

Interaction between naloxone and silver nanoparticles in central amygdala

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Background and Objective: Repeated injection of morphine can induce conditioned place preference (CPP) while naloxone, a selective competitive mu-opioid receptor antagonist, can reverse the effect of morphine. Silver nanoparticles (SNPs), one of the most commercially used nanomaterials, may be available in biological systems because of degradation and an environmental release of them. The purpose of this research was to study the effects of silver nanoparticles on naloxone induced conditioned place aversion (CPA) and withdrawal signs in morphine conditioned rats.

Materials and Methods: Male Wistar rats (300-350 g) were cannulated bilaterally by Stereotaxic apparatus for the CeA (Anteriorposterior= -2.12 mm posterior to bregma and lateral= ±4.1 mm; dorsoventral=7.8 mm, according to the atlas of Paxinos and Watson (Paxinos and Watson, 2003) coordinates. Morphine (0.5-7.5 mg/kg) was injected s.c. once a day throughout the conditioning phase of a CPP paradigm. On day of the testing, the naloxone (0.05- 0.4 µg/rat) was administered intra-CeA 10 min before of testing. SNPs (0.0001- 0.01 µg/rat) were intra-CeA injected 10 min before microinjection of naloxone dosages. Data in all groups were compared by ANOVA (one- and/or two-way analysis of variance).

Results: Naloxone (0.4 µg/rat) caused meaningful CPA in the morphine conditioning model, however, a microinjection of silver nanoparticles (0.001, 0.0001 µg/rat) caused meaningful change in naloxone induced CPA and had significant effect on the withdrawal signs. **Conclusion:** SNPs may have an impact on response in CPP animal model.

Keyword: morphine, naloxone, silver nanoparticles, withdrawal signs, CPP, CPA