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Establishing a translational platform for studying sensory processing in neurodevelopmental disorders

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Establishing a translational platform for studying sensory processing in neurodevelopmental disorders

Background

Developmental disorders such as developmental language disorder (DLD) or autism spectrum disorder (ASD) disrupt the normal development and maturation of our auditory or hearing system during early life. Proper development of the auditory system depends on accurately processing sound and other information. Long-term consequences of developmental auditory deficits can be profound, often extending from disruptions in how sound is perceived to learning and language impairments.

Over the past decade, increasing attention is being applied to sensory processing deficits and structural and functional deficits in developmental disorders like ASD. Separately, a variety of rodent models have been developed to try to understand the cellular mechanisms that may underlie particular autism-related changes in sensory processing.

The Problem

Despite these advances, very little progress has been made in the direct translation between mechanistic studies in rodents and the complex behavioural profiles observed in individuals with ASD or DLD. We remain far from understanding the cellular mechanisms that contribute to sensory processing and the related behavioral symptoms observed in ASD/DLD.

Our project aims to bridge studies in animal models and children with ASD/DLD by developing comparable behavioural tests of sensory reactivity and sensory perception in animal models and patients, in order to provide the tools to explore underlying mechanisms and to test both pharmacological and behavioral therapeutic interventions.

The Project

The causes for ASD and DLD are many, complex and largely unknown. One specific cause already identified is mutation of a single gene essential for neuronal development. A useful transgenic rat model has been developed with this mutation that exhibits disabilities very reminiscent of children with ASD or DLD. We will use it to demonstrate that the same tests can show the same disruptions to the auditory system between children with ASD/DLD and this rat model. This model can then be used to undertake further exploration of the impact of ASD/DLD on the auditory system and evaluation of possible behavioural and pharmacological interventions.

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Western Faculty, Group or Institution

Schulich School of Medicine & Dentistry, Department of Anatomy & Cell Biology

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