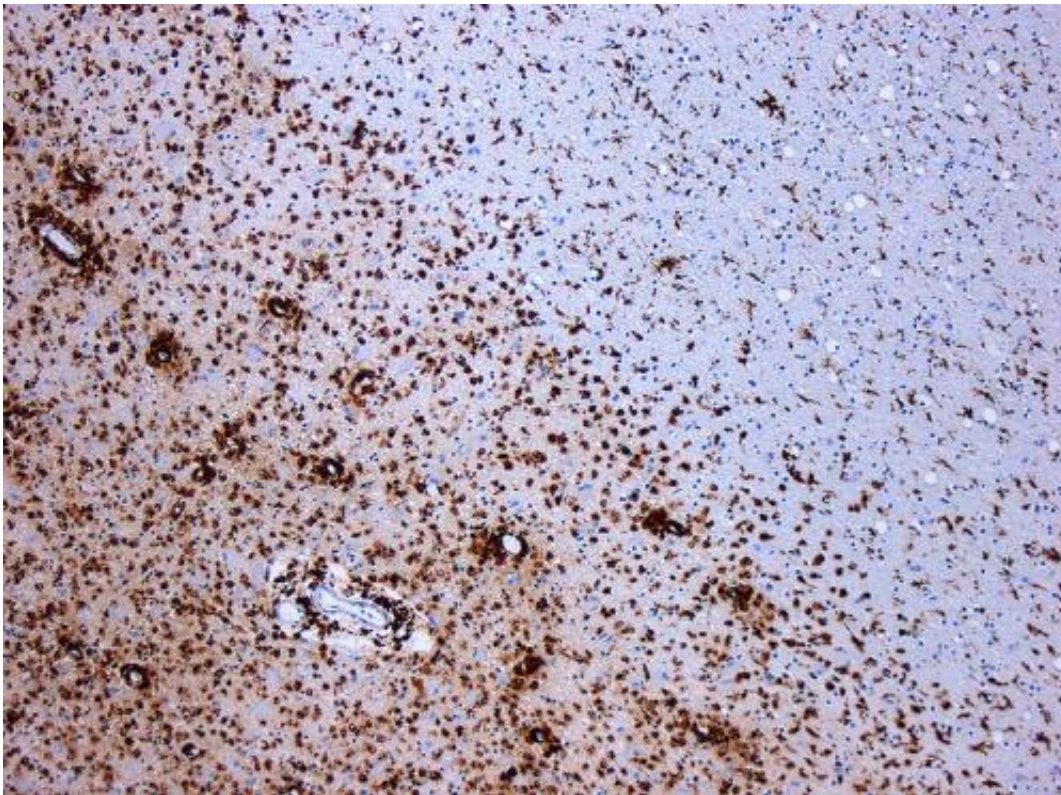


Research moves closer to unravelling mystery cause of multiple sclerosis

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Demyelination by MS. The CD68 colored tissue shows several macrophages in the area of the lesion. Original scale 1:100. Credit: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/) Marvin 101/Wikipedia

A new study has made a major new discovery towards finding the cause of multiple sclerosis (MS), potentially paving the way for research to investigate new treatments.

Ahead of MS Awareness Week, which starts today (Monday April 24), an international team involving the University of Exeter Medical School and the University of Alberta has discovered a new cellular mechanism— an underlying defect in [brain cells](#)—that may cause the disease, and a potential hallmark that may be a target for future [treatment](#) of the autoimmune disorder.

The study was recently published in the *Journal of Neuroinflammation* and part funded by the Royal Devon & Exeter NHS Foundation Trust.

Professor Paul Eggleton, of the University of Exeter Medical School, said: "Multiple sclerosis can have a devastating impact on people's lives, affecting mobility, speech, mental ability and more. So far, all medicine can offer is treatment and therapy for the symptoms - as we do not yet know the precise causes, research has been limited. Our exciting new findings have uncovered a new avenue for researchers to explore. It is a critical step, and in time, we hope it might lead to effective new treatments for MS."

Multiple sclerosis affects around 2.5 million people around the world. Typically, people are diagnosed in their 20s and 30s, and it is more common in women than men.

Although the cause has so far been a mystery, the disease causes the body's own immune system to attack myelin - the fatty "sheaths" that protect nerves in the [brain](#) and spinal cord. This leads to brain damage, a reduction in blood supply and oxygen and the formation of lesions in the body. Symptoms can be wide-ranging, and can include muscle spasms, mobility problems, pain, fatigue, and problems with speech.

Scientists have long suspected that mitochondria, the energy-creating "powerhouse" of the cell, play a link in causing [multiple sclerosis](#).

The joint Exeter-Alberta research team was the first to combine clinical and laboratory experiments to explain how mitochondria become defective in people with MS. Using human brain tissue samples, they found that a protein called Rab32 is present in large quantities in the brains of people with MS, but is virtually absent in healthy brain cells.

Where Rab32 is present, the team discovered that a part of the cell that stores calcium (endoplasmic reticulum or ER) gets too close to the mitochondria. The resulting miscommunication with the calcium supply triggers the mitochondria to misbehave, ultimately causing toxicity for brain cells people with MS.

Researchers do not yet know what causes an unwelcome influx of Rab32 but they believe the defect could originate at the base of the ER organelle.

The finding will enable scientists to search for effective treatments that target Rab32 and embark on determining whether there are other proteins that may play a role in triggering MS.

Dr David Schley, Research Communications Manager at the MS Society, said:

"No one knows for sure why people develop MS and we welcome any research that increases our understanding of how to stop it. There are currently no treatments available for many of the more than 100,000 people in the UK who live with this challenging and unpredictable condition. We want people with MS to have a range of treatments to choose from, and be able to get the right treatment at the right time."

More information: Yohannes Haile et al, Rab32 connects ER stress to mitochondrial defects in multiple sclerosis, *Journal of Neuroinflammation* (2017). [DOI: 10.1186/s12974-016-0788-z](https://doi.org/10.1186/s12974-016-0788-z)

Provided by University of Exeter

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