

Modulation of Cough Response by Different Stimulation Modes

Marcel Veternik, Michal Simera, Lukas Martvon, Lucia Cibulkova, Zuzana Kotmanova, Ivan Poliacek

Our study investigated how different levels (rates) of stimulation influence the characteristics of the cough response in 15 spontaneously breathing anesthetized cats. Coughs were elicited using three distinct modes of mechanical stimulation. The difference between "high" and "low" levels of stimulation was achieved in the following ways:

1. **First mode:** A soft catheter was inserted into the trachea approximately 10 cm deep, with 1 penetration for low stimulation and 4 penetrations for high stimulation.
2. **Second mode:** The catheter was equipped with cross nylon fibers, using 2 penetrations with 4 fibers vs. 4 penetrations with 8 fibers stimulator.
3. **Third mode:** A similar stimulator with 4 fibers was used to probe either 4 cm of the trachea below the larynx or deeper beneath the upper sternum (pooled data) for low stimulation. High stimulation involved simultaneous probing of both areas.

High levels of stimulation consistently produced more coughs, stronger cough efforts, and shorter durations of specific temporal cough features. These findings indicate that increased mechanical stimulation, which generates a stronger cough afferent drive, leads to more intense coughing with reduced temporal durations. Adjusting the cough afferent input influences both the spatial and temporal dynamics of the cough motor response, highlighting its importance in the management of cough.