食品生理学研究室 ニュース23

New of Laboratory of Food and Physiological Sciences:

Vol. 23. 13-JUN-2024

★平成31年度(2018年)卒業生「大崎響己君」と「森海那さん」の研究成果が、国際的口腔科学専門誌“European Journal of Oral Sciences”に掲載されました!!!

Received: 15 November 2022 | Accepted: 14 January 2023

DOI: 10.1111/eos.12917

European Journal of Oral Sciences NOF WILEY

ORIGINAL ARTICLE

Effect of local administration of eicosapentaenoic acid on the jaw-opening reflex in rats

Hibiki Osaki[1] | Mina Mori[1] | Katsuo Oshima[2] | Yoshihito Shimazu[1] | Mamoru Takeda[1]

[1]Laboratory of Food and Physiological Sciences, Department of Life and Food Sciences, School of Life and Environmental Sciences, Azabu University, Sagamihara, Japan

[2]Department of Dental Technology, The Nippon Dental University College, Tokyo, Japan

Correspondence
Mamoru Takeda, Laboratory of Food and Physiological Sciences, Department of Life and Food Sciences, School of Life and Environmental Sciences, Azabu University, 1-17-71, Fuchinobe, Chuo-ku, Sagamihara, Kanagawa 252–5201, Japan.
Email: m-takeda@azabu-u.ac.jp

Funding information
Grant-in-Aid for Scientific Research (C) from the Japanease Society for the Promotion of Science, Grant/Award Number: 19K10415

Abstract

Although eicosapentaenoic acid (EPA) application in vitro inhibits voltage-gated Na^+ (Nav) channels in excitable tissues, the acute local effect of EPA on the jaw-opening reflex in vivo remains unknown. The aim of the present study was to determine whether local administration of EPA to adult male Wistar rats could attenuate the excitability of the jaw-opening reflex in vivo, including nociception. The jaw-opening reflex evoked by electrical stimulation of the tongue was recorded by a digastric muscle electromyogram (dEMG) in pentobarbital-anesthetized rats. The amplitude of the dEMG response was significantly increased in proportion to the electrical stimulation intensity (1×–5× threshold). At 3×, local administration of EPA dose-dependently inhibited the dEMG response, lasting 60 min, with maximum inhibition observed within approximately 10 min. The mean magnitude of dEMG signal inhibition by EPA was almost equal to that observed with a local anesthetic, 1% lidocaine, and with a half dose of lidocaine plus a half dose of EPA. These findings suggest that EPA attenuates the jaw-opening reflex, possibly by blocking Nav channels of primary nerve terminals, and strongly support the idea that EPA is a potential therapeutic agent and complementary alternative medicine for the prevention of acute trigeminal nociception.

KEYWORDS

complementary alternative medicine, digastric muscle electromyogram, nociception, nociceptive reflex, polyunsaturated fatty acids, sodium channel blocker

ハイライト: 青魚に含まれるn3系脂肪酸のひとつ「エイコタペンタエン酸」は局所麻酔薬の標的分子である電位依存性Naチャネルの阻害薬であることは知られていましたが、in vivo での麻酔効果は不明でした。今回我々は、侵害受容性開口反射を用いて「エイコタペンタエン酸」が既存の局所麻酔酔薬と同等の効果を発揮することを明らかとして補完代替医療に応用できる可能性を指摘致しました。