Research project summary

# Role of cerebrovascular abnormalities in the pathophysiology of autism spectrum disorders

- Principal Investigator: Baptiste Lacoste
- Awarded $906,525 from the Canadian Institutes of Health Research (CIHR) in January 2018

Autism spectrum disorders (ASD) alter the child's development, affecting motor skills and social interactions. Genetic anomalies (mutations) have been identified as possible origins for ASD, leading for instance to delays in the maturation of neurons. About 1% to 2% of children worldwide have been diagnosed with ASD, but the causes of ASD remain enigmatic. Brain maturation heavily depends on a steady supply of oxygen and nutrients from the blood stream. As such, key vascular features ensure proper brain maturation: the growth of blood vessels, the maintenance of blood vessel permeability, and the regulation of blood flow. Early life impairments in these vascular features will alter the normal course of brain development. Very few studies have investigated the possible contribution of vascular deficits to this group of disorders. Several studies suggested a link between ASD and altered cerebral blood flow, and a recent postmortem study using brains of young ASD patients suggested a possible impairment in the formation of brain blood vessels. But these observations have not been thoroughly verified, nor tested in a robust animal model of the disease. As a result, involvement of the brain vasculature to the onset and/or progression of ASD remains to be elucidated. We propose to address this gap of knowledge by thoroughly investigating 1) the health of the brain vasculature in a genetically-engineered animal model of ASD, and 2) the consequences on neuronal development when only brain blood vessels (not neurons) are affected by a known, ASD-associated mutation. Our goal is to test novel questions: How do blood vessels develop in the ASD brain? What role(s) do vascular deficits play in the progression of ASD? Our research program proposes a new angle to ASD research, providing novel insight into the involvement of brain blood vessels in ASD. Identification of new players in ASD pathogenesis is essential to develop new therapeutic strategies.

Back to summary of all grants awarded to The Ottawa Hospital in this competition (January 2018)