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Effect of Trypsin on cultured astrocytes derived from rat brain

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Introduction: Astrocytes are most non neuronal cells within the central nervous system which supports neurons by feeding and producing a stable milieu. Oppose to brain pathologic conditions including trauma, infections and neurodegenerative diseases they reflect by activity alternation, so that they produce NO, ROS and pro-inflammatory cytokines. They have protease-activated receptors (PARs) can activated by proteases such trypsin and thrombin which transmitting the signals important for brain function regulation and inflammation. The study is aimed to investigate the inflammatory effects of trypsin at different concentrations around (1 to 20 U/ml) on the cultured astrocytes.

Methods: Brains of 2 days rat infants were derived and then homogenized after meninges removal, homogenizes were cultured in DMEM+10%FBS medium. 10 days later astrocytes were harvested

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and re cultivated for more purifications to 95% (using Immunocytochemistry method) to employ for tests. They were affected by different concentrations of trypsin (1, 5, 10, 15 and 20 U/ml) and to reveal the inflammation progress, NO concentrations (test of Griess) were assessed after 24 and 48 hours.

Results: Different concentrations of trypsin had significant inflammatory effect which showed elevation of NO production with a dose dependent manner by cultured astrocytes ($p < 0.001$) as trypsin at concentration of 20 U/ml caused NO production increases as two fold as control ($p < 0.001$).

Conclusion: Significant inflammatory effects of trypsin for mentioned concentrations on the astrocytes may be due to the stimulation of PAR-2 receptors on the astrocytes and then increasing the activation of MAPKs like as ERK, P38 and JNK, so it increases the iNOS activation then NO production. This assumption is needed to investigate more.

Key words: Astrocytes, Inflammation, Trypsin, NO.