

The following weighted-average assumptions were used to calculate the grant-date fair value of stock options:

	Years ended December 31,		
	2022	2021	2020
Expected term (in years)	6.2	6.3	6.2
Expected volatility	63%	65%	67%
Expected dividend yield	—	—	—
Risk-free interest rate	1.9%	1.1%	1.0%

In February 2021, the Company granted 150,000 shares of stock options with a performance and service condition that had a fair value of $358 thousand. The grant was fully expensed during the year ended December 31, 2021 as the performance and service conditions were met.

In March 2020, the Company granted 1,500,000 shares of stock options with performance, market and service conditions. At grant date, the Company estimated that the fair value of the options was approximately $2.0 million. For the years ended December 31, 2022, 2021 and 2020, $165 thousand, $1.7 million and zero of expense was recorded, respectively. For the year ended December 31, 2021, several of the award's conditions were met. For the year ended December 31, 2020, no expense was recorded as the performance conditions were not considered probable.

As of December 31, 2022, $29.1 million of unrecognized compensation cost related to stock options is expected to be recognized as expense over approximately the next three years.

RSUs

In April 2021, Recursion redesigned certain aspects of its long-term incentive program. As a result, equity awards granted to employees since the redesign generally consist of a combination of stock options and RSUs. RSUs awarded to employees pursuant to the 2021 Plan generally vest over four years. The weighted-average grant-date fair value of RSUs generally is determined based on the number of units granted and the quoted price of Recursion's common stock on the date of grant.

The following table summarizes Recursion's RSU activity during the year ended December 31, 2022:

	Stock units	Weighted-average grant date fair value
Outstanding as of December 31, 2021	478,136	$ 23.40
Granted	7,746,249	7.46
Vested	(896,555)	4.32
Forfeited	(433,305)	9.18
Outstanding as of December 31, 2022	6,894,525	$ 8.17

The fair market value of RSUs vested was $10.1 million during the year ended December 31, 2022. As of December 31, 2022, $49.9 million of unrecognized compensation cost related to RSUs is expected to be recognized as expense over approximately the next three years.

Employee Share Purchase Plan (ESPP)

In April 2021, the Board of Directors and stockholders of the Company adopted the 2021 Employee Stock Purchase Plan (the ESPP). Under the ESPP, 3,238,000 shares of Class A common stock were reserved. The ESPP has consecutive six-month offering periods. The offering periods are scheduled to start on the first trading day on or after May 20 and November 20 of each year. The per share purchase price is 85% of the lower of the fair market value on (1) the first trading day of the offering period or (2) the exercise date.

The fair value of the ESPP grants are measured at grant date. The fair value is determined considering the purchase discount and the fair value of the look-back feature. Black-Scholes pricing models are used to calculate

the fair value of the look-back feature. The weighted-average assumptions used in the Black-Scholes models were as follows:

	Years ended December 31,	
	2022	2021
Expected term (in years)	0.5	0.5
Expected volatility	66%	61%
Expected dividend yield	—	—
Risk-free interest rate	3.0%	0.1%

For the year ended December 31, 2022, 525,628 shares were issued under the ESPP. For the years ended December 31, 2022 and 2021, Recursion recognized expense of $1.0 million and $731 thousand, respectively. As of December 31, 2022, $714 thousand of unrecognized ESPP compensation cost is expected to be recognized as expense over approximately the next five months.

Warrants

In connection with a certain loan agreement, the Company issued fully vested warrants to purchase 112,647 shares of Series A Preferred Stock (Series A warrants) at a purchase price of $0.71 per share. These Series A warrants were exercised in April 2021.

Subsequently, the Company drew on additional borrowing capacity under an amended agreement. This required the Company to issue fully vested warrants to purchase 25,762 shares of Series B Preferred Stock (Series B warrants) at a purchase price of $2.79 per share. These Series B warrants were exercised in April 2021.

In January 2020, the Company issued warrants to purchase 213,646 shares of Series C Preferred Stock (Series C warrants) at a purchase price of $5.49 per share as part of a services agreement. These Series C warrants were exercised in October 2021. The grant date fair value was $4.10 per share.

The FASB has issued accounting guidance on the classification of freestanding warrants and other similar instruments for shares that are redeemable (either puttable or mandatorily redeemable). The guidance requires liability classification for certain warrants that are exercisable into convertible preferred stock. The initial fair values of the Series A and B warrants were recorded as debt issuance costs, which resulted in a reduction in the carrying value of the debt and subsequent accretion. The Company remeasured the Series A and B warrants on each Consolidated Balance Sheet date. The change in valuation was recorded in the Consolidated Statements of Operations in “Other income (loss), net.” The liability was recorded to equity upon the exercise of the Series A and B warrants.

The Series C warrants’ compensation expense was recorded in general and administrative expense ratably over the requisite service period based on the award’s fair value at the date of grant. These warrants were classified as equity as they were issued to non-employees for services and the convertible preferred stock was not redeemable.

The following is a summary of the changes in the Company’s Series A and B warrant liability balance during the years ended December 31, 2021 and 2020:

(in thousands)		
Balance as of December 31, 2019	$	128
Decrease in fair value of warrants		(3)
Balance as of December 31, 2020	$	125
Increase in fair value of warrants		2,215
Recorded in equity upon exercise		(2,340)
Balance as of December 31, 2021	$	—

Note 14. Employee benefit plans

The Company has an employee benefit plan under Section 401(k) of the Internal Revenue Code. The plan allows employees to make contributions up to a specified percentage of their compensation. The Company is currently contributing up to 4% of employee base salary, by matching 100% of the first 4% of annual base salary contributed by each employee. Additionally, the Company generally contributes a certain amount to the 401(k) plans for employees that worked at the Company during the year. Employer expenses were $3.6 million, $2.1 million and $1.1 million during the years ended December 31, 2022, 2021 and 2020, respectively.

Note 15. Income Taxes

The provision for income taxes consisted of the following components (all deferred):

	Years ended December 31,		
(in thousands)	2022	2021	2020
Federal	$ 61,225	$ 47,138	$ 20,707
State	3,188	(684)	947
Foreign	471	149	—
Change in valuation allowance	(64,884)	(46,603)	(21,654)
Total	$ —	$ —	$ —

The Company's effective tax rate of 0% during the years ended December 31, 2022, 2021 and 2020 differs from the statutory U.S. federal rate as follows:

	Years ended December 31,		
	2022	2021	2020
Statutory tax rate	21.0 %	21.0 %	21.0 %
R&D credit generation	3.7 %	3.2 %	3.3 %
Orphan drug credit generation	1.1 %	1.1 %	1.0 %
Stock based compensation	0.8 %	0.6 %	(0.5)%
Uncertain tax positions	(0.3)%	(0.4)%	(0.4)%
Other non-deductible expenses	(0.8)%	(0.2)%	(0.6)%
Change in valuation allowance	(25.5)%	(25.3)%	(23.8)%
Effective tax rate	— %	— %	— %

Significant components of deferred tax assets and liabilities were as follows:

(in thousands)	December 31, 2022	December 31, 2021
Deferred tax assets		
Net operating loss carryforwards	$ 89,951	$ 76,954
Research and development capitalization	39,095	—
Tax credit carryforwards	30,965	16,742
Lease liabilities	11,442	—
Reserves and accruals	3,622	5,922
Stock-based compensation	2,231	1,732
Definite lived intangibles	969	1,005
Deferred rent	—	3,132
Other	433	426
Gross deferred tax assets	178,708	105,913
Valuation allowance	(166,775)	(102,041)
Net deferred tax asset	11,933	3,872
Deferred tax liabilities		
Right-of-use assets	(9,416)	—
Depreciable assets	(1,951)	(2,089)
Tenant allowance receivable	(566)	(1,783)
Deferred tax liabilities	(11,933)	(3,872)
Net deferred tax asset	$ —	$ —

Significant judgment is required in determining the Company's provision for income taxes, recording valuation allowances against deferred tax assets and evaluating the Company's uncertain tax positions. Due to net losses since inception and the uncertainty of realizing the deferred tax assets, the Company has a full valuation allowance against its net deferred tax assets. To the extent that the Company generates positive income and expects, with reasonable certainty, to continue to generate positive income, the Company may release all, or a portion of, the valuation allowance in a future period. This release would result in the recognition of all, or a portion of, the Company's deferred tax assets, resulting in a decrease to income tax expense for the period such release is made. As of December 31, 2022 and 2021, the Company's valuation allowance was $166.8 million and $102.0 million, respectively, which increased by approximately $64.7 million and $46.6 million during the years ended December 31, 2022 and 2021, respectively.

Net operating losses (NOLs) and tax credit carry-forwards are subject to review and possible adjustment by the Internal Revenue Service ("IRS") and may become subject to annual limitation due to ownership changes that have occurred previously or that could occur in the future under Section 382 of the Internal Revenue Code, as amended and similar state provisions. These ownership changes may limit the amount of carryforwards that can be utilized annually to offset future taxable income. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain shareholders or public groups in the stock of a corporation by more than 50% over a three-year period. The Company has not conducted a study to assess whether a change of ownership has occurred or whether there have been multiple ownership changes since inception due to the significant complexity and cost associated with such a study. If the Company has experienced a change of ownership, as defined by Section 382, at any time since inception, utilization of the net operating loss carryforwards or research and development tax credit carryforwards would be subject to an annual limitation under Section 382, which is determined by first multiplying the value of the Company's stock at the time of the ownership change by the applicable long-term tax-exempt rate and then could be subject to additional adjustments, as required. Any limitation may result in expiration of a portion of the net operating loss carryforwards or research and development tax credit carryforwards before utilization. Further, until a study is completed and any limitation is known, no amounts are being presented as an uncertain tax position.

As of December 31, 2022 and 2021, the Company had federal NOL carryforwards of $414.4 million and $353.1 million, respectively, available to reduce taxable income, of which $18.6 million expire beginning 2036 and $395.8

million do not expire. The Company had state NOL carryforwards of $61.5 million and $63.0 million as of December 31, 2022 and 2021, respectively, available to reduce future state taxable income, of which $5.3 million expire beginning 2031 and $56.2 million do not expire. The Company had foreign NOL carryforwards of $1.4 million as of December 31, 2022, available to reduce future foreign taxable income, which do not expire.

As of December 31, 2022, the Company also had federal and state research and development credit carryforwards of $21.3 million and $5.6 million respectively. As of December 31, 2021, the Company had federal and state research and development credit carryforwards of $12.7 million and $2.2 million, respectively. The federal research and development credit carryforwards expire beginning in 2036 and the state credit carryforwards expire beginning in 2030. The Company also had federal Orphan Drug credits of $6.8 million and $3.8 million as of December 31, 2022 and 2021, respectively, which will begin expiring in 2036. The Company had reserves for uncertain tax positions against these credit carryforwards of $2.8 million and $1.9 million as of December 31, 2022 and 2021 respectively.

The Company recognizes benefits of uncertain tax positions if it is more likely than not that such positions will be sustained upon examination based solely on their technical merits, as the largest amount of benefit that is more likely than not to be realized upon the ultimate settlement. It is the Company's policy to include penalties and interest expense related to income taxes as a component of Other income (loss), net as necessary.

The Company files income tax returns in the United States, Canada, Utah, California and Massachusetts. The Company is not currently under examination in any of these jurisdictions. The Company is subject to income tax examinations on all federal returns since the 2019 tax return.

Note 16. Net Loss Per Share

For the years ended December 31, 2022 and 2021, Recursion calculated net loss per share of Class A and Class B common stock using the two-class method. Basic net loss per share is computed using the weighted-average number of shares outstanding during the period. Diluted net loss per share is computed using the weighted-average number of shares and the effect of potentially dilutive securities outstanding during the period. Potentially dilutive securities consist of stock options and other contingently issuable shares. For periods presented in which the Company reports a net loss, all potentially dilutive shares are anti-dilutive and as such are excluded from the calculation. For the years ended December 31, 2022 and 2021, the Company reported a net loss and therefore basic and diluted loss per share were the same.

The rights, including the liquidation and dividend rights, of the holders of the Company's Class A and Class B common stock are identical, except with respect to voting. As a result, the undistributed earnings for each period are allocated based on the contractual participation rights of the Class A and Class B common shares as if the earnings for the period had been distributed. As the liquidation and dividend rights are identical, the undistributed earnings are allocated on a proportionate basis and the resulting amount per share for Class A and Class B common stock was the same during the years ended December 31, 2022 and 2021.

Recursion issued certain shares of convertible preferred stock that were outstanding until April 2021 and were concluded to be participating securities. For the year ended December 31, 2020, there was only one class of common stock outstanding. Due to the presence of participating securities, Recursion calculated net loss per share during the year ended December 31, 2020 using the more dilutive of the treasury stock or the two-class method. For periods presented in which the Company reports a net loss, the losses are not allocated to the participating securities. For the year ended December 31, 2020, the Company reported a net loss and therefore basic and diluted loss per share were the same. The preferred stock converted to common stock in April 2021 as part of the Company's IPO. See Note 11, "Common stock" for additional details.

The following tables set forth the computation of basic and diluted net loss per share of Class A and Class B common stock during 2022 and 2021:

(in thousands, except share amount)	Year ended December 31, 2022		Year ended December 31, 2021	
	Class A	Class B	Class A	Class B
Numerator:				
Allocation of undistributed earnings	$ (228,270)	$ (11,206)	$ (172,399)	$ (14,080)
Denominator:				
Weighted average common shares outstanding	167,323,062	8,214,425	115,883,920	9,464,190
Net loss per share, basic and diluted	$ (1.36)	$ (1.36)	$ (1.49)	$ (1.49)

The following table sets forth the computation of basic and diluted net loss per share during 2020:

(in thousands, except share amounts)	Year ended December 31, 2020
Numerator:	
Net loss	$ (87,006)
Denominator:	
Weighted average common shares outstanding	21,781,386
Net loss per share, basic and diluted	$ (3.99)

The Company excluded the following potential common shares from the computation of diluted net loss per share for the periods indicated because including them would have had an anti-dilutive effect:

	Years ended December 31,		
	2022	2021	2020
Convertible preferred stock	—	34,615,890	90,684,675
Stock based compensation	10,966,651	15,381,210	3,636,400
Warrants	—	151,745	117,342
Total	10,966,651	50,148,845	94,438,417

Note 17. Fair Value Measurements

The fair value hierarchy consists of the following three levels:

- Level 1 — Valuations based on unadjusted quoted prices in active markets for identical assets that the company has the ability to access;
- Level 2 — Valuations based on quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active and model-based valuations in which all significant inputs are observable in the market; and
- Level 3 — Valuations using significant inputs that are unobservable in the market and include the use of judgment by the company's management about the assumptions market participants would use in pricing the asset or liability.

The Company is required to maintain a cash balance in a collateralized account to secure the Company’s credit cards. Additionally, the Company holds restricted cash related to an outstanding letter of credit issued by J.P. Morgan, which was obtained to secure certain Company obligations relating to tenant improvements.

The Company measured the Series A and B preferred stock warrant liabilities at fair value using a Black-Scholes option-pricing model. See Note 13, “Stock-based Compensation” for additional details on the warrant liabilities including a reconciliation of the balance.

The following tables summarize the Company's assets and liabilities that are measured at fair value on a recurring basis:

		Basis of fair value measurement		
(in thousands)	December 31, 2022	Level 1	Level 2	Level 3
Assets				
Cash equivalents:				
Money market funds	$ 404,613	$ 404,613	$ —	$ —
Restricted cash	9,200	9,200	—	—
Total assets	$ 413,813	$ 413,813	$ —	$ —

		Basis of fair value measurement		
(in thousands)	December 31, 2021	Level 1	Level 2	Level 3
Assets				
Cash equivalents:				
Money market funds	$ 155,731	$ 155,731	$ —	$ —
Commercial paper	12,000	—	12,000	—
Corporate bonds	200	—	200	—
Restricted cash	10,233	10,233	—	—
Investments:				
U.S. government debt	19,927	—	19,927	—
Corporate bonds	61,177	—	61,177	—
Certificates of deposit	21,440	—	21,440	—
Commercial paper	128,902	—	128,902	—
Total assets	$ 409,610	$ 165,964	$ 243,646	$ —

In addition to the financial instruments that are recognized at fair value on the Consolidated Balance Sheet, the Company has certain financial instruments that are recognized at amortized cost or some basis other than fair value. The carrying amount of these instruments are considered to be representative of their approximate fair values.

The following tables summarize the Company's financial instruments that are not measured at fair value:

	Book values		Fair values	
(in thousands)	December 31, 2022	December 31, 2021	December 31, 2022	December 31, 2021
Liabilities				
Current portion of notes payable	$ 97	$ 90	$ 97	$ 90
Notes payable, net of current portion	536	633	536	633
Total liabilities	$ 633	$ 723	$ 633	$ 723

Item 9. Changes in and Disagreements with Accountants.

None.

Item 9A. Controls and Procedures.

The Company has established disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act) designed to ensure that information required to be disclosed in the reports that the Company files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to management, including the principal executive officer (our Chief Executive Officer) and principal financial officer (our Chief Financial Officer), to allow timely decisions regarding required disclosure. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Evaluation of Disclosure Controls and Procedures

Our management has evaluated, with the participation of our Chief Executive Officer and Chief Financial Officer, the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives as management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our disclosure controls and procedures have been designed to provide reasonable assurance of achieving their objectives. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of December 31, 2022, our disclosure controls and procedures were effective.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, (as defined in Rule 13a-15(f) under the Exchange Act). Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP).

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with policies may deteriorate.

Management performed an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2022. In making this assessment, management used the framework in Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that assessment under the framework in Internal Control-Integrated Framework (2013), management concluded that our internal control over financial reporting was effective as of December 31, 2022.

An attestation report on the effectiveness of our internal control over financial reporting as of December 31, 2022 has been issued by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report which appears herein in Part II Item 8, "Financial Statements and Supplementary Data."

Changes in Internal Control Over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the quarter ended December 31, 2022 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this Item is incorporated herein by reference to the information that will be contained in our proxy statement related to the 2023 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission within 120 days of the end of our fiscal year.

Item 11. Executive Compensation.

The information required by this Item is incorporated herein by reference to the information that will be contained in our proxy statement related to the 2023 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission within 120 days of the end of our fiscal year.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this Item is incorporated herein by reference to the information that will be contained in our proxy statement related to the 2023 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission within 120 days of the end of our fiscal year pursuant.

Item 13. Certain Relationships and Related Transactions and Director Independence.

The information required by this Item is incorporated herein by reference to the information that will be contained in our proxy statement related to the 2023 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission within 120 days of the end of our fiscal year.

Item 14. Principal Accountant Fees and Services.

Our independent public accounting firm is Ernst & Young LLP, Salt Lake City, Utah, PCAOB Auditor ID 00042.

The information required by this Item is incorporated herein by reference to the information that will be contained in our proxy statement related to the 2023 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission within 120 days of the end of our fiscal year.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a) Documents filed as part of this Form 10-K.

(1) Financial Statements: See Item 8, “Financial Statements and Supplementary Data” for a list of financial statements.

(2) Financial Statement Schedules: All schedules omitted are inapplicable or the information required is shown in the consolidated financial statements or notes thereto.

(3) Exhibits Required by Item 601 of Regulation S-K: The information called for by this paragraph is set forth in Item 15(b) below.

(b) Exhibit Index:

		Incorporated by Reference				
Exhibit number	Description	Form	File No.	Exhibit No.	Filing Date	Filed / Furnished Herewith
3.1	Amended and Restated Certificate of Incorporation of Recursion Pharmaceuticals, Inc.	8-K	001-40323	3.1	April 21, 2021	
3.2	Amended and Restated Bylaws of Recursion Pharmaceuticals, Inc.	8-K	001-40323	3.2	April 21, 2021	
4.1	Amended and Restated Investors’ Rights Agreement by and among the Registrant and certain of its stockholders, dated September 1, 2020.	S-1/A	333-254576	4.1	April 15, 2021	
4.2	Specimen Class A common stock certificate of the Registrant.	S-1/A	333-254576	4.2	April 15, 2021	
4.3	Description of Securities	10-K	001-40323	4.3	March 23, 2022	
10.1	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers.	S-1/A	333-254576	10.1	April 15, 2021	
10.2+	2016 Equity Incentive Plan, as amended, and forms of agreement thereunder.	S-1/A	333-254576	10.2	April 15, 2021	
10.3+	2021 Equity Incentive Plan and forms of agreements thereunder.					X
10.4+	2021 Employee Stock Purchase Plan and forms of agreements thereunder.	S-1/A	333-254576	10.4	April 15, 2021	
10.5	Executive Incentive Compensation Plan.	S-1/A	333-254576	10.20	April 15, 2021	
10.6+	CEO Change in Control and Severance Policy	S-1/A	333-254576	10.21	April 15, 2021	
10.7+	Outside Director Compensation Policy.	S-1/A	333-254576	10.11	April 15, 2021	
10.8	Office Lease by and between Vestar Gateway, LLC and Registrant, dated November 13, 2017, as amended through December 2022.					X
10.9	Office Lease by and between Berrueta Family, L.P. and Registrant, dated July 27, 2015, as amended through April 2022.	10-Q	001-40323	10.2	August 9, 2022	
10.10	Office Lease by and between Constantine Enterprises, Inc and Registrant, dated May 1, 2022.	10-Q	001-40323	10.3	May 10, 2022	
10.11#	Research Collaboration and Option Agreement by and between Bayer AG and the Registrant, dated August 28, 2020.	S-1/A	333-254576	10.14	April 15, 2021	
10.12#	Bayer Collaboration Expansion Agreement, dated December 1, 2021.	10-K	001-40323	10.11	March 23, 2022	
10.13#	Amended and Restated License Agreement between the Registrant and University of Utah Research Foundation, dated February 9, 2016.	S-1/A	333-254576	10.15	April 15, 2021	
10.14#	Exclusive License Agreement between Ohio State Innovation Foundation and Registrant, dated December 21, 2018.	S-1/A	333-254576	10.16	April 15, 2021	
10.15#	License Agreement by and between Takeda Pharmaceutical Company Limited and Registrant, dated May 1, 2020.	S-1/A	333-254576	10.17	April 15, 2021	

10.16+	Confirmatory Employment Letter between the Registrant and Christopher Gibson, Ph.D.	S-1/A	333-254576	10.5	April 15, 2021	
10.17+	Confirmatory Employment Letter between the Registrant and Ramona Doyle.	S-1/A	333-254576	10.6	April 15, 2021	
10.18+	Confirmatory Employment Letter between the Registrant and Tina Marriott Larson.	S-1/A	333-254576	10.7	April 15, 2021	
10.19+	Confirmatory Employment Letter between the Registrant and Michael Secora.	S-1/A	333-254576	10.8	April 15, 2021	
10.20+	Confirmatory Employment Letter between the Registrant and Shafique Virani.	S-1/A	333-254576	10.9	April 15, 2021	
10.21+	Executive Change in Control and Severance Plan (for executives other than the CEO).	S-1/A	333-254576	10.10	April 15, 2021	
10.22+	Form of Equity Exchange Right Agreement among the Registrant, Christopher Gibson, Ph.D., and entities affiliated with Dr. Gibson.	S-1/A	333-254576	10.22	April 15, 2021	
10.23+	Form of Exchange Agreement among the Registrant, Christopher Gibson, Ph.D., and entities affiliated with Dr. Gibson.	S-1/A	333-254576	10.23	April 15, 2021	
10.24#	Roche Collaboration and License Agreement, dated December 5, 2021.	10-K	001-40323	10.25	March 23, 2022	
10.25^	Stock Purchase Agreement, dated October 24, 2022, by and among the Company and the Purchasers.	8-K	001-40323	10.1	Oct. 25, 2022	
10.26^	Registration Rights Agreement, dated October 24, 2022, by and among the Company and the Purchasers.	8-K	001-40323	10.2	Oct. 25, 2022	
21.1	List of Subsidiaries					X
23.1	Consent of Ernst and Young					X
24.1	Power of Attorney (included on signature page to this Annual Report on Form 10-K)					X
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
32.1*	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101.INS	XBRL Instance Document					X
101.SCH	XBRL Taxonomy Extension Schema Document					X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					X
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)					X

+	Indicates a management contract or compensatory plan.
#	Portions of the exhibit, marked by brackets and asterisks [***], have been omitted because the omitted information is not material and (i) would likely cause competitive harm to the registrant if publicly disclosed or (ii) is information that the registrant treats as private or confidential.
^	Certain schedules and exhibits have been omitted pursuant to Item 601(a)(5) of Regulation S-K. A copy of any omitted schedule and/or exhibit will be furnished to the SEC upon request.
*	The certifications furnished in Exhibit 32.1 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended. Such certifications will not be deemed to be incorporated by reference into any filings under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that the Registrant specifically incorporates it by reference.

Item 16. Form 10-K Summary.

None

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Act of 1934, Recursion Pharmaceuticals Inc. has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Salt Lake City, Utah, on February 27, 2023.

RECURSION PHARMACEUTICALS, INC.

By: /s/ Christopher Gibson
Christopher Gibson
Chief Executive Officer

Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints each of Christopher Gibson and Michael Secora his or her true and lawful attorney-in-fact and agent, with full power of substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitutes or substitute, may lawfully do or cause to be done by virtue hereof.

IN WITNESS WHEREOF, each of the undersigned has executed this Power of Attorney as of the date indicated opposite his/her name.

Pursuant to the requirements of the Securities Act of 1934, this report has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Christopher Gibson Christopher Gibson	Chief Executive Officer and Director *(Principal Executive Officer)*	February 27, 2023
/s/ Michael Secora Michael Secora	Chief Financial Officer *(Principal Financial and Accounting Officer)*	February 27, 2023
/s/ Zachary Bogue Zachary Bogue	Director	February 27, 2023
/s/ Blake Borgeson Blake Borgeson	Director	February 27, 2023
/s/ Terry-Ann Burrell Terry-Ann Burrell	Director	February 27, 2023
/s/ R. Martin Chavez R. Martin Chavez	Chair of the Board	February 27, 2023
/s/ Zavain Dar Zavain Dar	Director	February 27, 2023
/s/ Robert Hershberg Robert Hershberg	Director	February 27, 2023
/s/ Dean Li Dean Li	Director	February 27, 2023