Hebbian Bio, Inc.
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Industry: Therapeutics & Companion Diagnostics

Management:
Founder & CEO: Hourinaz Behesti, PhD in Dev Biology (UCL), Postdoc in Neurobiology (Rockefeller University)

Seeking to fill additional roles

Board: Seeking members

Scientific/Technical Advisory Board:
Mary E Hatten, PhD. Professor of Neurobiology, The Rockefeller University

Taha Havakhor, PhD. Associate Professor of Information Systems, McGill University

Business & Operations Advisory Board
Michael Roberts, PhD. Founder & former COO of Synpromics

Thomas Brennan, MSc. Serial entrepreneur with multiple exits

Amir Hosseini Rad, BEng. Ex-Google product manager. Founder of stealth tech company

Number of full-time employees:
Full-time: 1
Consultants: 2

Funding to Date:
Founder & SAB: $10,000
Paid pilot: $15,000

Financing Sought: $900K
For: Building the Hebbian Atlas
Validating targets
R&D
Filing 2nd patent
Operating Costs

IP:
TDB

Legal:
TDB

Business Description / Company Background:
Incorporated in July 2023 as a Delaware C-Corp, Hebbian Bio was founded upon a unique biological insight supported by publications, grants, and awards, as well as close interactions of the Founder with rare disease patient organizations. We are building a precision platform that enables therapeutics and companion diagnostics for central nervous system (CNS) disorders. We will initially develop drug targets through external partnerships with biotech/pharma followed by internal development of therapeutics in the next phase. Our initial indications are single-gene forms of autism/neurodevelopmental disorders (NDD). Our novel approach to target discovery for CNS disorders combines spatial mapping technology for protein networks in subtype-specific neurons derived from patients' own induced pluripotent stem cells, with machine learning and patient stratification. We generate in-house datasets (the Hebbian Atlas) and identify shared targets for multiple related NDDs. This enables a basket trial approach for multiple rare NDDs to treat larger patient numbers. As the Hebbian Atlas grows, it enables tackling of not only monogenic diseases, but also genetically complex CNS disorders.

Market Opportunity / Unmet Need:
50M children (3.3M in the US alone, NIH statistics) suffer from debilitating rare neurodevelopmental disorders caused by single gene mutations (our first indications). This population grows by 4.4% every year. 95% of the patients have no approved treatment options and there is an urgent unmet need for therapeutics that improve the quality of life of these patients and their caregivers. The total CNS therapeutics market size is currently estimated at $113B/yr with a CAGR of 6.3%. Licensing expenditure in the CNS space was $15B in 2020. We aim to capture parts of this expenditure as revenue. With nearly 3000 orphan NDDs, our approach is readily scalable.

Products / Services – Launched & Pipeline:
Our machine learning pipeline identified a novel candidate target in Q3 2023, that is shared among 4 NDDs. We have traction for our stem cell-based platform for target and biomarker discovery with patient organizations and have secured our first paid pilot. We plan to initiate target discovery collaborations with pharma companies in Q2 2025 as we scale and industrialize the Hebbian Atlas to identify targets and biomarkers for licensing.

Commercial / Technical Milestones:
1) Created machine learning pipeline and tested on an existing Rett Syndrome protein dataset, which identified MECP2 (the causative gene) and another novel candidate target backed by human genetic data (Q3 2023), 2) Generated the first NDD patient surface proteomic dataset (Q1 2024), 3) Obtained first paid pilot to map an NDD (Q1 2024), 4) Secured access to 35 patient induced pluripotent stem cells (iPSC) lines, 5) Established partnerships with four clinical trial ready patient organizations. These partnerships grant us access to patient cell lines, clinical information, and key opinion leaders (KOLs). Filed first patent (Q2 2024).
Ongoing: 1) End-to-end validation of platform (Q2 2024), 2) File 2nd method patent (Q4 2024), 3) Scale Atlas to five related NDDs (indications selected), identify patient protein signatures and validate in human tissue. 4) Initiate pharma collaboration discussions (Q2 2025).

Competition / Competitive Advantages / Customer Benefits:
We are a CNS platform company with an initial focus on accelerating the development of therapeutics for the 50M children diagnosed with NDDs (including autism). Our competitive advantage is a unique combination of advanced stem cell models of the human brain and a focus on a cellular layer that we discovered to be critically implicated in these conditions, using spatial proteomics. Unlike other multi-omics approaches, our approach is targeted (reduces time to discovery and overall costs), granular, and takes into account the dynamics of biology. Among other CNS platform companies, we are uniquely focused on cell surface biology. Another competitive advantage is our established partnerships with rare disease patient organizations, who are motivated commercialization partners and the end-users. The rare disease space offers lucrative regulatory and commercial incentives for faster go-to-market timelines and exclusivity.

Financial Forecast: Our business model is in two phases. In the first phase, we will generate revenue through licensing of data and targets to pharma companies. Recent examples of target (not drug) licensing deals in the CNS space include a $650M deal between Verge Genomics and AstraZeneca, and a $12B deal between Recursion and Roche/Genentech.