



TECHNOLOGY

Human Exhaled Aerosol Droplet Biomarker System (HEAD Biomarker System)

OVERVIEW

Background

Chronic lung diseases have significant health and economic consequences worldwide. In 2011, the American Cancer Society estimates 221,130 new cases of lung cancer will be diagnosed in the U.S. and 156,940 deaths due to lung cancer (27% of all cancer deaths). It is estimated that approximately \$10.3 billion is spent in the United States each year on lung cancer treatment. To date, efforts to identify biomarkers for these conditions have yielded little of clinical value. Exhaled breath condensate or EBC can be used to study biomarkers that may act as potential indicators of several respiratory pathological conditions and disorders. Despite the non-invasiveness of the EBC collection methods, it was found that aerosol particle collection by popular EBD devices was inefficient, with limited sensitivity and, had problems with reproducibility and validity of biomarker measurements.

Innovative Technology

Researchers at the University of Maryland have developed a novel integrated strategy that combines several methods for detecting non-volatile biomarkers in exhaled breath droplets of respiratory lining fluid from the distal lung. This system incorporates breathing maneuvers, collection techniques, efficient recovery of labile proteins, sensitive detection (at attomolar levels) and analytical techniques that far exceed the sensitivity and reliability of conventional exhaled breath condensate collection. This method will increase the release of biomarkers from the lung, improve the efficiency of biomarker collection, and greatly improve the sensitivity of biomarker assay.

APPLICATIONS

1. Non-invasive diagnostic tool for lung cancer, asthma, COPD, TB and other lung diseases.
2. Monitoring device for lung antibiotic levels during drug therapy for TB and other forms of pneumonia (especially with drug resistant organisms) and monitoring of chemotherapy for lung cancer
3. Important tool for environmental respiratory epidemiology

ADVANTAGES

1. Non-invasive diagnostic tool compared to the current techniques of bronchoscopy where a tube is introduced into the lung.
2. Sensitive detection and measurement of non-volatile biomarkers in the low attogram to femtogram quantities per sample (100-1000 molecules per sample).
3. Early detection & effective disease management and prevention

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Biomarker

EXTERNAL RESOURCES

- [US Patent 9,617,582](#)

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