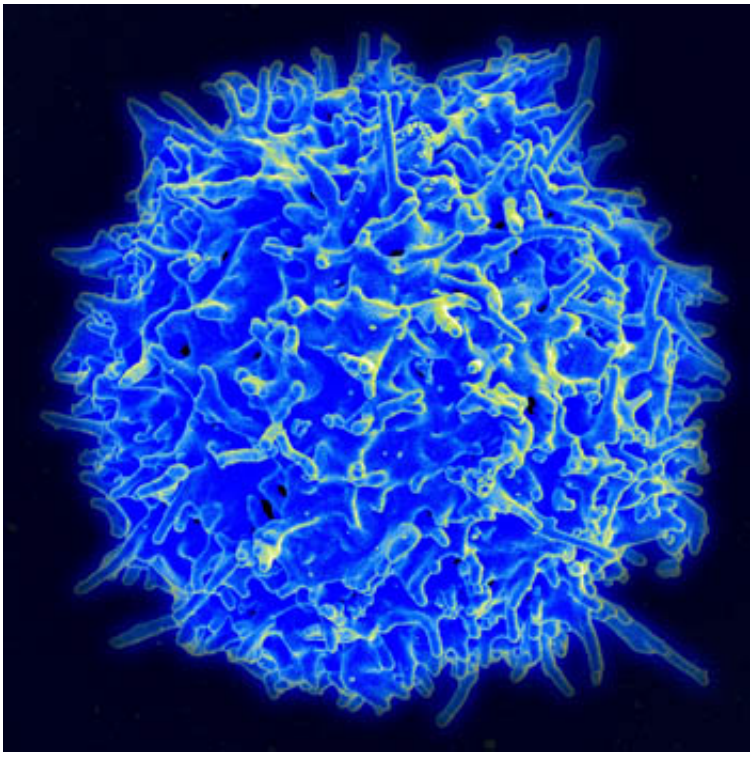
T-cell specificity found to play a role in attacks on myelin versus β-synuclein in MS

February 21 2019, by Bob Yirka



Scanning electron micrograph of human T lymphocyte or T cell. Credit: NIAID/NIH

A team of researchers affiliated with multiple institutions in Germany has found that T-cell specificity plays a major role in immune system attacks on myelin versus β-synuclein in people with multiple sclerosis. In their paper published in the journal *Nature,* the group describes their study of T-cell behavior in rat models and what they learned. Jenna

Pappalardo and David Hafler with the Yale School of Medicine have published a News and Views piece on the work done by the team in the same journal issue.

MS is a form of autoimmune disease—for unknown reasons, the immune system starts to attack the myelin sheath that covers and protects neuronal axons. There is currently no cure. MS also has two stages—the first is called the relapsing-remitting stage. It is characterized by symptoms such as tingling in parts of the body. The first stage often leads to the second stage, which is called the progressive stage. This is when symptoms continue for long periods of time, or never go away at all—and when progressive damage leads to more symptoms.

Prior research has shown that the symptoms typically associated with relapsing-remitting MS happen as the immune system attacks neuronal axons in the brain's white matter. The researchers note that much less research has been done to learn more about the progressive stage, but scientists have learned that it tends to have more of an impact on grey matter—and instead of attacking neural axons, it attacks a protein called β-synuclein. How and why a switch occurs is unknown. In this new effort, the researchers sought to learn more about why T-cells would switch targets as the disease progresses. More specifically, they wanted to know if T-cells were being drawn to different cells due to the expression of inflammatory chemokine molecules.

The study consisted of looking at T-cell behavior in rat models. They found that T-cell specificity resulted in the targeting of grey matter rather than the expression of chemokine receptors on the T-cells. They noted that T-cells that reacted to myelin cells were found in parts of white matter with a lot of neuronal axons, but not in the grey matter, and vice-versa. They also noted that the type of damage seen in the progressive stage of the disease was very similar to that seen in Parkinson's disease patients.

More information: Dmitri Lodygin et al. β-Synuclein-reactive T cells induce autoimmune CNS grey matter degeneration, *Nature* (2019). DOI: 10.1038/s41586-019-0964-2