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Poster Presentation

The Role of Astrocyte in Traumatic Brain Injury

Sajad Sahab Negah^{1,2}, Zabihollah Khaksar^{2*}, Sayed Mostafa Modarres Mousavi¹, Ali Jahanbazi Jahan-Abad¹, Arezou Eshaghbadi¹, Hassan Hossini Ravandi¹

¹Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran

²Histology and Embryology Group, Department of Basic Sciences, Faculty of Veterinary Medicine, Shiraz University, Shiraz, Iran

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Abstract

Traumatic brain injury (TBI) can be caused by a wide variety of stimuli and encompasses a large range of severities. TBI has the potential for long-term and gradually increased susceptibility for behavioral disturbances, seizure disorders or neurodegenerative disease. In the healthy central nervous system (CNS), astrocytes play important roles in preserving the homeostasis of ions, transmitters, water and blood flow that are critical for neural circuit function. Many features of astrocyte responses to CNS damage and disease have been studied. The potentially helpful or sometimes harmful effects of cellular responses to TBI such as reactive astrogliosis, are defined by a multitude of potential specific signaling events that can vary noticeably with different forms and severities of CNS insults. One mechanism could involve the activation of astrocyte mechanosensitive ion channels elicited by traumatic membrane deformation. Indeed, astrocytes express a number of mechanotransducing ion channels. Studies have showed astrocytes as critical early responders to TBI and suggest an essential role for astrocyte-derived ATP in stimulating other cellular responses. Reactive astrocytes play critical roles in post-TBI synaptic plasticity and the reorganization of neural circuits. Post-traumatic tissue repair and synaptic remodeling is improved by astrocyte, and astrogliosis to ameliorate TBI sequelae is considered.

Keywords: TBI, Astrocyte, Astrogliosis.

***Corresponding Author:** Zabihollah Khaksar

E-mail: khaksar@sirazu.ac.ir