Chingju Lin et al., Toxicol Open Access 2017, 3:1 (Suppl)
http://dx.doi.org/10.4172/2476-2067.C1.003

Anti-neuroinflammation of brain-derived neurotrophic factor in microglia

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In the Central Nervous System (CNS), microglia plays a crucial role in innate immune processes. The hallmark of neuroinflammation is considered to be microglial activation that leads to the production of excessive proinflammatory molecules. Hence, inhibition effects on microglial over-activation are major strategy to counter balance neurodegenerative progression. Brain-derived neurotrophic factor (BDNF) is one of the major neurotrophic factors to maintain development and survival of neurons in the brain. However, how BDNF signalling participates in modulating neuroinflammatory responses remains unknown. Recent studies have shown that BDNF is produced by astrocytes. Here, we reported experiments using supplements with exogenous BDNF to examine the neuroprotective effects. BDNF causes decrease of cyclooxygenase-2 (COX-2) as well as numerous proinflammatory cytokines. We found that BDNF resulted in increased expression of erythropoietin (EPO) and sonic hedgehog (Shh) in microglia, this result causes further inhibition of inflammation effect. In addition, astrocyte also acts through the endogenous mechanism to regulate microglia by increasing neuroprotective factor. The phosphorylated adenosine monophosphate-activated protein kinase (AMPK)-α was mediating anti-neuroinflammatory responses in microglia. In this study we provide the BDNF-EPO-Shh novel-signalling pathway involved in anti-inflammatory response via astrocyte-microglia endogenous regulation.

Biography

Chingju Lin is an Associate Professor at the Department of Physiology at China Medical University, Taichung, Taiwan. In recent years, neuroinflammation has been reported to be associated with the pathogenesis of neurodegeneration diseases. Her research interests focus on studying the relationship between neuroinflammation and neurodegeneration. She is also interested in investigating Chinese herbal compounds or chemicals exerting anti-inflammation effects and their potentials to be therapeutic drugs in treating neurodegeneration diseases.

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