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Potential Protective Effect of Alpha Lipoic Acid against Lead Toxicity in Pregnant Rats

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Exposure to lead (Pb^{2+}) during the in utero period has been proven to be detrimental to the human and animal offspring. Despite attempts to identify and eliminate sources of Pb^{2+} exposure, it is still present in the biotope and it induces adverse health effects. Reports suggested that antioxidants could serve as a therapeutic strategy against lead toxicity. The Alpha- lipoic acid (LA) is a natural organosulfur compound present in both prokaryotes and eukaryotes; where it exerts a selective immunomodulating activity with antioxidant and anti-inflammatory properties. However, little is known about its protective effect against Pb^{2+} toxicity in female reproduction. Here, we aimed to investigate the protective effect of LA against Pb^{2+} challenge in pregnant rats and their fetuses. Pregnant rats at day 1 of gestation were enrolled to this experiment and divided into five groups (10 rats of each) where group 1 was provided only with water and served as control. Group 2 received 1% tween 80 (a solvent for LA). Group 3 was gavaged lead acetate (233.25 mg/kg) from day 7 to 16 of gestation. The 4th group received LA (61.9 mg/kg) orally throughout the gestation period, while group 5 received both LA and lead acetate. Dams were sacrificed on the 20th day of gestation and fetuses were removed by cesarean section where implantation sites, fetal mortality, morphological examination, body weight and length were recorded. Blood samples were collected from both dams and fetuses for hematological and biochemical parameters assessment. Histopathological examination of placenta was also performed. The results showed that Pb^{2+} caused a reduction in the maternal body weight gain, increase in the rate of abortion, as well as fetal growth retardation and malformations in their skeleton. Moreover, Pb^{2+} induced severe hematological and biochemical alterations in both dams and fetuses. The toxicity of Pb^{2+} was further revealed by pathological alteration in the placenta and hepatic DNA fragmentation. However, LA pretreatment counteracted the impact of Pb^{2+} on both dams and fetuses parameters. The results suggested that LA could be a promising prophylaxis against Pb^{2+} toxicity.

Biography:

Hoda Samir Badr Aglan graduated from the faculty of Pharmacy Ain Shams University. She has been Assistant Researcher in National Organization for Drug Control and Research, Egypt. She has 8 years experience at the department of Pharmacology during which she got her MSc Degree in Pharmacology and Toxicology, specializing in Reproductive Toxicology, from the faculty of Pharmacy, Cairo University, Egypt. Now she is a PhD student in the Institute of Animal Science, University of Bonn. Her thesis theme is related to the impact of heavy metals on bovine ovarian granulosa cells and in vitro cultured preimplantation embryos. She has great motivation to learn about different assisted reproduction techniques and how they could be affected by unavoidable environmental stressors, meanly heavy metals. Additionally, she is interested in studying of the impact of antioxidants on the genetic and epigenetic make-up of bovine embryos during the preimplantation period.