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Systemic administration of resveratrol suppress the nociceptive neuronal activity of spinal trigeminal nucleus caudalis in rats.

Takehana S¹, Sekiguchi K¹, Inoue M², Kubota Y³, Ito Y³, Yui K³, Shimazu Y¹, Takeda M⁴.

Author information

Abstract

Although a modulatory role has been reported for the red wine polyphenol resveratrol on several types of ion channels and excitatory synaptic transmission in the nervous system, the acute effects of resveratrol in vivo, particularly on nociceptive transmission of the trigeminal system, remain to be determined. The aim of the present study was to investigate whether acute intravenous resveratrol administration to rats attenuates the excitability of wide dynamic range (WDR) spinal trigeminal nucleus caudalis (SpVc) neurons in response to nociceptive and non-nociceptive mechanical stimulation in vivo. Extracellular single unit recordings were made from 18 SpVc neurons in response to orofacial mechanical stimulation of pentobarbital-anesthetized rats. Responses to both non-noxious and noxious mechanical stimuli were analyzed in the present study. The mean firing frequency of SpVc WDR neurons in response to both non-noxious and noxious mechanical stimuli was inhibited by resveratrol (0.5-2 mg/kg, i.v.) and maximum inhibition of the discharge frequency of both non-noxious and noxious mechanical stimuli was seen within 10 min. These inhibitory effects were reversed after approximately 20 min. The relative magnitude of inhibition by resveratrol of SpVc WDR neuronal discharge frequency was significantly greater for noxious than non-noxious stimulation. These results suggest that, in the absence of inflammatory or neuropathic pain, acute intravenous resveratrol administration suppresses trigeminal sensory transmission, including nociception, and so resveratrol may be used as a complementary and alternative medicine therapeutic agent for the treatment of trigeminal nociceptive pain, including hyperalgesia.

KEYWORDS: Alternative medicine; Nociception; Polyphenol; Resveratrol; Single unit recording; Spinal trigeminal nucleus caudalis

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