Alteration of Mouse Oocyte Quality after a Chronic Exposure to Depleted Uranium.

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Gametes and embryo tissues are known to represent a sensitive target to environmental toxicants exposure. An alteration in oocyte quality can impact subsequent embryonic development, the establishment and maintenance of pregnancy, foetal developmental competence and even adult disease. The major health concern from DU is mainly centred on its chemotoxic properties as a heavy metal. Although the general toxicity of uranium is well established, little attention was paid to the impact of uranium on reproduction. Some reports in rodents highlighted a negative impact of uranium on male gametogenesis but female gamete quality was scarcely documented. The original purpose of this research was to evaluate the effect of depleted uranium (DU) on mouse oocyte quality after 49 days of chronic contamination in drinking water and to correlate the observed effects with the amount of DU accumulated in organs. Four different DU concentrations were investigated: 0 (control), 10 (DU10), 20 (DU20) and 40mg.L-1 (DU40). DU did not influence the intensity of ovulation but affected oocyte quality. The proportion of healthy oocytes was reduced by half ($P<0.001$) from 20mg.L-1 compared with control group (0.537; 0.497; 0.282 and 0.239 in control, DU10, DU20 and DU40 groups respectively) whereas no accumulation of DU was recorded in the ovaries whatever the dose tested. Indeed, this study revealed that reproductive tract is not a preferentially reservoir for DU which accumulated mainly in the bone and kidneys. Abnormal perivitelline space ($P<0.001$) or absence of the 1st polar body ($P<0.001$) were identified as the main morphological characteristics of DU impact on oocyte. These alterations of mouse oocyte quality could be related to impairment in nuclear or cytoplasmic maturation. The present study showed that oocyte quality was a sensitive target to DU exposure. In the context of this study, the NOAEL for oocyte quality was determined at 10mg U.L-1 in drinking water (1.93mgU.kg-1.day-1). Further investigations are necessary to correlate DU morphological alterations with the subsequent developmental competence of oocyte.

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