Forum Médical Suisse
Forum Medico Svizzero
Schweizerisches Medizin-Forum
Swiss Medical Forum

Enhancement of opioid-induced acute analgesia by targeting the peripheral MMP-9 dependent neuro-glial signaling

Literature

1. Labuz D, Mousa SA, Schafer M, Stein C, Machelska H: Relative contribution of peripheral versus central opioid receptors to antinociception. Brain Res 2007, 1160: 30–38.
2. Wu CL, Raja SN: Treatment of acute postoperative pain. Lancet 2011, 377: 2215–2225.
3. Watkins LR, Hutchinson MR, Milligan ED, Maier SF: "Listening" and "talking" to neurons: implications of immune activation for pain control and increasing the efficacy of opioids. Brain Res Rev 2007, 56: 148–169.
4. Hutchinson MR, Coats BD, Lewis SS, Zhang Y, Sprunger DB, Rezvani N et al.: Proinflammatory cytokines oppose opioid-induced acute and chronic analgesia. Brain Behav Immun 2008, 22: 1178–1189.
5. Johnston IN, Milligan ED, Wieseler-Frank J, Frank MG, Zapata V, Campisi J et al.: A role for proinflammatory cytokines and fractalkine in analgesia, tolerance, and subsequent pain facilitation induced by chronic intrathecal morphine. J Neurosci 2004, 24: 7353–7365.
6. Bessler H, Shavit Y, Mayburd E, Smirnov G, Beilin B: Postoperative pain, morphine consumption, and genetic polymorphism of IL-1beta and IL-1 receptor antagonist. Neurosci Lett 2006, 404: 154–158.
7. Berta T, Liu T, Liu YC, Xu ZZ, Ji RR: Acute morphine activates satellite glial cells and up-regulates IL-1beta in dorsal root ganglia in mice via matrix metalloprotease-9. Mol Pain 2012, 8: 18.
8. Liu YC, Berta T, Liu T, Tan PH, Ji RR: Acute morphine induces matrix metalloproteinase-9 up-regulation in primary sensory neurons to mask opioid-induced analgesia in mice. Mol Pain 2012, 8: 19.
9. Hanani M: Satellite glial cells in sensory ganglia: from form to function. Brain Res Brain Res Rev 2005, 48: 457–476.
10. Ji RR, Xu ZZ, Wang X, Lo EH: Matrix metalloprotease regulation of neuropathic pain. Trends Pharmacol Sci 2009, 30: 336–340.
11. Hu J, Van den Steen PE, Sang QX, Opdenakker G: Matrix metalloproteinase inhibitors as therapy for inflammatory and vascular diseases. Nat Rev Drug Discov 2007, 6: 480–498.
12. Chattopadhyay S, Shubayev VI: MMP-9 controls Schwann cell proliferation and phenotypic remodeling via IGF-1 and ErbB receptor-mediated activation of MEK/ERK pathway. Glia 2009, 57: 1316–1325.
13. Kawasaki Y, Xu ZZ, Wang X, Park JY, Zhuang ZY, Tan PH et al.: Distinct roles of matrix metalloproteases in the early- and late-phase development of neuropathic pain. Nat Med 2008, 14: 331–336.
14. Machado LS, Kozak A, Ergul A, Hess DC, Borlongan CV, Fagan SC: Delayed minocycline inhibits ischemia-activated matrix metalloproteinases 2 and 9 after experimental stroke. BMC Neurosci 2006, 7: 56.
15. Hutchinson MR, Northcutt AL, Chao LW, Kearney JJ, Zhang Y, Berkelhammer DL et al.: Minocycline suppresses morphine-induced respiratory depression, suppresses morphine-induced reward, and enhances systemic morphine-induced analgesia. Brain Behav Immun 2008, 22: 1248–1256.
16. Hutchinson MR, Lewis SS, Coats BD, Skyba DA, Crysdale NY, Berkelhammer DL et al.: Reduction of opioid withdrawal and potentiation of acute opioid analgesia by systemic AV411 (ibudilast). Brain Behav Immun 2009, 23: 240–250.
17. Hutchinson MR, Zhang Y, Shridhar M, Evans JH, Buchanan MM, Zhao TX et al.: Evidence that opioids may have toll-like receptor 4 and MD-2 effects. Brain Behav Immun 2010, 24: 83–95.
18. Tsai RY, Jang FL, Tai YH, Lin SL, Shen CH, Wong CS: Ultra-low-dose naloxone restores the antinociceptive effect of morphine and suppresses spinal neuroinflammation in PTX-treated rats. Neuropsychopharmacology 2008, 33: 2772–2782.