Jasmine Maghera - University of Alberta

Project: *Linking Cell Function and Gene Expression to Define Maturation of Stem-Cell Derived β-Cells to End Type 1 Diabetes*

Biography

Jasmine completed her Bachelors of science in pharmacology in 2019 at the University of Alberta and was involved in research since 2017 first working in a glycobiology lab in the department of Chemistry. She later moved onto research genetically linked Kv7.2/Kv7.3 mutants and their effects on Epilepsy with Dr. Harley Kurata where she first got to apply basic science research to real patients with real diseases.

She is now a Graduate student researching stem-cell derived b-cell therapy for Type 1 diabetes, in Dr. Patrick MacDonald's lab in the department of pharmacology. Jasmine´s interest in this field stems from her own personal challenges with type 1 diabetes for 12 years. She recently built her own artificial pancreas using the open sourced loop project built by others with type 1 diabetes. Joining the #wearenotwaiting movement made her realized the need for more transparent research and expectation management.

She believes that It is important to interact and involve patients starting at the earliest time of discovery because that research will ultimately trickle down and impact them one day. Setting realistic expectations and ensuring that community members know where the research is headed has been one of her goals and will always be at the forefront of her research.

Project Summary

Type 1 diabetes is caused by the lack of insulin production from pancreatic β-cells. For patients with labile diabetes, blood sugar fluctuations can be deadly. Currently, patients who require

intervention can receive transplants of human cadaveric islets, but they are severely limited in quantity. Recently, there has been a push towards using stem cells to evade the limited supply, but differentiation protocols produce stem-cell-derived β-cells (SCβ-cells) that appear to be immature.

To generate functionally useful cells for transplantation, I will conduct in-depth characterization of the biophysical properties and gene expression of SCβ-cells to propel cell-based treatments. Jasmine is currently using the Patch-seq platform developed by MacDonald lab to link the electrophysiological properties (Patch) with single cell RNA sequencing (Seq) to find gene markers and transcriptional changes that lead to cells that are more mature. She will also be applying Machine Learning to predict the functionality of cells based on the transcriptomic profiles. Doing so will be critical to scale the stem-cell differentiation protocol to ensure this technology can be accessible to those who need it.