



2023 Hopewell M.I.N.D. Prize Finalists



Finalist: [Dr Deborah Kurrasch](#)

Bio: Dr Deborah Kurrasch is a Professor in the Department of Medical Genetics at the University of Calgary and a Scientist in the Alberta Children's Hospital Research Institute and the Hotchkiss Brain Institute. Dr Kurrasch's research is focused on characterizing the genetic programs that govern hypothalamic development, and how exposure to environmental chemicals changes these programs, using zebrafish, mice and human brain organoids as model organisms. Her lab has also developed a drug screening platform to uncover therapies for children with refractory epilepsy. Her work is funded by the Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Canadian Foundation for Innovation, among other foundations.

Dr Kurrasch received her PhD in Molecular Pharmacology from Purdue University and conducted two postdoctoral fellowships, one at the University of Texas – Southwestern Medical Center in Dallas and one at the University of California – San Francisco. Dr Kurrasch has received various awards for her scholarly work and supervision of graduate students, most recently receiving the ASTech Women in Innovation award, 2021.

Dr. Kurrasch is the CEO and co-founder of Path Therapeutics. Path Therapeutics is a drug discovery company with platform technology that enables the rapid identification and validation of new targets, with an initial focus on brain disorders.

Proposal Title: The neurobiology and drug discovery of psychedelics

Summary:

In the 1970s, government regulatory agencies declared psychedelic compounds, such as psilocybin and LSD, as possessing 'no currently accepted medical uses', causing this field to go underground for half a century. Today, the use of psychedelics in mental health treatment is gaining renewed attention as a promising approach. Via mechanisms that are not fully understood, psychedelics alter the manner in which internal psychogenic stimuli can be interpreted, thereby creating an opportunity for the patient to reposition long-held negative beliefs. Indeed, small, open label studies show upwards of 70% of users display clinical benefit across a myriad of diseases, including depression, anxiety, post-traumatic stress, addiction, eating disorders, and terminal illness.

Psilocybin is the psychoactive ingredient in 'magic mushrooms' and is the leading contender for clinical use. Despite its positive advantages over other psychedelics, its pharmacological profile is not perfect. For example, a full-dose experience usually lasts more than six hours, which occupies clinicians time and hinders scalability. Additionally, lower doses or 'micro-doses' of psilocybin lack the cognitive enhancing capabilities to assist in therapy. Finally, the hallucinogenic trips can be varying and sometime veer into dark places, which limits effectiveness and requires the full-time presence of



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trained professionals to prevent self-harm. Thus, urgency exists to synthesize a 'sweet spot' psychedelic, one with a shorter length of trip and milder experience but still effective in opening the brain's networks.

We have identified such a compound. Our prototype allows the clarity of thinking and open mindset required for easy articulation of problems, and only lasts a few hours in duration. We have assembled a team of chemists, pharmacologists, neurobiologists, and psychiatrists to move this class of compounds forward into the clinic. In this MIND prize application, we propose two workplans: WP1 to synthesize analogs of this compound and conduct an iterative process of structure-activity optimization to identify the best candidate for eventual Phase I clinical trials; and WP2 to use these analogs and other structurally related but psychedelically distinct compounds to study their neurobiology in human brain organoids to reveal novel pathways that might be informative to identify other classes of psychoactive drugs. The overarching goal of this proposal is to advance the use of psychedelics in the clinic for the treatment of mental health.