**UNITED STATES**
**SECURITIES AND EXCHANGE COMMISSION**
**Washington, D.C. 20549**

# FORM 8-K

**CURRENT REPORT**
**Pursuant to Section 13 OR 15(d)**
**of The Securities Exchange Act of 1934**

Date of Report (Date of earliest event reported): January 8, 2024

# RECURSION PHARMACEUTICALS, INC.

**(Exact name of registrant as specified in its charter)**

| **Delaware** | **001-40323** | **46-4099738** |
|---|---|---|
| **(State or other jurisdiction of incorporation)** | **(Commission File Number)** | **(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)

**Not Applicable**
(Former name or former address, if changed since last report.)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

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 per share | RXRX | Nasdaq Global Select Market |

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 or (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

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. ☐

**Item 7.01. Regulation FD Disclosure.**

On January 8, 2024, Recursion Pharmaceuticals, Inc. (the "Company") released an updated investor presentation. The investor presentation will be used at the JP Morgan Healthcare Conference and from time to time in meetings with investors. A copy of the presentation is attached hereto as Exhibit 99.1.

The information furnished in this Item 7.01 (including Exhibit 99.1), shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as expressly set forth by specific reference in such filing.

**Item 9.01. Financial Statements and Exhibits.**

(d) Exhibits

| Exhibit Number | Description |
|---|---|
| 99.1 | Investor presentation of Recursion Pharmaceuticals, Inc. dated January 8, 2024. |
| 104 | Cover Page Interactive Data File (embedded within the Inline XBRL document) |

**SIGNATURES**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized on January 8, 2024.

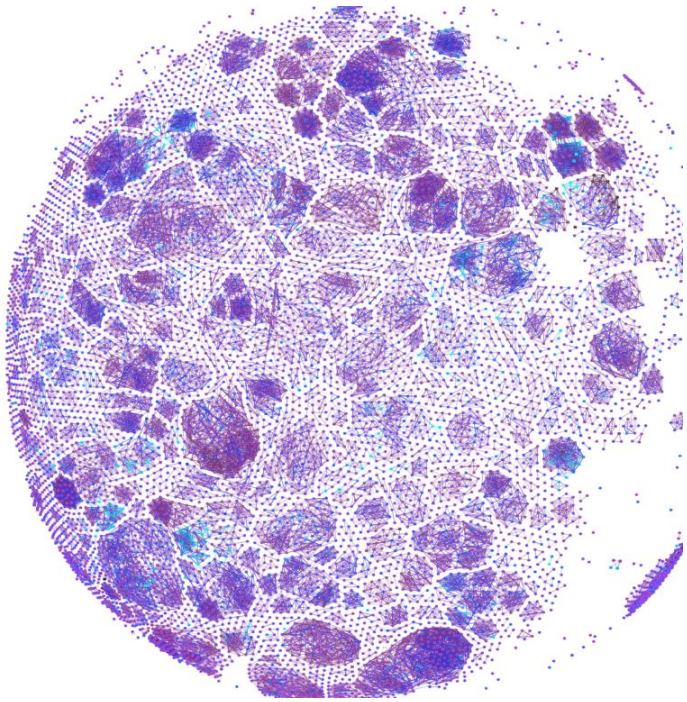
RECURSION PHARMACEUTICALS, INC.

By: /s/ Michael Secora
Michael Secora
Chief Financial Officer

Recursion

# Decoding Biology To Radically Improve Lives

January 2024



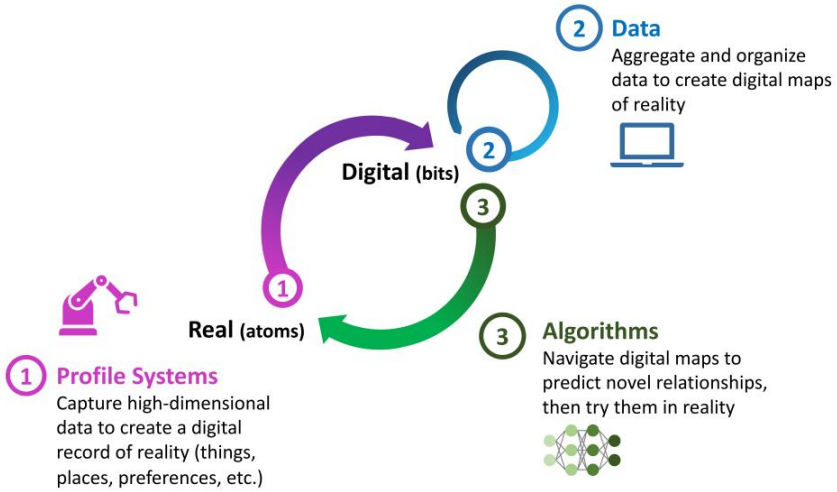
# Disclaimers

This presentation and any accompanying discussion and documents contain information that includes or is based upon "forward-looking statements" within the meaning of the Securities Litigation Reform Act of 1995. These forward-looking statements are based on our current expectations, estimates and projections about our industry and our company, management's beliefs and certain assumptions we have made. The words “plan,” “anticipate,” “believe,” “continue,” “estimate,” “expect,” “intend,” “may,” “will” and similar expressions are intended to identify forward-looking statements. Forward-looking statements made in this presentation include outcomes and benefits expected from the Tempus partnership, including our ability to leverage the datasets acquired through the license agreement into increased machine learning capabilities and accelerate clinical trial enrollment; outcomes and benefits expected from the Enamine partnership, including the generating and co-branding of new chemical libraries; our planned expansion of the BioHive supercomputer capabilities; outcomes and benefits from licenses, partnerships and collaborations, including option exercises by partners and additional partnerships and ability to house tools on the BioNeMo Marketplace; the potential for additional partnerships and making data and tools available to third parties; advancements of our Recursion OS; outcomes and benefits expected from the Large Language Model-Orchestrated Workflow Engine (LOWE); the occurrence or realization of any near- or medium-term potential milestones; the initiation, timing, progress, results, and cost of our research and development programs and our current and future preclinical and clinical studies, including timelines for data readouts, the potential size of the market opportunity for our drug candidates; our ability to identify viable new drug candidates for clinical development and the accelerating rate at which we expect to identify such candidates; 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, and many others. Forward-looking statements made in this presentation-are neither historical facts nor assurances of future performance, are subject to significant risks and uncertainties, and may not occur as actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. For a discussion of factors that could affect our business, please refer to the "Risk Factors" sections in our filings with the U.S. Securities and Exchange Commission, including our Annual Report for the Fiscal Year ended December 31, 2022, on Form 10-K and our most recent Quarterly Report on Form 10-Q. This presentation does not purport to contain all the information that may be required to make a full analysis of the subject matter. We undertake no obligation to correct or update any forward-looking statements, whether as a result of new information, future events or otherwise.

Certain information contained in this presentation relates to or is based on studies, publications, surveys and other data obtained from third-party sources and the company’s own internal estimates and research. While the company believes these third-party sources to be reliable as of the date of this presentation, it has not independently verified, and makes no representation as to the adequacy, fairness, accuracy or completeness of, any information obtained from third-party sources. In addition, all of the market data included in this presentation involves a number of assumptions and limitations, and there can be no guarantee as to the accuracy or reliability of such assumptions. Finally, while the company believes its own internal research is reliable, such research has not been verified by any independent source.

Any non-Recursion logos or trademarks included herein are the property of the owners thereof and are used for reference purposes only.

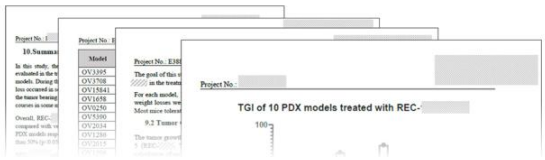
# There is a formula for mapping and navigating complex systems using technology



# Data roadblocks make mapping and navigating biology difficult

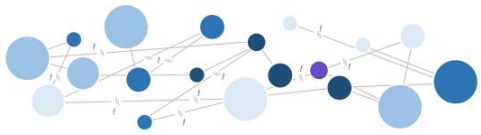
## Analog Standard

The fax machine is alive and well in medicine, while in biopharma, study results from CROs are still often reported as PDFs or scanned printouts




## Siloed Data in Pharma

Biopharma has 100s of petabytes of scientific data stored on a project-by-project basis without the meta-data or annotation needed to relate it to other projects or questions in biology



## Reproducibility Crisis

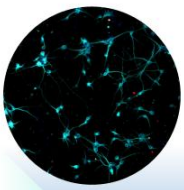
Multiple studies have shown that the vast majority of published academic literature cannot be recapitulated






*Baker, M. Irreproducible biology research costs put at $28 billion per year. Nature (2015). https://doi.org/10.1038/nature.2015.17711*

## We are building and aggregating the right datasets to map and navigate biology



**Data**
Each week we digitize millions of our own experiments across multiple layers of biology from cell to animal

**Profile Systems**
We have built and continue to scale among the world's most prolific automated wet labs

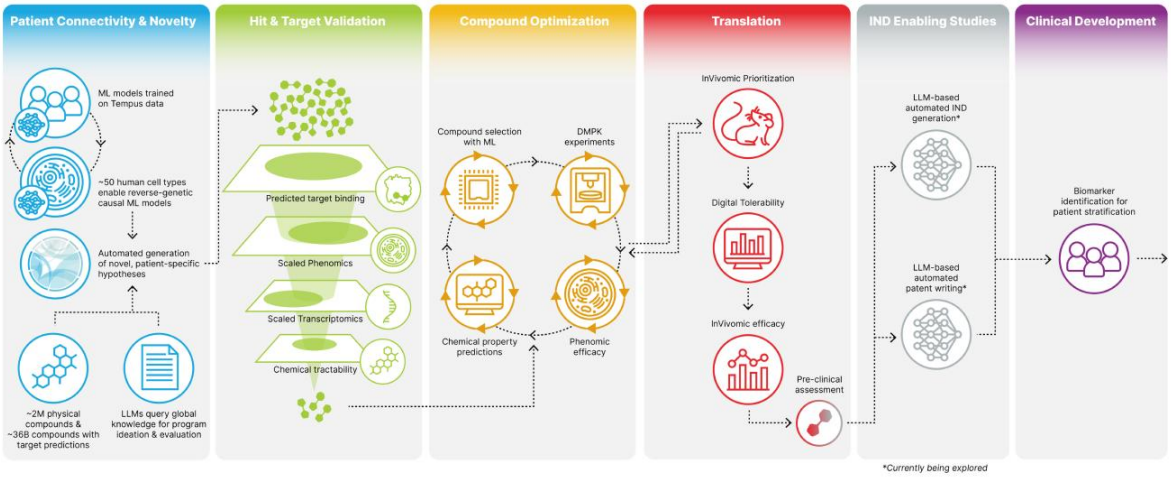

**Algorithms**
We own and operate one of the fastest supercomputers on earth, allowing us to train LLMs & FMs fit for the purpose of drug discovery

Improved and scaled clinical pipeline



Recursion

# The Recursion OS combines many tools to industrialize drug discovery



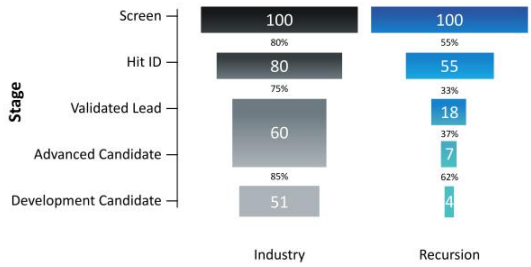



Recursion

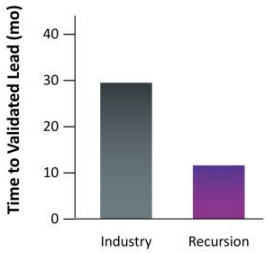
# In Brief:
# The Recursion Value Proposition

# The Recursion OS helps us map and navigate biology to shift drug discovery from bespoke science to scaled engineering

**Failing faster and earlier to ›**




**› explore biology at scale efficiently**

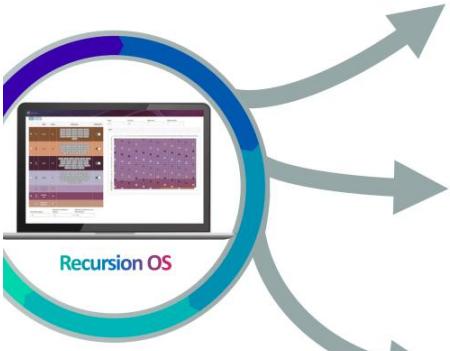



*Preliminary data shown is the average of all our programs since late 2017 through 2023.*
*All industry data adapted from Paul, et al. Nature Reviews Drug Discovery. (2010) 9, 203–214*



Recursion

# We harness value from the Recursion OS with a multi-pronged capital-efficient business strategy





**Pipeline Strategy**

Build internal pipeline in indications with potential for **accelerated path** to approval

- **Precision Oncology**
- **Rare Disease**


**Partnership Strategy**

Partner in **complex therapeutic areas** requiring large financial commitment or competitive arbitrage

**Leverage partner knowledge** and clinical development capabilities

- **Neuroscience***
- **Undruggable Oncology**
- **Other large, intractable areas of biology (e.g. CV/Met)**


**Data Strategy**

**License** subsets of data and key tools

Direct generation of new data internally **to maximize pipeline and partnership value-drivers**

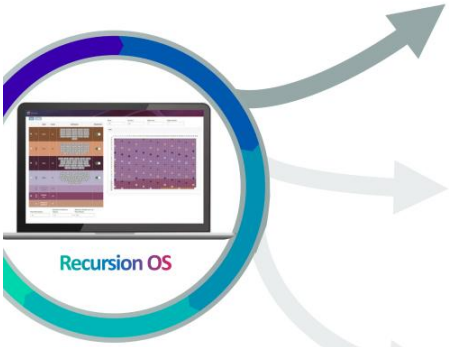
- **Licensing**
- **Augment Recursion OS**



**Includes a single oncology indication from our Roche and Genentech collaboration.*

Recursion

# We harness value from the Recursion OS with a multi-pronged capital-efficient business strategy





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Recursion

# Our pipeline reflects the scale and breadth of our approach


**More than a dozen additional early discovery and research programs in oncology or with our partners – first program already optioned by Roche-Genentech in GI-oncology**

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 population. (2) Annual US and EU5 incidence for all NF2-driven meningiomas. (3) Prevalence for adult and pediatric population. (4) Our program has the potential to address several indications. (5) Incidence for US only. (6) Our program has the potential to address several 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.

# We harness value from the Recursion OS with a multi-pronged capital-efficient business strategy





**Pipeline Strategy**

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Recursion

# Exciting scientific collaborations span biopharma, tech & data

## Therapeutic discovery

**Roche / Genentech** — Announced Dec. 2021

### Neuroscience and a single oncology indication

- **$150M upfront** and up to or exceeding **$500M in research milestones and data usage options**
- Up to or exceeding **$300M in possible milestones per program** for up to **40 programs**
- **First program already optioned**
- **Mid to high single-digit tiered royalties** on net sales

**Bayer** — Announced Sept. 2020; Significant Update Announced Nov. 2023

### Undruggable oncology targets

- **$30M upfront** and **$50M equity investment**
- Increased per program milestones which may be **up to $1.5B for up to 7 oncology programs**
- **Mid single-digit royalties** on net sales
- **Recursion owns all algorithmic improvements**

## Platform, Technology and Data

**NVIDIA** — Announced July 2023

### Computation and ML/AI

- **$50M equity investment**
- Partnership on **advanced computation** (e.g., foundation model development)
- **Priority access** to compute hardware or **DGXCloud Resources**
- **Phenom-Beta, a foundation model for phenomics from Recursion, now available on NVIDIA's BioNeMo platform**

**Tempus** — Announced Nov. 2023

### Real-world data access

- **Preferential access to >20 PBs of Tempus real-world, multi-modal oncology data**, including DNA/RNA sequencing and clinical outcome data for more than 100,000 patients
- Ability to train **causal AI models** with utility in **target discovery, biomarker development & patient selection**
- **Opportunity to accelerate clinical trial enrolment** through potential access to broad clinical network

**Enamine** — Announced Dec. 2023

### Cheminformatics and chemical synthesis

- Utilizes Recursion's **predicted protein-ligand interactions for ~36B compounds** from Enamine's REAL Library
- Aim to generate **enriched screening libraries** & co-brand customer offerings

# We harness value from the Recursion OS with a multi-pronged capital-efficient business strategy


Pipeline

**Pipeline Strategy**

Build internal pipeline in indications with potential for **accelerated path** to approval

- Precision Oncology
- Rare Disease

Partnerships

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Data

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# The future of TechBio



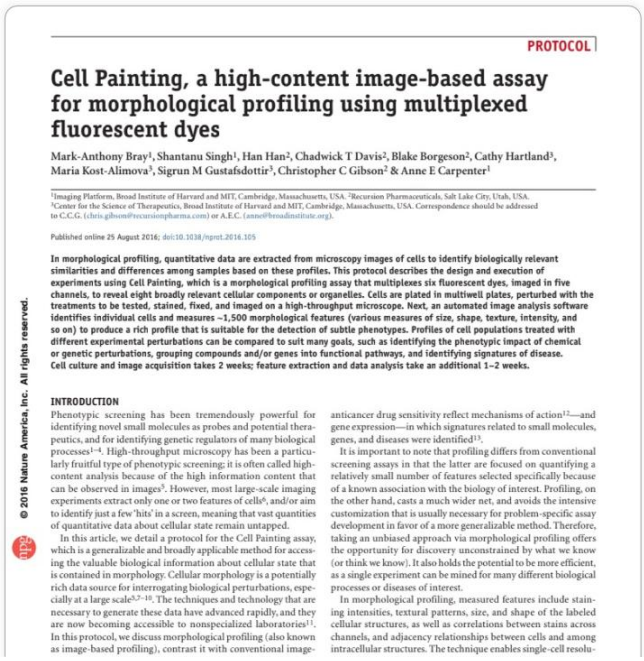
Recursion.

# TechBio Origins: Point Solutions

Most BioTech companies have built a point solution - they've developed a tool, process, model or analysis to accomplish an important step in drug discovery.

**This is how we started too.**

But discovering and developing medicines requires hundreds of steps…



PROTOCOL

## Cell Painting, a high-content image-based assay for morphological profiling using multiplexed fluorescent dyes

Mark-Anthony Bray[1], Shantanu Singh[1], Han Han[2], Chadwick T Davis[2], Blake Borgeson[2], Cathy Hartland[3], Maria Kost-Alimova[3], Sigrun M Gustafsdottir[3], Christopher C Gibson[2] & Anne E Carpenter[1]

[1]Imaging Platform, Broad Institute of Harvard and MIT, Cambridge, Massachusetts, USA. [2]Recursion Pharmaceuticals, Salt Lake City, Utah, USA. [3]Center for the Science of Therapeutics, Broad Institute of Harvard and MIT, Cambridge, Massachusetts, USA. Correspondence should be addressed to C.C.G. (chris.gibson@recursionpharma.com) or A.E.C. (anne@broadinstitute.org).

Published online 25 August 2016; doi:10.1038/nprot.2016.105

**In morphological profiling, quantitative data are extracted from microscopy images of cells to identify biologically relevant similarities and differences among samples based on these profiles. This protocol describes the design and execution of experiments using Cell Painting, which is a morphological profiling assay that multiplexes six fluorescent dyes, imaged in five channels, to reveal eight broadly relevant cellular components or organelles. Cells are plated in multiwell plates, perturbed with the treatments to be tested, stained, fixed, and imaged on a high-throughput microscope. Next, an automated image analysis software identifies individual cells and measures ~1,500 morphological features (various measures of size, shape, texture, intensity, and so on) to produce a rich profile that is suitable for the detection of subtle phenotypes. Profiles of cell populations treated with different experimental perturbations can be compared to suit many goals, such as identifying the phenotypic impact of chemical or genetic perturbations, grouping compounds and/or genes into functional pathways, and identifying signatures of disease. Cell culture and image acquisition takes 2 weeks; feature extraction and data analysis take an additional 1–2 weeks.**



### INTRODUCTION

Phenotypic screening has been tremendously powerful for identifying novel small molecules as probes and potential therapeutics, and for identifying genetic regulators of many biological processes[1–4]. High-throughput microscopy has been a particularly fruitful type of phenotypic screening; it is often called high-content analysis because of the high information content that can be observed in images[5]. However, most large-scale imaging experiments extract only one or two features of cells[6], and/or aim to identify just a few 'hits' in a screen, meaning that vast quantities of quantitative data about cellular state remain untapped.

In this article, we detail a protocol for the Cell Painting assay, which is a generalizable and broadly applicable method for accessing the valuable biological information about cellular state that is contained in morphology. Cellular morphology is a potentially rich data source for interrogating biological perturbations, especially at a large scale[6,7–10]. The techniques and technology that are necessary to generate these data have advanced rapidly, and they are now becoming accessible to nonspecialized laboratories[11]. In this protocol, we discuss morphological profiling (also known as image-based profiling), contrast it with conventional image-anticancer drug sensitivity reflect mechanisms of action[12]—and gene expression—in which signatures related to small molecules, genes, and diseases were identified[13].

It is important to note that profiling differs from conventional screening assays in that the latter are focused on quantifying a relatively small number of features selected specifically because of a known association with the biology of interest. Profiling, on the other hand, casts a much wider net, and avoids the intensive customization that is usually necessary for problem-specific assay development in favor of a more generalizable method. Therefore, taking an unbiased approach via morphological profiling offers the opportunity for discovery unconstrained by what we know (or think we know). It also holds the potential to be more efficient, as a single experiment can be mined for many different biological processes or diseases of interest.

In morphological profiling, measured features include staining intensities, textural patterns, size, and shape of the labeled cellular structures, as well as correlations between stains across channels, and adjacency relationships between cells and among intracellular structures. The technique enables single-cell resolu-

# As these point solutions evolve they increase in complexity and scale

AUTOMATION

## High-throughput screening

Our highly automated wet-labs systematically capture images of human cells in response to different perturbations

Up to
**2.2M experiments**
conducted every week

PROFILING SYSTEMS

## Diverse biological and chemical inputs

We manipulate human cells with CRISPR/Cas9-mediated gene knockouts, compounds, and other reagents

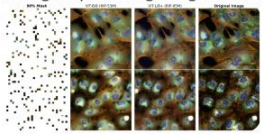
**~50 human cell types**
**~2M physical compounds**
**Whole-genome CRISPR knockouts**

Phenomics

FOUNDATION MODELS

## Phenom-1

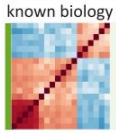
Groundbreaking models trained on >1 billion images and hundreds of millions of parameters learn to extract biologically meaningful signals from cell images



DIGITIZATION

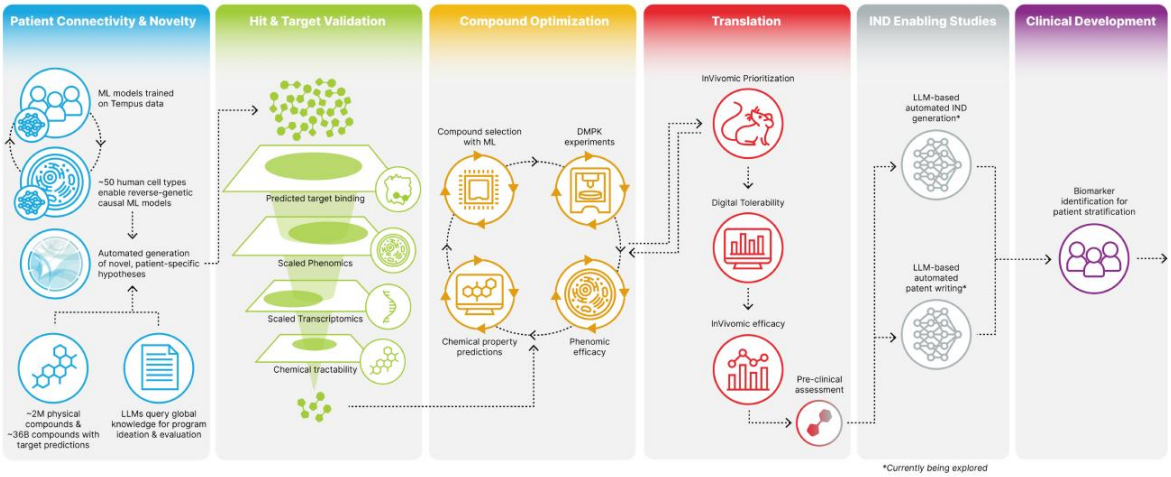
## Maps of Biology & Chemistry

Models infer relationships between all possible combinations of genes and compounds, recapitulating known biology and revealing novel insights



**>5 trillion relationships**
across multiple biological and chemical contexts

# To truly industrialize drug discovery, point solutions must be integrated as modules across many diverse steps






Recursion

# Each module is complex, and we continuously improve them

WET LAB

## HT ADME Experiments

A highly automated DMPK module executes 3 critical assays across human and rat contexts.

ENRICH FOR QUALITY

## Pre-synthesis Evaluation

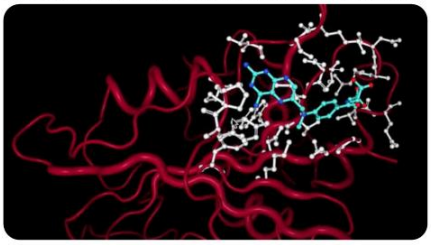
Prioritize compound synthesis for compounds predicted to have high likelihood of suitable pharmacokinetics

DMPK

LEARNING CYCLES

## Predictive Models

Leverage Recursion's power for structure-based prediction of in vitro assays and in vivo compound profiles



ANIMAL PHARMACOKINETICS

## In Vivo Validation

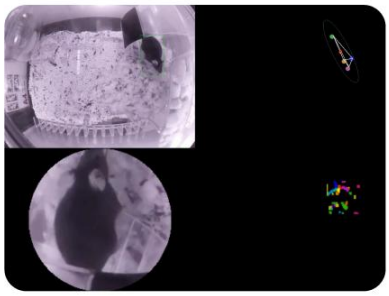
Establish in vitro-in vivo and in silico-in vivo correlations to minimize experimental toil.

# Utilizing each module requires specialized teams and expertise

GOING DIGITAL

## Industrialized program progression

Digitized data collection yields real-time, continuous, and non-invasive data recorded in the animal's home cage. Data generates high-dimensional assays, and ML connects studies for productivity. Overall, there is a drastic reduction in time, labor, and cost.



**InVivomic prioritization**

DETERMINING DOSAGE

## Compound optimization

Rat and mouse studies with ML-based selection of optimal compound and dose from video.


*ML evaluation of mice against >10 liabilities.*

SPEED & EFFICIENCY

## Faster readouts for critical studies

Speed to insight, including tolerability liability



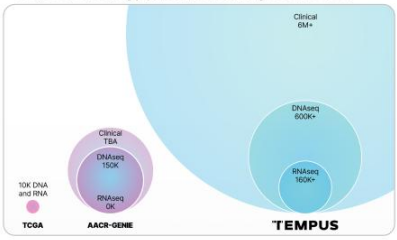
Recursion

# We continuously add new modules to improve the Recursion OS

**DATASET**

## >20 PB of real-world patient data

The Tempus partnership provides Recursion with preferential access to multi-modal data for >100,000 oncology patients totaling **over 20 PB**.




**COMPUTE**

## BioHive-1 supercomputer

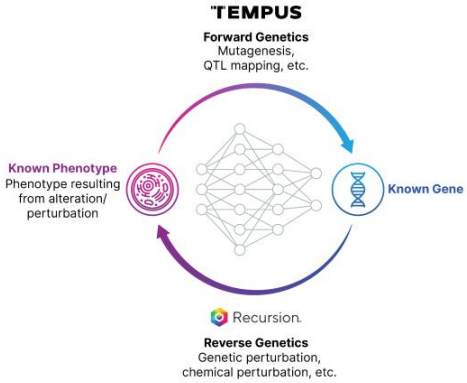
The Tempus data is computed and ML oncology models run on BioHive-1, Recursion's in-house supercomputer. BioHive-1 will be expanded into a **top 50 supercomputer** in 2024 in partnership with Nvidia.

**ML trained on Tempus data**

**APPROACH**

## Combining forward & reverse genetics

We are using Tempus' scaled multimodal real-world patient data to train AI models for target discovery, biomarker development, and patient selection.






Recursion

## The result is a palette of ever-evolving sophisticated modules




Recursion

## We use different modules for different tasks: Find NCE for known target




Recursion

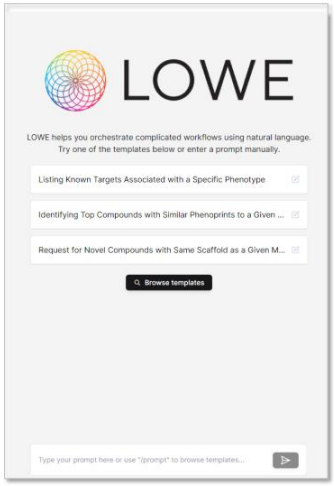
## We use different modules for different tasks: Find novel target & drug it

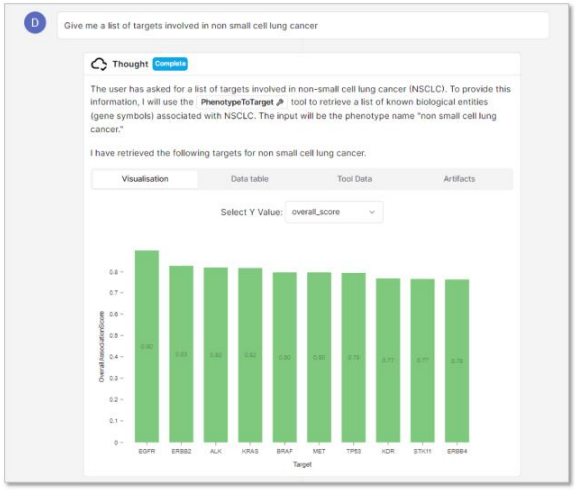



Recursion


LOWE

# Static images taken from live software demonstration

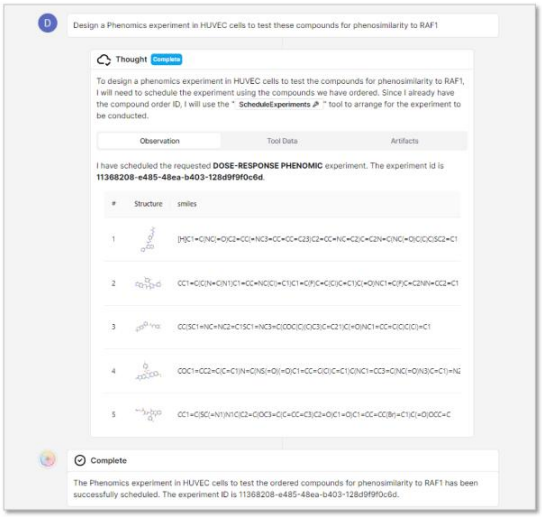


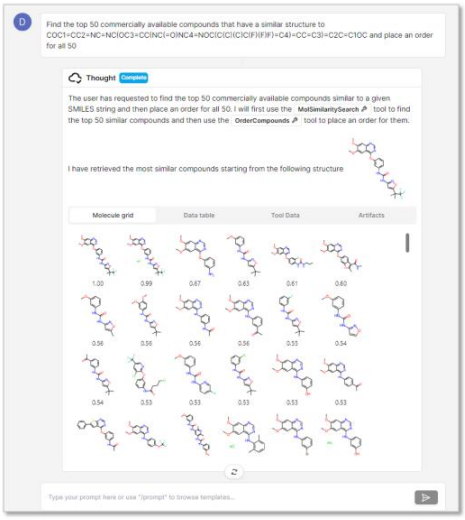






Recursion

# Static images taken from live software demonstration



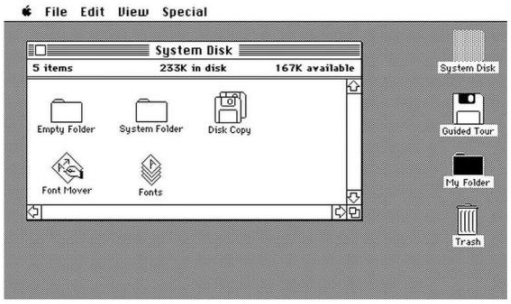






Recursion

# The Recursion OS is now more than a collection of point solutions accessible to expert users

…it is increasingly integrated and accessible via a **Discovery User Interface** that can be used by any of our scientists from the comfort of their laptop…



# 2023 Successes

### Pipeline

- Multiple Phase 2 trials began or continued enrolling patients
- Positive C Diff Phase 1 data
- Progress against multiple discovery and preclinical NCE programs moving towards the clinic

### Platform

- LLMs deployed to automate significant portions of new program initiation
- Creation of Phenom-1, which we believe is the largest phenomics-based foundation model
- Predictions for ~36B ligand-protein interactions using MatchMaker
- Produced more than 1 Trillion hiPSC-derived neuronal cells since 2022
- Scaled multi-timepoint phenomics and transcriptomics
- Already testing and improving causal models using patient-centric data from Tempus collaboration
- Creation of LOWE (LLM Orchestrator Workflow Engine)

### Partnerships

- Roche-Genentech GI-oncology program option
- Bayer focus evolving to precision oncology
- In-licensed program from Bayer for novel target in fibrosis
- NVIDIA Partnership and Investment
- Tempus collaboration signed
- Enamine collaboration signed

### Business

- Cyclica and Valence acquisitions
- Expanded operations in SLC, Toronto & Montreal
- Announced expansion of Biohive capabilities (Top 50 supercomputer)
- Deliver with our team as One Recursion to continue as a leader of the TechBio industry

# What to Watch for from Recursion: Potential Near-Term Milestones

- Potential for **additional INDs**
  - **HR-Proficient Ovarian Cancer RBM39** in **H2 2024**
  - **In-licensed program from Bayer (Target Epsilon)** for a novel target in fibrosis
- Expected **Ph2 Trial starts**
  - **Ph2 FPI** for **AXIN1 or APC mutant cancers** program expected in **Q1 2024**
  - **Ph2 initiation** for ***C. difficile* Infection** program in **2024**
- Expected **Ph2 readouts** for AI-discovered programs
  - **CCM** readout expected in **Q3 2024**
  - **NF2** safety & prelim efficacy expected **Q4 2024**
  - **FAP** safety & prelim efficacy expected **H1 2025**
  - **AXIN1 or APC mutant cancers** safety & prelim efficacy expected **H1 2025**

- Potential for **option exercises** for **map building** initiatives and **partnership programs**
- Potential for **additional partnership(s)** in large, intractable areas of biology (CV/Met)
- Potential to **make some data and tools** available to biopharma and commercial users
- Recursion OS moves towards **autonomous discovery**

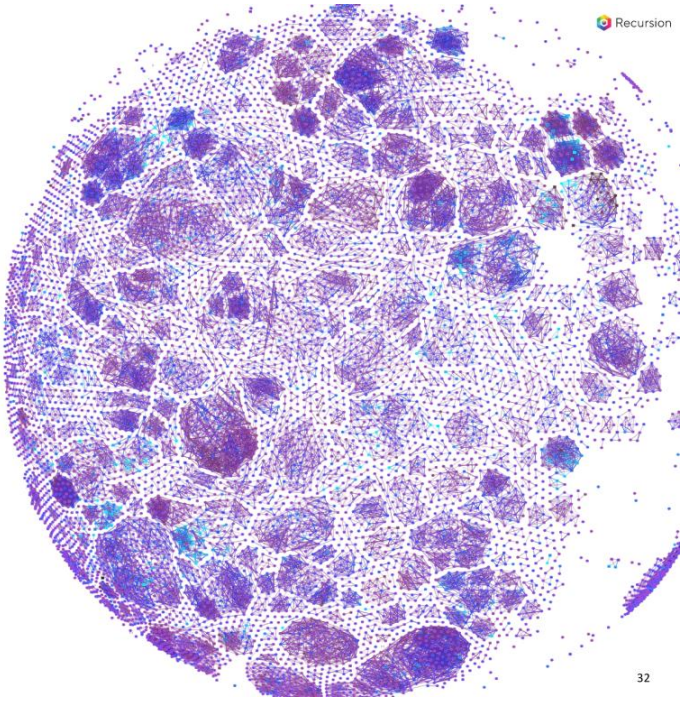
**Strong Financial Position**

**~$390M in cash YE 2023**

*Cash refers to cash and cash equivalents and reflects a preliminary estimate at the end of Q4 2023*


Recursion

# Appendix



Clinical: CCM

# SYCAMORE Clinical Trial : REC-994 for CCM Phase 2 Fully Enrolled

## PREVALENCE & STANDARD OF CARE

~360,000

**Symptomatic US + EU5,**
>1 million patients worldwide live with these lesions today

**>5x larger** US patient population than other rare diseases like Cystic Fibrosis (>31k patients)

**No approved therapy**

- Most patients receive no treatment or only symptomatic therapy
- Surgical resection or stereotactic radiosurgery not always feasible because of location and is not curative

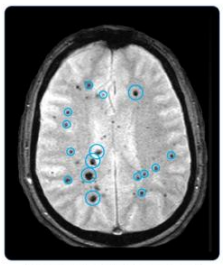
## CAUSE

**LOF mutations in genes *CCM1*, *CCM2* & *CCM3***, key for maintaining the structural integrity of the vasculature due to unknown mechanisms

## PATHOPHYSIOLOGY & REASON TO BELIEVE

**Vascular malformations of the CNS** leading to focal neurological deficits, hemorrhage and other symptoms

Efficacy in Recursion OS as well as functional validation via scavenging of massive superoxide accumulation in cellular models; reduction in lesion number with chronic administration in mice



Vascular malformations (cavernomas)

Julia – living with CCM

## KEY ELEMENTS

- Targeting **sporadic and familial symptomatic CCM** patients with *CCM1*, *CCM2*, and *CCM3* mutations
- Superoxide scavenger, small molecule
- Phase 2 readout **expected Q3 2024**
- US & EU **Orphan Drug Designation**
- Oral dosing

Clinical: CCM

# SYCAMORE Clinical Trial : REC-994 for CCM Phase 2 Fully Enrolled

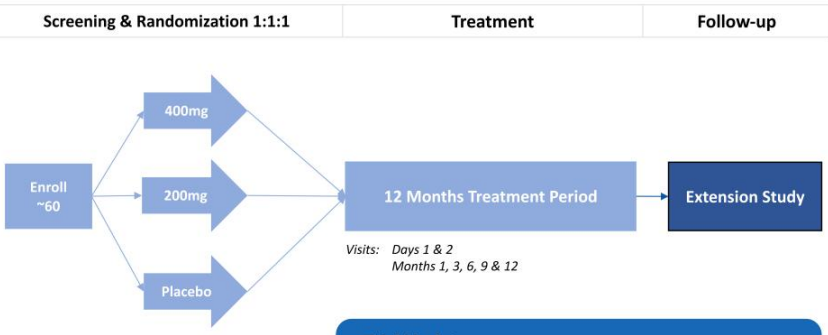
**Phase 2 trial initiated in Q1 2022**

### Enrollment Criteria

- MRI-confirmed CCM lesion(s)
- Familial or sporadic
- Symptoms directly related to CCM

### Outcome Measures

- Primary: Safety and tolerability
  - Adverse events & symptoms
- Secondary: Efficacy
  - Clinician-measured outcomes (CGI and PGI)
  - Imaging of CCM lesions – number, size & rate of change
  - Impact of acute stroke (mRS, NIHSS)
  - Patient reported outcomes (SMSS, PROMIS-29, CCM-HI, symptom questionnaires)
- Exploratory: Biomarkers




### Trial Update

- Enrollment is complete
- Vast majority of participants who completed 12 months of treatment continue to enter long-term extension study
- **Phase 2 readout expected Q3 2024**

*Source: https://www.clinicaltrials.gov/ct2/show/NCT05130866?term=recursion&draw=2&rank=3; https://www.SycamoreCCM.com/*

Clinical: NF2

# POPLAR Clinical Trial : REC-2282 for NF2 Part A Underway

**PREVALENCE & STANDARD OF CARE**

~33,000 **Treatable US + EU**

**No approved therapy**

- There are no approved drugs for NF2
- Surgery is standard of care (when feasible)
- Location may make complete resection untenable, leading to hearing loss, facial paralysis, poor balance and visual difficulty

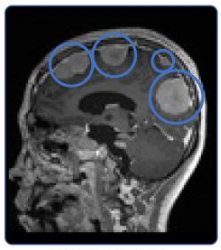
**CAUSE**

**LOF mutations in NF2 tumor suppressor gene**, leading to deficiencies in the tumor suppressor protein merlin

**PATHOPHYSIOLOGY & REASON TO BELIEVE**

Inherited rare **CNS tumor syndrome** leading to loss of hearing and mobility, other focal neurologic deficits

Efficacy in Recursion OS, cellular, and animal models; suppression of aberrant ERK, AKT, and S6 pathway activation in a Phase 1 PD Study in NF2 patient tumors



Intracranial meningiomas

Ricki – living with NF2

**KEY ELEMENTS**

- Targeting **familial and sporadic NF2 meningioma** patients
- HDAC inhibitor, small molecule
- Oral dosing
- Phase 2 readout **expected Q4 2024**
- **Fast-Track** and US & EU **Orphan Drug Designation**

Clinical: NF2

# POPLAR Clinical Trial : REC-2282 for NF2 Part A Underway

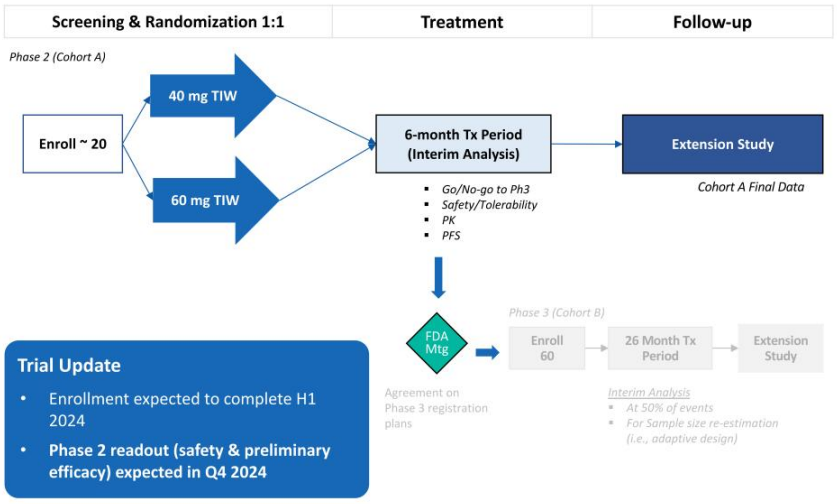
**Phase 2/3 trial initiated in Q2 2022**

## Enrollment Criteria

- MRI-confirmed progressive meningioma
- Either of the below
  - Sporadic meningioma with confirmed NF2 mutation
  - Confirmed diagnosis of NF2 disease

## Outcome Measures

- Primary: Safety and tolerability
  - Progression-free survival
  - Time to progression
  - Duration of response
  - Overall response rate




## Trial Update

- Enrollment expected to complete H1 2024
- **Phase 2 readout (safety & preliminary efficacy) expected in Q4 2024**

https://clinicaltrials.gov/ct2/show/NCT05130866

Clinical: FAP

# TUPELO Clinical Trial : REC-4881 for FAP Phase 2 Underway

**PREVALENCE & STANDARD OF CARE**

~50,000 **Diagnosed US + EU5**

**No approved therapy**

- Colectomy during adolescence (with or without removal of rectum) is standard of care
- Post-colectomy, patients still at significant risk of polyps progressing to GI cancer
- Significant decrease in quality-of-life post-colectomy (continued endoscopies, surgical intervention)

**CAUSE**

**Inactivating mutations in the tumor suppressor gene *APC***

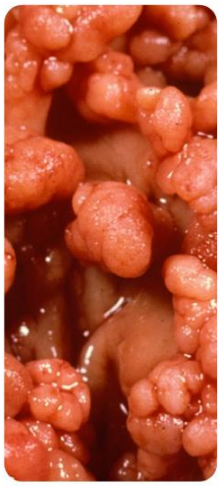
**PATHOPHYSIOLOGY & REASON TO BELIEVE**

**Polyps throughout the GI tract** with extremely high risk of malignant transformation

Efficacy in the Recursion OS showed specific MEK 1/2 inhibitors had an effect in context of *APC* LOF. Subsequent $APC^{min}$ mouse model showed potent reduction in polyps and dysplastic adenomas

**KEY ELEMENTS**

- Targeting **classical FAP patients (with *APC* mutation)**
- MEK inhibitor, small molecule
- Oral dosing
- FPI for Part 2 **expected H1 2024**
- **Fast-Track** and US & EU **Orphan Drug Designation**



Polyps Found in Colon and Upper GI Tract

Clinical: FAP

# TUPELO Clinical Trial : REC-4881 for FAP Phase 2 Underway

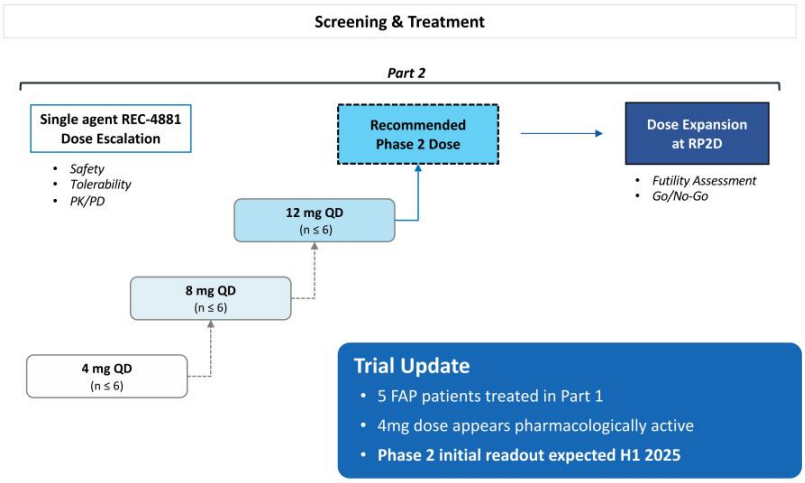
**Part 2 FPI Expected H1 2024**

## Enrollment Criteria

- Confirmed *APC* mutation
- ≥ 55 years old
- Post-colectomy/proctocolectomy
- No cancer present
- Polyps in either duodenum (including ampulla of vater) or rectum/pouch

## Outcome Measures

- Primary:
  - Safety & Tolerability
  - Change from baseline in polyp burden at 12 weeks
  - RP2D
- Secondary:
  - PK/PD




## Trial Update

- 5 FAP patients treated in Part 1
- 4mg dose appears pharmacologically active
- **Phase 2 initial readout expected H1 2025**

*https://clinicaltrials.gov/ct2/show/NCT05552755, protocol amendments made to enhance quality and accelerate the pace of the trial*

Clinical: AXIN1 or APC

# LILAC Clinical Trial : REC-4881 for *AXIN1* or *APC* mutant cancers

**PREVALENCE & STANDARD OF CARE**

~65,000 **Treatable US + EU5**

**Substantial need** for developing therapeutics for patients harboring mutations in *AXIN1* or *APC*, as **these mutations are considered undruggable**

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*

**CAUSE**

**LOF mutations in *AXIN1* or *APC* tumor suppressor genes**

**PATHOPHYSIOLOGY & REASON TO BELIEVE**

**Alterations in the WNT pathway** are found in a **wide variety of tumors** and confer poor prognosis and resistance to standard of care

Efficacy in the Recursion OS and favorable results in PDX models harboring *AXIN1* or *APC* mutations vs wild-type leading to a significant PFS benefit in HCC and Ovarian tumors

**KEY ELEMENTS**

- Targeting ***AXIN1* or *APC* mutant cancers**
- MEK inhibitor, small molecule
- Oral dosing
- **FPI expected Q1 2024**
- Phase 2 initial readout **expected H1 2025**

Gross morphology of HCC

Clinical: AXIN1 or APC

# LILAC Clinical Trial : REC-4881 PoC for *AXIN1* or *APC* mutant cancers

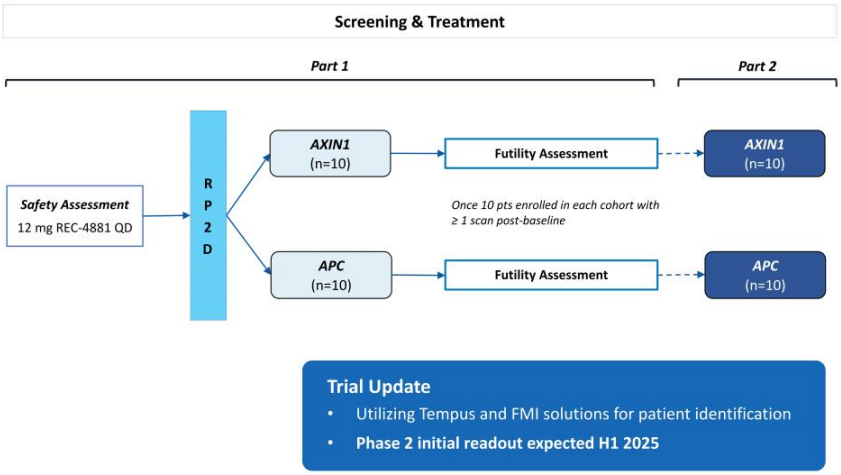
**Expect FPI in Q1 2024**

## Enrollment Criteria

- Unresectable, locally advanced, or metastatic cancers
- ≥ 55 years old
- *AXIN1* or *APC* mutation confirmed by NGS (tissue or blood)
- CRC patients must be *RAS / RAF* wildtype
- No MEK inhibitor treatment within 2 months of initial dose
- ≥ 1 prior line of therapy
- ECOG PS 0-1

## Outcome Measures

- Primary
  - Safety/tolerability
  - ORR (RECIST 1.1)
- Secondary
  - PK
  - Additional efficacy parameters




**Trial Update**

- Utilizing Tempus and FMI solutions for patient identification
- **Phase 2 initial readout expected H1 2025**

*https://clinicaltrials.gov/ct2/show/NCT06005974, protocol amendments made to enhance quality and accelerate the pace of the trial*

Clinical: *C. difficile*

# Clinical Trial : REC-3964 for *C. difficile* Phase 1 Study Complete

**PREVALENCE & STANDARD OF CARE**

~730,000 **Diagnosed US + EU5**

Standard of care includes antibiotic therapies which can further impair gut flora, and lead to relapse

**CAUSE**

***C. difficile* toxins from colonizing bacterium** causes degradation of colon cell junction, toxin transit to bloodstream, and morbidity to host

**KEY ELEMENTS**

- Selective *C. difficile* toxin inhibitor, small molecule
- **Non-antibiotic approach** with potential for combination with SOC and other therapies
- Designed for **selective antitoxin pharmacology** to target infection
- Phase 1 HV study complete

**PATHOPHYSIOLOGY & REASON TO BELIEVE**

**Highly recurrent infectious disease** with severe diarrhea, colitis, and risk of toxic megacolon, sepsis, and death

Recursion OS identified a new chemical entity for recurrent *C. difficile* infection and potentially prophylaxis via glycosyl transferase inhibition with potential to be orally active

**TRIAL UPDATE**

- **Phase 1 PK study complete**
- REC-3964 was **well tolerated** and all AEs were Grade 1
- Expect to **initiate Phase 2 proof-of-concept study** in **2024**

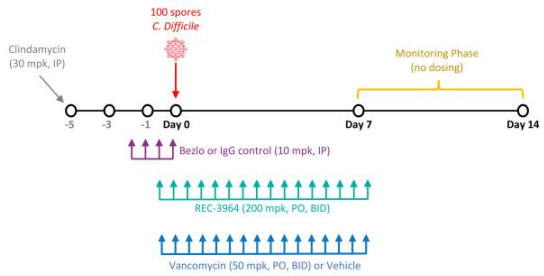
Colleen – lived with rCDI

Clinical: *C. difficile*

# Further Confidence : Preclinical Studies Confirmed Recursion OS Insight

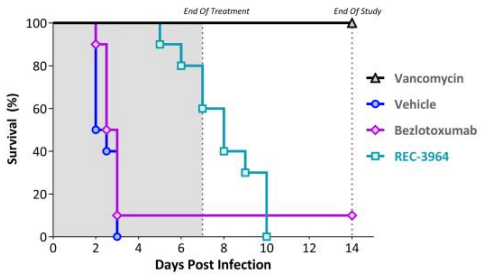
## REC-3964 is Superior to Bezlotoxumab in a Human Disease Relevant CDI Hamster Model

**Schematic representation of timelines for CDI model**




- N = 10 hamsters per group
- *C. difficile* strain 630 was used as genetic experiments confirmed virulence via toxin B[1]
- Clinical observations were conducted from Day 0 to Day 7, with surviving animals monitored until Day 14

**REC-3964 significantly extended survival over SOC**




- REC-3964 potently inhibits toxin B with residual activity against toxin A, while bezlotoxumab is specific to toxin B.
- Significant difference in probability of survival vs bezlotoxumab alone at the end of treatment (**p<0.001**, log-rank test)

[1] *Lyras, D, et al. Nature, 2009, 458, pp.1176-1179.*

Clinical: *C. difficile*

# Clinical Trial : REC-3964 for *C. difficile* Phase 1 Study Complete

**Trial Design**
- Randomized, Double-blind Trial

**Population**
- Healthy Participants
- SAD (n = 48)
  - 36 participants treated with REC-3964
  - 12 participants treated with placebo
- MAD (n = 42)
  - 34 participants treated with REC-3964
  - 8 participants treated with placebo

**Primary Objectives**
- ✓ Assess the safety & tolerability of SAD and MAD of REC-3964
- ✓ Evaluate the PK profile of REC-3964 after single and multiple doses

**Phase 1 Topline**

- REC-3964 oral administration was **well tolerated** by all subjects tested
  - ✓ **3%** (n=1) of participants in SAD with drug-related AEs
  - ✓ **12%** (n=4) of participants in MAD with drug-related AEs
  - ✓ All AEs were deemed **Grade 1**
  - ✓ **No SAEs** were observed
  - ✓ **No discontinuations** related to treatment
- REC-3964 exhibited a **favorable PK profile**
  - ✓ Exposures (AUC) **increased approximately dose-proportionally** across the dose ranges tested (50 mg – 1200 mg)
  - ✓ Half-life ranged from **~7-10 hours;** BID dosing expected to reach targeted trough concentrations

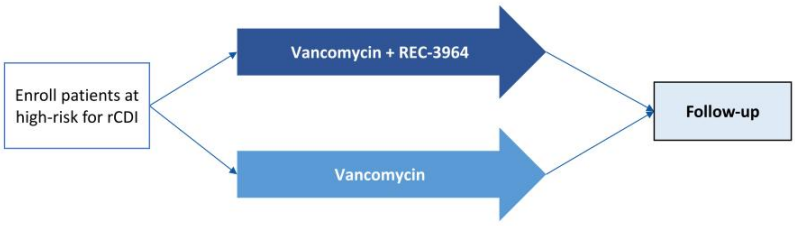
Clinical: *C. difficile*

# Planned Phase 2 Proof-of-Concept Trial Design

**Development Approach**

- Initial Phase 2 POC study to evaluate REC-3964 in combination with vancomycin
- Focus on subjects at risk for CDI with moderate to severe disease planning to receive SOC therapy
- Flexibility to assess effects of REC-3964 on both treatment and reduction of recurrence populations
- Potential to generate early evidence of economic value and model cost-effectiveness of REC-3964

**Preliminary Phase 2 POC Design**



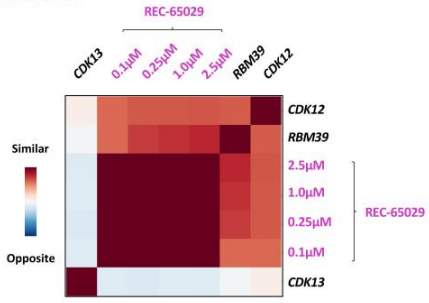

**Trial Update**

- Determination of optimal dose and sample size underway
- **Phase 2 initiation expected in 2024**

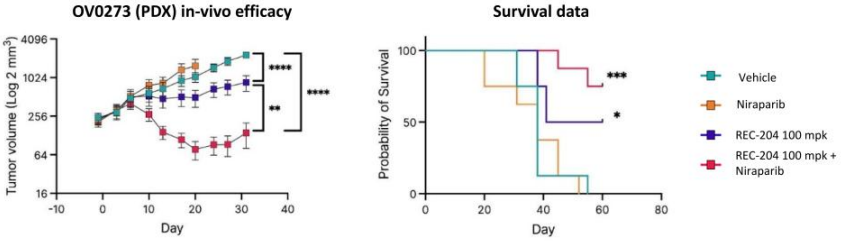
Preclinical: HR-Proficient Ovarian Cancer

# RBM39: Novel CDK12-Adjacent Target for HR-Proficient Ovarian Cancer

| | |
|---|---|
| GOAL | Identify potential first-in-class tumor-targeted precision therapeutic NCE with novel MOA capable of potentially treating HR-proficient ovarian cancer |
| INSIGHT FROM OS | Inhibition of target RBM39 (previously referred to as Target γ) may mimic the inhibition of CDK12 while mitigating toxicity related to CDK13 inhibition |
| FURTHER CONFIDENCE | A Recursion-generated NCE showed single agent efficacy that is enhanced in combination with Niraparib in a BRCA-proficient PDX model |
| NEXT STEPS | IND submission expected in H2 2024 |




BRCA-proficient ovarian cancer PDX




*Note: 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*

# RBM39 Program for HR-Proficient Cancers

**Lead NCE is a potential best-in-class RBM39 degrader being developed for HR-Proficient tumors**

| | |
|---|---|
| **Program Overview** | • Recursion OS identified RBM39 as a novel target capable of mimicking CDK12 biology independent of CDK13<br>• Lead molecule has demonstrated durable regressions across HRP and HRD cell line and patient derived xenografts<br>• Program advanced from target identification to IND-enabling stages in under 18 months |
| **Non- Clinical Updates** | • No significant in vitro safety concerns with favorable tolerability in disease relevant animal models<br>• Target engagement assays demonstrate strong correlation between RBM39 degradation and tumor reduction in vivo<br>• Excellent physiochemical properties and reasonable human projected doses support cost-effective CMC campaign |
| **Near-term Catalysts** | • IND submission expected in H2 2024 |
| **Commercial Opportunity** | • >100,000 patients in US and EU5 harbor cancers that are HR-Proficient and are not eligible for PARP inhibitors<br>• Best-in-class potential as a single agent or in combination with other agents (PARP, IO, chemo, etc) |
| **IP & Exclusivity** | • Composition of matter patent pending with protection until 2043 (excluding extensions)<br>• No known barriers to market access |

Preclinical: Undisclosed Indication in Fibrosis

Recursion

# Target Epsilon: Novel Approach for Fibrotic Diseases

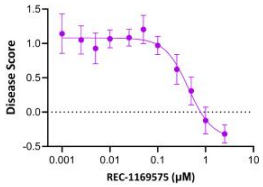
| | |
|---|---|
| GOAL | Identify a potential first-in-class therapeutic NCE with a novel MOA capable of reversing disease-related fibrotic processes |
| INSIGHT FROM OS | Recursion-generated hits show concentration-dependent rescue in a disease relevant human PBMC assay and phenomimic genetic KO of *Target Epsilon* |
| FURTHER CONFIDENCE | Prioritized hits confirmed as potent inhibitors of Target Epsilon in orthogonal biochemical and cell-based assays |
| NEXT STEPS | Lead-optimization studies ongoing |

## Reversal of Fibrocyte Differentiation Assay

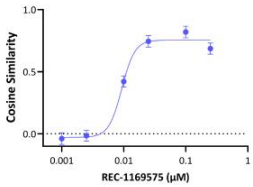

**Diseased State** **Healthy State**

- *Differentiation of human PBMCs into fibrocytes can be reversed by Pentraxin-2, a tissue repair protein, to mimic a healthy state*
- *Phenotypic features of healthy state can be replicated by small molecule rescue*

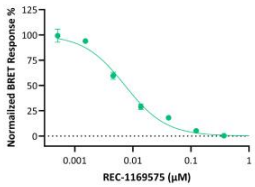
**REC-1169575 demonstrates phenotypic rescue in human fibrocyte assay[1]**




**REC-1169575 phenotypically mimics CRISPR-KO of Gene *Epsilon*[2]**

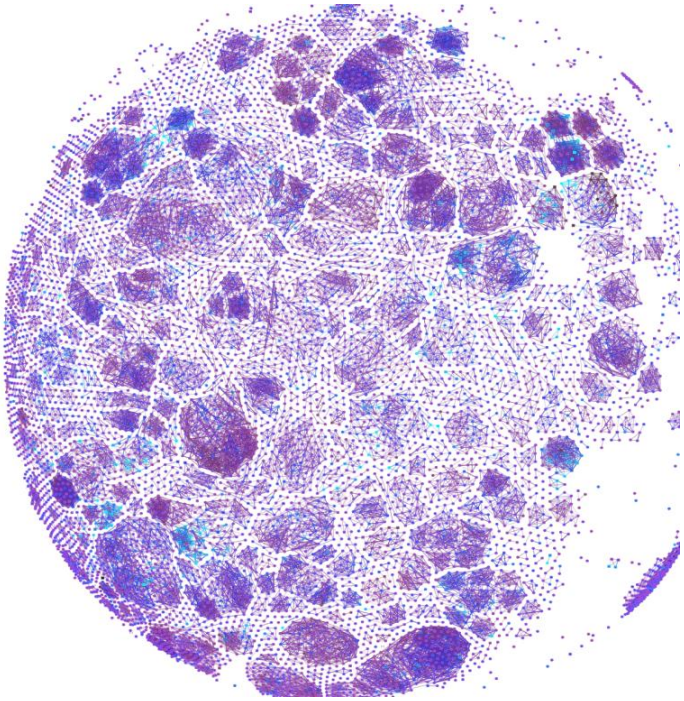



**REC-1169575 strongly inhibits Target Epsilon in a validation assay[3]**




*1. Disease Score of 1.0 reflects "disease state" while disease score of 0.0 reflects "healthy state" 2. Cosine similarity between REC-1169575 and genetic knockout of Epsilon is the cosine of the angle between the two vectors in high-dimensional space. Values near 1.0 suggest the angle between perturbations is near 0° and is interpreted as directionally phenosimilar 3.Target Epsilon NanoBRET assay.*

# Value driven by our team and our milestones



Recursion

# What it takes to make this happen – a new kind of team and culture

## Team Members

>500 **Employees**

>50% **Advanced degrees**

- Life Sciences – biology, chemistry, development, etc.
- Technology – data science, software engineering, automation, etc.
- Strategic Operations

~44% Female ~55% Male ~1% Non-Binary

***Parity Pledge Signer*** gender parity and people of color parity

*Preliminary data shown reflective of Q4 2023, gender statistics include participating individuals*


## ESG Highlights

- ✓ ESG reporting on **Healthcare and Technology Metrics**
- ✓ **100% of electricity** powering our Biohive-1 supercomputer comes from renewable sources
- ✓ Learn more about Recursion's ESG stewardship: www.recursion.com/esg

## Community Impact

altitude lab
Founding Partner,
Life Science Accelerator

biohive.
Founding Member,
Life Science Collective

## Committed to ESG Excellence

Corporate ESG Performance Prime
RATED BY ISS ESG

Rated SUSTAINALYTICS

MSCI ESG RATINGS A
CCC | B | BB | BBB | A | AA | AAA

# Our leadership team brings together experience & innovation to lead TechBio

## Board of Directors

**R Martin Chavez, PHD**
Chairman of RXRX,
Board Member of Alphabet,
Vice-Chairman of 6th Street,
Former CFO/CIO of GS

**Chris Gibson, PHD**
Co-Founder & CEO

**Dean Li, MD PHD**
Co-Founder of RXRX,
President of Merck Research Labs

**Zavain Dar**
Co-Founder & Partner of Dimension

**Terry-Ann Burrell, MBA**
CFO & Treasurer,
Beam Therapeutics

**Rob Hershberg, MD PHD**
Co-Founder/CEO/Chairman of HilleVax, Former EVP/CSO/CBO of Celgene

**Blake Borgeson, PHD**
Co-Founder of RXRX

**Zachary Bogue, JD**
Co-Founder & Partner of Data Collective

## Executive Team

**Chris Gibson, PHD**
Co-Founder & CEO

**Tina Larson**
President & COO

**Michael Secora, PHD**
Chief Financial Officer

**Shafique Virani, MD FRCS**
Chief Business Officer

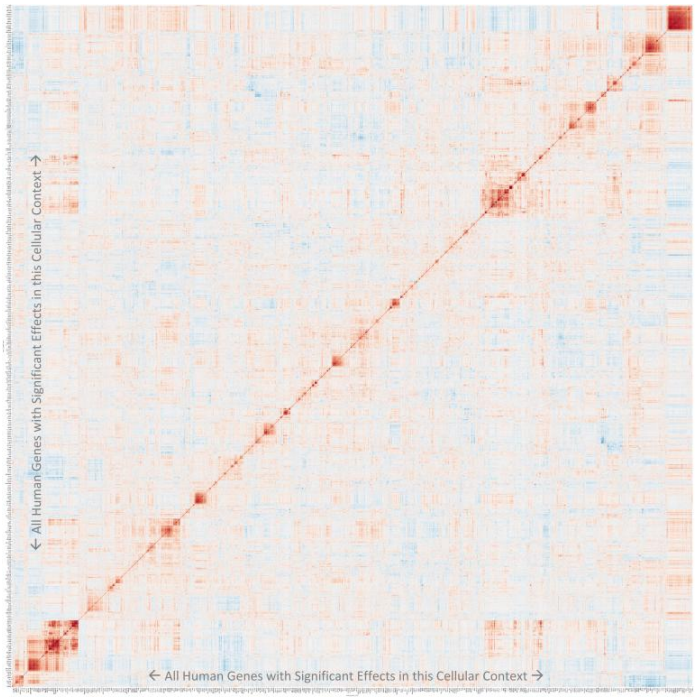
**David Mauro, MD PHD**
Chief Medical Officer

**Ben Mabey**
Chief Technology Officer

**Laura Schaevitz, PHD**
SVP and Head of Research

**Kristen Rushton, MBA**
SVP of Business Operations

**Nathan Hatfield, JD MBA**
Chief Legal Officer




Recursion

# Genome-scale mapping

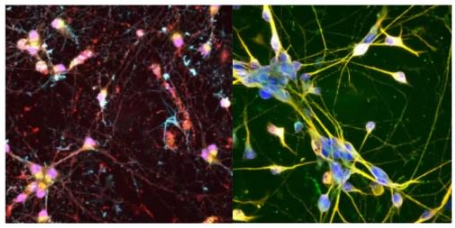
This is a **whole-genome arrayed CRISPR knock-out Map** generated in primary human endothelial cells

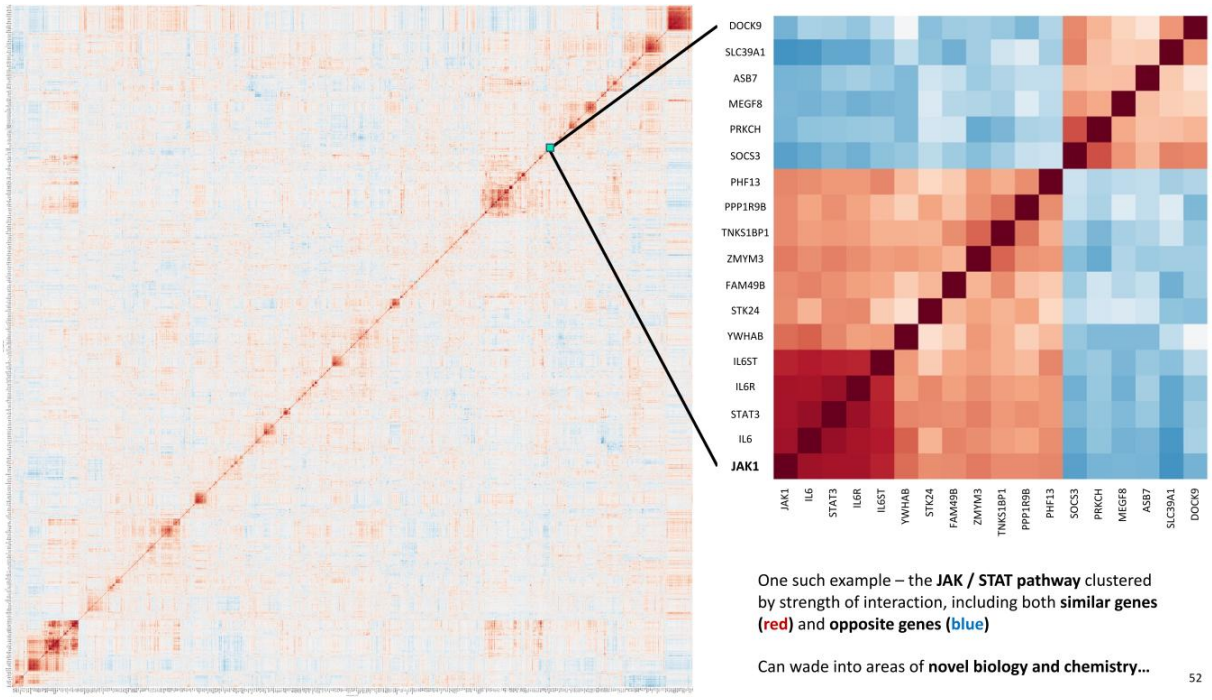
Every gene is represented in a pairwise way (each is present in columns and rows)

**Dark Red** indicates phenotypic similarity according to our neural networks while **Dark Blue** indicates phenotypic anti-similarity (which in our experience often suggests negative regulation)

We can add the phenotypes of hundreds of thousands of small molecules at multiple doses and query and interact with these maps using a web application

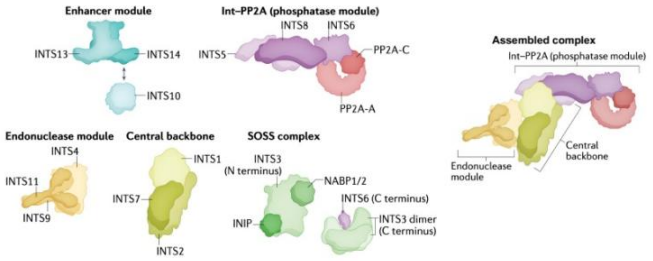
**Thousands of examples of known biology and chemistry**



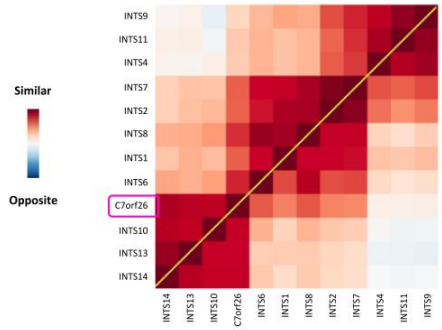



One such example – the **JAK / STAT pathway** clustered by strength of interaction, including both **similar genes (red)** and **opposite genes (blue)**

Can wade into areas of **novel biology and chemistry…**




**Phenomics TVN (below diagram) vs. Centerscale (above diagram)**



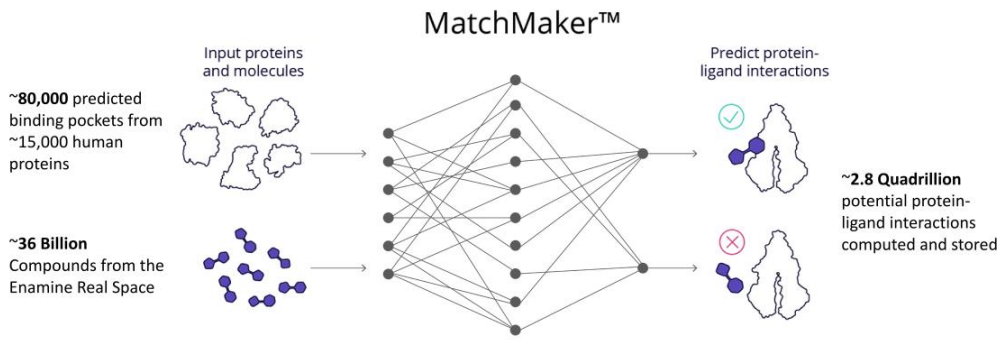

# Maps reveal known and novel biology

- In 2022, new independent research identified a previously unknown gene, C7orf26, as part of the Integrator complex
- Maps jointly developed by Recursion and Genentech replicated this same result
- Demonstrates accuracy and consistency across different map building approaches

Recursion

Genentech
*A Member of the Roche Group*

# Bridging Protein and Chemical Space with Massive Protein-Ligand Interaction Predictions




**Computation at Scale**

Recursion partnered with NVIDIA to integrate and optimize MatchMaker (acquired via CYCLICA) for massive scale GPU-based computation on BioHive-1 and the DGXCloud

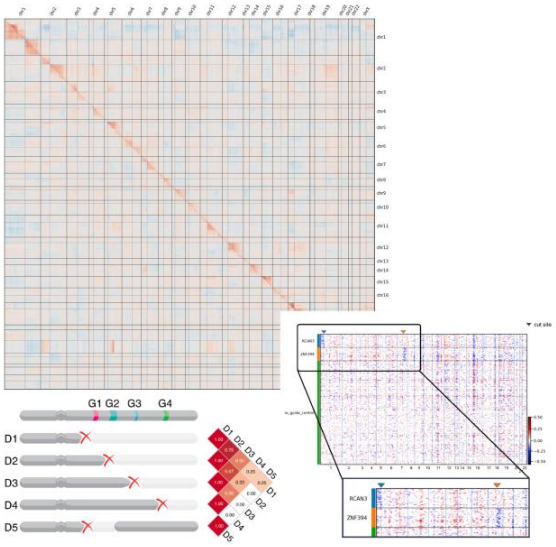
**Computation at Speed**

This tool was deployed to predict protein-ligand interaction for ~36 Billion compounds from the Enamine Real Space, less than 90 days post-acquisition of Cyclica and less than 30 days post-partnership with NVIDIA

**Computation as a Data-Layer**

Recursion will use the predicted interactions as a data-layer in its multi-omic dataset for honing mechanistic predictions from its wet-labs and for accelerating SAR cycles through better predictions for its internal pipeline and within its partnerships

# CRISPR proximity bias revealed using genome-wide phenomics screens




- Recursion demonstrated that **CRISPR-Cas9 editing induces chromosome arm-scale truncations** across the genome
- **Creates a proximity bias** in CRISPR screens which can confound some gene-gene relationships
- Recursion **demonstrated a correction method** leveraging public CRISPR-Cas9 knockout screens to **mitigate bias**
- Read "High-resolution genome-wide mapping of chromosome-arm-scale truncations induced by CRISPR-Cas9 editing" at www.biorxiv.org
- Already in the **top 5% of research outputs** in online engagement www.altmetric.com

# COVID-19 research: Recursion OS correctly predicted 9 of 10 clinical trials

| Drug | Prediction | Correct? |
|---|---|---|
| Hydroxychloroquine | x | ✓ |
| Lopinavir | x | ✓ |
| Ritonavir | x | ✓ |
| Remdesivir | ✓ | ✓ |
| Baricitinib | ✓ | ✓ |
| Tofacitinib | ✓ | ✓ |
| Fostamatinib | ✓ | ✓ |
| Ivermectin* | x | ✓ |
| Fluvoxamine | x | ✓ |
| Dexamethasone | x | x |

** Recursion did not screen ivermectin, but did screen the related compounds selamectin and doramectin. Both of these tested negative; consequently ivermectin was not expected to have efficacy. Fostamatinib recently read out positive Ph3 results in COVID but was discontinued in ACTIV-4.*

https://www.biorxiv.org/content/10.1101/2020.04.21.054387v1

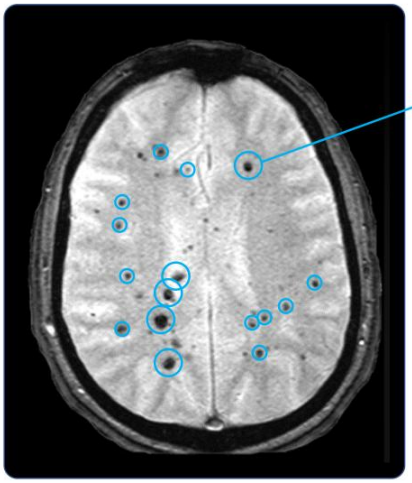
- Recursion conducted several AI-enabled experiments in **April 2020** to investigate therapeutic potential for COVID-19
  - Included FDA-approved drugs, EMA-approved drugs, and compounds in late-stage clinical trials for the modulation of the effect of SARS-CoV-2 on human cells
- Experiments were compiled into the **RxRx19 dataset** (860+ GB of data) and **made publicly available** to accelerate the development of methods and pandemic treatments.

# **REC-994** for the Treatment of Symptomatic Cerebral Cavernous Malformations (CCM)

| | |
|---|---|
| **Target / MOA** | Superoxide Scavenger |
| **Molecule Type** | Small Molecule |
| **Lead Indication(s)** | Cerebral Cavernous Malformations |
| **Status** | Phase 2 |
| **Designation(s)** | US & EU Orphan Drug |
| **Source of Insight** | Recursion OS |

Clinical: CCM

# Disease Overview : Cerebral Cavernous Malformations (CCM)



**Description**

- Large unmet need for a novel nonsurgical treatment
- Vascular malformations (cavernomas) in the brain and spinal cord
- High-risk for hemorrhage creates "ticking time bomb"
- Progressive increase in CCM size and number over time in those with familial disease
- Debilitating symptoms, including intractable seizure, intracerebral hemorrhage, focal neurological deficits

"Historically, cavernomas have been managed primarily with observation, surgical resection, and occasionally radiotherapy. However, for a number of reasons, many patients with cavernomas must endure a life with neurologic symptoms"

- **Ryan Kellogg**, MD, Investigator at the University of Virginia

Clinical: CCM

# Disease Overview : Cerebral Cavernous Malformations (CCM)

Julia – living with CCM

## Patient Population – Large and Diagnosable

- **>1 million patients** worldwide live with these lesions today
- Caused by loss of function mutation in one of three genes: *CCM1* (60%), *CCM2* (20%), and *CCM3* (20%)
- Inherited autosomal dominant mutation in 30-40%; or sporadic
- US symptomatic population is more than 5 times larger than other rare diseases like **Cystic Fibrosis** (>31k patients) and **Spinal Muscular Atrophy** (>33k patients)

## No Approved Medical Therapy

- **No approved drugs** for CCM
- Most patients receive **no treatment** or only **symptomatic therapy**
- Surgical resection or stereotactic radiosurgery not always feasible because of location of lesion and is not curative

**~360,000** Symptomatic US + EU5 patients

*Sources: Angioma Alliance ; Flemming KD, et al . Population-Based Prevalence of Cerebral Cavernous Malformations in Older Adults: Mayo Clinic Study of Aging. JAMA Neurol. 2017 Jul 1;74(7):801-805. doi: 10.1001/jamaneurol.2017.0439. PMID: 28492932; PMCID: PMC5647645 ; Spiegler S, et al Cerebral Cavernous Malformations: An Update on Prevalence, Molecular Genetic Analyses, and Genetic Counselling. Mol Syndromol. 2018 Feb;9(2):60-69. doi: 10.1159/000486292. Epub 2018 Jan 25. PMID: 29593473; PMCID: PMC5836221.*

Clinical: CCM

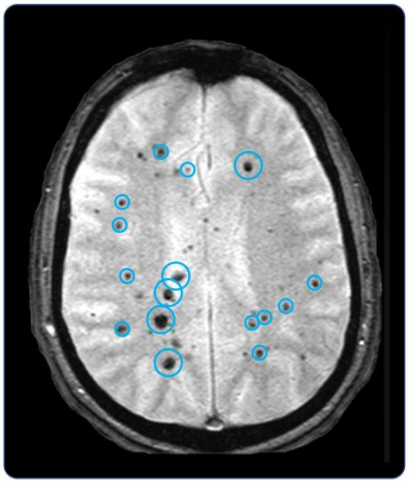
# Disease Overview : CCM is an Under-Appreciated Orphan Disease

| Non-oncology Orphan Indication | Product | U.S. + EU5 Prevalence |
|---|---|---|
| **Cerebral cavernous malformation (CCM)** | **REC-994 (Recursion)** | **>1,800,000 (Symptomatic: ~360,000)** |
| **Idiopathic pulmonary fibrosis (IPF)** | Esbriet (pirfenidone) | >160,000 |
| **Cystic fibrosis (CF)** | VX-669/ VX-445 + Tezacaftor + Ivacaftor - Vertex | >55,000 |
| **Spinal muscular atrophy (SMA)** | SPINRAZA (nusinersen) | >65,000 |

*Sources: Angioma Alliance ; Flemming KD, et al . Population-Based Prevalence of Cerebral Cavernous Malformations in Older Adults: Mayo Clinic Study of Aging. JAMA Neurol. 2017 Jul 1;74(7):801-805. doi: 10.1001/jamaneurol.2017.0439. PMID: 28492932; PMCID: PMC5647645 ; Spiegler S, et al Cerebral Cavernous Malformations: An Update on Prevalence, Molecular Genetic Analyses, and Genetic Counselling. Mol Syndromol. 2018 Feb;9(2):60-69. doi: 10.1159/000486292. Epub 2018 Jan 25. PMID: 29593473; PMCID: PMC5836221; Maher T, et al Global incidence and prevalence of idiopathic pulmonary fibrosis. Respir Res. 2021 Jul 7;22(197). Doi: 10.1186/s12931-021-01791-z. PMID: 34233665. DRG 2022 Solutions, Report: Epidemiology, Cystic Fibrosis. CDC: SMA*

Clinical: CCM

# Therapeutic Approach to Cerebral Cavernous Malformations (CCM)

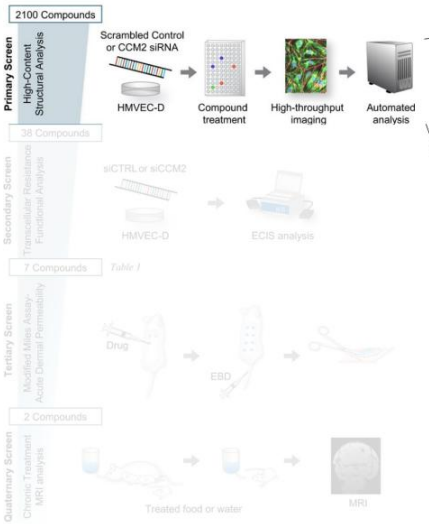


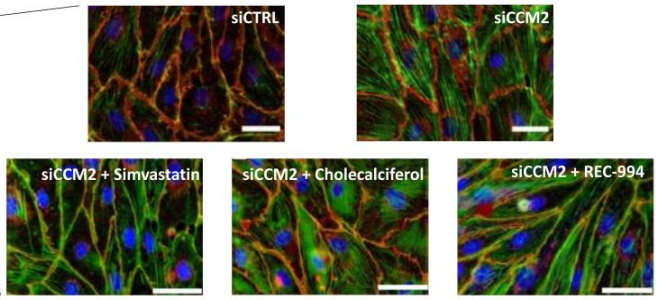
## Novel therapeutic approach

- Symptoms associated with both increased size of lesions, but also inflammation or activation of lesions within the immunoprivileged environment of the brain
- Lesions arise from the capillary bed and are not high-pressure (e.g., the lesion growth is unlikely to be primarily driven by the *law of Laplace*)
- *The Recursion Vascular Stability Hypothesis:*
  - Eliminating the lesions may <u>not</u> be required for significant patient benefit
  - Slowing or halting the growth of the lesions while mitigating lesion leakiness and endothelial cell activation to halt the feed-forward inflammatory reaction *may* mitigate some symptoms and be beneficial to patients

Clinical: CCM

# CCM – Applied prototyping of the Recursion OS




Using an early version of our Recursion OS in an academic setting, we identified about 39 molecules out of 2,100 screened that according to a machine learning classifier rescued a complex unbiased phenotype associated with CCM2 loss of function.

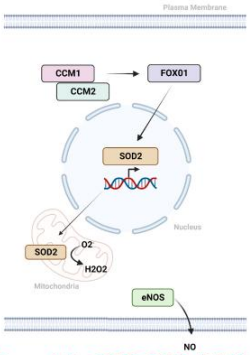
Through a set of follow-on confirmatory assays of increasing complexity, REC-994 stood out as one of two compounds we tested in a 5-month chronic CCM animal model where both compounds demonstrated significant benefit.

*Gibson, et al. Strategy for identifying repurposed drugs for the treatment of cerebral cavernous malformation. Circulation, 2015*

Clinical: CCM

# REC-994 – Mechanism of Action

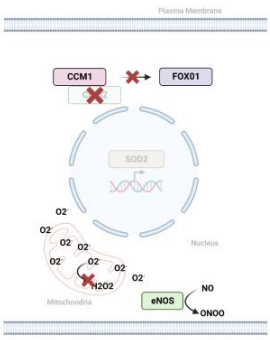
## Healthy




**By regulating SOD2, CCM1 (KRIT1) & CCM2 suppress:**

- Endothelial cell activation
- Smooth muscle proliferation
- Leukocyte adhesion
- Platelet aggregation

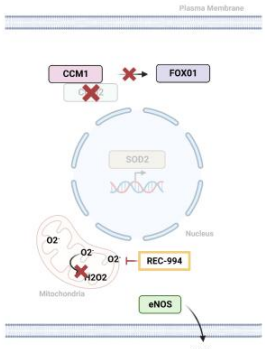
## CCM




***CCM1* or *CCM2* loss of function leads to activated endothelium:**

- Decreased cell-cell junctional integrity and increased monolayer permeability
- Impaired vasodilation
- Cavernous angioma formation

## REC-994 Impact




**Dosing of REC-994 restores normal function:**

- Normalized ROS balance
- Restores quiescent endothelial cell state
- Stabilizes endothelial barrier function

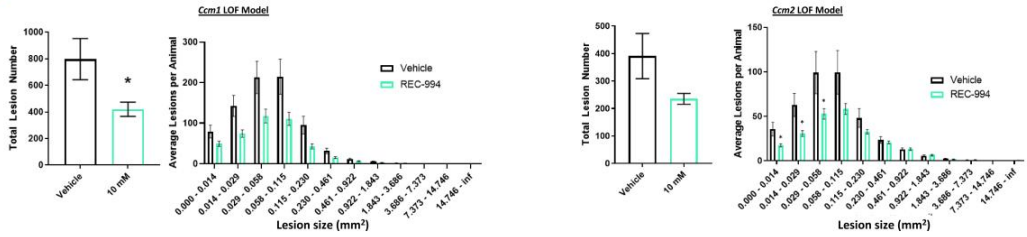
*Adapted from REC-994 Investigator Brochure*

Clinical: CCM

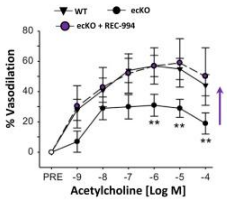
# Further Confidence : Preclinical Studies Confirm Insight

**Preclinical Studies: REC-994 reduces lesion burden and ameliorates vascular defects in genetic mouse models of CCM**

**1** **Reduces lesion number and size in *Ccm1* and *Ccm2* LOF mouse models**

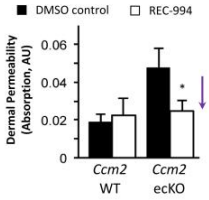



**2** **Completely rescues acetylcholine-induced vasodilation defect**




REC-994 stabilizes the integrity of vasculature against challenges to permeability

**3** **Rescues dermal permeability defect in CCM2 mice**




Vascular permeability is a clinically relevant feature of CCM lesions

*Source: Data above from Gibson, et al. Strategy for identifying repurposed drugs for the treatment of cerebral cavernous malformation. Circulation, 2015 or Recursion internal data (Ccm1 mouse model)*

Clinical: CCM

# Further Confidence : Clinical Studies Confirming Safety

**REC-994 Phase 1 Studies - well-tolerated with no dose-dependent adverse events in SAD and MAD**

| 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 |

*Source: REC-994 for the Treatment of Symptomatic Cerebral Cavernous Malformation (CCM) Phase 1 SAD and MAD Study Results. Oral Presentation at Alliance to Cure Scientific Meeting. 2022 Nov 17*

# **REC-994** *for* Symptomatic Cerebral Cavernous Malformations (CCM)

## Target Product Profile:

**Population** not restrictive.
*Targeting both sporadic and familial patients*

**Differentiated** mechanism of action.
*Decreases ROS and oxidative stress*

**Well-tolerated** with no DLTs or SAEs in Phase 1.
*No treatment-related discontinuations*

**Drug-like** properties support oral dosing QD.
*Therapeutic exposures achievable in humans*

# REC-994 for Cerebral Cavernous Malformations (CCM)

**First-in-disease potential in CCM with a first-in-class orally bioavailable small molecule SOD2 mimetic**

| | |
|---|---|
| **Program Overview** | • First therapeutic candidate advanced to an industry-sponsored Phase 2 trial (SYCAMORE) for CCM<br>• Partnered with leading KOLs at University of Rochester to develop a CCM PRO instrument for clinical trials<br>• Putative MOA decreases ROS and oxidative stress to rescue pathogenetic endothelial dysfunction |
| **Clinical Updates** | • Favorable safety and tolerability profile in Phase 1 dose-escalation with no DLTs and no SAEs<br>• Phase 2 trial fully accrued ahead of schedule in June 2023, enrolling 62 symptomatic CCM patients<br>• Majority of patients treated with REC-994 for ≥ 12 months have opted into LTE portion |
| **Near-term Catalysts** | • Phase 2 readout (safety, preliminary efficacy, pharmacokinetics) expected Q3 2024<br>• Results from Phase 2 expected to inform defined registration path with guidance from FDA |
| **Commercial Opportunity** | • ~360,000 symptomatic CCM patients living in US and EU5 with no pharmacological agents approved<br>• Favorable competitive landscape with REC-994 2+ years ahead in development |
| **IP & Exclusivity** | • ODD in US and EU provides 7 and 10 years, respectively, of market exclusivity following approval<br>• Method of use patents provide protection until 2035 (excluding extensions) |

# **REC-2282** for the Treatment of Progressive Neurofibromatosis Type 2 (NF2) Mutated Meningiomas

| | |
|---|---|
| **Target / MOA** | HDAC Inhibitor |
| **Molecule Type** | Small Molecule |
| **Lead Indication(s)** | NF2 Mutated Meningiomas |
| **Status** | Phase 2/3 |
| **Designation(s)** | Fast Track; US and EU Orphan Drug |
| **Source of Insight** | Recursion OS |

Clinical: NF2

# Disease Overview : Neurofibromatosis Type 2 (NF2)

Ricki – living with NF2

## Patient Population – Large and Diagnosable

- Rare autosomal dominant tumor syndrome resulting from biallelic inactivation of the *NF2* gene which leads to deficiencies in the tumor suppressor protein merlin
- **NF2 can be inherited or spontaneous** (>50% of patients represent new mutations); up to 1/3 are mosaic
- CNS manifestations: meningiomas and vestibular schwannomas; mean age at presentation: **~20 years**

## No Approved Medical Therapy

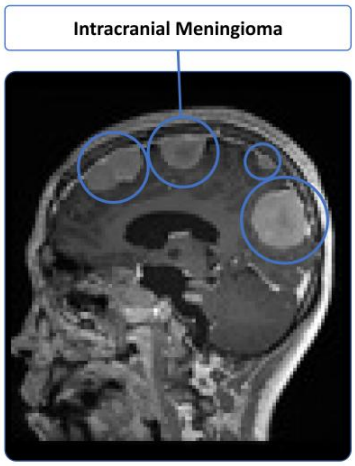
- **No approved drugs** for NF2
- **Surgery** is standard of care (when feasible)
- Location may make complete resection untenable, leading to hearing loss, facial paralysis, poor balance and visual difficulty

*Source: https://rarediseases.org/rare-diseases/neurofibromatosis-2*

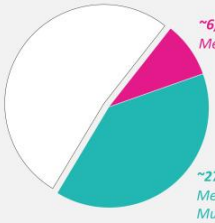
Clinical: NF2

# Disease Overview : Neurofibromatosis Type 2 (NF2) Meningiomas

- Most tumors are benign and slow growing but location in CNS leads to serious morbidity or mortality
- Prognosis is adversely affected by early age at onset, a higher number of meningiomas and having a truncating mutation




**>66,000 Patients have Meningiomas**



***~6,000** NF2 Patients have Meningiomas (Familial)*

***~27,000** Patients who have Meningiomas that Harbor NF2 Mutations (Sporadic)*

**~33,000**

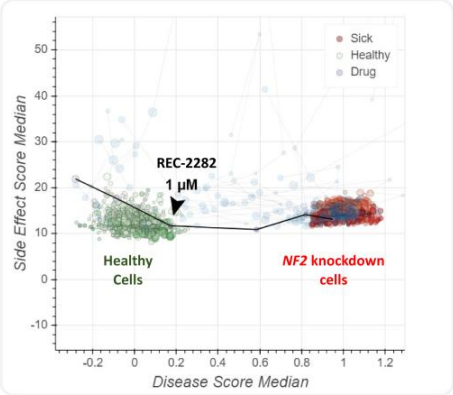
Treatable US + EU5 patients

- Threatens mortality; if amenable, surgical excision is primary intervention
- Many patients have multiple meningiomas that exhibit heterogenous behavior and asynchronous growth
- **Stasis or shrinkage of tumor could improve prognosis**

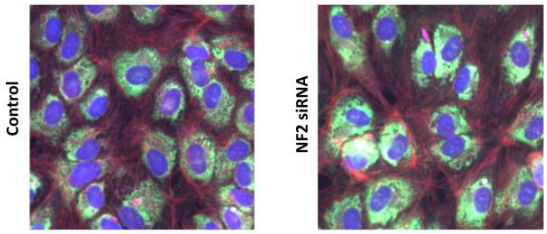
*Source: Pemov, et al. Comparative clinical and genomic analysis of neurofibromatosis type 2-associated cranial and spinal meningiomas. Nature. 2020 Jul 28;10(12563). Doi: https://doi.org/10.1038/s41598-020-69074-z; NORD*

Clinical: NF2

# Insight from OS : REC-2282 Rescued Loss of *NF2*




**REC-2282 identified as rescuing HUVEC cells treated with NF2**

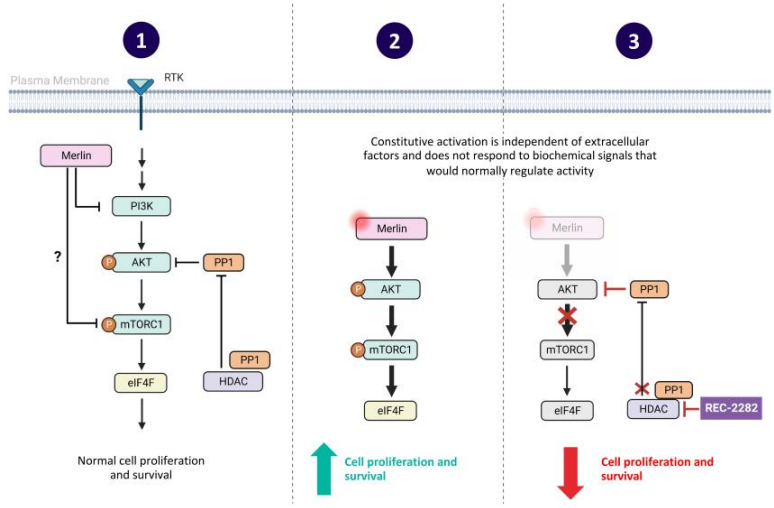



*HUVEC, human umbilical vein endothelial cells; NF2, neurofibromatosis type 2; siRNA, small interfering RNA.*

Clinical: NF2

# REC-2282 – Mechanism of Action

**Orally Bioavailable, CNS-penetrating, Small Molecule HDAC Inhibitor**




1. NF2 encodes for the protein Merlin and negatively regulates mTOR signaling
2. Loss of Merlin leads to increased signaling in the PI3K/AKT/mTOR pathway
3. Oncogenic mTOR signaling arrested with HDAC inhibitors

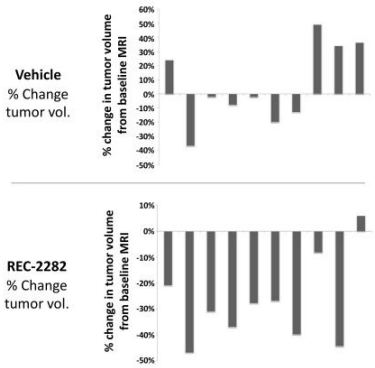
*AKT, protein kinase B; eIF4F, eukaryotic initiation factor 4F; HDAC, histone deacetylase; mTor, mammalian target of rapamycin; mTORC1; mammalian target of rapamycin complex 1; NF2, neurofibromatosis type 2; PI3K, phosphoinositide 3-kinase; PP1, protein phosphate 1; Ras, reticular activating system.*

Clinical: NF2

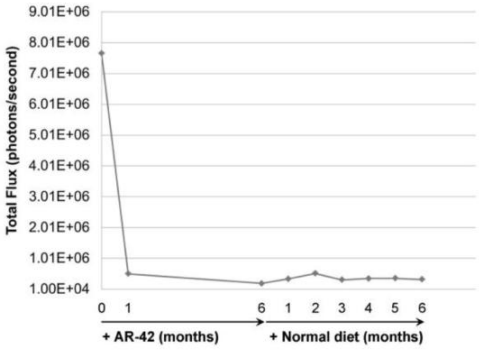
# Further Confidence : Preclinical Studies Confirming Insight

**REC-2282 preclinical studies demonstrated clear in-vivo efficacy in multiple NF2 tumor types**

**1** **Shrinks vestibular schwannoma xenografts in nude mice**




**2** **Prevents growth & regrowth of NF2-deficient meningioma model in mice**




*https://link.springer.com/article/10.1007/s00280-020-04229-3*

Clinical: NF2

# Further Confidence : Prior Studies Suggest Potential Therapeutic Benefit

- **Evaluable Patients: CNS Solid Tumors: NF2 N=5; Non-CNS Solid Tumors: N=10**
- PFS: CNS solid tumors = **9.1** months; Non-CNS solid tumors = **1.7** months
- Best overall response = **SD in 8/15 patients** (53%; 95% CI 26.6–78.7)
- Longest duration of follow-up without progression: > **27 months** (N=1)
- Most common AEs: **cytopenia, fatigue, nausea**


## Well understood clinical safety ...

- Multiple investigator-initiated studies in oncology indications
- Lengthy human clinical exposure in NF2 – multiple patients on drug for several years
- Well-characterized side effect profile

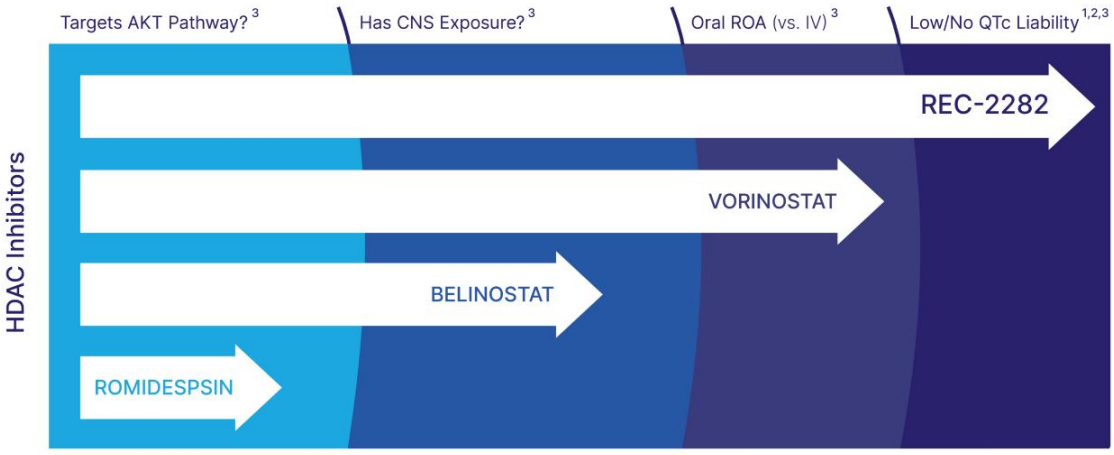
## ... with a drug-like profile

- Established and scalable API manufacturing process
- Multiple cGMP batches of 10mg and 50mg tablets have been manufactured
- Excellent long-term stability

Clinical: NF2

# REC-2282 Appears Well Suited for NF2 vs Other HDAC Inhibitors

**REC-2282 Would be First-In-Disease HDAC Inhibitor for Treatment of NF2 Meningiomas**




[1] Sborov DW, et al. A phase 1 trial of the HDAC inhibitor AR-42 in patients with multiple myeloma and T- and B-cell lymphomas. Leuk Lymphoma. 2017 Oct;58(10):2310-2318.
[2] Collier KA, et al. 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. 2021 May;87(5):599-611.
[3] Prescribing Information of Vorinostat/Belinostat/Romidepsin respectively

Recursion

# **REC-2282** *for* Progressive Neurofibromatosis Type 2 (NF2) Mutated Meningiomas

## Target Product Profile:

**Brain-penetrant** and orally bioavailable.
*Preferential distribution into CNS tissues*

**Differentiated** profile versus other HDACs.
*Low/minimal QTc prolongation observed*

**Well-established** safety profile.
*50+ patients exposed across 4 ISTs*

**Preliminary** evidence of PK/PD in Phase 1.
*First-in-disease potential*

# REC-2282 for Neurofibromatosis type 2 (NF2)

**First-in-disease potential in NF2 with a best-in-class HDAC inhibitor**

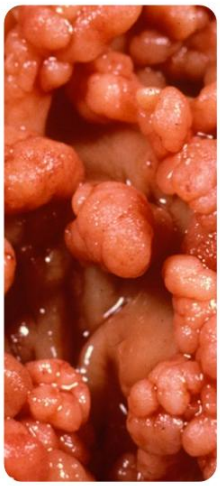
| | |
|---|---|
| **Program Overview** | • Orally bioavailable small molecule inhibitor of class I and class IIB HDACs in Phase 2/3 (POPLAR) trial<br>• Unique MOA that disrupts PP1-HDAC interface, attenuating pathophysiologic p-AKT without affecting total AKT<br>• Fast Track Designation in *NF2* mutant meningioma granted by FDA in 2021 |
| **Clinical Updates** | • Cohort A (Phase 2) enrollment ongoing targeting ~ 20 adults<br>• Early Phase 1 study demonstrated mPFS of 9.1 months in patients with CNS tumors, including 5 NF2 patients<br>• Therapeutic concentrations of REC-2282 achieved in plasma and CNS tumors in early Phase 1 studies |
| **Near-term Catalysts** | • Expected to complete enrollment in adults by H1 2024<br>• Phase 2 readout (safety, preliminary efficacy, pharmacokinetics) expected Q4 2024 |
| **Commercial Opportunity** | • ~ 33,000 NF2-associated meningioma patients in US and EU5 eligible for treatment with no approved therapies<br>• Potential to expand into additional NF2 mutant populations including mesothelioma, MPNST and EHE |
| **IP & Exclusivity** | • ODD in US and EU provides 7 and 10 years, respectively, of market exclusivity following approval<br>• Composition of matter patent provides protection until 2030 (excluding extensions) |

# **REC-4881** for the Treatment of Familial Adenomatous Polyposis (FAP)

| | |
|---|---|
| **Target / MOA** | MEK Inhibitor |
| **Molecule Type** | Small Molecule |
| **Lead Indication(s)** | Familial Adenomatous Polyposis |
| **Status** | Phase 2 |
| **Designation(s)** | Fast Track; US and EU Orphan Drug |
| **Source of Insight** | Recursion OS |

Clinical: FAP

# Disease Overview : Familial Adenomatous Polyposis



Polyps Found in Colon and Upper GI Tract

## Patient Population – Easily Identifiable

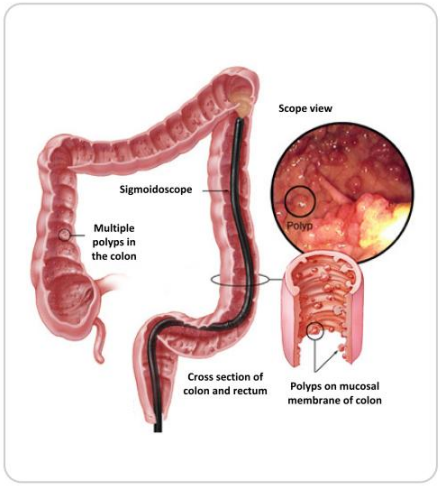
- Autosomal dominant tumor predisposition syndrome caused by a mutation in the APC gene
- Classic FAP (germline mutation) :
  - Hundreds to thousands of polyps in colon and upper GI tract
  - Extraintestinal manifestations (e.g., desmoid tumors)
  - 100% likelihood of developing colorectal cancer (CRC) before age 40, if untreated

**~50,000** Diagnosed US + EU5 patients

*https://www.hopkinsmedicine.org/health/conditions-and-diseases/familial-adenomatous-polyposis*

Clinical: FAP

# Disease Overview : Familial Adenomatous Polyposis – Standard of Care




## No Approved Medical Therapy

- Standard of care: colectomy during adolescence (with or without removal of rectum)
- Post-colectomy, patients still at significant risk of polyps progressing to GI cancer
- Significant decrease in quality-of-life post-colectomy: continued endoscopies and surgical intervention

"Despite progress with surgical management, the need for effective therapies for FAP remains high due to continued risk of tumors post-surgery"

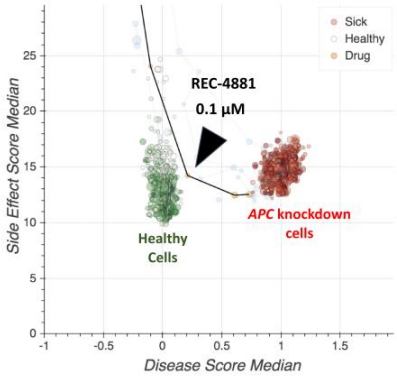
- **Niloy Jewel Samadder**, MD, Mayo Clinic

*https://www.hopkinsmedicine.org/health/conditions-and-diseases/familial-adenomatous-polyposis*

Clinical: FAP

# Insight from OS : Rescued Loss of *APC*, Inhibited Tumor Growth

**REC-4881 rescued phenotypic defects of cells with APC knockdown**



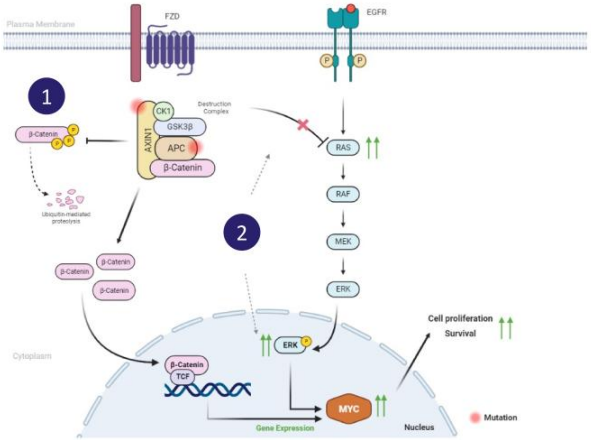

- Compared to thousands of other molecules tested, REC-4881 rescued phenotypic defects substantially better (including better rescue than other MEK inhibitors) for APC specific knockdown
- Findings validated in tumor cell lines and spheroids grown from human epithelial tumor cells with *APC* mutation
  - 1,000x more selectivity in tumor cell lines with *APC* mutation
  - Inhibited growth and organization of spheroids

Clinical: FAP

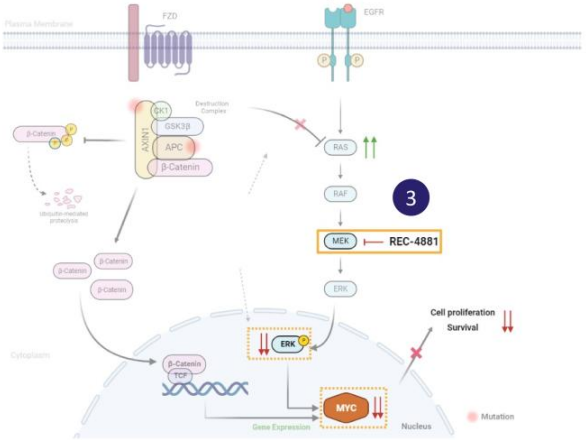
# MoA : REC-4881 Blocks Wnt Mutation Induced MAPK Signaling

**Orally Bioavailable, Small Molecule MEK Inhibitor**

**Disease State**




**REC-4881 Impact**




3 REC-4881 inhibits MEK 1/2 and recovers the destabilization of RAS by the β-Catenin destruction complex, restoring the cell back to a Wnt-off like state

*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).*

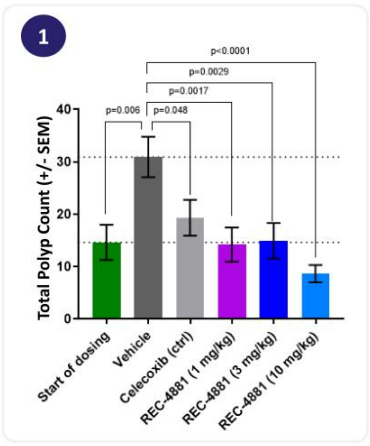
Clinical: FAP

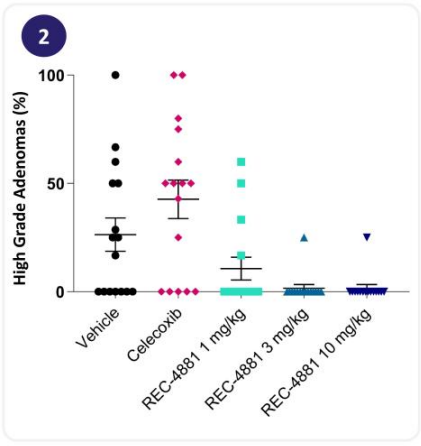
# Further Confidence : Preclinical Studies Confirming Reduction in Polyp Count and High-Grade Dysplasia

- In-vivo efficacy in APCmin mouse model
- $Apc^{min}$ = FAP disease model
- Mice treated once daily for 8 weeks

After 8 weeks of treatment:

1. ↓ Polyp Count
2. ↓ High-Grade Dysplasia




*APC, adenomatosis polyposis coli; ERK, extracellular signal-regulated kinase; FAP, familial adenomatous polyposis.*

Clinical: FAP

# Further Confidence : Clinical Data Generated by Recursion

**REC-4881-101: Single-center, double-blind, placebo-controlled, dose-escalation study in healthy volunteers**

- Group 1 (n=13): Food effect crossover (REC-4881 4 mg/PBO [fed/fasted]), followed by single dose REC-4881 8 mg/PBO [fed]
- Group 2 (n=12): Matched single ascending dose (REC-4881 4 mg/PBO; REC-4881 8 mg/PBO; REC-4881 12 mg/PBO)

**Accomplished**

- Recursion formulation yields exposures comparable to Takeda's formulation (molecule in-licensed from Takeda)
- No food effect
- Dose proportional increases in exposure
- Similar to C20001 study, observed pERK inhibition (i.e., target engagement) at 8 mg and 12 mg doses
- Acceptable safety profile

*Note: AE, adverse event; MEK, mitogen-activated protein kinase; NHV, normal healthy volunteer; pERK, phosphorylated extracellular signal-regulated kinase; SAE, serious adverse event.*

# **REC-4881** *for* Familial Adenomatous Polyposis (FAP)

## Target Product Profile:

**Population** specific for germline *APC* patients.
*First precision targeted approach*

**Differentiated** profile versus other MEKs.
*Low clearance and minimal hepatic metabolism*

**Acceptable** safety profile consistent vs other MEKs.
*5 FAP patients treated in Part 1 of TUPELO*

**Drug-like** properties support oral dosing QD.
*Target engagement observed at 4mg*

# REC-4881 for Familial Adenomatous Polyposis (FAP)

**First-in-disease opportunity in FAP with a potential best-in-class MEK 1/2 inhibitor**

| | |
|---|---|
| **Program Overview** | • Orally bioavailable, small molecule non-ATP competitive allosteric inhibitor of MEK 1/2 in Phase 2 (TUPELO)<br>• REC-4881 appears more active versus approved MEK inhibitors in disease relevant preclinical models<br>• Fast Track Designation in FAP granted by FDA in 2022 |
| **Clinical Updates** | • Part 1 completed with 4 mg QD generally well-tolerated and safety profile consistent with other MEK inhibitors<br>• Early PD data indicates 4 mg is pharmacologically active – Part 2 protocol updated to dose escalation / expansion<br>• Efficacy will evaluate change in polyp burden relative to baseline at 12 weeks |
| **Near-term Catalysts** | • FPI for Part 2 expected H1 2024<br>• Phase 2 readout (safety, preliminary efficacy, pharmacokinetics) anticipated H1 2025 |
| **Commercial Opportunity** | • ~ 50,000 FAP patients in US and EU5 eligible for treatment with no approved therapies<br>• Opportunity to treat moderate-to-severe population to potentially delay or prevent surgical intervention |
| **IP & Exclusivity** | • ODD in US and EU provides 7 and 10 years, respectively, of market exclusivity following approval<br>• No known barriers to market access |

# **REC-4881** for the Treatment of Solid Tumors with AXIN1 or APC Mutant Cancers

| | |
|---|---|
| **Target / MOA** | MEK Inhibitor |
| **Molecule Type** | Small Molecule |
| **Lead Indication(s)** | Solid Tumors with AXIN1 or APC Mutant Cancers |
| **Status** | Phase 2 |
| **Source of Insight** | Recursion OS |

Clinical: AXIN1 or APC

# Disease Overview : *AXIN1* or *APC* Mutant Cancers

Gross morphology of HCC tumor

- **Sustained Wnt signaling** is a frequent driver event found across a wide variety of solid tumors
- Dysregulation of β-catenin destruction complex due to inactivating mutations in *AXIN1* or *APC* **leads to sustained Wnt signaling promoting** cancer progression and survival[1]
- *AXIN1* or *APC* **mutant solid tumors** are considered clinically aggressive and resistant to standard treatments

**"Nothing in HCC has immediate therapeutic relevance and the most common mutations are TERT, TP53, and Wnt (CTNNB1/AXIN1/APC) and combined these alterations define almost 80% of patients and are not targetable"**

**- KOL,** Clinical Investigator, Texas

[1] *Bugter, J.M., et al. Nat Rev Cancer, 2021, 21, pp.5-21*

Clinical: AXIN1 or APC

# Disease Overview : *AXIN1* or *APC* Mutant Cancers

| Tumor Type | *AXIN1* Mutation Frequency[1] | *APC* Mutation Frequency[1] | Treatable Population[2] (US+EU5) |
|---|---|---|---|
| **CRC** | 3% | 70% | 27,450 |
| **LUAD** | 4% | 11% | 14,000 |
| **Prostate** | 2% | 11% | 6,700 |
| **Bladder** | 3% | 8% | 5,100 |
| **HCC** | 12% | 5% | 3,100 |
| **Endometrial** | 8% | 12% | 2,600 |
| **Esophageal** | 2% | 7% | 2,600 |
| **PDAC** | 1% | 2% | 1,500 |
| **Ovarian** | 1% | 3% | 1,400 |
| **TNBC** | 1% | 2% | 300 |
| | | | **~65,000** |

**Flexible Patient Selection Strategy and Study Design**

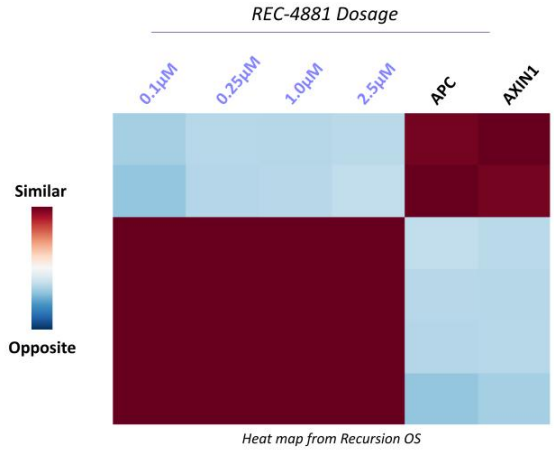
- *AXIN1* and *APC* genes covered by commercially available NGS panels and liquid biopsy detection assays
- FDA guidance supports utility of ctDNA as patient selection for the detection of alterations for eligibility criteria and as a stratification factor for trials enrolling marker-positive and marker-negative populations[3]
- Multiple tumor types will inform study design and patient selection

Preclinical data with REC-4881 at clinically relevant exposures in HCC and Ovarian PDX mouse models gives confidence to pursue other mutant cancer types

[1] *Obtained from cbioportal.org.* [2] *Represents 2L treatable population estimates; obtained from DRG.* [3] *https://www.fda.gov/media/158072/download*

Clinical: AXIN1 or APC

# Insight from OS : Novel Insight around Established MoA




*Heat map from Recursion OS*

**Hypothesis:** Rescue of *AXIN1* may impact tumor progression and/or restore checkpoint sensitivity in cancers driven by *AXIN1* loss

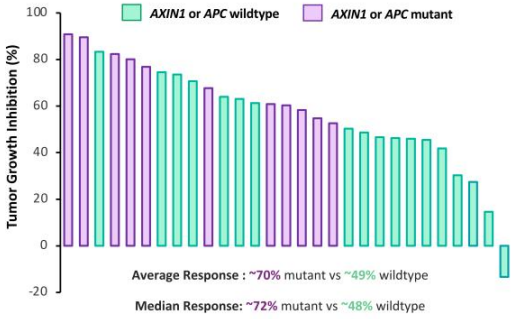
**Recursion Differentiation:** REC-4881 rescues tumor suppressor genes *APC* and *AXIN1*

- *APC* and *AXIN1* are negative regulators of Wnt signaling
- Both proteins form part of the B-catenin destruction complex. Strong clustering suggests map recapitulation of this biology

Clinical: AXIN1 or APC

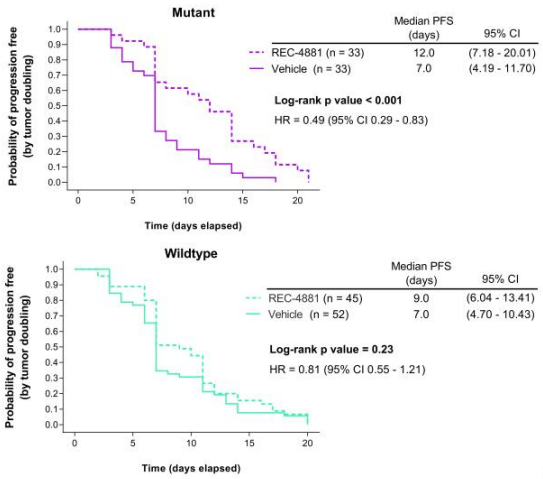
# Further Confidence : Preclinical Studies Confirming Insight

**Efficacy found in PDX Models …**




- Significantly greater antitumor activity observed with REC-4881 in mutant models versus wildtype
- Majority of mutant models ≥ 60% tumor growth inhibition, which is considered a benchmark for a response in the clinic[1]

**… Led to Significant Progression Free Survival**







*Note: REC-4881 dosed at 3 mg/kg QD for up to 21 days. 3 mice per treatment per model (3 x 3 x 3) design. [1] Wong, H., et al. Clin Cancer Res, 2012, 18:14, pp.3846-3855*

# **REC-4881** *for AXIN1 or APC* mutant cancers

## Target Product Profile:

**Potential** to obtain tumor agnostic label.
*First in disease opportunity*

**Differentiated** versus other MEKs.
*Low clearance and minimal hepatic metabolism*

**Acceptable** safety profile versus other MEKs.
*51 solid tumor patients treated in Phase 1*

**Drug-like** properties support oral dosing QD.
*Pharmacologically active at low doses*

# REC-4881 for AXIN1 or APC Mutant Cancers

**First-in-disease opportunity in AXIN1 or APC mutant cancers with a potential best-in-class MEK 1/2 inhibitor**

| | |
|---|---|
| **Program Overview** | • Orally bioavailable, small molecule non-ATP competitive allosteric inhibitor of MEK 1/2 in Phase 2 (LILAC)<br>• First therapeutic candidate advanced to a Phase 2 signal finding study in AXIN1 or APC mutant cancers<br>• Utilizing Tempus and FMI clinical trial solutions for patient identification and enrollment |
| **Clinical Updates** | • Safety run-in of REC-4881 to identify RP2D prior to allocation<br>• Protocol designed to assess activity in two independent cohorts of AXIN1 or APC mutant tumors<br>• Efficacy will evaluate ORR as measured by RECIST 1.1 |
| **Near-term Catalysts** | • FPI expected in Q1 2024<br>• Phase 2 readout (safety, preliminary efficacy, and PK) anticipated H1 2025 |
| **Commercial Opportunity** | • ~ 65,000 *AXIN1* or *APC* mutant patients in 2L in US and EU5 eligible for treatment with no approved therapies<br>• AXIN1 and APC genes covered by commercially available NGS panels and liquid biopsy detection assays |
| **IP & Exclusivity** | • Method of use patent pending with protection until 2043 (excluding extensions)<br>• No known barriers to market access |

# **REC-3964** for the Prevention of Recurrent *C. difficile* Infection (rCDI)

| | |
|---|---|
| **Target / MOA** | Selective *C. difficile* Toxin Inhibitor |
| **Molecule Type** | Small Molecule |
| **Lead Indication(s)** | Prevention of rCDI |
| **Status** | Phase 2 |
| **Source of Insight** | Recursion OS |

Clinical: *C. difficile*

# Disease Overview : *C. Difficile* Infection (CDI)

Colleen – lived with rCDI

## Patient Population – Large, Diagnosable and Easy to Identify

- Symptoms caused by clostridioides difficile tissue-damaging toxins released in the colon
- Patients who experience >3 unformed stools are diagnosed via NAAT* for toxin gene or positive stool test for toxins
- Patients who are at highest risk are those on antibiotics, and frequently visit hospitals or are living in a nursing home
- More than **80% of cases** occur among patients **age 65** or older

## Large, Unmet Need with Significant Cost Burden

- RCDI** occurs in **20-30% of patients treated with standard of care**
  - 40% of those patients will continue to recur with 2+ episodes
- **>29,000 patients** die in the US each year from CDI
- Cost burden of up to **$4.8bn annually**

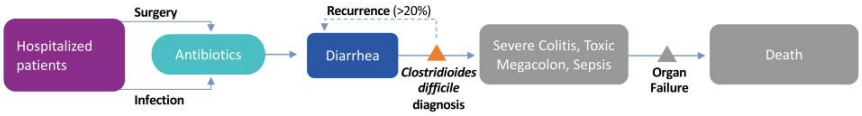
**~730,000** **Diagnosed US + EU5 patients**

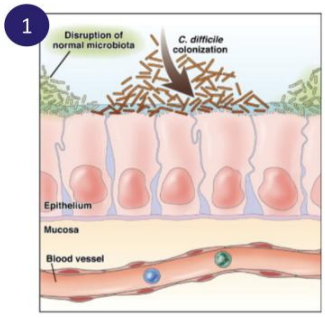
*Source, CDC *NAAT = Nucleic Acid Amplification Test; **rCDI = recurrent CDI*

Clinical: *C. difficile*

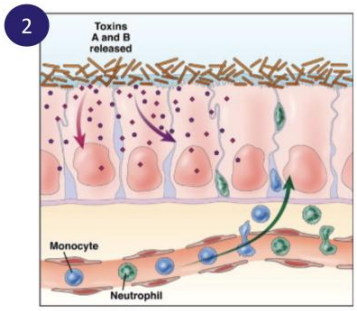
# Disease Overview : *C. Difficile* Infection (CDI)

***C. Difficile*** **is the leading cause of antibiotic-associated diarrhea**

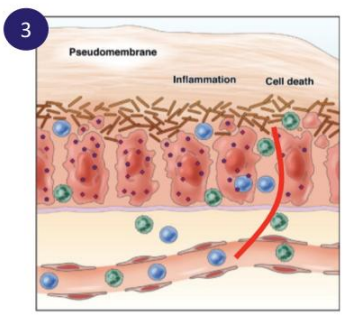



**Disruption of microbiota and colonization of** *C. diff*




*Release of C. diff toxins*

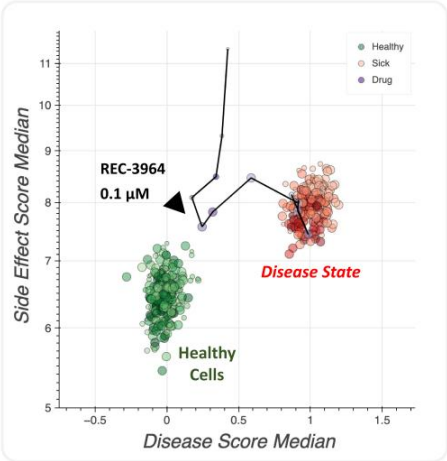



*Degradation of colon cell junction & toxin transit to bloodstream*

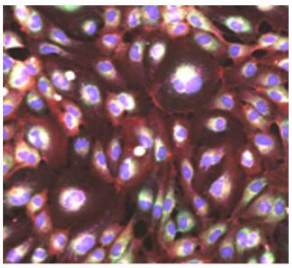
*Source: McCollum, D., Rodriguez, JM . Detection, Treatment, and Prevention of Clostridium difficile Infection. Clinical Gastroenterology and Hepatology 2012 Mar 19. https://doi.org/10.1016/j.cgh.2012.03.008*

Clinical: *C. difficile*

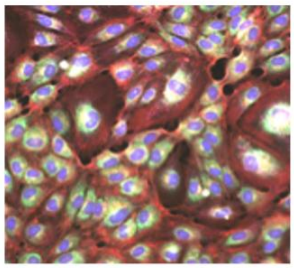
# Insight from OS : REC-3964 Rescued Cells Treated with *C. difficile* Toxins




**REC-3964 identified as a NCE that demonstrated strong rescue in HUVEC cells treated with *C. difficile* toxin**



*C. difficile* toxin B phenotype



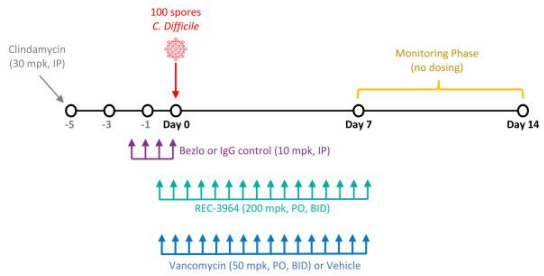
Healthy Control

Clinical: *C. difficile*

# Further Confidence : Preclinical Studies Confirmed Recursion OS Insight

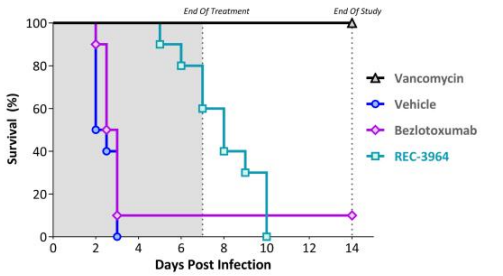
## REC-3964 is Superior to Bezlotoxumab in a Human Disease Relevant CDI Hamster Model

**Schematic representation of timelines for CDI model**




- N = 10 hamsters per group
- *C. difficile* strain 630 was used as genetic experiments confirmed virulence via toxin B[1]
- Clinical observations were conducted from Day 0 to Day 7, with surviving animals monitored until Day 14

**REC-3964 significantly extended survival over SOC**




- REC-3964 potently inhibits toxin B with residual activity against toxin A, while bezlotoxumab is specific to toxin B.
- Significant difference in probability of survival vs bezlotoxumab alone at the end of treatment (**p<0.001**, log-rank test)

[1] *Lyras, D, et al. Nature, 2009, 458, pp.1176-1179.*

Clinical: *C. difficile*

# Further Confidence : Clinical Studies Confirming Safety

**REC-3964 was well-tolerated with no treatment-related SAEs**

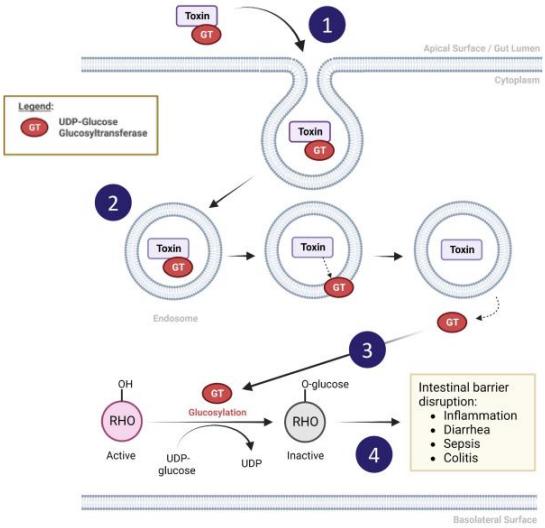
| MAD Study | Placebo (N=8) n ( %) | 100 mg (N=10) n ( %) | 300 mg (N=8) n ( %) | 500 mg (N=8) n ( %) | 900 mg (N=8) n ( %) | REC-3964 Overall (N=34) n ( %) | MAD Overall (N=42) n ( %) |
|---|---|---|---|---|---|---|---|
| Total Number of TEAEs | 17 | 24 | 5 | 9 | 7 | 45 | 62 |
| Total Participants with ≥ 1 TEAE | 6 ( 75.0) | 8 ( 80.0) | 4 ( 50.0) | 5 ( 62.5) | 4 ( 50.0) | 21 ( 61.8) | 27 ( 64.3) |
| **Relationship to Study Drug** | | | | | | | |
| Not Related | 4 ( 50.0) | 6 ( 60.0) | 3 ( 37.5) | 4 ( 50.0) | 4 ( 50.0) | 17 ( 50.0) | 21 ( 50.0) |
| Related | 2 ( 25.0) | 2 ( 20.0) | 1 ( 12.5) | 1 ( 12.5) | 0 | **4 ( 11.8)** | 6 ( 14.3) |
| Abdominal Distension | 2 ( 25.0) | 1 ( 10.0) | 1 ( 12.5) | 1 ( 12.5) | 0 | 3 ( 8.8) | 5 ( 11.9) |
| Flatulence | 0 | 1 ( 10.0) | 0 | 0 | 0 | 1 ( 2.9) | 1 ( 2.4) |
| **Severity** | | | | | | | |
| Grade 1 | 6 ( 75.0) | 8 ( 80.0) | 4 ( 50.0) | 5 ( 62.5) | 4 ( 50.0) | 21 ( 61.8) | 27 ( 64.3) |
| Grade 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grade ≥ 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Number of SAEs** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Discontinued Study Drug Due to AE** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*TEAEs = treatment emergent adverse events; Grade 1 = Mild, Grade 2 = Moderate, Grade 3 = Severe, Grade 4 = Life Threatening, Grade 5 = Fatal*

Clinical: *C. difficile*

# REC-3964 : Selective Inhibitor of *C. difficile* Toxins

**REC-3964 is Recursion's 1st Small Molecule NCE to Reach the Clinic**




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

1. CDI toxins bind to cell surface receptors and trigger endocytic event
2. Autocatalytic cleavage event releases CDI toxin's glucoyltransferase enzymatic domain into the cytosol of the infected cell
3. The glucosyltransferase locks Rho family GTPases in the inactive state
4. Inactivation of Rho GTPases alters cytoskeletal dynamics, induces apoptosis, and impairs barrier function which drives the pathological effects of CDI

Clinical: *C. difficile*

# REC-3964 : Selective Inhibitor of *C. difficile* Toxins

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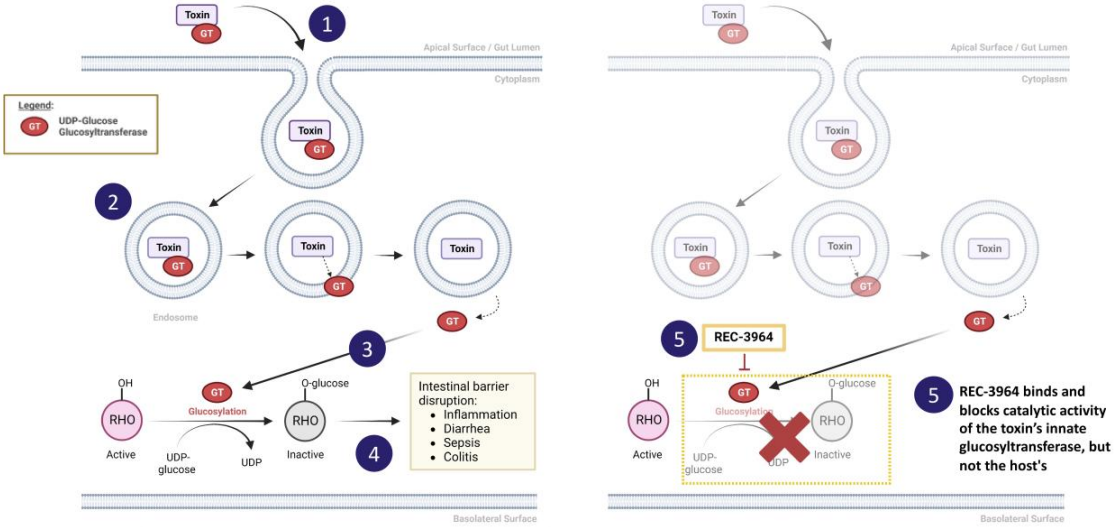



*Adapted from Awad, MM. et al. (2014). Clostridium difficile virulence factors: Insights into an anaerobic spore-forming pathogen. Gut Microbes. 5(5), 579-593.*

# **REC-3964** *for*

## Prevention of recurrent *C. difficile* infection (rCDI)

### Target Product Profile:

**Population** addresses high unmet need.
*Targeting patients with recurrent CDI*

**Differentiated** mechanism of action.
*Host independent and bacterial toxin selective*

**Well-tolerated** with no DLTs or SAEs in Phase 1.
*No treatment-related discontinuations*

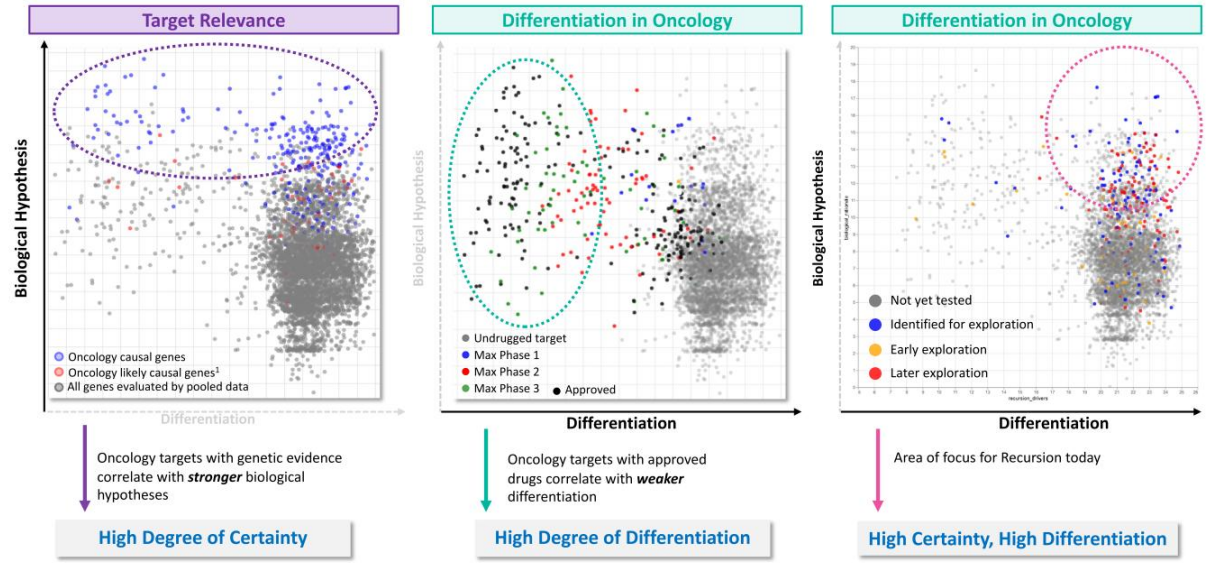
**Drug-like** properties support oral dosing BID.
*Therapeutic exposures observed in humans*

# REC-3964 for Prevention of recurrent *C. difficile* infection (rCDI)

**First-in-class potential for prevention of rCDI**

| | |
|---|---|
| **Program Overview** | • Orally bioavailable, small molecule C. difficile toxin inhibitor and the first NCE developed by Recursion<br>• Differentiated MOA selectively targets bacterial toxin while sparing the host to minimize adverse events<br>• Robust preclinical efficacy demonstrating superiority vs bezlotoxumab in the gold standard hamster model |
| **Clinical Updates** | • Favorable safety and tolerability profile in Phase 1 dose-escalation with no DLTs and no SAEs<br>• Minimal adverse events seen in Phase 1, and all deemed Grade 1<br>• BID dosing provides therapeutic exposures expected to reach targeted trough concentrations |
| **Near-term Catalysts** | • Full Phase 1 data to be presented at a medical conference in H1 2024<br>• Phase 2 proof-of-concept study planned for initiation in 2024 |
| **Commercial Opportunity** | • > 100,000 high-risk rCDI patients in US and EU5 with limited treatment options to prevent recurrent disease<br>• Ability to address populations not eligible for FMT or microbiome-based therapies due to comorbidities |
| **IP & Exclusivity** | • Composition of matter patent allowed with protection until 2042 (excluding extensions)<br>• No known barriers to market access |

# Benchmarking Strategy for Program Prioritization




*Sources: Independent cancer gene census dataset COSMIC (738 genes). Open Targets*