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CHANGES IN COUGH REFLEX SENSITIVITY IN A GUINEA PIG MODEL OF ALLERGIC RHINITIS

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Cough reflex sensitivity is increased in patients with allergic rhinitis. We reported that coughing is enhanced in the guinea pig model of allergic rhinitis. Here we address the hypothesis that the cough reflex sensitivity could be increased in this model. A retrospective analysis of the pooled data from our previous studies was carried out. In the ovalbumin-sensitized guinea pigs the allergic inflammation in the nose was induced by repeated intranasal instillations of ovalbumin (6-8 times in 7 days intervals). Control naïve animals received intranasal saline. Cough reflex sensitivity was determined by the inhalation of aerosols with doubling concentrations of citric acid (0.05-1.6M) 30 min-2h after intranasal instillation of ovalbumin. Cough threshold was expressed as the concentration of citric acid at which two cumulative coughs were recorded (C2cum, expressed as geometric mean [95% confidence interval]). We found that the cough threshold was reduced in the ovalbumin-treated animals. C2cum was 0.44M[0.33-0.58M] and 0.25M[0.18-0.35M] prior and after 6 repeated intranasal ovalbumin instillations, respectively ($p<0.05$, n=36). There was no difference in the cough threshold in the control animals (0.64M[0.5-0.82M] vs. 0.76M[0.51-1.14M], $p=0.85$, n=29). We reported that the leukotriene cys-LT1 receptor antagonist montelukast inhibited the enhanced coughing in this model. In this separate study, montelukast also partially reversed reduced cough threshold. C2cum was 0.33M[0.15-0.75M], 0.05M[0.02-0.11M] and 0.18M[0.08-0.4M] at the baseline, prior and after montelukast treatment, respectively ($p<0.01$, n=8). We conclude that the increase in the cough reflex sensitivity due to rhinitis can be modeled in the guinea pig. Our data indicate that the guinea pig model is useful for the evaluation of drugs aimed to treat cough associated with rhinitis.