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Interaction of Fentanyl and Buprenorphine in an Experimental Model of Pain and Central Sensitization in Human Volunteers

March 2012 · Clinical Journal of Pain 28(8):705-11 · [Follow journal](#)

DOI: [10.1097/AJP.0b013e318241d948](https://doi.org/10.1097/AJP.0b013e318241d948)

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Abstract

: There is controversy about combining opioids with different receptor affinities. We assessed the analgesic and antihyperalgesic effects of the μ -agonist fentanyl and the partial μ -agonist/ κ -antagonist buprenorphine in a human pain model, when given alone or in combination. : Fifteen healthy male volunteers (22 to 35 y) were included in this randomized, double-blind, placebo-controlled, cross-over study. Transcutaneous electrical stimulation induced spontaneous acute pain and stable areas of secondary hyperalgesia. Pain intensities, measured on a numeric rating scale from 0 to 10, and the size of the hyperalgesic areas were assessed before, during, and after an intravenous infusion of 1.5 $\mu\text{g}/\text{kg}$ fentanyl, 1.5 $\mu\text{g}/\text{kg}$ buprenorphine, a combination of 0.75 $\mu\text{g}/\text{kg}$ fentanyl and buprenorphine each, or saline 0.9%. Maximum effects of the treatments were compared by repeated measurement analysis of variance, and pharmacodynamic interaction models were fitted to the data. : Starting from a baseline value of numeric rating scale=6, the maximum reduction of pain intensity after correction for placebo effects was $43.9 \pm 22.2\%$ after fentanyl, $35.0 \pm 23.0\%$ after

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pharmacodynamic models assuming an additive interaction. : For the doses administered in this study, buprenorphine and fentanyl showed an additive interaction.

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Different profiles of buprenorphine-induced analgesia and antihyperalgesia in a human pain model



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Different mechanisms were proposed for opioid-induced analgesia and antihyperalgesia, which might result in different pharmacodynamics. To address this issue, the time course of analgesic and antihyperalgesic effects of intravenous (iv) and sublingual (sl) buprenorphine was assessed

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Chronic pain and hyperalgesia can be difficult to treat with classical opioids acting predominately at the μ -opioid receptor. Buprenorphine and its active metabolite are believed to act through μ -, κ - and δ -receptors and may therefore possess different analgesic and anti-hyperalgesic effects... ..

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