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Curcumin and Its Emerging Role in Pain Modulation and Pain Management

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TO THE EDITOR

I read with great interest the article by Han et al. in a recent issue of your esteemed journal [1]. Interestingly, it was found that curcumin is rapidly emerging as a potent agent with significant anti-nociceptive properties.

For instance, curcumin decreases post surgical allodynia after surgical procedures such as laparoscopic cholecystectomy [2]. Curcumin exerts its anti-nociceptive effect by acting on dorsal root ganglia, while also subsequently decreasing CX3CR1 expression [3]. The function of Curcumin acts via the Mu and Delta opioid receptors [4]. The 5-HT (1A) receptors are an important necessity for curcumin induced inhibition allodynia. This is evident from the fact that 5-HT (1A) antagonists, such as WAY-100635, attenuate the anti-nociceptive effects of curcumin. Curcumin was also found to mitigate the capsaicin induced transient receptor potential of vanilloid 1 in pain hypersensitivity [5].

Curcumin also has a mitigating effect on diabetic neuropathic pain. This is clearly evident since it inhibits TNF-α, thereby ameliorating thermal hyperalgesia when co-administered with insulin in streptozotocin induced diabetic animal models [6]. Simultaneously, curcumin has a dose dependent attenuating effect on the release of nitric oxide, which further decreases the strength of the nociceptive stimuli [7]. In addition, curcumin prevents the development of diabetic neuropathy when co-administered with agents such as gliclazide [8]. The dual combination has an accentuating effect on serum C-peptide levels, which increases the threshold level to mechanical hyperalgesia. Similarly, curcumin inhibits IL-1β release, thereby improving neuronal function in alcoholic neuropathy [9].

Curcumin also has a mitigating effect on pain associated depression. For instance, Arora et al have recently reported that curcumin administration reduces reserpine induced pain and depression by reversing the changes in serotonin and substance P levels induced by reserpine [10]. In certain animal models, such as the facial pain model, curcumin exhibits pain ameliorating, synergistic effects when administered alongside NSAIDs [11].

Clearly, curcumin has significant anti-nociceptive properties. Further large scale studies are needed in humans to fully elaborate and harness the pain mitigating effects of curcumin.

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