2018 Talent Development Competition Awardees

Title: Multi-modal MRI Investigation of Function and Structural Connectivity Related to Neurodevelopmental Disorders

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Abstract: Children with neurodevelopmental disorders (NDDs), including autism spectrum disorder (ASD), obsessive-compulsive disorder (OCD) and attention-deficit/hyper activity disorder (ADHD) feature overlapping clinical symptoms, including impaired daily functioning. Recently we found a relationship between everyday functioning and the structure of the main wiring connecting left and right sides of the brain, called the corpus callosum, in children with NDDs. This relationship was seen across different NDDs and suggests that the same structural changes in the brain relate with everyday functioning, regardless of diagnosis. However, because brain structure influences the function of the brain, we predict that structural changes in wiring would impact behaviour through related changes in brain function. In the present study, we will use a uniquely large local dataset of children, adolescents and young adults with NDDs (the Province of Ontario Neurodevelopmental Disorders [POND] dataset) to investigate how changes in corpus callosum structure influence brain functioning and relate to behaviour. Findings of the relationships between brain properties and behaviour will also be examined in an independent European sample (COMPULS) to see if our findings in POND extend to an independent sample of young people with NDDs. Identification of specific brain properties that relate to behaviour across children with different NDDs would be transformative to efforts to better understand factors contributing to impairment in children with NDDs and will yield new opportunities to develop treatments that can improve everyday functioning across children with different NDDs.