

# Impact of Antibiotic-Induced Dysbiosis on Cough Reflex: Insights from a Guinea Pig Model

Jana Plevkova<sup>1,2</sup>, Mariana Brozmanova<sup>1</sup>, Janka Jakusova<sup>1</sup>, Zuzana Biringero<sup>2</sup>,

Lukas Martvon<sup>2</sup>, Tomas Buday<sup>1</sup>

*<sup>1</sup>Department of Pathophysiology, <sup>2</sup>Centre for Medical Education Support*

*Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava*

**Background:** Respiratory dysbiosis, a disruption in the airway microbiome, is linked to various pathological conditions, indicating its role in airway defence.

**Objective:** To investigate the effect of antibiotic (ATB) treatment on cough reactivity in relation to airway dysbiosis in a guinea pig model.

**Methods:** Dunkin-Hartley guinea pigs (n=8 per group) were treated with either a sulfadoxine/trimethoprim combination (200/40 mg/mL, 0.02 mL/kg i.p., 5 days) or saline (0.02 mL/kg i.p., 5 days). Cough was induced by inhalation of citric acid aerosol (0.4M) for 5 minutes in a double chamber plethysmograph, both before and after treatment.

**Results:** Cough bursts decreased significantly in the ATB-treated group (median  $\pm$  interquartile range;  $6.5 \pm 5.25$  vs  $2 \pm 2.25$ ,  $P=0.0159$ ) and non-significantly in the saline group ( $5.5 \pm 3.75$  vs  $4 \pm 5.25$ ). Cough latency increased in both groups but was not statistically significant. Microbial DNA analysis from bronchoalveolar lavage fluid revealed reduced DNA in ATB-treated animals, indicating dysbiosis.

**Conclusions:** ATB treatment attenuated cough reactivity, likely linked to induced airway dysbiosis. These findings suggest caution in ATB use for patients with weakened cough reflex, such as the elderly or those with neuromuscular conditions.

**Acknowledgement:** Supported by VEGA 1/0041/23 and APVV-22-0052.