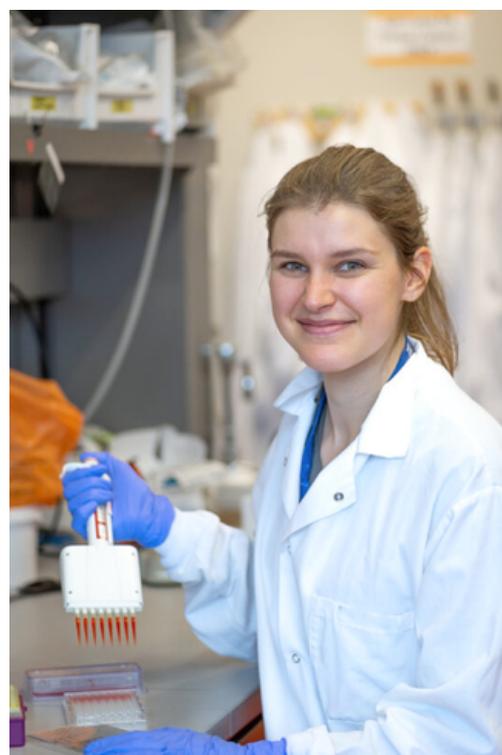


Insights from the Network

The J. Andrew McKee Fellowship: A fast track journey into autoimmunity, translational medicine, and collaborative research

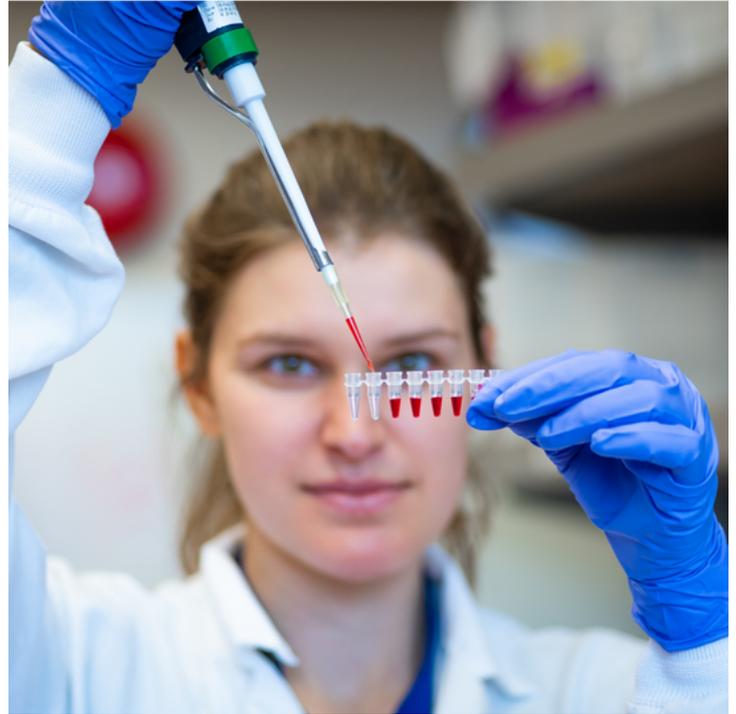
by Karoliina Tuomela, Postdoctoral Fellow, BC Children's Hospital Research Institute

Type 1 Diabetes (T1D) is an autoimmune disease that destroys the insulin-producing cells in the pancreas. There is no cure for T1D and people diagnosed with this disease, often from a young age, are fully dependent on insulin injections to keep blood sugar levels stable. Research is ongoing to target T1D at every stage: preventing occurrence, halting the progression of disease, and restoring insulin production even after the body's own beta cells have been lost. Achieving any of these goals represents a synergy of two different fields of study. One half seeks to understand how the unwanted immune attacks are triggered and can be stopped. The other half aims to understand how to better maintain beta cell function, as well as to develop new sources of beta cells, such as from stem cells, to replace destroyed cells in the body. The only way we can hope to achieve a cure for T1D is to combine these two areas through collaborative research.



Approximately one year ago I was awarded the J. Andrew McKee Fellowship in Type 1 Diabetes, a joint venture between the Stem Cell Network and JDRF Canada. The goal of this fellowship is to invest in the future of T1D research in Canada and to provide a much-needed platform to accelerate the collaborative research required for discovery and progress in this field. Working under the supervision of Dr. Megan Levings and within the broader sphere of the JDRF Centre of Excellence at the University of British Columbia, I embarked on a journey to develop a cell therapy using regulatory T cells (Tregs), which are a naturally suppressive immune cell, to reduce autoimmunity in T1D. The body's own Tregs are often dysfunctional in T1D, so this therapy aims to stop autoimmune responses by infusing genetically engineered, highly functional Tregs into the body. More specifically, my goal is to target the metabolic pathways used by Tregs to improve their function and help them survive in the pancreatic environment.

My background is not in T1D research or even in autoimmunity, so this fellowship has been a fast-track route deep into the world of T1D. I completed my PhD training at the University of Manchester studying cancer immunology, but I knew that I wanted the next step in my career to take me toward a new area of immunology where I could develop skills in translational and collaborative research while using my expertise in studying immune cell behaviour. In the last year through the J. Andrew McKee Fellowship, I've had the privilege of working precisely towards those goals. My research has allowed me to delve into the biology of T1D and autoimmunity, learn new bioengineering techniques, and gain experience with translational immunology.



Outside of my own research, this fellowship also gave me many opportunities to expand my expertise in other areas. One of these was the opportunity to participate in a regulatory literacy course, organized by the Stem Cell Network in collaboration with weCANreg, which provided an in-depth introduction to the complex regulations covering the translation of therapies to the clinic. Regulatory requirements can represent a major stumbling block for therapeutics in the journey from bench to clinic, but this course provided me with the skills and knowledge to begin anticipating future regulatory requirements, even at this early stage of my work, to accelerate the journey toward clinical benefit.

As part of this fellowship, I also had the privilege of undertaking two rotations in other research groups within the JDRF Centre of Excellence. The first took place under the supervision of Dr. Francis Lynn, during which I learned about the process of stem cell differentiation into beta cells. The second rotation was completed under Dr. Bruce Verchere developing skills in bioinformatics and coding. Through these rotations, I was able to develop new skills, tools, and a deeper understanding of T1D that I will be applying in my work. Importantly, these rotations also fostered a closer relationship with other labs, which will undoubtedly provide a basis for further collaborative work.

So where am I headed after this fellowship? The projects that I started during this year are still ongoing and will continue progressing over the next years. Research is far from a straight path from idea to implementation, which is indeed what I've experienced. Some aspects of my work have hit a dead end this year, but others have led to unexpected findings that I will continue to investigate. The hope is that we will find our way along this winding road to clinical implementation and see individuals with T1D benefiting from our research. Without a doubt, the opportunities that have come with the J. Andrew McKee Fellowship will have made the journey significantly smoother.