MedicalXpress

Scientists identify how normally protective immune responses kill neurons

October 6 2015

National Institutes of Health (NIH) scientists studying inflammation of the brain have discovered why certain immune responses, which typically help cells recognize and fight viral and bacterial infections, can sometimes be harmful to the brain. Many brain disorders involve the death of neurons, or nerve cells, but how these neurons die is not well understood. A new study in *The Journal of Immunology* describes how the activation of normally protective immune responses causes nerve cells to die and identifies the protein responsible, providing a potential target for therapeutic intervention.

Researchers from NIH's National Institute of Allergy and Infectious Diseases (NIAID) studied the effect of immune system proteins called toll-like receptors on neurons. These receptors detect infection by bacteria or viruses. They also can detect certain molecules released by dying neurons and associated with diseases such as Alzheimer's. The researchers used a mouse model to study why stimulation of these receptors caused death in neurons, but not other cell types. They determined that toll-like receptors activated a protein called SARM1 in neurons, which induces their death by affecting the function of mitochondria, the cells' energy producers.

The study builds on the NIAID group's previous work showing that SARM1 also caused neuronal death during viral infections in the brain. The new research demonstrates that immune activation of neurons, even in the absence of viral infection, can cause them to die. By identifying SARM1 as a key molecule responsible for this process, researchers have

an improved understanding of why the normally protective immune response can be detrimental when infection or damage occurs in the brain.

More information: P. Mukherjee, et al. SARM1, not MyD88, mediates TLR7/TLR9-induced apoptosis in neurons. The *Journal of Immunology* DOI: 10.4049/jimmunol.1500953 (2015).

Provided by NIH/National Institute of Allergy and Infectious Diseases