

Research Summary

Understanding the role of the ACE2 protein in COVID-19 susceptibility

COVID-19 is a severe acute respiratory disease that results from infection by the SARS-CoV2 virus and causes mild to severe illness, potentially resulting in death of the patient. Multiple organ systems are affected by the virus, including the lungs, heart and gut. Clinical reports indicate that many severely ill patients present with co-morbidities such as severe lung diseases. In Nova Scotia, the Covid-19 pandemic has affected over 84,000 people along the 5 consecutive waves since March 2020, among which 242 patients died of severe complications. It is not clear so far how patients are at higher risk of developing severe Covid-19 disease. The goal of this project is to provide critically missing scientific data to understand the role of the ACE2 protein in COVID-19 susceptibility, in particular for people with cystic fibrosis (CF), a severe chronic lung disease.

ACE2 is the receptor protein for the SARS-CoV-2 virus' spike protein (S-Protein) to bind to the surface of cells of the lung. The ACE2/S-protein complex is known to allow the virus to enter the cell by a mechanism called endocytosis, leading to the development of COVID-19 disease. It has been postulated that differences in the expression of the ACE2 protein within the lung may contribute to different susceptibility to this infection and could be a protective mechanism for some. Therefore, this project aims to determine the impact of different levels of ACE2 protein expression on the virus entry to cells of the lung, and therefore informing on its role in COVID-19 susceptibility. Results and conclusions from this study will advance treatment and prevention strategies for those with severe lung disease, such as CF, and the general population, as we will know whether changes in ACE2 expression is key to COVID-19 development and severity. This will provide knowledge on a potential therapeutic target to reduce or treat the disease.