Role of glia in memory deficits following traumatic brain injury: Biomarkers of glia dysfunction brain injury: Biomarkers of glia dysfunction

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Historically, glial cells have been recognized as a structural component of the brain. However, it has become clear that glial cells are intimately involved in the complexities of neural networks and memory formations. Astrocytes, microglia, and oligodendrocytes have dynamic responsibilities which substantially impact neuronal function and activities. Moreover, the importance of glia following brain injury has come to the forefront in discussions to improve axonal regeneration and functional recovery. The numerous activities of glia following injury can either promote recovery or underlie the pathobiology of memory deficits. This review outlines the pathological states of glial cells which evolve from their positive supporting roles to those which disrupt synaptic function and neuroplasticity following injury. Evidence suggests that glial cells interact extensively with neurons both chemically and physically, reinforcing their role as pivotal for higher brain functions such as learning and memory. Collectively, this mini review surveys investigations of how glial dysfunction following brain injury can alter mechanisms of synaptic plasticity and how this may be related to an increased risk for persistent memory deficits. We also include recent findings that demonstrate new molecular avenues for clinical biomarker discovery.

Keywords: Astrocytes, Microglia, oligodendrocytes, Traumtic brain injury (TBI), biomarkers, MRS Spectroscopy., memory impairment, Gliosis

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This article is part of the Research Topic All 3 types of glial cells are important for memory formation

Mini Review ARTICLE