

Doctoral position available in the lab of Dr. Laura Hulea at the University of Montreal, Canada and the Maisonneuve-Rosemont hospital Research centre.

Project description and applicant information

The research project aims to decipher the cross-talk between gene expression (mRNA translation) and metabolic reprogramming in cancer, and in adaptation to stress, by exploiting a combination of systems biology approaches (i.e. metabolomics, transcriptomics, and translomics [transcriptome-wide collection of actively translated mRNAs]), combined with rigorous validation using standard molecular and cellular biology techniques.

We recently showed that translational alterations underpin metabolic reprogramming that reduces cancer cell sensitivity to clinically used inhibitors of oncogenic kinases and their combinations with energy stressors (i.e. biguanides) (Hulea *et al*, *Cell Met* 2018). Based on these findings, ***we postulate that targeting the translational machinery may alleviate drug-resistance by impeding metabolic reprogramming that allows adaptation of cancer cells to therapy-induced stress.***

The research will consist of ***dissecting the mechanisms underpinning the anti-cancer action of translational inhibitors (against eIF4A and eIF4G) in the context of kinase inhibitor resistance, with the long-term goal of improving kinase inhibitor efficacy in the clinic.***

Graduate positions are available for enthusiastic and driven students wishing to study molecular and mechanisms controlling mRNA translation and metabolism and how it regulates cancer. Applicants with expertise in some or all of these methods: molecular and cellular biology techniques, tissue culture, and xenotransplantation, are encouraged to apply. Experience in bioinformatics, metabolism or mRNA translation is a plus.

About us

We are a young and enthusiastic group looking for people willing to make significant contributions to an innovative research programme in translational and metabolic regulation. High level of participation in a collaborative team setting will be required. We are looking for candidates with a high degree of self-motivation, good time management skills, and an ability to demonstrate creativity and sound judgment. Ability to communicate well in written and spoken English is also desirable.

The lab uses a wide variety of molecular biology and biochemical approaches in cultured mammalian cells, as well as mouse models. Commonly used techniques include: polysome profiling (mRNA translation assessment), mass spectrometry (metabolomics; ¹³C-metabolic tracing), bioenergetic measurements (Seahorse), Western blotting, quantitative RT-PCR, RNA interference, cell biology assays (proliferation, apoptosis, transfection, CRISP/Cas9), molecular cloning. In addition, *in vivo* approaches are used such as xenotransplantation, using both cell lines and human patient derived samples (PDXs).

The Maisonneuve-Rosemont Hospital Research Centre and the University of Montreal provide access to numerous high-quality platforms (metabolomics, flow cytometry, microscopy, polysome fractionation, proteomics, sequencing, etc). Montreal is a culturally vibrant, bi-lingual (French-English) city and was voted as North America's top city for students several years in a row.

How to apply

Please send a cover letter, CV, the name and contact information of 2 referees in a single PDF document to Dr. Hulea (laura.hulea@umontreal.ca). Review of applications will start immediately and will continue until the position is filled.