

Microglial Galectin-3 and Neuroinflammation – with A Specific Focus on Neurodegenerative Diseases

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Abstract:

Microglia serve as the brain's immune guardians. Overactivation of microglia is closely linked to neurodegeneration. Galectin-3 (Gal3), a protein that binds with β -galactoside, has been extensively studied in various diseases of the peripheral system, including lung scarring, various cancers, and heart and kidney failures. Recently, due to its elevated levels in activated microglia, Gal3 has garnered significant attention in the field of neuroscience. In this presentation, we will discuss how human iPSC-derived microglia-like cells respond to the pathogenic tau protein—a key factor in neurodegeneration—and explore how they contribute to the spread of this harmful tau protein in the brain via a Gal3-dependent pathway. Considering the connection between microglial activation and various brain disorders, our insights into Gal3's pathogenic role could deepen our understanding of microglial reactions to misfolded proteins. This knowledge can further guide the development of treatments that target Gal3 in neurodegenerative diseases, such as Huntington's and Alzheimer's, both of which are characterized by the accumulation of misfolded proteins that cause disease and inflammation driven by microglia.