

# Fight against hay fever and other allergies helped by new immune system discovery

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A mechanism which can lead to hay fever and other allergic reactions, by preventing the immune system from regulating itself properly, has been discovered by scientists. Researchers hope their finding, published today in the journal *PLoS Biology*, will allow therapies to be developed that treat allergies by stopping this mechanism.

The new research shows that a gene known as GATA-3 can block the development of regulatory T-cells in the immune system by locking another gene. This gene, FOXP3, is key to regulatory T cells and when it is blocked new regulatory T cells stop being produced.

The scientists, from Imperial College London, the Swiss Institute of Allergy and Asthma Research in Davos, Switzerland, and other international institutions, hope that if they can develop therapies to stop FOXP3 being blocked, they can ensure that regulatory T cells are free to work normally.

Regulatory T cells are believed to be vital for averting allergic reactions in healthy individuals because they keep the other cells in check, suppressing pro-allergic cells known as Th2 cells and stopping the immune system from needlessly attacking the body.

In people with allergies, some types of cells in the immune system, particularly the Th2 cells, wrongly identify a particular allergen, such as pollen, as being dangerous. Whenever the person encounters this allergen again, these cells promote the production of antibodies to attack it,

causing an allergic reaction.

Dr Carsten Schmidt-Weber, the principal investigator on the research from the National Heart and Lung Institute at Imperial College London, said: “This finding will help us to understand how healthy individuals are able to tolerate allergens and what we need to do to re-induce tolerance in the immune systems of patients with allergies. We hope that we will soon be able to help not only patients suffering from single allergies, but also those with multiple ones - the atopic patients.”

The researchers reached their conclusions by analysing the genes related to regulatory T-cells and analysing how they interacted. They confirmed their findings by using mouse models to show that mice which were genetically engineered to express the GATA-3 gene in all T cells showed dramatic defects in the production of regulatory T-cells.

Dr Schmidt-Weber and his colleague Professor Stephen Durham, also from the National Heart and Lung Institute at Imperial College, hope the new findings will eventually lead to new, more effective treatments for hayfever and other allergies, to be used in combination with existing immunotherapies. They hope such treatments could help prevent hay fever and allergic asthma from reaching epidemic proportions.

Source: Imperial College London

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