CHINESE-AMERICAN LUNG ASSOCIATION

CALA Happy Friday Seminar

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Time: EST 10:30 am; PST: 7:30 am; Beijing time: 10:30pm

Zoom: 849 9682 9273 (Password: 654321)

Pulmonary Neuroendocrine Cells Sense Succinate to Stimulate Submucosal Gland Contraction

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Bio: Dr. Wenjie Yu obtained his B.S. from China Agricultural University and Ph.D. from the University of Iowa. Currently, he is a senior postdoctoral associate in Dr. Michael J. Welsh laboratory of the University of Iowa. His research focuses on the cell biology and physiology of the airway involving in mucus secretion. Using piglets as an animal model, Dr. Yu and colleagues identified cellular and molecular architecture of normal and cystic fibrosis pig airways and submucosal glands. He found that pulmonary neuroendocrine cells, a rare airway surface epithelial cell type, localize in submucosal glands with new chemosensory mechanism and physiological function. His research is recently published in Developmental Cell, PNAS, Am J Respir Cell Mol Biol, and Development.

Abstract: Regulating the function and secretion of submucosal glands is key to respiratory host defense, but when abnormal, submucosal glands contribute to lung disease. We discovered that submucosal glands contain pulmonary neuroendocrine cells (PNECs) that detect succinate, a stress signal that accumulates on the airway surface in response to inflammation and infection. Succinate diffuses down into submucosal glands and activates an apical succinate receptor SUCNR1 on PNECs, increasing the intracellular Ca2+ concentration. PNECs then release ATP, a short-range signal, which stimulates P2Y1 purinergic receptors on myoepithelial cells wrapped tightly around the submucosal glands. As a result, submucosal glands contract. Succinate-triggered gland contraction may complement action of neurotransmitters that induce mucus release but not gland contraction, to promote mucus ejection onto the airway surface. These findings identify a local circuit in which rare PNECs within submucosal glands sense an environmental cue to orchestrate the function of airway glands.