

Michelle Scott

Investigation of a potential nuclear role for small RNAs in alternative splicing

The human genome encodes approximately 22000 protein-coding genes. Depending on the cell type, the actual protein content varies as controlled not only by gene expression regulation but also through the process of alternative splicing, which allows the production of different proteins from a single gene. Although alternative splicing requires extensive and complex regulation, relatively few such tissue-specific regulators have been well characterised. Several human diseases are caused by mutations affecting splicing including familial dysautonomia, spinal muscular atrophy, and hypercholesterolemia, highlighting the importance of a comprehensive understanding of this regulation.

Long ignored as cellular degradation products, small non-coding RNAs are now recognized as playing varied regulatory roles that are essential for proper cellular function. Preliminary evidence suggests a role for specific types of small RNAs in the regulation of alternative splicing. In light of these recent findings, we propose to characterise specific families of small RNAs and to study their regulatory role in alternative splicing, using computational and experimental methods. We will also study the consequences of their deregulation in cancer, which will be instrumental in devising and improving methods for the detection and treatment of such diseases.

Our research group is inter-disciplinary, combining experimental methods including molecular biology to computational methods, such as machine learning and the extensive use of databases, as well as bioinformatics, comparative genomics and molecular network analysis to analyze high-throughput and large scale data sets.

The trainee will have his/her own research project in either molecular biology or bioinformatics, depending on the student's interests. Students working on bioinformatics project will be introduced to computer programming as well as several essential tools of bioinformatics, a field in great demand both in industry than in academia.

To enquire about this opportunity, please contact Michelle Scott (michelle.scott@usherbrooke.ca)