

The omega-3 fatty acids are anti-pain endocannabinoids!

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According to a stunning recent biochemical study, the anti-inflammatory effects of omega-3 fatty acids were due to their transformation into cannabinoids, leading to the activation of anti-pain receptors specific to these molecules.

ENDOGENOUS EUPHORIANTS

Cannabis has been used as a euphoriant substance for at least 4000 years and today remains the most popular illegal drug in the world, with no less than 185 million regular users. The psychoactive effects of cannabis are in large part due to Δ^9 -tetrahydrocannabinol (THC), the principal cannabinoid produced by the plant. By interacting with certain receptors located within the brain, THC modifies the release of neurotransmitters and thus alters several mental processes (emotions, sensory perception, memory, appetite), characteristics of the “buzz” obtained following consumption of cannabis.

The receptors for cannabinoids are not only activated by the THC of cannabis: the human body produces endogenous substances that possess structures similar to cannabinoids (endocannabinoids) and which can themselves also influence several mental processes. For instance, it was recently shown that the “runner’s high”, which is the sensation of well-being that accompanies physical activity, was due to the anxiolytic and analgesic effects of an endocannabinoid substance called anandamide¹. It is thus not too surprising that exercise can improve mood!

OMEGA-3 CANNABINOIDS

A new class of endocannabinoids has just been discovered by a team at the University of Illinois². The researchers made the surprising discovery that docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), two long-chain omega-3 fatty acids found in oily fish, can be modified by a series of complex biochemical reactions into endocannabinoids. This transformation seems to play a crucial role in the well-documented anti-inflammatory actions of these omega-3 molecules, because the endocannabinoids produced from these molecules interact specifically with the receptor for CB₂ cannabinoids, known for its role in the anti-pain effect of these molecules. The studies showed that activation of these receptors by cannabis can significantly



diminish inflammation and some forms of chronic pain, and it is for this reason that the medical usage of cannabis is increasingly being considered as a useful alternative for the treatment of specific disorders such as neuropathic pains and for inflammatory diseases such as rheumatoid arthritis and ulcerative colitis. By activating these same receptors, the omega-3 endocannabinoids could thus mimic this phenomenon, to a certain extent, which contributes to their anti-inflammatory properties. Without the psychotropic effects of marijuana, however!

REBALANCING THE FAT INTAKE

These observations illustrate how the type of fat in our daily food can greatly influence the development of inflammation, an important risk factor for an ensemble of chronic diseases which currently plague our society (cardiovascular diseases, type 2 diabetes, several types of cancers). The modern diet contains much more pro-inflammatory omega-6 than omega-3 and this disequilibrium contributes to the creation of an inflammatory climate within our bodies. Increasing the intake of omega-3 fatty acids can re-establish this balance and prevent the creation of a chronic inflammatory climate in our tissues. The oily fish (salmon, sardines and mackerel) are the principal source of long-chain omega-3 and weekly consumption of one or two portions of these fish represents the simplest way of doing so. This is all the more important because, along with their anti-inflammatory effects, these omega-3 fatty acids have several additional beneficial effects on the organism, notably on the transmission of nervous impulses and on the prevention of cardiac arrhythmias, often responsible for embolisms and sudden deaths. Research in biochemistry is always full of stunning surprises.

- (1) Fuss J et al. A runner’s high depends on cannabinoid receptors in mice. *Proc. Natl. Acad. Sci. USA* 2015;112:13105-13108.
- (2) McDougale DR et al. Anti-inflammatory omega-3 endocannabinoid epoxides. *Proc. Natl. Acad. Sci. USA* 2017;114(30):E6034-E6043.