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Quest for lung disease treatments aided by blood sample study

New treatments for some lung diseases are a step closer, thanks to research that pinpoints why existing drugs are ineffective.

The discovery could lead to better therapies for chronic ailments such as chronic bronchitis and emphysema, which fail to respond to the most widely used treatments – glucocorticoid drugs, known as GCs.

The study by the University of Edinburgh sheds new light on the complex biological processes that cause lung inflammation – our immune system’s response to disease, caused by bacterial infection.

In particular, it focuses on the vital role that white blood cells – called neutrophils – play in fighting infection.

Neutrophils ordinarily have a lifespan of only a few hours. When they are called into action at sites of inflammation, however, neutrophils survive for several days in order to carry out their protective functions, and absorb more oxygen than usual.

Scientists have found that GCs are ineffective because, at inflammation sites, there is insufficient oxygen for the drugs to function efficiently.

Researchers say that treatments that are less reliant on oxygen supply are more likely to be effective.

They made their finding by taking neutrophils from the blood of healthy volunteers and studying the effect that oxygen has on the lifespan of the cells.

The researchers found that when there were healthy levels of oxygen in the blood, drugs could keep cells alive for longer.

Neutrophils survive for longer at sites of infection because the body deliberately alters conditions to stop infection from spreading.

The study was carried out by researchers at the University of Edinburgh, together with colleagues at the University of California and CXR Biosciences, Dundee.

Ranked among the top universities in the world

Lead researcher Professor Adriano Rossi, of the University of Edinburgh's MRC Centre for Inflammation Research, said: "Most diseases afflicting humans have an important inflammatory component. Understanding the fundamental mechanisms and processes controlling inflammation will undoubtedly lead to the development of much-needed, safer anti-inflammatory drugs."

Fellow author Dr John Marwick, also of the University of Edinburgh's MRC Centre for Inflammation Research, said: "Inflammatory diseases contribute to countless deaths and suffering and deciphering how important inflammatory cells live and function is vital."

The study, published in the *Journal of Leukocyte Biology*, was funded by Medical Research Scotland and the Medical Research Council.

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