

Chronic obstructive pulmonary disease (COPD) is currently the third leading cause of death in the US. Nearly 15 million individuals suffer from COPD, generating over \$30 billion in annual healthcare costs. Unfortunately, current COPD treatment options are limited. No current therapies alter COPD's natural history or reduce symptoms of chronic cough, excess mucus production and infections seen in patients with chronic bronchitis, the most common form of COPD. Current laboratory animal models such as mice and rats do not develop chronic bronchitis symptoms of COPD. This limits the models' usefulness in understanding the disease processes and testing new therapies.

In the publication titled "A Ferret Model of COPD-Related Chronic Bronchitis," S. Vamsee Raju, B. Pharm, PhD, and Steven Rowe, MD, MSPH from the UAB Division of Pulmonary, Allergy, and Critical Care Medicine presented recent research on the first COPD animal model exhibiting clinical and pathologic features of chronic bronchitis. This research focused on ferrets, due to their similarities to humans in airway anatomy and physiology. Following exposure to chronic cigarette smoke, laboratory ferrets were discovered to exhibit chronic cough, bronchiolitis, emphysema, and airway obstruction. This key advancement in the laboratory modeling of COPD will support development of novel treatments for chronic bronchitis, as most COPD patients grapple with these symptoms.

As cigarette smoking and chronic exposure to inhaled irritants are the main contributors to COPD etiology, laboratory ferrets were exposed to chronic cigarette smoke. After three months of cigarette smoke exposure, ferrets began to develop a noticeable signs of spontaneous cough and infections that worsened over six months. Unlike mouse models, which develop solely emphysema, smoke-exposed ferrets exhibited increased early morning cough, sporadic infectious exacerbations, and airway obstruction. These symptoms were accompanied by goblet cell metaplasia/hyperplasia and increased mucus expression in small airways, indicative of human chronic bronchitis in addition to mild emphysema.

For the first time, these studies provide evidence that ferrets are well suited to model classic features of COPD consistent with the complexities of the human disease. Thus, the ongoing studies may enhance our understanding of COPD pathology and enable testing of emerging therapies.