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# Inhibitory Effect of Aminophylline and Simvastatin on Airway Inflammation and Mucus Hypersecretion in a Chronic Obstructive Pulmonary Disease Rat Model

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***SUMMARY.*** **This study aimed to investigate the preventive effect of aminophylline and simvastatin against chronic obstructive pulmonary disease (COPD) in rats and elucidate the related mechanism of action. The COPD model rats were divided into three groups randomly, designated as the COPD model (MG), aminophylline (AG), and simvastatin (SG) groups, which were treated with saline, aminophylline, and simvastatin, respectively. Healthy rats administered saline were used as the control group (CG). Pulmonary function was evaluated, and the pathology of the bronchus and lung tissue was observed. Interleukin (IL)-8, IL-17, and tumor necrosis factor (TNF)-α levels in the bronchoalveolar lavage fluid (BALF) were measured. The mRNA and protein expression of mucin 5ac (Muc5ac) and Toll-like receptor-4 (TLR4) in bronchial and lung tissue were analyzed. Inflammation in the AG and SG was more severe than that in the MG. The pulmonary function of the AG and SG was significantly higher than that in the MG was ($P < 0.01$). The peak expiratory flow in the SG was significantly higher than that in the AG was ($P < 0.01$). The levels of IL-8, IL-17, and TNF-α in the AG and SG were significantly lower than that in the MG was ($P < 0.01$). The mRNA and protein levels of Muc5ac and TLR4 in the AG and SG were significantly lower than those in the MG were ($P < 0.05$). Aminophylline and simvastatin reduced the airway inflammation and mucus hypersecretion, which would successfully prevent and treat chronic obstructive pulmonary disease.**

*RESUMEN.* Este estudio tuvo como objetivo investigar el efecto preventivo de la aminofilina y la simvastatina contra la enfermedad pulmonar obstructiva crónica (EPOC) en ratas y dilucidar el mecanismo de acción relacionado. Las ratas modelo EPOC se dividieron en tres grupos al azar, designados como el modelo de EPOC (MG), aminofilina (AG) y simvastatina (SG), que se trataron con solución salina, aminofilina y simvastatina, respectivamente. Se usaron ratas sanas con solución salina como grupo de control (CG). Se evaluó la función pulmonar y se observó la patología del bronquio y el tejido pulmonar. Se midieron los niveles de interleucina (IL)-8, IL-17 y factor de necrosis tumoral (TNF)-α en el líquido de lavado broncoalveolar (BALF). Se analizaron la expresión del ARNm y la proteína de la mucina 5ac (Muc5ac) y del receptor tipo 4 Toll (TLR4) en el tejido bronquial y pulmonar. La inflamación en el AG y SG fue más severa que en el MG. La función pulmonar de AG y SG fue significativamente mayor que en la MG ($P < 0.01$). El flujo espiratorio máximo en el SG fue significativamente mayor que en el AG fue ($P < 0.01$). Los niveles de IL-8, IL-17 y TNF-α en el AG y SG fueron significativamente menores que en MG ($P < 0.01$). Los niveles de ARNm y proteína de Muc5ac y TLR4 en AG y SG fueron significativamente más bajos que en MG ($P < 0.05$). La aminofilina y la simvastatina redujeron la inflamación de las vías respiratorias y la hipersecreción de moco, lo que podría prevenir y tratar con éxito la enfermedad pulmonar obstructiva crónica.

*KEY WORDS:* aminophylline, chronic obstructive pulmonary disease, inflammation, simvastatin.

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