

Effects of MDMA (Ecstasy) on Oocyte Quality and Fertilization Rate in Mice

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Abstract

Introduction: Ecstasy drug abuse is relatively common among the youth undergoing psychosocial stresses. Categorized as a stimulant drug, ecstasy has nervous, cardiac and immunological side-effects. The endocrine system is not spared from the harmful effects of the drug and it could influence ovulation by exerting its effects on the hypothalamic-hypophyseal-gonadal axis. The aim of this study was to evaluate the effects of ecstasy on the quality of oocytes and on fertilization rate in mice.

Materials and Methods: Thirty female NMRI mice were divided into three groups, after checking for their estrous cycles. At the beginning of each cycle, ecstasy was administered intraperitoneally to the animals in groups A (a minimum dose of 5 mg/kg/day) and B (a maximum dose of 20 mg/kg/day). At the end of the second day, 10 IU PMSG, and at the end of the 4th day, 10 IU HCG were administered intraperitoneally. The mice in group C underwent the same procedures except receiving ecstasy. All the mice were sacrificed on the fifth day to aspirate their oocytes for further evaluation. In-vitro fertilization was done using mature or MII oocytes and fertilization was checked after 5 hours. The results were later statistically analyzed.

Results: The number of retrieved oocytes was similar between the experimental and control groups. However, the rate of mature oocytes (MII) was significantly higher ($p = 0.0001$) in the controls (31.2%) than the mice in groups A (15.2%) and B (12.8%). Moreover, fertilization rate was significantly higher in the controls than the experimental groups.

Conclusion: Administration of Ecstasy in mice can affect both oocyte maturity and the fertilization potential of oocytes. The overall effects of ecstasy on embryo development and implantation needs further studies to reach a definitive conclusion.

Keywords: Beta-keto-3,4-methylenedioxymethamphetamine (MDMA), Ecstasy, Fertility, Fertilization, In-vitro fertilization, Methamphetamine, Oocyte, Ovary.

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