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Leptin is essential for spinal microglia activation and the development of neuropathic pain after preganglionic cervical root avulsion

Preganglionic Cervical Root Avulsion (PCRA) affects both the peripheral and central nervous systems and is often associated with neuropathic pain. Unlike Peripheral Nerve Injuries (PNI), central lesions caused by disruption of cervical roots from the spinal cord following PCRA contribute to the generation of neuropathic pain. Leptin is involved in the development of neuropathic pain after PNI by affecting neurons. However, whether leptin is involved in microglial activation leading to neuropathic pain after PCRA is unknown. In this study the preganglionic avulsion of the left 6th-8th cervical roots was performed in C57B/6J mice and leptin-deficient mice. A leptin antagonist or leptin was administered to C57B/6J mice and leptin-deficient mice after injury, respectively. The expression pattern of spinal microglia was examined by immune-fluorescent staining. Von Frey filaments were used to test pain sensitivity. Our data showed that leptin is essential for the development of neuropathic pain after PCRA. Allodynia was absent in the leptin-deficient mice and the mice administered the leptin antagonist. We also found that leptin deficiency or the administration of its antagonist inhibited the development of microgliosis, the expression of CD86 and iNOS and Wallerian degeneration in the spinal cord. Moreover, the administration of exogenous leptin to leptin-deficient mice reversed these effects. We concluded that leptin is involved in the proliferation and activation of microglia, which in turn enhances the development of neuropathic pain. Blocking the effects of leptin might be a target for the treatment of neuropathic pain after PCRA.

Biography

Ming-Chao Huang has completed his MD degree from Taipei Medical University, Taiwan in 1984 and his PhD degree from Tokyo Women's Medical University, Japan in 1996. He is a Neurosurgeon and is currently the Division Chief of Department of Neurosurgery, Taipei Veterans General Hospital, Taiwan. His research interests are nerve root injury (including basic mechanism and surgical repair), neuropathic pain (including basic study and treatment) and brain tumor (including medical and surgical treatment).

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