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NON-INVASIVE OXIDATIVE AND INFLAMMATORY BIOMARKERS IN BREATH CONDENSATE IN HEALTH AND DISEASE

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Oxidative stress is the hallmark of various inflammatory lung diseases/disorders such as asthma, adult respiratory distress syndrome, idiopathic pulmonary fibrosis, pneumonia, lung transplantation, Chronic Obstructive Pulmonary Disease (COPD), cystic fibrosis, bronchiectasis, lung cancer and various occupational diseases. Increased levels of reactive oxygen species produced in the airways can trigger inflammatory response which are reflected by increased markers of oxidative stress and inflammation in the breath, airways, lungs and blood in patients with these diseases. Traditionally, the measurement of these biomarkers has involved invasive procedures to procure the samples, or examine the compartments. As a consequence, there is a need for less invasive approaches to measure oxidative stress and inflammation. Exhaled breath condensate (EBC) is simple, non-invasive approach to sample the lower respiratory tract in humans. The measurement of biomarkers for oxidative stress, such as F2-isoprostanes, malondialdehyde, hydrogen peroxide, Nitric oxide (nitrite and nitrate), 3-nitrotyrosine and S-nitrosothiols etc., and inflammatory mediators, such as TNF-α, IL-1, IL-6, IL-8 and leukotriene B4, by non-invasive methods is an emerging and promising area of research in free radical biology, toxicological studies and medicine. It is currently used as a research and diagnostic tool in the free radical field, yielding information on redox disturbance and the degree and type of inflammation in the lung. With further technical development, such an approach may ultimately have a role in the clinic,

in helping to diagnose a specific lung disease. Highly sophisticated techniques, such as cytometric bead analysis (luminex), metabonomics and proteomics can be employed in EBC to assess a spectrum of potential biomarkers, thus generating a 'finger print' characteristic of the disease. By assessing oxidative stress status, the most appropriate therapy can be selected and the response to treatment monitored.

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