Comprehensive Research Experience for Medical Students
Summer Research Program 2018

Supervisor/Project Information Form
Due February 14 2018 by email to crems.programs@utoronto.ca

PLEASE SUBMIT IN WORD FORMAT ONLY. PDF will not be accepted

Supervisor Name: Andrea Kassner

Hospital/Research Institution: The Hospital for Sick Children

Email: andrea.kassner@utoronto.ca

Field of Research (2 keywords): Stroke, neuroimaging

Department: Translational Medicine

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes

If YES, please name: IMS

Project Title: Assessing structural and functional changes in obese children with obstructive sleep apnea using MRI

Brief Project Description (<300 words):
Obstructive sleep apnea (OSA), characterized by snoring, recurrent partial or complete obstruction of the upper airway during sleep. Obese individuals are particularly vulnerable to upper airway obstruction during sleep, with a reported 46% of obese children and adolescents having abnormal sleep studies. Evidence suggests that recurrent nocturnal intermittent hypoxia associated with OSA plays a pivotal role in endothelial dysfunction, which increases the predisposition to cerebrovascular disease. This may first manifest as adverse changes in cerebral blood flow (CBF) and cerebrovascular reserve (CVR), resulting in the hypoperfusion of the brain and subsequent neuronal cell loss cognitive impairment.

Using advanced MRI acquisition and analysis techniques, our lab is investigating the physiological changes that occur in obese children with OSA. We have collected MRI data from a cohort of obese children, with and without OSA, and we would like to perform analysis on this data to derive measures of cortical thickness, CBF, and CVR. These parameters will be compared to measurements taken from overnight polysomnography (PSG) to determine their relation to sleep disturbances in obese children. We will also investigate the potential changes over time with and without clinical treatment using our pool of longitudinal data.

The student will assist with the aforementioned analysis processes on the MRI data and compare them to the PSG measurements. This will involve learning about different physiology-based MRI techniques and the associated quantification processes using established and customized analysis pipelines. The student is also expected to develop a strong understanding of the physiological implications of each measurement in the context of OSA. As such, we expect the student to review the current literature. We also expect the student to present new findings on a regular basis to lab team members and collaborators.