



The Role of ILCs in Chronic Allergic Airway Inflammation and Lung Fibrosis

Samuel Shin (University of British Columbia)

Bastable-Potts Graduate Student Research Award

Supervisor: Dr. Kelly M. McNagny

Samuel Shin, an MSc student at the University of British Columbia, will investigate the role of innate lymphoid cells in the onset of chronic asthma and lung fibrosis. His findings can create novel therapeutic options and provide permanent relief for patients suffering from chronic asthma.

The Role of ILCs in Chronic Allergic Airway Inflammation and Lung Fibrosis

Allergic asthma is an increasingly prevalent disorder that involves chronic airway inflammation, airway hyper-responsiveness (AHR), and fibrosis. Its symptoms include shortness of breath, wheezing, chest tightness or pain. It is primarily characterized by inflammatory immune cells that promote IgE antibody production, which in turn signals for downstream effector responses such as mucous secretion and airway obstruction. Since the 1970s, the use of inhaled corticosteroids and long-lasting β -agonists have been used to relieve patients of airway inflammation and constriction. However, these drugs are only able to act as remedies as they do not target the underlying mechanism behind the pathology. Currently, anti-IgE treatments are available; however, these new treatment options have shown only marginal success, and the data indicates that targeting effector responses might not be the most optimal approach.

To better understand the upstream events involved in asthmatic inflammation, our lab has previously examined the role of recently discovered family of white blood cells named innate lymphoid cells (ILCs) in the lung. These cells are tissue-resident and are found mostly in skin, lung, and intestinal tract. ILC subsets (ILC1, ILC2, ILC3, LTi, and ILCreg) carry out specialized functions to maintain and protect our body from foreign entities. We reported that ILC2s are involved in priming the effector immune cells to produce IgE antibodies upon local insults. However, it is not clear whether other subsets of ILCs help enhance the onset of asthma. By identifying the underlying cell types and their functions, we hope to explore novel therapeutic targets and potentially create a treatment which can provide permanent relief for patients with chronic asthma.

About Samuel Shin

I completed my Bachelor's degree in Anatomy and Cell Biology at McGill University in 2018. In hopes of better understanding and improving our standard of care, I focused my studies on cancer biology, immunology, and regenerative medicine. Among these disciplines, I was particularly attracted to the mysteries of our immune system. I was

fascinated by its intimate relationship with all branches of medicine and how little we know about the immune responses associated with increasingly prevalent disorder such as allergic asthma. To learn and possibly make an impact to those who are affected by this condition, I decided to pursue my graduate studies at the University of British Columbia.

As an undergraduate, my first wet-lab experience started at the Goodman Cancer Research Centre (GCRC) in 2017 when Dr. Peter Siegel kindly agreed to supervise me as an undergraduate volunteer researcher. My project consisted of examining the stress-mediated responses in human breast cancer cell lines upon administration of already-approved chemotherapeutic agents. After receiving my Bachelor's degree, I wanted to pursue my interest in immunology. I accepted the award for the Centre for Blood Research (CBR) Summer Studentship program at the University of British Columbia. With Dr. Kelly McNagny's supervision, I investigated the role of IL-22 cytokine in inflammatory bowel disease. From these experiences, I learned about the importance of both clinical and basic research and how new findings can improve existing therapies for patients.

Besides research, I love to teach and educate younger generations about science as well as getting involved in community projects. Currently, I am volunteering as a CBR Outreach Committee member to promote research in STEM with workshops for secondary school students. I am also volunteering at the Greater Vancouver Food Bank Society to help people who are in need.

Building on my experiences and future opportunities, I would like to fulfill my long-term dream of becoming a clinician scientist. Combining both clinical and scientific aspects of medicine would open new doors for treatment options and patient care. I see my future as a dual path of academic learning and laboratory research toward the goal of new discovery.