Activation of p38 mitogen-activated protein kinase in spinal microglia contributesto incision-induced mechanical allodynia

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摘要

Abstract

Background: Recent studies have implicated the activation of stress-activated mitogen-activated protein kinase (MAPK) p38 in spinal microglial cells for development of neuropathic and inflammatory pain. The aim of the present study was to investigate whether phosphorylation of p38 (p-p38) also mediates mechanical allodynia and thermal hyperalgesia induced by plantar incision. Methods: After rats received a plantar incision surgery, mechanical allodynia and thermal hyperalgesia were determined by von Frey filaments and radiant heat, respectively, and the number of p-p38 immunoreactive cells in the dorsal horn was quantified to determine p38 activation at different time points after incision. The p38 inhibitor FR167653 was administered intrathecally 30 min before hind paw plantar incision to determine the role of p38 in postoperative pain. Results: A significant increase in number of p-p38 immunoreactive cells was observed in the ipsilateral L4-5 spinal dorsal horn from 1 h to 3 days after the incision. p-p38 was found predominantly in microglia. However, microglial activation (assessed by OX-42 upregulation) was not evident until 3 days after plantar incision. Intrathecal pretreatment of FR167653 attenuated incision-induced mechanical allodynia from 1 h to day 2 and significantly reduced activation of p38 in the dorsal horn 1 day after plantar incision. However, FR167653 only inhibited heat hyperalgesia at an early time point. Conclusions: Plantar incision-induced mechanical allodynia can be prevented by the p38 inhibitor. Our results suggest that p38 activation in spinal microglia

play a role in incision-induced mechanical allodynia in rats. Therefore, p38 inhibition may be useful in treating postsurgical pain.