Innovation Grant 2019
Six-Month Progress Report

Cystic fibrosis (CF) is the most common life threatening genetic condition in Australia and affects multiple organs, including the lungs, intestinal tract and pancreas. The new CFTR modulators hold great promise to improve quality of life and extend life expectancy as they are directly targeted at correcting the defective protein that regulates chloride ion channel function. This is a very exciting and rapidly changing time in CF translational research and clinical practice with the approval of an increasing number of CFTR modulators. Our work aims to identify the most accurate and reproducible *in vitro* CFTR functional test in order to predict CF patient responses to modulator therapy in the clinic. We have been generating and bio-banking colonoids (sometimes referred to as 'organoids') derived from the stem cells of CF patient rectal biopsies and we have also collected patient-matched nasal brushings from the airways of adults with CF of different genetic mutations. The whole process is a simple procedure that patients can undergo in less than 30 minutes. The functional tests to determine the responses to the CFTR modulators include a 3-dimensional swelling assay Versus an in-house developed CFTR assay with intra-individual comparisons for these assays made between intestinal and airway stem cells. Another aim of this work involves cross-comparison and sample sharing between our centre in the University of Newcastle/Hunter New England Health (directed by Prof Peter Wark) and the CF centre at UNSW/Sydney Children's Hospital collaborating with Prof Adam Jaffe and Dr Shafagh Waters. This work will compare two different technologies to assess CFTR function. We hope that the findings of this work over the next 12 months will contribute to identifying the most optimal functional test to help enable the right CF patient to be matched to the most optimal CFTR modulator therapy so that eventually this may save time, costs, and potentially increase access.