TITLE: *The development of the neural architecture supporting memory*

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RESEARCH PROJECT DESCRIPTION

While developmental disorders are associated with profound cognitive impairments, how normal memory function develops is still not understood. This lack of understanding precludes the identification of therapeutic strategies for optimizing cognitive outcomes in individuals afflicted with Down's Syndrome, Fagile X and other developmental disorders. We understand that neural connections and the dynamic activity that support memory encoding are honed and developed after birth. The goal of the current project is to investigate the engagement of neural activity in a rodent model of development at different time points following birth. We expect that neurons will initially be minimally engaged in an object-exploration task, but rapidly becoming engaged within the first three weeks of life. As neurons transcribe genes into RNA following activity (trains of action potentials), we will assess regional brain function using "cellular compartment analysis of temporal activity by fluorescence in situ hybridization (*catFISH*)". This approach permits the investigation of development from genes-through networks-to behavior. The medical student will have the opportunity to assist in animal behavior, become proficient in *in situ* hybridization, collect imaging data and quantify the activity of neurons across temporal lobe regions as a function of age in an R01-funded laboratory.