POSTER 45

GREEN TEA EPIGALLOCATECHIN-3-GALLATE (EGCG) INHIBITS CYTOKINE-INDUCED NITRIC OXIDE AND SECRETORY PHOSPHOLIPASE A2-IIA IN GLIAL CELLS

Arwa Mohammad (Undergraduate)

Wenwen Sheng (Postdoctoral Fellow)

(Grace Sun, PhD)
Department of Biochemistry

Glial cells, including astrocytes and microglial cells, are activated in response to injury and neurodegenerative diseases. In culture studies, astrocytes and microglial cells are capable of responding to proinflammatory cytokines and lipopolysacharides (LPS), which cause the induction of inflammatory factors, including inducible nitric oxide synthase (iNOS) and secretory phospholipase A2 (sPLA2). In our recent studies, we provided evidence for specific conditions for induction of iNOS and sPLA2-IIA in immortalized glial cell lines, including the murine BV-2 microglial cells, rat HAPI microglial cells, and rat DITNC astrocytes. Cytokine induction of iNOS and sPLA2-IIA also involved oxidative enzymes such as NADPH oxidase, which produces reactive oxygen species (ROS). In turn, ROS is involved in activation of mitogen activated protein kinases (MAPK) and the NF- κB transcriptional pathway for synthesis of iNOS and sPLA2. In this study, we used BV-2 and DITNC cell to investigate whether botanical compounds offer protective effects on cytokine-induced iNOS and sPLA2-IIA, respectively. Levels of NO were measured using the Griess reagent; and sPLA2-IIA by Western blotting. Cell morphology changes were assessed using bright field microscopy, production ROS by dihydroethidium (DHE), and the cell viability using the MTT test. Among botanical compounds tested, (-)-epigallocatechin-3-gallate (EGCG) from green tea was the most active in ameliorating cytokine-induced NO production in BV-2 cells and sPLA2-IIA induction in DITNC cells. These results provide evidence for EGCG to protect neural cells from oxidative and inflammatory responses, and support for future use of cell models in studies to screen compounds.