Comprehensive Research Experience for Medical Students (CREMS)  
2022 Supervisor and Project Information Form

Please complete and return via email ONLY to crems.programs@utoronto.ca by February 18, 2022.

**Supervisor Information**

*NOTE: CREMS will not support pre-determined pairings of students and supervisors. Supervisors must agree to open their projects to all students and interview all that are interested.*

**Name:** Lakshmikumar Venkat Raghavan  
**Email:** Lashmi.venkatraghavan@uhn.ca

**Department:** Anesthesia  
**Hospital/Research Institution:** Toronto Western Hospital

**SGS Department(s) (if applicable):**  
Click or tap here to enter text.

**ORCID ID** (see https://orcid.org/ - If you do not have an ORCID ID we encourage you to sign up for one):

0000-0002-1506-7000

**Location of Work:**  
Toronto Western Hospital or Remote

**Field of Research (up to 4 keywords):**  
Anesthesia, Neurosurgery, Patient outcomes, Cerebrovascular disease, stroke

**Student contact time** (number of hours per week YOU are available to the student for any concerns or to review progress):

8-10 hours/week in person or virtually and more frequently via email or phone
Project Information

NOTE: If this project is selected, this information will be posted on CREMS website for interested student applicants to view research opportunities.

PROJECT TITLE:
Effect of Two General Anesthesia Based Regimes (TIVA versus Volatile anesthetics) on Functional Outcome in Patients with Acute Ischemic Stroke Undergoing Endovascular Thrombectomy: A Systematic Review and Metanalysis

PROJECT DESCRIPTION:
Including background, aim(s), methods and significance of the project. Maximum 300 words.

Stroke is a leading cause of mortality and disability worldwide and the economic costs of treatment and post-stroke care are substantial. Endovascular therapy has become the standard treatment for severe acute ischemic stroke (AIS) caused by large-vessel occlusion in the anterior circulation, but the choice of anesthetic technique for ischemic stroke patients undergoing endovascular thrombectomy (EVT) remains controversial. Patients often undergo either general anesthesia (GA) or conscious sedation (CS). Recent randomized controlled trials and systematic reviews have shown that functional outcomes after EVT under GA is comparable to CS.

However, in patients undergoing EVT under GA, some prefer total intravenous anesthetics and other use volatile based maintenance anesthesia. Theoretically, intravenous propofol and volatile inhalational based general anesthetics have varied effects on cerebral hemodynamics, which may affect ischemic brain tissue, penumbra and clinical outcomes. Inhalational agents such as Sevoflurane, uncouples metabolism from the cerebral blood flow(CBF), increasing CBF while reducing metabolic rate (CMR) in a dose dependent nonlinear manner. There is varied discussion and opinions that volatile anesthetics induce cerebral vasodilatation and risk an intracranial steal phenomenon. In contrast, intravenous anesthetic agent Propofol bind to the GABA receptor and increase conductivity to chloride ions leading to hyperpolarization of cell membranes. Thereby decreasing CBF coupled to decreased CMR and is expected to increase CBF to an ischemic area. Currently, we don’t know if one technique is associated with better functional outcome than the other.

Hence, we plan to undertake a systematic review and meta-analysis to address this question and hope that our review would provide guidelines for stroke teams, including the anesthesiologists, regarding specific choice of general anesthetic drugs (TIVA /Volatile) to use during EVT. If we find significant difference in the neurological outcome based on the type of anesthetic agents used, this will open up a new area of clinical science.

This study has already registered with PROSPERO (CRD42021266330). Full study protocol is available at https://www.crd.york.ac.uk/prospero/#searchadvanced
☒ Yes, remote capable  ☐ No
☐ Yes, alternate remote option. Please specify (100 words max): Click or tap here to enter text.

If human subjects are involved, have the appropriate Research Ethics Board approvals been obtained?
☐ Yes  ☐ No  ☒ Not Applicable
If yes, please list the application submission date:

Do you expect this work will be published?
☒ Yes  ☐ No  ☐ Uncertain / Other
**Research Environment and Student Roles and Responsibilities**

Please be specific as possible. Please describe the research environment, including availability of required facilities/equipment/expertise, supervisor’s experience and mentorship plans. Please clearly outline the student role(s) and responsibilities related to the project, potential educational value, and indicate who will serve as the student’s direct report for daily oversight (PI, PHD student, technician, etc.). **Maximum 300 words.**

**Research Environment**

Our research unit is located within the department of Anesthesia at Toronto Western Hospital. Our research team includes anesthesiologists (Dr L Venkatraghavan, Dr Tumul Chowdhury, Dr Michael Dinsmore), Neuroanesthesia fellows, Anesthesia residents, research coordinators and a research manager. Our research team focus on various aspects of clinical neuroscience including patient outcomes after neurosurgery. In 2021, we have published more than 20 peer reviewed manuscripts. Our program has attracted many trainees (summer students, residents and clinical fellows) over the years. Trainees get their experience in all aspects of research methodology including systematic reviews. Our trainees present in various local, national and international meetings. We have once a week research meeting either Wednesday or Friday afternoon.

**Student Mentorship and Training**

Student should have some prior research experience

Basic understanding of anesthesia techniques is highly recommended

Prior knowledge on the basic principle of conducting a systematic review is highly recommended.

We will provide necessary training and resources.

Literature search will be conducted by a professional information specialist.