



Combination effects of olive oil and fullerol nanoparticles on neuronal damages and FasL/Fas system during brain ischemia-reperfusion in rat

Masiha Aryafar¹, Mohammad Taghi Mohammadi²

1-Department of Nanotechnology, School of New Sciences and Technology, Islamic Azad University of Pharmaceutical Sciences Branch, Tehran, Iran

2-Department of Physiology and Biophysics, School of Medicine, Baqiyatallah University of Medical Sciences, Tehran, Iran

Introduction: Previous findings have shown that FasL/Fas system has a critical role in induction of neuronal death following brain ischemia. Since olive oil and some nanoparticles such as fullerol have a power antioxidant effects in biological systems, we investigated the probable protective effects of these substances on brain infarction and gene expression of FasL and Fas after transient model of focal cerebral ischemia in rat.

Methods: Experiment was performed in five groups of rats (N=30): Sham, Control ischemia and ischemia treated groups (Olive oil, Fullerol, Olive oil&Fullerol). Ischemia was induced by 90 minutes middle cerebral artery occlusion (MCAO) followed by 24 hours reperfusion. Rats intra-peritoneally were treated with fullerol (5mg/kg) and olive oil (0.5 ml/rat), one hour before induction of MCAO. Infarct volume (TTC staining), mRNA level (RT-PCR) and histopathological alterations were assessed 24 hours after termination of MCAO.

Results: MCAO induced brain infarction ($351 \pm 77 \text{ mm}^3$) and increased the FasL and Fas mRNA in accompany with histopathological damages. Treatment with olive oil, fullerol and combination of them significantly reduced the infarct volume by 76.9%, 43.87% and 66.6%, respectively. The mRNA level of FasL and Fas protein considerably decreased in all treated groups. Finally, in histopathological assessment, neuronal damages were reduced in treated groups.

Conclusion: Our findings indicated that fullerol and olive oil effectively reduce ischemia-induced neuronal damage. It is appeared that these substances are potent neuroprotective factors, which prevent neurodegeneration at ischemic region through inhibition of FasL/Fas system.

Keywords: FasL/Fas; Ischemia-reperfusion; Apoptosis; Fullerol; Neurodegeneration