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★平成28年度卒業生「池田杏樹さん、室木亜香里さん、鈴木千恵さん」の研究成果が神経科学の専門誌“Brain Research Bulletin”に掲載されました!!!

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Resolvin D1 suppresses inflammation-induced hyperexcitability of nociceptive trigeminal neurons associated with mechanical hyperalgesia

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Aabstract

7S,8R,17S-trihydroxy-4Z,9E,11E,13Z,15E,19Z-docosahexaenoic acid (resolvin D1 [RvD1]) is biosynthesized from docosahexaenoic acid (DHA), and belongs to a novel family of lipid mediators showing remarkable antiinflammatory effects; however, the effect of RvD1 on inflammation-induced hyperexcitability of nociceptive neurons under in vivo conditions remains to be determined. The present study, therefore, investigated whetherunder in vivo conditions, systemic administration of RvD1 could attenuate the inflammation-induced hyperexcitability of spinal trigeminal nucleus caudalis (SpVc) wide-dynamic range (WDR) neurons associated with hyperalgesia in rats.The threshold of escape from mechanical stimulation applied to the orofacial area in rats with complete Freund's adjuvant-induced inflammation was significantly lower than in naïve rats. The lowered mechanical threshold in rats with inflammation was returned to control levels following administration of RvD1 (3 ng/kg,i.p.) for 3 days. The mean discharge frequency of SpVc WDR neurons in rats with inflammation was significantly decreased after RvD1 administration for both non-noxious and noxious mechanical stimuli. Increased spontaneous discharge of SpVc WDR neurons in rats with inflammation was also significantly decreased after RvD1 administration. Noxious pinch-evoked afterdischarge frequency and occurrence in rats with inflammation was significantly diminished after RvD1 administration. Expansion of the receptive field in rats with inflammation also returned to control levels after RvD1 administration. These results suggest that administration of RvD1 attenuates inflammation-induced hyperexcitability of SpVc WDR neurons associated with inflammatory hyperalgesia. These findings support the idea that RvD1, derived from DHA, as well as DHA itself, are potential complementary or alternative therapeutic agents for the alleviation of inflammatory hyperalgesia.

ハイライト：これまでの本研究室の研究成果より、末梢組織の炎症に伴い生じる“痛覚過敏の症状”がドコサヘキサエン酸（DHA)の慢性投与により抑制されることが判明している（Nakazaki et al., 2018）。今回、著者らはDHAから生合成される”レゾルビンD1“の微量投与により痛覚過敏発現に重要な役割を果たす”疼痛伝達ニューロンの興奮性の増大が、顕著に抑制されることを明らかとした。本研究の成果はDHAおよびその代謝産物が臨床の場において非ステロイド性鎮痛薬（NSAIDｓ）に変わる新たな副作用のない炎症性疼痛治療薬となる可能性と代替医療に貢献することを示唆している！