

# The balancing act between protection and inflammation in MS

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Scientists have discovered a molecular mechanism that could help explain how multiple sclerosis (MS) and other autoimmune diseases can be exacerbated by the onset of an infection.

MS is an autoimmune disease of the [central nervous system](#) which affects approximately 100,000 people in the UK.

The research, directed by Dr Bruno Gran at The University of Nottingham, focused on a population of cells of the immune system known as [regulatory T cells](#), which control and regulate the behaviour of other [immune cells](#). The results of this study have been published in the [Journal of Immunology](#).

Dr Bruno Gran, from the School of [Clinical Sciences](#), said: "The connection between infections and MS is complex. We have known for many years that in some cases, infections can promote disease [exacerbations](#) (also known as "MS relapses"). Our study sheds light on a new mechanism that could explain how infections can trigger such relapses. This might have relevance to other [autoimmune diseases](#) as well"

When the immune system is functioning properly Regulatory T cells — also known as Tregs — keep in check the tendency of other cells of the immune system to over react and cause inflammation when the body is under attack from infectious agents such as bacteria or viruses.

## **The battle of the immune cells**

In the battle that follows the research group discovered that bacteria and viruses activate certain receptors of the innate immune system — known as Toll-like receptors (TLRs), making the Tregs less inhibitory. The positive consequence is that inflammatory immune cells are more able to react against infectious agents and eliminate them. The problem is that such increased activity of inflammatory immune cells could also increase the occurrence of autoimmune reactions against organs such as the central nervous system.

## **Research led by award winning PhD student**

Most of the experimental work was conducted in the laboratory by award winning PhD student Mukanthu Nyirenda under the supervision of Dr Gran in the Division of Clinical Neurology. The research was funded by the Multiple Sclerosis Society of Great Britain and Northern Ireland.

Last year Mukanthu received the University Endowed Postgraduate Prize in recognition of the progress he has made with his research. He is also a previous recipient of a Jacqueline Du Pre' Award of the [Multiple Sclerosis](#) International Federation.

Mukanthu said: "This publication is a very important part of the work leading to my doctoral dissertation, planned for 2012. I am grateful for the recognition and support given to me by the University with the Endowed Postgraduate Prize."

The study was carried out in collaboration with Professor Cris Constantinescu and other researchers at The University of Nottingham and experts at McGill University in Montreal.

## Flirting with the enemy

The research team also found that when stimulated by molecules that activate TLRs, regulatory T cells become themselves functionally more similar to inflammatory T cells, another reason why autoimmune reactions could occur in relation to infections.

Although this part of the study focussed on healthy subjects, ongoing studies in Dr Gran's laboratory are comparing the properties of regulatory T cells in these people with those obtained from patients with MS. Other researchers have previously found that Tregs may in fact be defective in MS patients, and this study contributes to our understanding of how episodes of infections, known to influence the clinical course of MS, could in certain circumstances promote the occurrence of autoimmunity.

**More information:** [www.jimmunol.org/content/187/5/2278.short](http://www.jimmunol.org/content/187/5/2278.short)

Provided by University of Nottingham

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