

15 February 2023

CFWA Golf Classic Grant 2021

Interim Report from Luke Garratt

Project Titled: Neutrophils in CF

Neutrophils are short-lived cells that already contain everything they need to eat and kill microbes but in CF they end up becoming key drivers of CF lung damage. This CFWA funded project is designed to expand my capacity in analysing and modifying gene expression in neutrophils to better understand how we can intervene to reduce the harmful effects of neutrophils. There are three goals. First is to compare commercial kits for extracting messenger RNA (mRNA; copies of genes that instruct the cell what proteins to make) from neutrophils, as they contain much less than other cells in the body. I compared several kits and identified one that can reliably obtain enough mRNA from neutrophils. The second goal is to enable routine analysis of neutrophil gene expression. I have successfully established the first protocols in WA for both bulk and single cell RNA sequencing of neutrophils, which permits us to analyse all the individual mRNA in neutrophils. Currently I am creating the computational pipelines to make this analytical process faster. The third key goal is to be able to deliver any mRNA we desire into neutrophils. First experiments have found that neutrophils are quite resistant to this delivery, as they do not conduct much gene expression until they move into the tissues in response to signals such as infection. Further testing to overcome this is currently underway.