Identifying Influenza Virus in Sputum Samples of Cystic Fibrosis Patients

Cystic fibrosis (CF) is a genetic disorder causing a build-up of mucus in the lungs, and subsequent bacterial lung infections. These lung infections are the leading cause of death in those with CF, which affects an estimated 30,000 people in the United States, and 70,000 worldwide. A patient may experience high levels of infection and, consequently, low levels of health; these periods are known as pulmonary exacerbations (PEs). The use of antibiotics does help reduce PE symptoms, but they eventually lose effectiveness due to the buildup and acquired resistance of bacteria. The resistance causes infections and ultimately leads to morbidity. The exact cause of pulmonary exacerbations (PEs) is still uncertain, but has been attributed to factors associated with acute bacterial infections. It is evident that bacterial infections are the primary cause of this decline in health, but whether or not viruses also attribute to this has not been thoroughly studied. It is suspected that changes in viral abundance may correlate with bacterial abundance and the occurrence of PEs.

Using qPCR techniques, measured the abundance of 2 pathogens in adult patient samples: Influenza A and *Staphylococcus aureus*. We hypothesized that at least one of these two pathogens would be present in the samples, there would be a change in abundance, and that change would correlate with the onset and relief of a PE. Select samples from the 3-year study were tested, and neither pathogen was found in great abundance; therefore, it is unlikely that these pathogens serve as a biomarker for PEs in this patient. I also performed qPCR on samples from a new group of adolescent patients to determine if the results are applicable to all CF patients. I tested select samples from five different patients to determine if *S. aureus* was present. The samples did not show amplification, making it unlikely that these pathogens serve as biomarkers in these patients.