First classification of severe asthma

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Severe asthma can have a devastating effect on sufferers, affecting their ability to work or go to school and to lead normal lives. It is difficult to treat because it is not a single disease entity. Now, for the first time, a group of European researchers has succeeded in defining three distinct types of severe asthma by analysing sputum samples from a group of patients.

Presenting her team's results to the European Respiratory Society's International Congress 2015 today (29 September 2015), Ms Diane Lefaudeux, a research engineer at the European Institute of Systems Biology and Medicine, Lyon, France, will say that they have taken the first step towards understanding how the different categories of patients vary in terms of what is causing their severe asthma,and that in the long term this would enable the development of drugs tailored to each category, as well as help identify existing drugs that could be used to help a particular group of patients. "We knew that each new treatment does not work in all people with the disease, which is why we decided to undertake sputum 'handprinting' in 72 people across the severity of asthma, including smokers," she said.

The research was carried out by U-BIOPRED (Unbiased BIOmarkers in PREDiction of respiratory disease outcomes), a public/private partnership, using information and samples from European adults and children in order to learn more about the different types of asthma. For their research on severe asthma, the scientists analysed patient sputum samples using gene expression measurements (transcriptomics), abundance of proteins (focused and non-focused proteomics), and

measurements of abundance of certain lipids (focused lipidomics). "Each 'omic' type brings a different and complementary piece of information concerning the biology of asthma and severe asthma, leading to the combination of fingerprints which make up the handprint of disease," says Ms Lefaudeux.

Difficult-to-treat asthma affects about 5% of the 30 million European asthma sufferers, and of those probably about half a million suffer from severe asthma, say the researchers. "We presume that severe asthma develops in patients who already have asthma and therefore the question is: what drives the evolution? We now believe that there may be a number of causes, since we have found that severe asthma consists of a number of different phenotypes," says Ms Lefaudeux.

Asthma is diagnosed at present by evaluation of the patient's symptoms of cough, wheeze, and chest tightness, but there is no test that is 100% accurate. Severe asthma is defined according to the amount of treatment that the asthmatic patient is taking, usually in addition to the inhaled corticosteroids and long-acting beta-agonists (medications that relax the muscle of the airways) prescribed to all asthmatic patients. Severe asthmatics often take other medications, in addition to regular corticosteroid tablets (50% of the U-BIOPRED sample were taking prednisolone).

The researchers intend to follow up their work by linking their findings to the large amount of clinical data and additional 'omics' data types that has been collected by the clinical centres of U-BIOPRED. Further and deeper analyses and interpretation of these data will help to understand the underlying biology of the newly identified groups of severe asthma patients.

To date, gaps in knowledge about differences between groups of severe asthma patients have made it difficult to predict, in the early stages of

drug development, how well a new medicine will work, and for which group. "We believe that our work, dividing severe asthmatics into meaningful categories, is the first step towards being able to provide each sufferer with optimal individualised treatment, the ultimate goal of personalised medicine," Ms Lefaudeux will conclude.

  More information: Abstract: The first U-BIOPRED sputum handprint of severe asthma

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