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Gap junction blocker as a reasonable choice for prevention of morphine withdrawal symptoms

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Background: The exact mechanisms of morphine-induced dependence and withdrawal symptoms remain unclear. In order to identify an agent that can prevent withdrawal syndrome, many studies have been performed. This study was aimed to evaluate the effect of gap junction blockers; carbenoxolone (CBX) or mefloquine (MFQ); on morphine withdrawal symptoms in male rat.

Methods: Adult male Wistar rats (225-275 g) were selected randomly and divided into 10 groups. All groups underwent stereotaxic surgery and in order to induce dependency, morphine was administered subcutaneously (Sc) at an interval of 12 hours for nine continuous days. On the ninth day of the experiment, animals received vehicle or CBX (100, 400, 600 µg/10µl/rat, ICV) or MFQ (50, 100 and 200 µg/10µl/rat, ICV) after the last saline or morphine (Sc) injection. Morphine withdrawal symptoms were precipitated by naloxone hydrochloride 10 min after the treatments. The withdrawal signs including: jumping, rearing, genital grooming, abdomen writhing, wet dog shake and stool weight, were recorded for 60 minutes.

Results: Results showed that CBX and MFQ decreased all withdrawal signs; and the analysis indicated that they could attenuate the total withdrawal scores significantly.

Conclusion: Taking together, it is concluded that gap junction blockers prevented naloxone-precipitated withdrawal symptoms.

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