

### Erythropoietin and neuroinflammation

Injuries (infectious or non-infectious) to any organ result in a cascade of inflammatory reactions. Neuro-inflammation refers to the inflammatory reactions in the CNS due to trauma, infections, and neurodegenerative diseases such as Alzheimer's and Parkinson's disease and even multiple sclerosis. Inflammation in the CNS has recently been considered as a contributor to the pathophysiology of epilepsy, depression, obsessive compulsive disorder, and schizophrenia. Although as a homeostatic process, neuroinflammation involves in the development and repair of the CNS, it may have a deleterious effect on the neural and glial cells if is exaggerated and sustained. Anti-inflammatory/anti-apoptotic properties of EPO have long been underscored. In an animal model of brain ischemia induced by thrombus formation or embolism anti-apoptotic and anti-inflammatory potentials of EPO resulting in limiting neural loss and BBB disruption were described. According to a growing number of studies, EPO has been found to have potentials to regulate both apoptotic and anti-apoptotic mitochondrial pathways. An animal study in rats revealed that EPO behaved as an anti-apoptotic factor for microglia without having any influence on pro-inflammatory potentials of these cells. Apart from prolonging the survival of microglia, astrocyte-derived EPO seems to have a dose-dependent proliferative effect on microglia. It elevates Bcl/Bax ratio in the microglia and prevents activation of caspase-3 and -9, two apoptosis-triggering factors. In a recent in vitro study, it was reported that plasma membrane of human CD4<sup>+</sup> and CD8<sup>+</sup> T cells contain EPO-R and EPO and could suppress alloreactive human T-cell immunity via inhibition of downstream T-cell and IL-2 receptor signaling pathways. Recently the potency of EPO in treating neurodegenerative disorders has been considered. It seems that erythropoietin effects on neuroinflammation will be promising in treating many of the neurological diseases in the future.

### Biography

Reza Nejat is a board certified Anesthesiologist, FCCM and ECFMG certified. He was graduated from Tehran University of Medical Sciences (TUMS) as a GP and achieved his expertise in Anesthesiology from Iran University of Medical Sciences. He obtained his Fellowship in Critical Care Medicine at Sina Hospital, TUMS, which made him fascinated to Molecular Medicine with inclination to sepsis, acute heart failure, neuroscience and neuro-critical care. Neuroprotection through administration of erythropoietin and IVIg have been one of his fields of interests and experience for the past four years. In addition to his positions as the Chief of few hospitals and as Assistant Professor in Shahid Beheshti University of Medical Sciences for eight years, he has four published books in the fields of Cardiology, Nephrology, Fluid and Electrolyte, Nutrition, Metabolism and Endocrinology. He has established his website on which he publishes his articles. He has given few oral presentations in different international conferences.

rezanejat@yahoo.com



**Reza Nejat**

Shahid Beheshti University of  
Medical Sciences, Iran