# Measuring the Activity of a Specific Fraction of Albumin for Early Diagnosis of COPD or Sepsis

Published date: March 14, 2017

## Technology description

Chronic obstructive pulmonary disease (COPD) is a complex group of conditions usually related to cigarette smoking. COPD is associated with progressive airway obstruction and loss of lung function. This disease is the fourth leading cause of death in the U.S., and caring for patients with COPD costs as much as 40 billion dollars each year.

Current methods of diagnosing COPD include pulmonary function testing, pulse oximetry, radiological procedures and arterial blood gases. However, these tests only detect relatively advanced disease. Early diagnosis is critical to slowing disease progression and preventing irreversible lung damage.

The level of inflammation in patients with COPD may provide a means of early diagnosis. However, a recent study of 36 systemic biomarkers found that they were not useful in predicting which patients will develop severe respiratory dysfunction. Currently, no reliable way exists to predict which individuals who smoke tobacco will develop COPD or which patients with COPD will become progressively worse.

Sepsis is a life-threatening systemic inflammatory response syndrome. Patients with the onset of an infection are at risk of developing sepsis. Like COPD, early diagnosis is critical to improving patient outcomes, but accurate ways of detecting sepsis at an early stage currently are not available. UW-Madison researchers have developed a sensitive and rapid high throughput assay that can be used for early detection of COPD or sepsis. This assay measures the functional activity of a specific fraction of albumin (SFA) in serum or plasma.

The assay uses a liposome that contains a fluorescently labeled fatty acid and a negatively charged phospholipid as a substrate. The liposome is mixed with phospholipase $A_2$ ($PLA_2$), an enzyme that plays a key role in inflammation, and a biological sample from a patient. The SFA in the sample then acts to remove the labeled fatty acid from the liposome, causing a detectable change in fluorescence intensity. This change can be used to determine SFA activity.

The measured SFA activity then can be compared to a normal range of SFA activity or to a baseline measurement from the patient to determine if it is decreasing, abnormally low or normal. A decrease or

low measurement of SFA activity can indicate inflammation. If the patient is a tobacco smoker, a decrease in activity as compared to an earlier measurement from the patient suggests the patient has developed or will soon develop COPD. If a patient has recently undergone surgery, a decrease in SFA activity can indicate infection and the possibility of sepsis. On the other hand, a return of SFA activity to normal levels may indicate that the patient has recovered.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a fast, sensitive and high throughput assay for diagnosing COPD or sepsis.

## Additional Information

**Francis H.C. Tsao**
https://www.linkedin.com/in/francis-h-c-tsao-8926027b

**See WARF reference number P02007US for information about using PLA $_2$ activity to diagnose inflammation.**
http://www.warf.org/technologies/summary/P02007US.cmsx

## Application area

Detecting and monitoring the development, progression and severity of COPD
Detecting and monitoring sepsis
Evaluating chronic and acute inflammation

## Advantages

Provides a sensitive and rapid blood test that is amenable to high throughput screening
Enables a method of diagnosing COPD or sepsis at an early stage
Allows early intervention for patients with COPD or an evolving infection

## Institution

Wisconsin Alumni Research Foundation

## Inventors

Keith Meyer
Francis Tsao

# 联系我们


叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com