

TRPV4 AND COUGH EVOKED BY OSMOTIC STIMULI

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Background: Changes of osmolarity of the airway superficial fluid are known to provoke cough - hypotonic and hypertonic aerosols are tussive stimuli used in experimental studies. TRPV4 is calcium channel initially described as osmolarity-sensitive and it can play indirect role in increasing cough reflex sensitivity. The aim of our study was to test the hypothesis that cough to osmotic stimuli is mediated via TRPV4.

Methods: Cough was measured in 12 male guinea pigs by inhalation of saline, hypotonic solution, hypertonic solution and citric acid (0.4M) for 10 minutes in whole-body plethysmograph. Data obtained in naïve animals were compared to animals pre-treated with selective TRPV4 antagonist GSK2193874 300 µg/kg (GSK300) and 900 µg/kg of body weight (GSK900).

Results: Cough response in animals to hypotonic and hypertonic solution and to citric acid was significantly higher than to saline (3 ± 2 vs 5 ± 2 vs 9 ± 3 vs 27 ± 5 ; $p < 0.05$). Similar pattern was observed for cough latencies. Pre-treatment with neither GSK300 nor GSK900 did not significantly influence the response to osmotic stimuli.

Conclusion: TRPV4-mediated activation of airway afferents does not seem to be the exclusive mechanism of cough response to hypotonic stimuli in physiologic conditions.