INVESTIGATING MOLECULAR MECHANISM OF SPHINGOSINE-1 PHOSPHATE RECEPTOR-3 ACTIVATION IN NEUROINFLAMMATION

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Neuroinflammation, characterized by inflammatory responses within the brain and spinal cord, plays a pivotal role in various neurological diseases, including neurodegenerative conditions, psychiatric disorders, pain syndromes, stroke, and traumatic brain injuries. This inflammatory process is primarily driven by cells such as astrocytes, microglia, immune cells, and the blood-brain barrier. The interplay between various receptors and signalling pathways is of great interest in understanding the underlying mechanisms of neuroinflammation. In this study, we aimed to investigate the potential interaction between Sphingosine-1-Phosphate Receptor-3 (S1PR3), a G-protein-coupled receptor, and Toll-Like Receptor-4 (TLR4), a pattern recognition receptor, within C6 glioma cells (*Rattus norvegicus)* under conditions of neuroinflammation and the presence of S1PR3 receptors. Our experimental approach involved several key steps.C6 glioma cells were cultured, and changes in cell growth and morphology were meticulously observed. Subsequently, these cells were utilized for RNA extraction assays. To verify the expression of S1PR3 and TLR4 in the cultured C6 glioma cells, fluorescence imaging was performed, revealing the presence of S1PR3 in modified cells under the U-FBNA filter. In future work, these validated cells can serve as a valuable platform for exploring the actions of Sphingosine-1-Phosphate receptors in the context of neuroinflammation. The expression levels of the receptors and relevant cytokines will be analysed using Reverse Transcriptase-Polymerase Chain Reaction.This study contributes to our understanding of the molecular and cellular mechanisms underlying neuroinflammation, with a particular focus on the potential interplay between S1PR3 and TLR4 in C6 glioma cells, offering insights into their roles in the pathophysiology of neurological diseases.

Keywords*: Neuroinflammation, S1PR3, Cytokines*