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BOOK OF ABSTRACT

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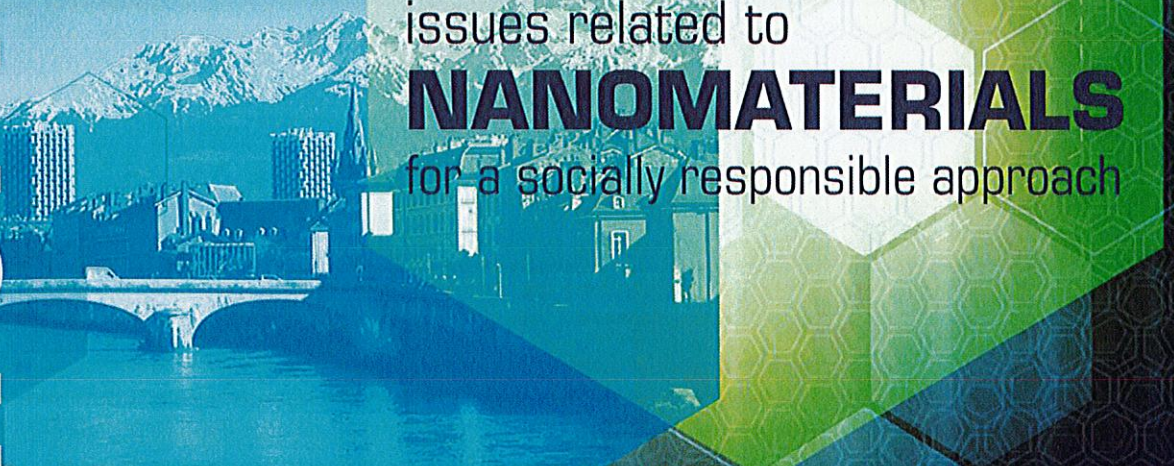

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Oral contamination by gold, including gold-nanoparticles (Au-NP) exposure, occurs via food, dental fillings, tobacco and pharmaceuticals. The general population, including pregnant women, is exposed by ingestion, but effects of Au-NP during pregnancy on the feto-placental development remain misunderstood. The aim of this work was to evaluate the effects of an oral maternal sub-chronic exposure to Au-NP throughout the gestation on the feto-placental development and placental function in a rabbit model. Pregnant females were orally exposed (NP, n=9) or not (C, n=9) to uncoated Au-NP (5 nm diameter), at 1.54 µg/kg/day (corresponding to the estimated daily exposure of humans through diet), 5 days/week, from D3 to D27 of gestation (total exposure: 18-20 days). Gestation was monitored by ultrasound, including fetal biometric measurements and fetal blood flows. At D28, effects on maternal and fetal biometry, maternal hematology and biochemistry were analyzed using a linear mixed model taking into account exposure, litter size, sex and duration of exposure as fixed effects, and dams as random effects. To detect DNA lesions, the alkaline comet assay was performed on various maternal and fetal tissues. Au-NP distribution in placental tissue was evaluated by transmission electron microscopy and placental function was explored by transcriptomic approach. Fetal growth was normal throughout the gestation, despite a significant decrease of cerebral diastolic velocity at D21 in NP compared to C. At D28, adrenal glands were heavier in NP dams, whereas maternal hematology and biochemistry, fetal biometry remained unchanged. No DNA lesions were observed in maternal and fetal tissues at D28. The presence of «finger-prints» inclusions was revealed by ultrastructural analysis in the labyrinthine area (exchange area) of the placenta, in the maternal blood space and in the trophoblast of the NP group. Moreover, dense elements were observed in erythrocytes of fetal vessels' suggesting that Au-NP could cross the placental barrier. Placental transcriptomic data were analyzed using GSEA (Gene Set Enrichment Analysis) and revealed that gene set enrichment profiles differed completely between males and females in NP compared to C. In conclusion, in utero exposure to Au-NP by maternal ingestion affected only weakly maternal and fetal biometric phenotypes but Au-NP were present in the placenta and placental gene expression was affected in a sex-specific manner.

Session 5
5.1 Toxicology