Effects of guaifenesin on canine tracheal epithelium

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1. Expectorants are said to increase the efficiency of mucociliary transport in the trachea. However, supporting evidence of this hypothesis is lacking. The objective of this study was to examine the effects of Robitussin™ on the canine tracheal epithelium, determine if these effects could be accounted for by the active ingredient guaifenesin, and elucidate the mechanism by which guaifenesin acts.

2. Short-circuit current (I_sc) measurements were made using Ussing chambers. Cumulative concentration-effect relationships were constructed for Robitussin™ and guaifenesin both on the luminal and serosal surface of the epithelium. Equivolume additions were made to rule out hydrostatic effects. Equiosmolar additions of mannitol were made to rule out osmolarity effects.

3. Robitussin™ caused a concentration-dependent drop in I_sc only on the luminal side. Guaifenesin alone induced a similar, though slightly smaller, drop in I_sc also on the luminal side only. Guaifenesin's effects proved not to be hydrostatic, or intracellular in nature. Additions of mannitol did cause a drop in I_sc similar to that observed by guaifenesin, suggesting that the effects of guaifenesin might be largely due to changes in osmolarity.