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Oxycodone alters temporal summation but not conditioned pain modulation: preclinical findings and possible relations to mechanisms of opioid analgesia

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Abstract

Opioid analgesia is mediated primarily by modulating (inhibiting and enhancing) pain mechanisms at the spinal and supraspinal levels. Advanced psychophysical paradigms of temporal summation (TS) and conditioned pain modulation (CPM) likely represent pain mechanisms at both levels. Therefore, the study of opioid effects on TS and CPM can shed light on their analgesic mechanisms in humans. The current randomized, double-blind study tested the effects of oxycodone on the magnitude of both TS and CPM in 40 healthy subjects. TS was tested by measuring increments in pain intensity in response to 10 repetitive painful phasic heat stimuli. CPM was assessed by subtracting the response to a painful phasic heat stimulus administrated simultaneously with a conditioning cold pain stimulus from a painful phasic heat stimulus alone. These paradigms were tested before and at 60, 120, and 180 minutes after administration of a single oral dose of either oxycodone or an active placebo. Repeated-measures analysis of variance revealed significant effects of oxycodone, but not placebo, on the magnitude of TS (F=7.196, P<.001). Pairwise comparisons revealed that relative to baseline, TS was significantly reduced at 60 minutes (P=.008) and at 180 minutes (P=.017) after oxycodone administration. In contrast, no significant effects of either oxycodone (F=0.871, P=.458) or placebo (F=2.086, P=.106) on the magnitude of CPM were found. These results suggest that under the current experimental conditions, oxycodone exerted spinal, rather than supraspinal, analgesic effects. Furthermore, compared with CPM, TS seems more suitable for studying the mechanisms of opioid analgesia in humans.

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