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EFFECTS OF ALUMINIUM OXIDE NANOPARTICLES ON SOME BLOOD PARAMETERS IN FEMALE WISTAR RATS

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Nanoparticles (<100 nm) containing metals are being used various fields of technology and released to the environment, causing contamination of food supplies. Thus, the present work was undertaken to investigate the effects aluminium oxide nanoparticles (Al2O3) sized 40 nm after its administration to female Wistar rats. Following 14 days oral administration of Al2O3 nanoparticle (0, 0.5, 5, 50 mg/kg b.w./day), the levels of 19 serum biomarkers (glucose, cholesterol, creatinine, urea, triglycerides, bilirubin, protein, ALP, ALT, AST, cortisol, T3, T4, estradiol, prolactin, IgG, IgM, total oxidant, total antioxidant) belonging to different metabolic systems and the activities of osmoregulation enzymes (Na, K-ATPase, Mg-ATPase, CaATPase) in the erythrocyte were measured. Except the lowest Al2O3 dose, Na, K-ATPase activity (up to 76%) decreased significantly ($P<0.05$) following Al2O3 administrations, while Al2O3 did not alter the activities of Mg-ATPase and Ca-ATPase in the erythrocytes. Al2O3 administration caused an increase (167%) in the levels of total oxidants in the serum, while total antioxidant levels were not altered by Al2O3. The levels of the liver enzymes, ALT and AST did not change significantly, while ALP levels increased (58%) following Al2O3 administration. The levels of the immune system parameters (IgM, IgG) did not change significantly. The levels of estradiol and T3 decreased (up to 83%) significantly, while the levels of prolactin, cortisol and T4 did not change significantly. An increase (240%) in bilirubin level and a decrease (73%) in triglyceride level were also noted in the serum of Al2O3 administrated rats. The present study demonstrated that oral administration of Al2O3 to female rats altered many parameters in the serum and ATPase activities in the erythrocyte and suggests carrying out further research to enlighten better the environmental fate of nanoparticles.