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★令和6年度（2024年）卒論3年次学生「千田理彩子さん」の研究成果が、「麻酔学」の国際的専門誌”Anesthesia research“に掲載されました!!!

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Article

Suppression of the Excitability of Nociceptive Secondary Sensory Neurons Following Systemic Administration of Astaxanthin in Rats

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Abstract: Although astaxanthin (AST) has demonstrated a modulatory effect on voltage-gated Ca^{2+} (Cav) channels and excitatory glutamate neuronal transmission in vitro, particularly on the excitability of nociceptive sensory neurons, its action in vivo remains to be determined. This research sought to determine if an acute intravenous administration of AST in rats reduces the excitability of wide-dynamic range (WDR) spinal trigeminal nucleus caudalis (SpVc) neurons in response to nociceptive and non-nociceptive mechanical stimulation in vivo. In anesthetized rats, extracellular single-unit recordings were carried out on SpVc neurons following mechanical stimulation of the orofacial area. The average firing rate of SpVc WDR neurons in response to both gentle and painful mechanical stimuli significantly and dose-dependently decreased after the application of AST (1–5 mM, i.v.), and maximum suppression of discharge frequency for both non-noxious and nociceptive mechanical stimuli occurred within 10 min. These suppressive effects persisted for about 20 min. These results suggest that acute intravenous AST administration suppresses the SpVc nociceptive transmission, possibly by inhibiting Cav channels and excitatory glutamate neuronal transmission, implicating AST as a potential therapeutic agent for the treatment of trigeminal nociceptive pain without side effects.

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Keywords: nociception; astaxanthin; spinal trigeminal nucleus caudalis; single-unit recording; Ca^{2+} channel; glutamate receptor

ハイライト： アスタキサンチンは鮭や表皮の赤い魚やエビ、カニなど魚貝類に含まれるカロチノイドであり、これまでに中枢神経系の神経細胞のカルシウムチャネルやグルタミン酸受容体を阻害する可能性は知られていた。今回著者らは疼痛伝達に重要な役割を果たす広作動域ニューロンの興奮がアスタキサンチンに静脈内投与により、可逆的濃度依存性に抑制されることを明らかとした。本研究の成果はアスタキサンチンが臨床の場において新たなる副作用のない鎮痛薬となる可能性と補完代替医療に貢献することを示唆している。