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Discovery opens new avenues for treatment of poorly controlled asthma

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(PhysOrg.com) -- A new study at the University of Leicester is probing why asthma relief inhalers might actually make asthma worse- and what can be done about it.

Research led by Professor Peter Bradding, of the Department of Infection, Immunity and Inflammation, is providing new insights into factors influencing effectiveness of certain asthma medicines.

His study is focusing on the preventer and reliever treatments for asthma.

Asthma is characterised by reversible narrowing of airways in the lungs, which makes breathing difficult. An estimated 300 million people suffer from this condition worldwide. There is, to date, no cure for asthma, although the condition can be well managed with proper treatment.

Professor Bradding said, “Asthma treatment can be broadly classified into preventer and reliever treatments. Preventers control swelling and inflammation of lung airways. Their protective effect is not immediate, but develops gradually with time. It is therefore, essential to take preventer medication regularly. Relievers on the other hand have an immediate effect. They help ‘relieve’ asthma symptoms by relaxing airways, making breathing easier”.

Professor Bradding added: “Despite their usefulness in rapidly relieving asthma, relievers may cause asthma to worsen when used too frequently.

Moreover, they are not always as effective as predicted. We investigated mechanisms behind this by studying interactions between reliever medicines and the immune system.

“Our immune system uses antibodies (a type of protein found in blood and other body fluids) to identify foreign bacteria and viruses and neutralise their effects. Asthma is commonly associated with allergies, which are caused by antibodies called IgE which react with allergens such as house dust mite and grass.. IgE binds to mast cells in lungs of asthma sufferers. This, in turn, causes mast cells to release chemicals such as histamine, which cause narrowing of lung airways and thus, lead to an asthma attack”.

Mast cells need a chemical known as stem cell factor to survive and function and this chemical is present in asthmatic lungs. Professor Bradding’s research shows that when lung mast cells are exposed to reliever drugs, in the presence of both IgE and stem cell factor, relievers lose their ability to prevent chemical release from mast cells. Interestingly, under these circumstances, relievers may actually cause mast cells to release more chemicals, causing asthma to worsen.

Professor Bradding says, “This research might explain why reliever drugs are not always as effective as predicted, why they might worsen and destabilise asthma”. This research has important consequences for individuals with poorly controlled asthma and for those who rely too heavily on relievers, whilst not using their preventer medication regularly. Professor Bradding adds, “If we can inhibit the function of stem cell factor in the lungs of asthmatic patients, reliever drugs such as salbutamol, might be more effective”.

If future research reinforces these findings, then this work could lead to the development of new treatment strategies that could benefit thousands of people.

The research is funded by Asthma UK.

Dr Elaine Vickers, Research Relations Manager at Asthma UK says: “Millions of people around the world use reliever inhalers that contain medicines such as salbutamol and these devices play a crucial role in relieving asthma symptoms. Professor Bradding aims to understand why it is that people who use their reliever inhalers too often, without using a preventer inhaler, are putting themselves at risk of worse asthma symptoms.

“We hope that the results of Professor Bradding’s work will lead to the development of drugs that overcome the problems associated with over-use of reliever inhalers but in the meantime we would urge anyone who needs to use their reliever inhaler three or more times a week to visit their doctor or asthma nurse to have their symptoms reviewed. We would also urge people with asthma to use their preventer inhalers as prescribed. This should not only control symptoms, but also guard against any harmful effects of frequent reliever use.”

Provided by University of Leicester