Spinal fluid could be used to predict the progression of multiple sclerosis, study finds

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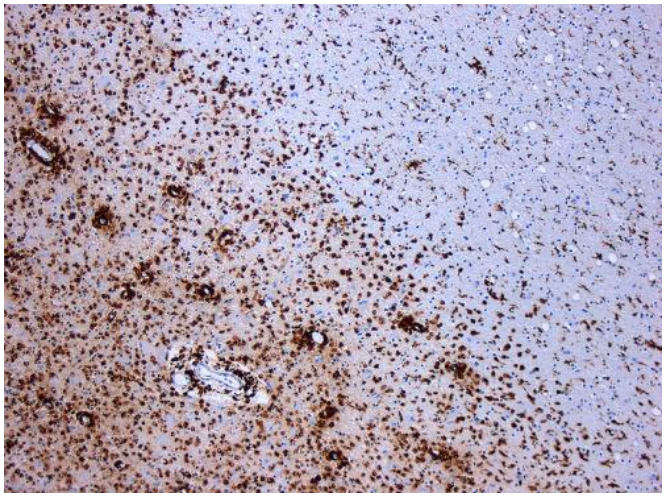

Demyelination by MS. The CD68 colored tissue shows several macrophages in the area of the lesion. Original scale 1:100. Credit: Marvin 101/Wikipedia

A study led by the University of Birmingham has found that analysis of fluid in the spine could be used to predict the future progression of multiple sclerosis.

Multiple sclerosis (MS) is a condition in which the immune system attacks the nervous system and is the leading cause of non-traumatic disability in young adults, with around 100,000 people currently diagnosed in the UK.

It can cause a wide range of health issues including visual problems, fatigue, thinking difficulties, muscle weakness and a lack of coordination.

However, severity and progression of the disease can vary widely between individuals - some patients will only ever have a single episode of the disease, others will go on to suffer multiple attacks, potentially resulting in serious disability.

Mike Douglas, an honorary Professor at the University of Birmingham who led the clinical work in this study, said: "Although there are now a wide range of therapies available for the treatment of multiple sclerosis, the specific choice of treatment in any individual patient is not made in a very evidence-based way.

"We do not have reliable long-term outcome predictors for individual patients to guide their choice between more potent therapies with potentially greater side effects, and more gentle therapies which may not fully control the condition.

"The use of 'biomarkers' to predict future risk of disability is critical to ensure that individual patients receive the right treatment at the right time."

The team of scientists investigated whether fluid in the spine could hold the answer to help predict the progression of disability in patients with MS. The findings of the six-year study were published today in the *Journal of Neurology, Neurosurgery & Psychiatry*.

The study saw the team analyse the spinal fluid from patients with MS at the time they were diagnosed and matched these data with the progression of their disease five years later.

The researchers found a highly unusual pattern in the behaviour of white blood cells responsible for immunity and in the antibodies produced by these cells. Antibodies are required to fight infection and disease.

They found that the cells were producing a significantly higher ratio of one type of antibody

molecule. These antibodies originated from cells within the nervous system of these patients - yet these cells are not normally found in this part of the body.

In the blood of MS patients there is a normal ratio of around 2:1 of each type of antibody, but in the spinal fluid of the study's MS patients the researchers found ratios of more than 100:1.

Joint lead author Dr John Curnow, of the University of Birmingham's Institute of Inflammation and Ageing, added: "What was interesting about our findings was that this unusual extreme ratio bias mostly occurred in patients in the early stages of the disease, while there was far less bias in those patients who later developed greater disability.

"Our research suggests that this early bias in this type of antibody could be related to a trigger of MS.

"For patients who later develop more severe disease we find that this attack by the immune system, even when analysed at the time of diagnosis, has already developed beyond the initial trigger of the disease, resulting in greater damage to the nervous system in subsequent years.

"The unusual pattern of antibody suggests a very distinct immune response early in the disease. We are hoping to identify the target of this immune response.

"Alongside improving our fundamental understanding of MS, this presents the opportunity to identify patients who are at higher risk of developing disability and may need more aggressive treatment. Similarly, it may be possible to identify patients at lower risk, who may be able to manage their condition more conservatively."

This is the first research to have identified an association between this distinct immune response and the development of disability over time.

Dr Curnow said that more research was necessary to validate these research findings, including a study using a larger number of patients.

He added: "If our findings are confirmed, then we would have a relatively simple test that could be used at diagnosis to help identify patients with a poor prognosis.

"This will enable clinicians to justify the use of highly effective therapies, which could potentially improve the long-term outcomes for these patients."

More information: Rathbone et al (2018) 'Cerebrospinal fluid immunoglobulin light chain ratios predict disease progression in multiple sclerosis'. *Journal of Neurology, Neurosurgery & Psychiatry*. DOI: 10.1136/jnnp-2018-317947

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