

Summary of the Ph.D thesis No.,**1577** Faculty of Veterinary Medicine, Urmia University.

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Title: Investigating the effects of nano-EDTA on lead injuries in male reproductive system

Summary:

Lead presents as one of oldest chemical poisons in life history. Lead presents in environment and its compounds find in food, water and cosmetic materials. Organic compounds of lead can seriously damage reproductive system and lead poisoning in males will result in decrease in spermatozoid count, lowering motility and deformation. Removing poisons from body consider as the first step to counteracting toxins. Chelators have proven to be successful in expelling heavy metals out of soft tissues and finally out of body. As researches shown Sodium Versenate or Na-EDTA can expel lead out of soft tissues, decision made to put EDTA on nano-vector to improve its pharmacokinetics. Graphene Quantum Dot(GQD) is able to bound with chemicals and slow-release them. Efficiency of EDTA coated on GQD on expelling lead out of body in measure to Na-EDTA surveyed in current study. 64 male rats sorted to 8 groups of 8. First group was sham without any lead prescription and others took solution of 1000ppm lead acetate as their water source for 5 weeks. Then they divided to 7 groups as one control without treatment(Ctrl-), one with 54mg/kg/day Na-EDTA(E+), three with 2X,X and X/2 dosage of EDTA coated grapheme quantum dot(E2X,EX,EX/2), one with DMSO(GQD solvent) and last group treated with just GQD(GQD). Treatment continued for two weeks then needed examples got taken. In Neutral red test only EX and EX/2 made difference with Ctrl-. E+ and EX had meaningful difference with Ctrl- in MTT test. In Sperm count all groups had meaningful difference with Ctrl-. Atomic absorption test had shown meaningful increase of lead blood level in all treated groups. Lower amounts of lead blood level in EX and E2X suggests these doses of nano-drugs may passed to successfully expelling drug out of blood phase. Lead presence in all testicular samples, were significantly lower due to measurements done by atomic absorption. In conclusion, this study shows graphene quantum dot coated by EDTA is as effective as Na-EDTA in expelling lead out of body in general and more effective in expelling lead out of soft tissues.

Keywords: nano-EDTA, male reproductive system, rat, lead