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## NEUROPROTECTIVE PROPERTIES OF PLANT EXTRACT FROM LIMONIUM GMELINII

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**Introduction:** Reactive oxygen species (ROS) are generated in response to various physiologic or pathologic conditions. When excess ROS are present within the cell, this oxidative stress may have profound deleterious effects on the cell, including the direct oxidation of biomolecules (e.g., lipid, protein, and DNA), indirect alteration in cellular structures and functions, and the induction of cell death. The brain is one of the organs especially vulnerable to the effects of ROS because of its high oxygen demand and abundance of peroxidation-susceptible lipid cells. However, there are numerous data indicating that plant polyphenols are able to reduce oxidative stress and inflammatory processes associated with brain damage. As it was shown in previous studies, the extract of polyphenols isolated from the roots of *Limonium gmelinii* (a plant widespread on the territory of Kazakhstan) has a number of therapeutic properties. Here we investigated antioxidant and anti-inflammatory properties of polyphenols extract from *L.gmelinii* in astrocytes and cerebral endothelial cells (CECs) in vitro.

**Methods:** Human primary astrocytes and mouse bEnd3 line of CECs were pre-treated with polyphenol extract of *L.gmelinii* followed by incubation in tumor necrosis factor alpha (TNF- $\alpha$ ) or H<sub>2</sub>O<sub>2</sub>. The level of ROS generation, nicotinamide adenine dinucleotide phosphate (NADPH) oxidase activation, P-selectin expression, and activity of extracellular signal-regulated kinases 1/2 (ERK1/2) were evaluated by quantitative immunofluorescence analysis, confocal microscopy and mitogen-activated protein kinase (MAPK) assay.

**Results:** It was shown that the extract of the *L.gmelinii* at a dosage of 30  $\mu$ g/ml does not have a cytotoxic effect. Moreover, it neutralizes the toxic effect of TNF- $\alpha$  by blocking the formation of ROS in astrocytes, interfering with the activation of NADPH oxidase in astrocytes, mobilization of P-selectin on the surface of bEnd3 cells, and inhibiting the activity of protein kinase ERK1/2.

**Conclusion:** It can be concluded that polyphenols extract from *L.gmelinii* has an antioxidant properties, neutralizes TNF- $\alpha$ -induced inflammatory processes in the brain cells and could be utilized for further in vivo examination.