

Protective Effect of Diminazene Aceturate in Acid-Induced Airway Obstruction

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Mild airway acidification occurs in several airway diseases, including cystic fibrosis and asthma. However, the role of airway acidification in airway pathology is controversial. Here, we studied mucus secretion in piglets forty-eight hours following an intra-airway acid challenge. Airway submucosal glands of acid-challenged piglets exhibited faulty submucosal gland secretion, with a retainment of mucin 5B (MUC5B) in the submucosal gland and decreased concentrations of MUC5B in lung lavage fluid following cholinergic stimulation. Concomitantly, intrapulmonary airways were obstructed with glycoprotein rich material under both basal and methacholine-stimulated conditions. Blocking detection of acid with the diminazene acetate, a small molecule that inhibits the acid-sensing ion channel (ASIC), partially restored submucosal gland function and mitigated acid-induced airway obstruction. These findings suggest that transient airway acidification significantly impacts mucus secretion and highlight diminazene acetate as an agent beneficial in alleviating some mucus defects.