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Antiviral Immune Response in Alzheimer's Disease

Wei Cao is an Associate Professor at the Huffington Center on Aging, Molecular and Human Genetics at Baylor College of Medicine in Houston. For many years, Dr. Cao has studied the fundamental mechanisms of innate immune activation and regulation, which govern type I interferon biology. Now Dr. Cao's research focuses on the neuroinflammatory responses imperative in neurodegenerative processes, especially Alzheimer's disease.

Abstract: With an aging population, Alzheimer's disease (AD) becomes an increasing public health challenge. Type I interferon (IFN) is a key cytokine known to curb viral infection and cell malignancy. We recently detected an IFN-stimulated gene (ISG) signature in the brains of multiple murine Alzheimer disease (AD) models, where activated ISG-expressing microglia exclusively surrounded nucleic acid (NA)-positive A β plaques and accumulated in an age-dependent manner. Selective IFN receptor blockade effectively diminished the ongoing microgliosis, synapse loss and improved cognitive functions in AD models. Furthermore, we observed activated ISG-expressing microglia enveloping neuritic plaques in post-mortem brains of AD patients and grossly upregulated IFN pathway expression in clinical AD. Interestingly, polymorphisms of several ISGs pose as genetic risk factor for AD and IFN signaling has been linked to brain aging. Therefore, IFN constitutes a pivotal element within the neuroinflammatory network of AD and critically contributes to neuropathogenic processes.