

PRESS RELEASE

Potential target for MS therapy discovered

Researchers from Bonn and Erlangen identify the protein MLC1 as a target antigen in multiple sclerosis

Bonn, February 18 – Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system caused by the immune system. B cells, which are a type of white blood cell, play a role in the development of MS and are thus a target for therapies. Researchers at the University Hospital Bonn (UKB), the University of Bonn and the FAU Erlangen-Nuremberg identified the membrane protein MLC1 as a potential target antigen in MS. To do this, the team used a novel combination of modern techniques. The results of the work have now been published in the renowned journal “Neurology Neuroimmunology & Neuroinflammation”.

Inflammation in the brain and spinal cord is characteristic of multiple sclerosis (MS). This is caused by the attack of the body's own immune cells on the myelin sheaths of the nerves. The success of B-cell-depleting therapies, which specifically remove B-cells from the body, shows their significant contribution to the disease activity of MS. “The target antigen of MS has long been a mystery and there seems to be no defined single target antigen,” says Prof. Stefanie Kürten, Managing Director of the Anatomical Institute at the UKB. She is also a member of the Transdisciplinary Research Area (TRA) ‘Life & Health’ and the Immunosensation2 Cluster of Excellence at the University of Bonn. Recently, the antigen GlialCAM was identified as relevant for MS. This is particularly interesting because there is a connection with an infection with the Epstein-Barr virus, which is considered a risk factor for MS.

The favorite is the membrane protein MLC1

Prof. Kürten's research team combined the technique of B-cell stimulation of peripheral blood mononuclear cells (PBMCs) with a human proteome-wide protein microarray. They used it to test the B-cell response of MS patients compared to healthy individuals or patients with other neuroinflammatory or neurodegenerative diseases. “One of the top hit proteins was MLC1, which is why we focused on it,” says co-first author Raffael Dahl from the FAU Erlangen-Nuremberg. Co-first author Alicia Weier, a doctoral student at the University of Bonn's Neuroanatomy at the UKB, adds: “Furthermore, it is a very interesting candidate because the protein is expressed on astrocytes and neurons. MLC1 is also a binding partner of GlialCAM.”

The research team was able to confirm the existing concept of an extremely diverse autoimmune response in MS. They found a significantly increased antibody response against MLC1 in B-cell cultures and serum samples from patients with MS. They also observed significantly increased titers against MLC1 in the cerebrospinal fluid of patients with viral-induced neuroinflammatory diseases of the central nervous system. In addition, the researchers identified neurons and astrocytes as the main cell types expressing MLC1 in the brains of MS patients.

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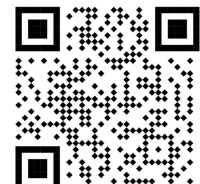
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Future studies will need to address the diagnostic and prognostic value of MLC1-specific antibodies in neuroinflammatory diseases such as MS and characterize the role of MLC1 expression by neurons and astrocytes. “It is interesting, for example, to see how the two molecules MLC1 and GlialCAM interact with each other, what functional role they play and whether there is a temporal sequence of antigen recognition in the course of MS,” says Prof. Kürten. “In addition, the MLC1 protein probably has clinical relevance beyond MS.

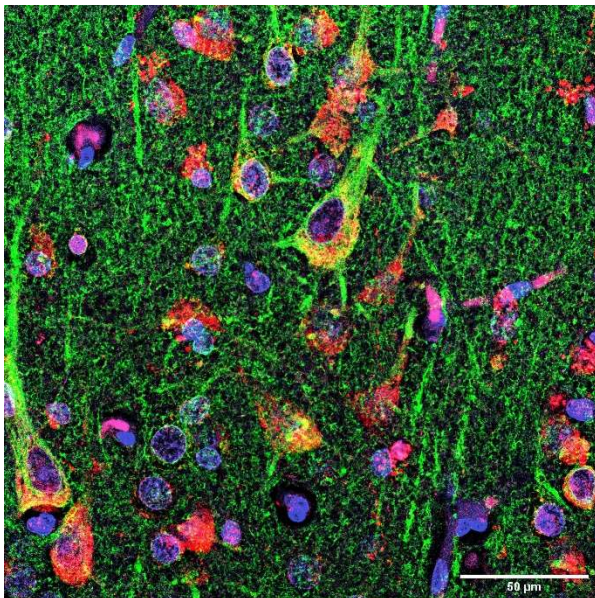
Funding: The study was funded by Sanofi as an investigator-initiated trial and by the SFB1540 EBM (DFG project 460333672).

Publication: Raffael Dahl; Alicia Weier et al.: Modulator of VRAC Current 1 Is a Potential Target Antigen in Multiple Sclerosis, *Neurology Neuroimmunology & Neuroinflammation*: DOI: <https://doi.org/10.1212/NXI.0000000000200374>

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Image material:



Under the microscope: In the brain section of an MS patient, the neurons are shown in green and the target antigen MLC1 in red

Picture credits: University Hospital Bonn (UKB) / Research group Prof. Stefanie Kürten”



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(f. I.) Alicia Weier, Dr. Maik Hintze, Dr. Rittika Chunder und Prof. Stefanie Kürten identify the protein MLC1 as a target antigen in multiple sclerosis.

Picture credits: University Hospital Bonn (UKB) / Katharina Wislsperger

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About Bonn University Hospital: The UKB treats around 500,000 patients per year, employs around 9,500 staff and has a balance sheet total of 1.8 billion euros. In addition to the 3,500 medical and dental students, 550 people are trained in numerous healthcare professions each year. The UKB is ranked first among university hospitals (UK) in NRW in the Focus Clinic List, had over 100 million third-party funds in research in 2023 and has the second highest case mix index (case severity) in Germany. The F.A.Z. Institute awarded the UKB first place among university hospitals in the category "Germany's training champions 2024".