

## Chronic Morphine Dependency and its Behavioral and Reproductive Effects in Rats

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### Abstract

**Introduction:** Opioids and morphine are increasingly abused in modern societies, especially in recent years. Therefore, the present study was designed to evaluate the effects of morphine dependency on rats' sexual and maternal behaviors, birth rate, sex ratio and the rate of stillbirths.

**Materials & Methods:** Adult male and female rats were allocated into treatment and control groups. The treatment group was sub-divided into two morphine-dependent groups, group I) consisting of a number of male couples and group II) of both parents. Morphine dependency was induced by gradual administration of oral morphine with a final dose of 0.4 mg/ml dispensed in drinking water for 14 days. Morphine dependency was confirmed by the observation of changes induced by naloxane administration. Sexual behavior was determined by vaginal plague observation. Weight gain during pregnancy, rate of stillbirths, sex ratio, and maternity behavior (Caring for the neonates or eating them) were assessed in the groups. For statistical tests, one-way ANOVA with its non-parametric equivalent and for comparing means,  $\chi^2$  were used while employing SPSS software, version 13, for statistical analysis. The level of significance was regarded as  $p < 0.05$ .

**Results:** A non-significant decline in sexual tendency was observed in groups I (60%) and II (67%), compared to the control group (80%). In the control group, 69% of all matings resulted in delivery compared to 39% and 38% in groups I and II respectively ( $p < 0.05$ ). Weight gain in groups I, II and the controls were  $46 \pm 38$ ,  $28 \pm 28$  and  $62 \pm 33$  grams respectively. Weight gain difference between the control group and group II was statistically significant ( $p < 0.05$ ). Sex ratio was 1.17, 1 and 1.57 in groups I, II and the controls, respectively. No stillbirths were seen in group I, while the rate of stillbirth in group II (67%) was statistically significant ( $p < 0.001$ ); one stillbirth was also seen in the control group. The rate of pup cannibalism in female rats on group II (37%) was significantly higher ( $p < 0.001$ ) than group I and the controls.

**Conclusion:** Morphine dependency neither had effects on sex drive nor on fertilizing capacity in male or female rats but it increased the rate of pseudo-pregnancy. Morphine also increased the rate of stillbirths but it adversely affected maternal weight gain during pregnancy. Maternal behavior was highly affected by morphine dependency as well.

**Key Words:** Opioids, Addiction, Fertility, Morphine dependency, Libido, Maternal behavior, Stillbirth, Sex ratio, Rat.

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