

COMPARISON OF COUGH REFLEX AND AIRWAY REACTIVITY IN TOLUENE AND OVALBUMINE INDUCED AIRWAY HYPERRESPONSIVENESS

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Background: Both direct and indirect stimulation of mechanoreceptors (extrapulmonary cough receptors) are considered to be the major mechanisms of cough reflex. The aim of the presented study was to evaluate the relationship between *in vivo* and *in vitro* airway reactivity (AR) in chemically-induced and antigen-induced airway hyperresponsiveness (AHR). Furthermore, the correlation between experimentally induced AHR and chemically evoked cough was studied.

Material and methods: Healthy male guinea pigs weighing 250-350 g were used for the experiments. AHR was induced chemically (Group 1, n=8) by repetitive inhalation of toluene vapors (2 hours, 3 consecutive days) or *via* antigen (Group 2, n=8) by repeated administration of 1% ovalbumine solution. The cough reflex was elicited by nebulization of citric acid aerosol (CA; 0.6 M). The number of cough efforts was evaluated visually by trained observer during nebulization (2 min) as well as immediately after it (2 min). Specific airway resistance (RxV) after inhalation of histamine (10⁻⁶ M) and CA aerosols, measured in double chamber whole body plethysmograph, was considered as a marker of the *in vivo* AR. The *in vitro* AR was evaluated using tracheal and lung tissue strips in an organ chamber after adding the cumulative doses of acetylcholine and histamine (10⁻⁸ - 10⁻³ M).

Results: Toluene vapor inhalation did not cause a significant difference in cough efforts during or after CA nebulization. However, a significant increase in specific airway resistance after inhalation of CA was observed. Contrary, the ovalbumine challenge led to a significant increase in the number of cough efforts and in the *in vivo* AR. The *in vitro* tests confirmed the significant increase in tracheal and lung tissue strips reactivity to acetylcholine and histamine.

Conclusions: Experimentally induced AHR can be used as a suitable model of evaluating the relationship between cough and bronchoconstriction. However, possible differences in the selected model should be taken into account.

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