



Review

Modulation of microglia can attenuate neuropathic pain symptoms and enhance morphine effectiveness

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Abstract:

Microglia play a crucial role in the maintenance of neuronal homeostasis in the central nervous system, and microglia production of immune factors is believed to play an important role in nociceptive transmission. There is increasing evidence that uncontrolled activation of microglial cells under neuropathic pain conditions induces the release of proinflammatory cytokines (interleukin – IL-1 β , IL-6, tumor necrosis factor – TNF- α), complement components (C1q, C3, C4, C5, C5a) and other substances that facilitate pain transmission. Additionally, microglia activation can lead to altered activity of opioid systems and neuropathic pain is characterized by resistance to morphine. Pharmacological attenuation of glial activation represents a novel approach for controlling neuropathic pain. It has been found that propentofylline, pentoxifylline, fluorocitrate and minocycline decrease microglial activation and inhibit proinflammatory cytokines, thereby suppressing the development of neuropathic pain. The results of many studies support the idea that modulation of glial and neuroimmune activation may be a potential therapeutic mechanism for enhancement of morphine analgesia. Researchers and pharmacological companies have embarked on a new approach to the control of microglial activity, which is to search for substances that activate anti-inflammatory cytokines like IL-10. IL-10 is very interesting since it reduces allodynia and hyperalgesia by suppressing the production and activity of TNF- α , IL-1 β and IL-6. Some glial inhibitors, which are safe and clinically well tolerated, are potential useful agents for treatment of neuropathic pain and for the prevention of tolerance to morphine analgesia. Targeting glial activation is a clinically promising method for treatment of neuropathic pain.

Key words:

neuropathic pain, morphine, glia, minocycline, pentoxifylline, interleukins, complement
