Changes in microglia impact neuroinflammation and disease pathology

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Advances in research about the brain's immune system have revealed the underlying foundations of neuroinflammation. These findings were presented at Neuroscience 2019, the annual meeting of the Society for

Neuroscience and the world's largest source of emerging news about brain science and health.

Neuroinflammation is a hallmark of degenerative brain diseases like Alzheimer's disease (AD), and understanding the causes and mechanisms are critical for treating them. Microglia, immune cells in the brain, are an important part of the immune system and its inflammatory response. Scientists are beginning to understand how microglia respond to damage and disease, and how this response can become disordered and/or harmful. Changes in microglial cells are noted in a wide variety of neurodegenerative diseases ranging from autism spectrum disorder (ASD) to AD and other forms of dementia.

Today's new findings show that:

- Microglia activated by inflammation in the cerebellum of mice trigger hyperexcitability in the brain, causing decreases in sociability, motivation, and healthy behavior (Gen Ohtsuki, Kyoto University Graduate School of Science).
- Baby aspirin given to AD mice increases the response of a protective molecule that prevents neuroinflammation, leading to improved memory and learning. These finding provide insight into the mechanism by which the medication affects the brain (Kalipada Pahan, Rush University).
- Microglia in mice with decreased sensory experience eliminate sensory experience-related synapses in the brain, unless a regulating molecule is blocked. This study provides a better understanding of the function of microglia in the brain and their role in neurodegenerative diseases (Dori Schafer, University of Massachusetts Medical School).

"This represents research that helps us understand the underpinnings and mechanisms of neuroinflammation," said press conference moderator

Donna Wilcock, Ph.D., a professor at the University of Kentucky who studies vascular cognitive impairment and dementia. "We are only beginning to understand the complex interplay between the immune system and the brain, and we don't yet know how to manipulate it effectively. This research will further our understanding of these challenges and find a way forward to treat patients with inflammation due to disease or injury."

Provided by Society for Neuroscience