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Systemic administration of α-lipoic acid suppresses excitability of nociceptive wide-dynamic range neurons in rat spinal trigeminal nucleus caudalis

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Although a modulatory role has been reported for α-lipoic acid (LA) on T-type Ca^{2+} channels in the nervous system, the acute effects of LA *in vivo*, particularly on nociceptive transmission in the trigeminal system, remainto be determined. The aim of the present study was to investigate whether acute intravenous LA 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 seventeen 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 significantly and dose-dependently inhibited by LA (1–100mM, i.v.) and maximum inhibition of the discharge frequency of both non-noxious and noxious mechanical stimuli was seen within 5min. These inhibitory effects lasted for approximately 10min. These results suggest that acute intravenous LA administration suppresses trigeminal sensory transmission, including nociception, via possibly blocking T-type Ca^{2+}channels. LA may be used as a therapeutic agent for the treatment of trigeminal nociceptive pain.

ハイライト：これまでに、in vitro の実験系においてα−リポ酸は、L−typeのCa^{2+}チャネルの阻害薬として知られていたが、今回、著者らは、In vivoにおいて、関連痛などの疼痛伝達に重要な役割を果たす三叉神経脊髄路核の広作動域ニューロンの興奮性がレスベラトロールの静脈内投与により濃度依存性・可逆的に抑制されることを明らかとした。これらの成果は α−リポ酸が、臨床の場において、新たな静脈内鎮静・鎮痛薬として急性疼痛を緩和できる可能性を示唆している。