

Inside neuroinflammation: role of nanomedicine as emerging therapeutic tool in the symphony of glial cells

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The neuroinflammation term's represents the response of the central nervous system (CNS) to altered homeostasis. This response is primarily mediated by the contribution of one/two cell systems: glia and microglia of the CNS, lymphocytes, monocytes, and macrophages of the hematopoietic system. The neuroinflammation can be triggered by infection, autoimmunity and toxins that are defined such as classical factors but also by noxious stimuli or psychological stress that are classified such as neurogenic factors.

Regulatory factors that control glial activation play an important role in neuroinflammation and neurotoxicity. Several anti-inflammatory drugs and herbal compounds have been identified in treating glia/microglia-mediated neuroinflammation in the CNS. However, hurdles in crossing blood brain barrier (BBB), expression of metabolic enzymes, presence of efflux pumps and several other factors prevent the entry of these drugs into the CNS. Nanomedicine, a nanoparticle-mediated drug delivery system, exhibits a new potential to overcome these hurdles in drug delivery to the CNS enabling alternatives with significant promises in revolutionizing the field of neuroinflammatory disease therapy.