

Hopewell M.I.N.D. Prize Finalists

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Project Title: Exploring the role of psychedelics as an early stage intervention for Alzheimer's Disease

Today, over seven million people in North America are living with Alzheimer's dementia, and the number is rapidly increasing. Alzheimer's disease (AD) causes significant emotional and financial strain on patients and their caregivers. Despite many attempts, current drug treatments have not been successful in helping those suffering from this disease. Years ago, scientists suggested that the early brain changes in AD start in a part of the brain called the Dorsal Raphe Nucleus (DRN), which contains serotonin producing cells. Serotonin is a brain chemical that is highly important for controlling mood and thinking. Although there is a link between serotonin problems and the first signs of AD, this area has not been studied much because we lacked the right technology and animal models.

Here, we propose that a low dose of the psychedelic psilocybin, which is similar to serotonin and works by binding to brain's serotonin cells, could be a promising early treatment for AD. Our pilot data show impairments in serotonin cells in brains of Alzheimer's patients in the early stage of their disease. Based on this information, we developed a mouse model that mimics these early changes, leading to behaviour problems seen in Alzheimer's long before dementia is diagnosed. With the help of Dr. Shaista Jabeen, a newly recruited postdoctoral researcher, we will use advanced techniques to test psilocybin's potential as both an early and late-stage treatment in our mouse model. Working with mouse models will also allow us to take a deeper look into the brain and determine differences in brain connectivity and gene expression in the regions affected early in AD.

This research aims to understand if microdosing psilocybin can improve brain connectivity issues that appear early in the disease and may be responsible for brain-wide spread of disease specific changes. The results of the proposed experiments have an immense potential to lead to groundbreaking treatment strategies for AD.