

## The Study on Mucin Release by Airway Goblet Cells in Primary Culture

Ji Sun Yang, Ok Hee Kim, Yong Nam Roh, Sook Young Yi, Ki Hwan Choi and Hang Mook Rheu

Department of Pharmacology, National Institute of Safety Research

Surface epithelial cells isolated from hamster tracheas and grown on a thick collagen gel become a highly enriched population of mucus-secreting cells. Epithelial cells from tracheas of hamsters were collected using enzymatic procedures and cultured under various conditions. The medium used consisted of a 1:1 mixture of medium 199 and Dulbecco's modified Eagle's (DME) medium which was conditioned before use. Insulin, transferrin, hydrocortisone, epidermal growth factor, and extract from bovine hypothalamus were used as supplement. Due to relatively low basal rates of mucin secretion from in vitro cultures, cultures are generally radiolabeled using  $^3\text{H}$ -glucosamine as a metabolic precursor. The radiolabeled mucins released are quantitated by precipitation with TCA/PTA. Using this cell culture system, we investigated mucin release of goblet cells by altering the media bathing the apical surface of hamster tracheal surface epithelial (HTSE) cells. Acidic media added sulfuric acid caused significant increases in mucin release ( $155 \pm 20\%$  at pH 4 and  $146 \pm 16\%$  at pH 5). Ammonium hydroxide also increased mucin release at pH 9.0 ( $156 \pm 17\%$ ) and pH 10 ( $295 \pm 9\%$ ) respectively. This additional mucin release seems to be associated with cell membrane damage as indicated by release of cellular LDH. SP stimulates secretion of mucin in cultured HTSE cells ( $154 \pm 16\%$  at  $1 \times 10^{-6}\text{M}$  and  $165 \pm 25\%$  at  $1 \times 10^{-5}\text{M}$ ). PAF at  $5 \times 10^{-6}\text{M}$  and  $5 \times 10^{-5}\text{M}$  enhanced by HTSE cells in vitro  $168 \pm 34\%$  and  $259 \pm 30\%$  of mucin secretion, respectively. The increase in mucin release by PAF and SP was not secondary to cell damage or necrosis. SP and PAF may be in mediating mucous secretion induced by inflammation irritation and infection.