Effect of acute alcohol injection on plasma beta-endorphin levels in Warsaw high-preferring rats treated with acamprosate and naltrexone

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Abstract:
Naltrexone and acamprosate are the most effective drugs in reducing alcohol consumption, operating through different pharmacological mechanisms. Some studies have demonstrated that naltrexone and acamprosate in combination have significantly greater effectiveness in alcohol therapy than either agent used alone. We have previously found that beta-endorphin plasma levels are increased after repeated treatment with either of these drugs.

In this study, we examined the effect of a single administration of ethanol on the beta-endorphin levels in rats treated with both naltrexone and acamprosate. We used Warsaw High Preferring (WHP) rats and treated them for 10 days with naltrexone (2 mg/kg, ip) and acamprosate (200 mg/kg, po) or with each of these drugs separately. The control group was treated with saline and 1% methylcellulose. One hour before blood collection, the rats were injected with a single dose of ethanol or saline. We observed the increases in beta-endorphin levels after a single administration of ethanol to untreated rats compared with a single administration of saline. The same increase was observed after a single administration of ethanol to rats treated with naltrexone or naltrexone and acamprosate. However, a single injection of ethanol to rats treated only with acamprosate resulted in smaller increases in plasma beta-endorphin content. As the endogenous opioid system has an important role in the development of craving for alcohol, restoring the alcohol-induced deficits of beta-endorphin in the reward system may be an important factor contributing to preventing craving and relapse to drinking. Therefore, we suggest that the similar changes in the activity of beta-endorphin following therapy with either naltrexone alone or combined naltrexone plus acamprosate, may explain why the combined drug therapy is not more effective in treating alcoholism than naltrexone alone. The present findings support the results from some randomized clinical trials demonstrating that the efficacy of acamprosate plus naltrexone in the treatment of alcoholism was not significantly different from the efficacy of the treatment with naltrexone alone.

Key words: beta-endorphin, naltrexone, acamprosate, ethanol, alcohol-prefering rats