INVESTIGATING ANTI-NEUROINFLAMMATORY MECHANISM OF ORIENTIN IN LIPOPOLYSACCHARIDE-INDUCED BV2 MICROGLIA CELLS

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Abstract - Chronic neuroinflammation in central nervous system (CNS) can lead to neurodegenerative diseases (ND). The occurrence of chronic neuroinflammation is triggered by overstimulation of stimulus such as Lipopolysaccharides (LPS), which resulted in excessive release of pro-inflammatory cytokines followed by the activation of transcription factors and upregulation of pro-inflammatory proteins. Orientin had been proven for its anti-inflammatory and anti-oxidative properties. However, the molecular mechanisms of orientin as anti-neuroinflammatory are yet to be fully elucidated. Thus, the present study aimed to determine the anti-neuroinflammatory properties of orientin on LPS-stimulated BV2 microglia cells by measuring the production of Reactive Oxygen Species (ROS) level and determining the mRNA and protein expression of pro- and anti-inflammatory proteins.In order to study the effect of orientin on LPS-stimulated BV2 microglial cells, the cells were pre-treated with orientin at Maximum Non-toxic Dose (MNTD) (15 µM) or half MNTD (½ MNTD) (7.5 µM) for 3 hours, followed by incubation with 0.1 µg/mL of LPS for 24 hours. The LPS-stimulated cells were then subjected to three studies including the determination of ROS level using 2',7' – dichlorofluorescin diacetate (DCFH-DA) methods and the determination of mRNA and protein expression of NF-kB, iNOS, COX-2, STAT1 and HO-1 via qPCR and western blot respectively.The findings from this study demonstrated the probable mechanism of orientin in treating neuroinflammation via the downregulation of ROS level, transcription factors (STAT1, NF-kB) and pro-inflammatory proteins (iNOS, COX-2) whilst upregulating the anti-inflammatory proteins (HO-1). Validation of molecular mechanism of orientin suggested that orientin could be a potential therapeutic agent in treating ND.

Keywords - Anti-inflammatory proteins, Neurodegenerative diseases,Neuroinflammation, Orientin, Pro-inflammatory proteins, Transcription factors.