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## **Effects of popcorn butter flavorings, diacetyl and 2,3-pentanedione, on isolated airway preparations**

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**RATIONALE:** "Popcorn workers' lung" is a life-threatening, fixed obstructive pulmonary disease caused by inhalation of butter flavoring vapor. Histological evidence from animals exposed by inhalation to the butter flavorings, diacetyl (2,3-butanedione), and a diacetyl substitute, 2,3-pentanedione (acetyl propionyl), demonstrated vapor-concentration-dependent damage to epithelial cells. Because nothing is known about the effects of diacetyl and 2,3-pentanedione on airway smooth muscle (ASM), we investigated the pharmacological activity of these two flavorings on isolated airways.

**METHODS:** In rat isolated, perfused tracheas, the contractile and relaxant effects of diacetyl and 2,3-pentanedione applied to the serosal and mucosal surfaces of intact and denuded contracted (MCh;  $3 \times 10^{-5}$  M) tracheas were evaluated.

**RESULTS:** Concentrations of both agents greater than 3 mM resulted in ASM relaxation. Relaxation of the trachea by diacetyl and 2,3-pentanedione was not dependent upon the presence of the epithelium.

**CONCLUSIONS:** Our findings indicate that both flavorings are similar in their effects as ASM relaxants.