Advances in brain diseases mediated by inflammatory cytokines

Brain diseases can occur in acute and chronic inflammatory conditions characterized by immune cell dysfunction. Cytokines mediate innate and adaptive immune systems, they are pleiopropic, and can have an autocrine and paracrine action. They are ubiquitous and constitutively found in various organs including brain, playing a critical role in pathological processes. Cytokines are known to mediate almost all biological processes by intervening in immunology, cancer, inflammation, and neurodegenerative diseases. Brain diseases are manifold and the role of cytokines produced by a wide range of immune cells is very important. Elevation of pro-inflammatory cytokines in the brain contributes to physiological changes that can lead to a dysregulation of the cross-talk between the immune system and the brain, and may cause diseases such as tumors and autoimmunity, including Alzheimer's disease. The systemically increased cytokines, produced by inflammatory cells, can stimulate brain tissue, causing local production of cytokines by microglia cells, which influences the production of neurotransmitters. Many brain diseases involve cellular immunological reactions with the release of many proteins that bind to the receptors of microglia cells and trigger an innate immune reaction with the release of inflammatory cytokines which contribute to the progression and severity of the disease. Targeting and inhibiting these inflammatory cytokine mechanisms could lead to new therapeutic strategies or prevent brain diseases.

In the last quarter of the 20th century, new inhibitory cytokines have been described, which could have a therapeutic implication. In addition to the pro-inflammatory cytokines, IL-1 also contains 4 members that suppress inflammation, two specific anti-receptors and two cytokines that inhibit various cytokines and chemokines. In acute and chronic brain diseases, by blocking inflammatory cytokines such as pro-inflammatory IL-1 family members and TNF, patients are certainly less likely to remain disabled and die.

This supplementary issue will focus primarily on the importance of pro-inflammatory and anti-inflammatory cytokines in physiological and pathological brain diseases.

Guest Editor(s):

Prof. Dr. Pio Conti
pconti@unich.it
University of G. d'Annunzio Chieti and Pescara, Chieti, Italy

Submission Deadline: 01 December 2020
Contact us: JIneditorial@imrpress.org