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CAFFEINE IN THE TREATMENT OF FIBROMYALGIA, THERAPEUTIC PROPOSAL

LA CAFEÍNA EN EL TRATAMIENTO DE LA FIBROMILGIA, PROPUESTA TERAPÉUTICA

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INTRODUCTION

Chronic pain is a condition of high prevalence worldwide. With the passage of time, people suffering from pain are exposed to different neurophysiological alterations at central and peripheral levels that modify the way in which they interpret sensory signals, many of which are perceived as harmful without being so (1). This process of modification in pain physiology is known as nociplasticity, in which no somatic or neuropathic cause is found, but the pain is perceived, where personal experiences and emotions play a fundamental role in sensory expressions (2). Caffeine is a stimulant with an analgesic effect that may be relevant in the control of neuropathic and nociplastic pain.

FIBROMYALGIA AND CAFFEINE

Fibromyalgia is a chronic painful condition, framed within the nociplastic pain disorders, but also affects the patient's sleep pattern, generates fatigue, and has associated memory, gastrointestinal and emotional symptoms (3). This condition has different therapeutic approaches ranging from non-pharmacological with cognitive-behavioral therapy, electrical stimulation, and aerobic exercises; to pharmacological interventions with gabapentinoids, tricyclics, and dual serotonin and norepinephrine reuptake inhibitors (3).

Caffeine (Ca) is the most widely consumed psychoactive drug worldwide, being present in many beverages such as coffee or soft drinks. Its clinical implementation has been used for some years in combination with acetaminophen, non-steroidal anti-inflammatory drugs, and even opioid drugs (4). it has been considered that caffeine could increase the absorption of other analgesic drugs by decreasing the gastric pH and increasing circulation, as well as reducing hepatic blood flow and minimizing the metabolism of these drugs. It could also play a role in arachidonic acid metabolism by blocking COX 2 conformation and modifying pain perception at the cortical level (5).

Its clinical benefit in pain is still unclear but may be because, it is a centrally acting lipophilic molecule that can cross the blood-brain barrier, in addition to generating a non-selective antagonism of adenosine (Ad). Ad is involved in pain modulation processes having pro-nociceptive and anti-nociceptive effects, depending on the receptor subtype stimulated, the time of action, and the dose (5). Ca can also block TRPA1 receptors involved in cold hyperalgesia (6,7).

In fibromyalgia, different mechanisms of hyperalgesia have been proposed in cutaneous receptors, where adenosine receptor agonists 1, 2, and 3 play an important role, which increases cutaneous receptive changes in this disease (8). Pharmacological treatments tested in fibromyalgia such as amitriptyline have an action on adenosine pathways, decreasing its reuptake at the neurological level, destimulating its receptors, and generating analgesia (9). On the other hand, TRPA1 receptors play a role in the perception

of hyperalgesia in fibromyalgia patients, which have been found in large quantities in patients with chronic and nociplastic pain such as fibromyalgia (10).

On this physiological basis, we can consider that the antagonism generated by caffeine on adenosine receptors, mainly 1, along with the blockade of TRPA1 receptors, may improve pain outcomes in patients with fibromyalgia (Figure 1). Some studies have been reported in combination with other drugs such as opioids and acetaminophen showing a clinical benefit in patients with this entity (4,11). However, there is a lack of controlled clinical trials that determine concentrations and administration time of Ca in fibromyalgia; but there is an important theoretical effect that is worth considering in a drug that generates low pharmacological interactions, good tolerance, low cost and can be used in a large part of the population with comorbidities (12).

CONCLUSION

The theoretical use of caffeine in patients with nociplastic pain such as fibromyalgia has an important effect on adenosine receptors and TRPA1 that can generate a positive impact on pain reduction and thus on functional improvement and quality of life.

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CONFLICTS OF INTEREST

The auditors declare that they have no conflict of interest.

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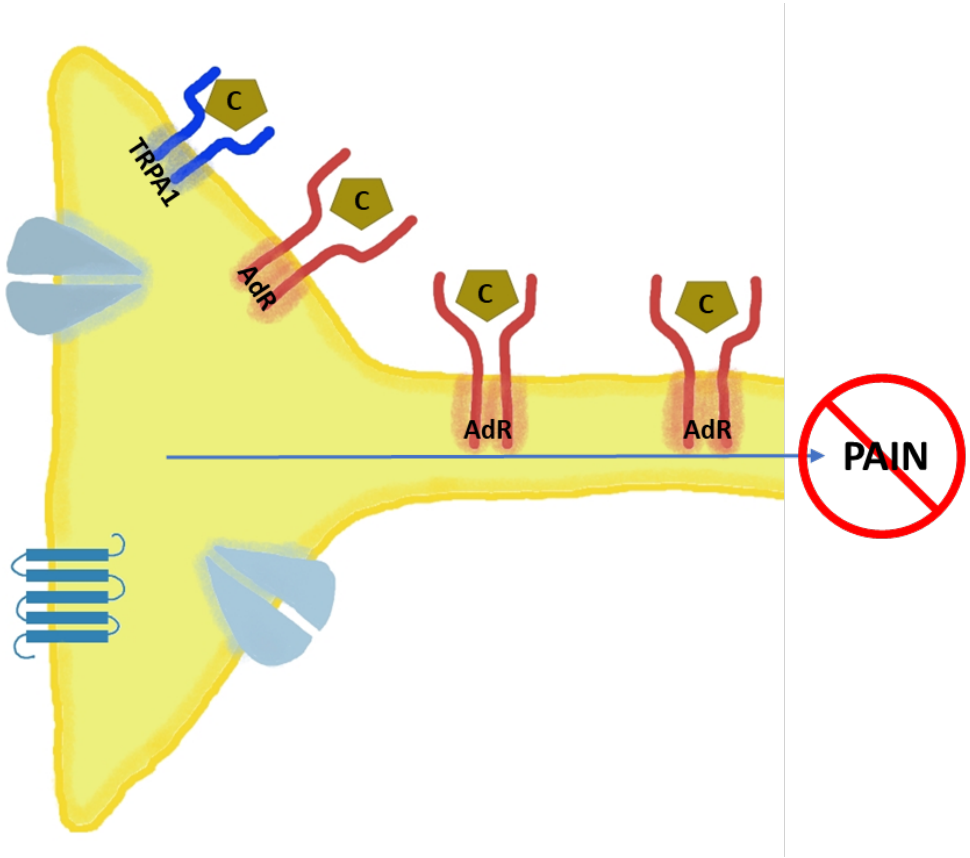

Figure 1. Caffeine molecules block TRPA1 and adenosine receptors, decreasing the transmission of pain stimuli. AdR: adenosine receptor. C: caffeine TRPA1: TRPA1 receptor.