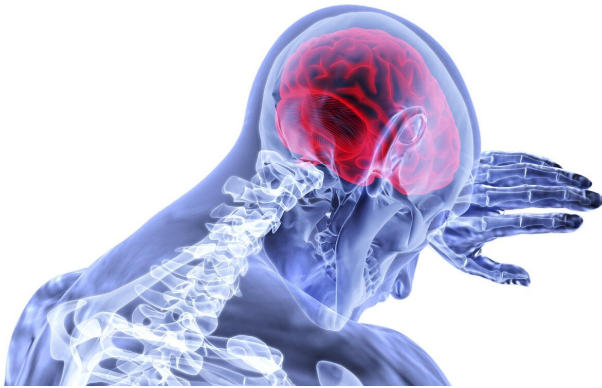


Local inflammatory cells are characteristic for advanced multiple sclerosis

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In the brains of people that suffer from long-term multiple sclerosis (MS), inflammatory cells are not entering the brain via the bloodstream anymore. Instead, the cells arise from local memory cells in the brain. Nina Fransen and her colleagues of the Netherlands Institute for Neuroscience show this in a recently published article in the scientific journal *Brain*.

At its onset, MS is characterized by a relatively high frequency of attacks of neurological symptoms that recover relatively well. During attacks early in the [disease](#), [white blood cells](#) migrate from the bloodstream into the brain, where they contribute to the inflammation. In patients with advanced MS, the number of attacks with neurological symptoms is reduced, but disability does progress. "Our previous studies indicated that there is still a significant amount of inflammatory activity in the brain also at later stages of MS, which is remarkable", says Nina Fransen. The researchers therefore wondered whether white blood [cells](#) still play a role in the inflammation during advanced MS.

White blood cells

In this study, the research group of professor Inge Huitinga focussed mainly on one specific type of white blood cell, the T cell. Brain tissue that was donated by MS patients that are passed away, was examined at the Netherlands Brain Bank. In this tissue, the researchers found activated T cells inside of the inflammatory lesion centers. These cells had characteristics of tissue-resident memory T cells. This kind of T cell remains in tissues after [viral infections](#) and offers long-term local protection to new infections. In the brain, these cells have only recently been discovered by the same research group.

These new findings support the idea that during the late phase of MS, the disease is happening entirely inside the brain. In this case, white blood cells on the outside of the brain do not influence the disease any more. "These data give us insight into the disappointing effects of current treatments during later stages of MS. By mapping the behavior of the T cells, we can start thinking of ways to slow down the disease process in patients with advanced MS", explains Joost Smolders, member of the research group and neurologist at Erasmus MC in Rotterdam.

Multiple sclerosis

In people with MS, inflammation in the [brain](#) is responsible for the breakdown of myelin, the insulating layer that forms around nerves. Without this insulation, it would not be possible for nerve cells to communicate properly with each other. As a consequence, important functions like walking, feeling, talking and thinking are being affected. Each person with the condition is affected differently and the course of the disease is hard to predict. Unfortunately, there is no cure for MS yet.

More information: Nina L Fransen et al, Tissue-resident memory T cells invade the brain parenchyma in multiple sclerosis white matter lesions, *Brain* (2020). [DOI: 10.1093/brain/awaa117](https://doi.org/10.1093/brain/awaa117)

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