Airway Clearance Technology for Patients with Chronic Lung Diseases

Brief Description of Technology
Rapid and highly effective mucus clearance from airways without active coughing.

Technology Overview
Airway clearance techniques (ACTs) are part of routine clinical care for chronic lung disease patients, helping them to expel the excessive secretions so they can breathe with less difficulty. Current ACTs include breathing practices, percussion therapy, or using devices to apply air pulses or create vibrations in the lung. However, all these methods still rely on the patient to forcefully expel secretions with a huff or a cough, and are less effective on small airways. Our novel technology combines low frequency air pulsations with high frequency acoustic pulsations. Preliminary results with a benchtop model show this combination modality is significantly more effective than commonly used ACTs. Under optimized conditions, simulated mucus can be cleared from simulated trachea sections in as little as 5 minutes with near complete clearance. Notably, the tests used a passive lung (i.e. no breathing or coughing action) and showed that the simulated mucus migrates from the distal (lung) end all the way to the proximal (mouth) end. Additionally, the combination approach allows for the frequency combinations to be “tuned” to target specific airway sections including small airways.

Applications
- Rapid airway clearance for chronic diseases such as CF, and potentially for other conditions such as bronchiectasis and RSV.
- Effective airway clearance for patients with weak lung function such as late stage COPD or patients on ventilators.

Advantages
Fraction of treatment time compared to current methods. Potentially higher compliance. Vastly more effective without need to cough.

Market Overview
251 million COPD cases in 2016 (WHO). ~$3 billion USD addressable market potential in U.S. alone.

Investigator Overview
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