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Poster Presentation

The Effect of Galectin-3 and Lanthionine Ketimine Ester in Neural Recovery after Spinal Cord Injury

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Abstract

Spinal cord injury (SCI) is a trauma that disturbs motor, sensitive and autonomic function and directly impacts the quality of life. After physical damage, releasing of pro-inflammatory proteins and cytokines occurs and with collaboration of immune system cells, an immune response begins in the brain tissue. The result of neuroinflammation is edema, apoptosis and release of axonal growth inhibitory factors and accordingly nerve function loss. Neural damage spreads further so the paralysis can extend to higher segments. Experimental studies on animals have shown that galectin-3 (gal3), a protein that belongs to carbohydrate ligand lectin family expressed by different cells, contributes to neuroinflammation after SCI by activating lymphocytes, macrophages and microglial cells and shifting the microglial phenotype toward M1. Neuroinflammation activated by gal3 also causes neuropathic pain which poorly responses to common analgesics. It has been shown that inhibition of gal3 by intrathecal administration of modified citruspectin (MCP) reduces inflammatory response and leads to better motor recovery. On the other side lanthionine ketimine (LK), a natural brain sulfur amino acid metabolite and its synthetic brain penetrating ethyl ester (LKE) have anti-inflammatory and neurotrophic activities that promote growth factor-dependent neurite extension and suppress microglial activation by shifting the microglial phenotype toward a more neurotrophic M2 character resulting in promoting locomotor recovery after SCI. Taken together, considering the activators effect of gal3 and inhibitory effect of LKE on neuroinflammation and the key role of neuroinflammation in secondary damage after SCI and neuropathic pain, it seems that the lack of gal3 and using LKE as a drug can lead to reduction of neuropathic pain and better recovery of neurons after SCI and providing a chance of better quality of life for the patients and a step forward to make them walk.

Keywords: Spinal cord injury, Galectin-3, lanthionine ketimine, Neuroinflammation

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