Basic Research Overview
High-Frequency Chest Compression:
Mechanisms of Action/Physiological Effects

This *in vitro* study tested the hypothesis that a mucus mass can be moved by the difference between expiratory and inspiratory airflow velocities. An experimental model using mucus gel simulants showed that nonsymmetrical airflow and shearing at the air-mucus interface contribute significantly to enhanced mucus clearance during HFCC

Title	Chang HK, Weber ME, King M. Mucus transport by high-frequency nonsymmetrical oscillatory airflow. *J Appl Physiol* 1988; 65 (3):1203-1209.
Objective/s	• To study air-mucus interaction as a possible mechanism of tracheal mucus transport • To test the validity of using surface tracer displacement to indicate bulk mucus transport
Method	The rate of transport of a layer of simulated mucus lining the bottom of a rectangular trough was measured in two ways during oscillatory airflow. Tidal volumes (V_T) between 50 and 100 ml were generated with a custom-made pump. • Peak velocity ratios (R) from 1.0 to 2.0 • Frequencies (*f*) between 7 and 13Hz Average mucus velocity was plotted as a function of five variables with the following middle values: • Bias ratio: R=1.5 • Frequency: (*f*) =10 Hz • Tidal volume (ml): V_T = 75 ml • Depth (mm): δ =2.0 mm • Viscosity (P): μ = 20 poise (P)
Results	• Mucus movement *increases* with o R o *f* o V_T o Mucus layer depth • Mucus movement *decreases* with mucus apparent viscosity • There is NO mucus movement at low *f*, low V_T, and low R

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