Aerosol Separation and Collection Device (#5407)

A device to collect aerosol samples from the respiratory system using exhaled breath.

Georgia Tech inventors have developed a lower respiratory aerosol sample collection device that is simple, inexpensive, and accurate for the collection of aerosols from the alveoli and bronchioles of the lung while excluding contaminating material from the upper airway. The invention relates to collection of materials such as pathogens from alveolar aerosols or other lower respiratory aerosols to the exclusion of significant contamination by upper respiratory materials such as solid and liquid pathogens contained therein. Accurate diagnosis of pneumonia is still a major problem and the field is innovating toward complex devices with multiple valves and chambers. There is an unmet need for a simple device for collecting a sufficient sample of lower airway material not contaminated by upper airway material for accurate detection clinical of pneumonia. The device does not require: electronic detection, collection, or measuring devices; chamber(s); resistance elements or shapes; or particular positioning.

Benefits/Advantages

- **Effectiveness**: the device is > 90 percent effective at separating lower airway aerosols from upper airway material
- **Simplicity**: the device functions without the need for complex valving, switching, or actual collection of air from the lower respiratory system
- **Comfort**: less invasive than common testing practices
- Devices are available for FDA clearance and sale

Potential Commercial Applications

- Pneumonia detection and diagnosis

Background/Context for This Invention

Pneumonia, or an inflammation of the lungs, is a leading cause of morbidity and mortality worldwide. Pneumonia can be caused by a variety of bacterial and viral pathogens, including streptococcus pneumoniae, mycoplasma tuberculosis, influenza viruses, respiratory syncytial virus, parainfluenza, adenovirus, rhinovirus, human bocavirus, influenza, Mycoplasma pneumoniae, hantavirus, and cytomegalovirus. To treat this condition appropriately it is necessary to properly identify the pathogen or cytokine content in the lower airway. This can be done by checking for the presence of the pathogen, virus, bacteria or fungus, in the lung, i.e. alveoli and/or bronchioles. Obtaining a sample from the lung and confirming the etiology of pneumonia has proven difficult. This device serves as a low-cost, non-invasive alternative to a Bronchiolar Lavage.
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For more information about this technology, please visit:  
https://industry.gatech.edu/technology/aerosol-separation-and-collection-device