Virtual lung models set to personalize asthma and COPD treatment

May 3 2011

A team of international experts are set to develop a pioneering tool to help tailor the treatment of asthma and chronic obstructive pulmonary disease (COPD) as part of a new EU project.

The 5-year AirPROM project, which is being launched this month (May 2011), will create computed and physical models of the whole airways system, to help scientists and doctors predict how patients might react to different treatments.

The news comes on World Asthma Day (3 May 2011), which aims to raise awareness about asthma and improve asthma care throughout the world.

Damaged, inflamed or obstructed airways are common in people with COPD and asthma, which makes breathing difficult. The current methods to detect and treat these conditions do not always consider individual differences in the airways that make each person unique. As a consequence, people with these conditions may not receive the most effective treatment.

Whilst scientists are working on more advanced, targeted approaches to treatment, they have often been unable to match these treatments to the right patients and explain the reasons behind this until now.

The AirPROM research team, which involves scientists from over 10 European countries, will make a computed model of the cells in an

airway and a physical model of the airways, to assess how air flows through the lungs and why it becomes obstructed in people with asthma and COPD.

By using these unique models, along with existing data from tests which measure lung capacity and highly detailed x-rays, known as CT scans, the scientists will be able test new therapies, which will enable them to tailor treatments to the individual.

The aim is to use this information to generate an extensive database that will be able to link the characteristics of different airways to a particular treatment in the future, helping health professionals provide personalised treatment for people with COPD and asthma.

These tools will also help scientists predict how the diseases will progress and the effect on the airways, to help monitor the future risk to patients.

Professor Chris Brightling, project lead, said: "Current treatments for COPD and asthma adopt a 'one size fits all' approach. People with these respiratory diseases are therefore missing out on the right treatment to help them manage their condition. These patient-specific models will help us monitor the diseases and how they progress, to make current treatments much more specific and targeted to benefit COPD and asthma patients.

Our ability to create a model of the lung using CT scans and other data has advanced greatly along with our ability to measure genes and their activity. We are also at a point in time where computational models have advanced to the point where they can be used to make sense of 1000s of measurements. Now is the time to bring all these elements together to change the way diagnose patients"

Breda Flood, a patient with asthma and board member of European

Federation of Allergy and Airways Diseases Patients Association (EFA), said: "This new model will help us to visualise activity in our lungs and see how our illness affects our breathing. By gaining an insight into how specific treatments will work, patients will have a better understanding of how to manage their condition in the future."

Provided by European Lung Foundation