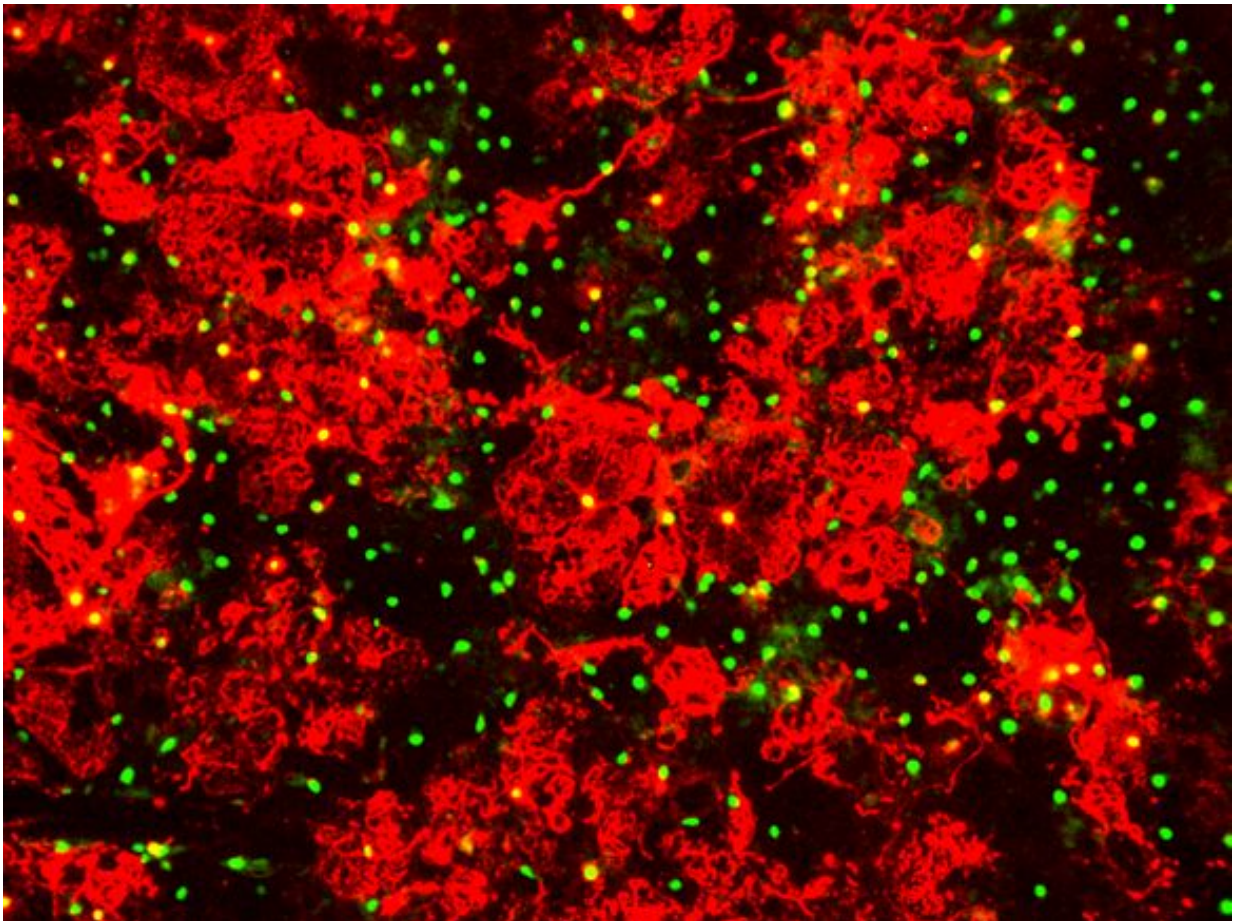


# Researchers make major brain repair discovery in fight against multiple sclerosis

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Many mature oligos: red = myelin; green = oligodendrocyte cells. Credit: Queen's University, Belfast

Queen's University Belfast scientists have discovered that specific cells from the immune system are key players in brain repair – a fundamental breakthrough that could revolutionise the treatment of debilitating neurological disorders such as multiple sclerosis (MS).

The research study, led by Dr Yvonne Dombrowski and Dr Denise Fitzgerald at the Wellcome-Wolfson Institute for Experimental Medicine at Queen's University Belfast, is being hailed as a landmark study in unravelling the mysteries of how the brain repairs damage. This is crucial in the fight against MS, which affects 2.3 million people worldwide and over 4,500 people in Northern Ireland.

MS is the most common neurological disease affecting young adults and is the result of damage to myelin, the protective sheath surrounding nerve fibres of the central nervous system – the brain, [spinal cord](#) and optic nerve. In MS, the [immune system](#) wrongly attacks the [myelin sheath](#) covering [nerve fibres](#) in the brain and spinal cord, which can lead to symptoms such as vision loss, pain, fatigue and paralysis.

Until now, medical treatment could limit relapses but could not reverse the damage already done by the condition. The exciting aspect of this new research is that the team have uncovered beneficial effects of immune cells in myelin repair that have potential to reverse myelin damage. The study was an [international collaboration](#) including experts in Cambridge, San Francisco, Edinburgh, Maynooth and Nice.

The research breakthrough, which has been published today in *Nature Neuroscience*, shows that a protein made by certain cells within the immune system triggers the brain's stem cells to mature into oligodendrocytes that repair myelin.

The discovery means that researchers can now use this new knowledge to develop medicines which will boost these particular cells and develop an

entirely new class of treatments for the future.

Speaking about the importance of the new research, Dr Dombrowski, who is the lead author of the report, explained: "At Queen's we are taking a unique and fresh approach to uncover how the immune system drives [brain repair](#). This knowledge is essential to designing future treatments that tackle neurological diseases, such as MS, in a new way – repairing damage rather than only reducing attacks. In the future, combining these approaches will deliver better outcomes for patients."

Senior author of the study, Dr Denise Fitzgerald from Queen's, experienced a condition similar to MS, called Transverse Myelitis when she was 21 and had to learn to walk again.

Commenting on the findings, Dr Fitzgerald said: "This pioneering research, led by our team at Queen's, is an exciting collaboration of top scientists from different disciplines at Cambridge, San Francisco, Edinburgh, Maynooth and Nice. It is by bringing together these experts from immunology, neuroscience and stem cell biology that we have been able to make this landmark discovery.

"This is an important step forward in understanding how the brain and spinal cord is naturally repaired and opens up new therapeutic potential for myelin regeneration in patients. We continue to work together to advance knowledge and push the boundaries of scientific knowledge for the benefits of patients and society, in a bid to change lives for the better, across the globe."

Dr Sorrel Bickley, Head of Biomedical Research at the MS Society, said: "MS is an unpredictable and challenging condition, and we are committed to driving forward research to find effective treatments for everyone. This exciting study gives us an important understanding of how myelin repair can be promoted, which could open up new areas for

treatment development. We welcome this international collaboration led by Northern Ireland, where rates of MS are amongst the highest in the world."

**More information:** Yvonne Dombrowski et al. Regulatory T cells promote myelin regeneration in the central nervous system, *Nature Neuroscience* (2017). [DOI: 10.1038/nn.4528](https://doi.org/10.1038/nn.4528)

Provided by Queen's University Belfast

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