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METAL-BASED NANOPARTICLES AND HEAVY METALS ON SPERMATOGENESIS: PRECLINICAL STUDIES

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Male reproductive function integrates delicate biological systems (tissues and gametes) strongly susceptible to a myriad of factors including man made engineered nanomaterials, heavy metals and metalloids. Metal-based nanoparticles (NPs) are broadly used in biomedical field especially as drug delivery systems, therapy in some pathologies namely cancer, and imaging. Furthermore, its application on assisted reproductive technologies is also emphasized. It is also worth noting for example, the benefits of nanoselenium in sperm motility in experimental models. However, strong evidences demonstrate the adverse impact of these nanosystems, and some metal compounds on reproductive hormonal axis, and spermatogenesis in animal models and man. Semen quality decay is largely referred at both occupational and environmental settings. This work critically analyses the up-to-date information of the influence of some metal-based nanoparticles (eg. Au-NPs, ZnO-NPs), metals (eg. lead, cadmium, and chromium) on male reproductive health. In addition, data from our preclinical studies will be focussed on genotoxicity trials, antioxidant biomarkers, histopathological, and ultrastructural tools. In addition semen analysis will be highlighted. Some discrepancies in the literature were reported among experimental studies due to different procedures in experimental design (dose, route of exposure, and duration). However, in general, the factors mentioned above affect male reproductive health, through oxidative stress which results in reversible and/or irreversible changes in testosterone-producing cells, spermatogenesis, and sperm quality parameters. Heavy metals such as cadmium induce severe damage into the blood-testicular barrier, thus compromising fertility.

Biography

M L Pereira is an Associate Professor with Habilitation at Department of Medical Sciences, University of Aveiro, and Member of the Associate Laboratory CICECO-Aveiro Institute of Materials. She got her PhD in Biology (Animal Cytology) at the University of Aveiro. Her teaching activities include essentially Cytology and Histology, and Cell Biology. She was Director of the Master on Molecular and Cell Biology (2008-2018) at University of Aveiro. Her research has been focused on the adverse effects of heavy metals, nanoparticles, and pesticides on animal models, especially male reproductive function, combining histological, cell biology and ultrastructural approaches. She co-authored more than several papers in international journals, and has been serving as an Editorial Board Member of some journals, acting also as referee.

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