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Connection between Gut-derived Phytochemical molecules and Brain Inflammatory Cascade

Anti-inflammatory effect of several phytochemicals such as curcumin, resveratrol, polyunsaturated fatty acids (PUFAs) and ginsenosides has been extensively studied. However, their underlying mechanism against neuroinflammatory pathogenesis of neurodegenerative diseases is still unclear, especially in connection between their dietary supplementation and reversal of brain neuronal damage or dysfunction. In this article, we analyze anti-oxidative and anti-inflammatory effects of phytochemicals, and then discuss their communication approaches with brain microenvironment and the potential binding receptors on microglia, astrocytes and neurons. These data show that phytochemicals may modulate and suppress neuroinflammation by several approaches: 1) amelioration of systemic inflammation and inflammatory infiltration via blood brain barrier (BBB); 2) direct permeation into brain parenchyma and binding to aryl hydrocarbon receptor (AHR), leading to neuroprotective effect; 3)

enhanced integrity of disrupted BBB; and 4) improved gastrointestinal function, signaling to the brain by vagal/inflammatory reflex, to promote glial and neuronal activities. Therefore, these phytochemicals have a potential neuroprotective implication, and development of strategies for preventing these diseases represents a considerable public health concern and socioeconomic burden.

Speaker Biography

Jintang Wang is Associate Professor of Neuroimmunology at Beijing Geriatric Hospital and a recipient of fellowship award from Johns Hopkins University School of Medicine, sponsored by Milstein Medical Asian American Partnership (MMAAP) Foundation. His research is focused on neuroinflammatory mechanism underlying pathogenesis of neurodegenerative diseases and anti-inflammatory mechanism of phytochemicals. Research projects use α -synuclein and cytokines or phytochemicals to stimulate glial cells and address their interaction mechanism by determining activation of canonical inflammatory pathway. He has published more than 20 papers in reputed journals and is a review expert of Neural Regeneration Research journal.

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