Research Profile: The work of our group focuses on Cystic Fibrosis (CF). CF is an autosomal recessive life limiting disease caused by mutations in a gene called Cystic Fibrosis Transmembrane conductance Regulator (CFTR). Life expectancy in the 1970s was less than 20 years of age, but has now reached greater than 40 years due to an increased understanding of the underlying pathophysiology and improved therapies. Defects in CFTR lead to an array of multi-system complications including progressive airway obstruction (bronchiectasis), chronic respiratory infections associated with ongoing inflammation, and early bone loss among many other complications including chronic sinusitis, pancreatic insufficiency, liver disease, and diabetes. Despite the equal prevalence of disease in both sexes, CF females have a shortened life expectancy relative to males. In addition, females acquire respiratory infections at an earlier age than males and have a more rapid decline in health. Similar patterns of health have been described in women versus men with other airway diseases such as chronic obstructive pulmonary disease, asthma, and non-CF related bronchiectasis. Our research team is, therefore, primarily dedicated to understanding the role of sex hormones on host immune responses to infection, specifically *Pseudomonas aeruginosa* and non-tuberculous mycobacterial infections, using murine and cell-based models as well as evaluating this in prospective clinical trials in CF patients. Much of this work involves understanding the impact of estrogen receptor activation on inflammation and neutrophil responses. We are additionally collaborating with other investigators on campus to study the impact of new antibiotics on multi-drug resistant organisms such as *Pseudomonas aeruginosa* using biofilms of clinical strains on airway epithelial cells. Finally, we have begun a collaborative project to study the role of neutrophils and chronic inflammation in early and rapid bone loss in CF.

Techniques:
- Cell based molecular biology studies using airway epithelial cells, primary neutrophils and macrophages. Neutrophil studies include assays such as bacterial killing, respiratory burst, phagocytosis, and apoptosis
- Murine CFTR knock out studies utilizing a model of Pseudomonas aeruginosa pneumonia and chronic infection.
- Microbiology based biofilm assays with biofilms grown on airway epithelial cells.
- Human database driven studies using the very large and robust CF patient registry we have in hand.

Selected Recent Publications: