Neural-glial interaction in the spinal cord for the development and maintenance of nerve injury-induced neuropathic pain.

溫永銳

Ji RR;Wen YR

摘要

Abstract

Damage to the nervous system often results in neuropathic pain. Current treatment for this disabling state is unsuccessful due to our incomplete understanding of cellular mechanisms causing this pain. Although glial cells were largely ignored in most textbooks of pain, accumulating evidence over the last decade indicates an important role of glial cells in the pathogenesis of pain. Both microglia and astroglia are activated in the spinal cord after peripheral nerve injury. Importantly, activated microglia and astroglia produce multiple inflammatory mediators and neuromodulators, acting on primary afferents or dorsal horn neurons and leading to an enhancement and maintenance of dorsal horn neuron sensitization and subsequent pain sensitization. This neural-glial interaction after peripheral nerve injury is likely to be triggered by signaling molecules released in the spinal cord from central terminals of damaged sensory neurons, stimulating surrounding glial cells. In addition, there is a microglial-astroglial interaction; microglia activation occurs before astroglial activation and is known to cause astroglial activation. Glial activation is further enhanced by microglial-microglial interaction and astroglial-astroglial interaction. Many signaling molecules (e.g., MAP kinases, ATP receptors, chemokine receptors) are exclusively activated in spinal microglia or astroglia after nerve injury, and an inhibition of these molecules can attenuate neuropathic pain. Since traditional pain-killers are designed against neuronal targets and are only partially effective to treat neuropathic pain, searching for signaling molecules that are induced in spinal glia in neuropathic pain conditions will identify novel targets for the management of this debilitating chronic pain. Drug Dev. Res. 67:331-338, 2006.