

## **STEM CELLS-DERIVED EXTRACELLULAR VESICLES**

### **Repair of brain injury after neonatal stroke**

Perinatal arterial ischemic stroke is a major cause of CP, but no effective treatments currently exist. Stem cell therapy has emerged as a potential but the exact mechanisms of their action is insufficiently understood and there are multiple concerns for long-term adverse effects. This very innovative project will determine if extracellular vesicles released from mesenchymal stem cells provide therapeutic effects in an animal model of neonatal stroke and cerebral palsy, the first step in preparation for clinical trials.

#### **PROJECT BACKGROUND**

A recently discovered *novel principle of cell-cell communication*, via release and uptake of extracellular vesicles (EVs), has changed the perception of drug targets. EVs may prompt the production and delivery of substances critical for repair of injured brain tissue. Therapeutic potential for MSC-derived EVs in neonatal stroke is unknown. Using novel advanced technology (ImageStreamX) and mass-spectrometry, we will characterize EVs and their cytokine and lipid "cargo". Secondly, using a unique neonatal rodent arterial stroke model, we will examine long-term functional outcomes of administration of MSC-derived EVs. We will use non-invasive DWI/T2W MRI to randomize injured pups and use longitudinal diffusion-tensor imaging (DTI) to characterize injury progression.



#### **RESEARCHER**

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**FUNDING REQUIRED**

**\$240,500 over 2 years**