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Title: Effect of Carbon Quantum Dots on Testicular Autophagic and Apoptotic Alterations in Mature Male Rats

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Carbon quantum dots (CQDs) are novel fluorescent carbon-based nanomaterials that have attracted enormous attention recently regarding their unique bioactivities. This study was executed to scrutinize the effect of CQDs on testicular autophagic and apoptotic alterations in mature male rats. Twenty adult male Wistar rats were assigned into four equal groups including control (0.50 mL normal saline; intra-peritoneally (IP), single dose), CQD1 (2.50 mg k⁻¹; IP, single dose), CQD2 (10 mg k⁻¹; IP, single dose) and CQD3 (40 mg k⁻¹; IP, single dose). All animals were euthanized after 35 days and Atg7, LC3 and caspase III syntheses were determined through immunohistochemical analyses. Intra-peritoneal administration of CQDs resulted in significant dose-dependent increases in Atg7, LC3 and caspase III synthesis levels in testicular tissue of mature rats compared to the control group. Based on these findings, CQDs have the potential of autophagic and apoptotic mechanisms stimulation in a dose-dependent manner in mature male rats testicular tissue.

Keywords: Apoptosis, Autophagy, Carbon Quantum Dots, Rat, Testis