Uterine Position Effect in Fetal Growth Pattern of Nanopolysterene-Exposed Rats

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Plastics are everywhere around us. When disposed, these ubiquitous products are unable to degrade completely, instead fragmenting into smaller pieces, producing micro- and even smaller nanoplastics. It has been shown that the average woman inhales an average of 132 microplastics daily. Previous studies have shown that nanoplastics are significantly more toxic than larger microparticles after inhalation. Unfortunately, studies evaluating fetal health after maternal nanoplastic exposures are limited. In this study, we assessed rat fetal growth, while taking into consideration the anatomical uterine positioning of fetal implantation (ovarian, middle, and vaginal thirds) within the uterine horn after maternal pulmonary exposure to nanopolysterene particles (NP) late in gestation. We hypothesize that rat fetuses exposed to NP during gestation have a lower average weight than controls and that fetuses implanted in the middle of the uterine horn will have a higher average weight than those in the ovarian/vaginal ends. Pregnant rats (n=9-12) were exposed to NP through intratracheal instillation at gestational day (GD) 19 and sacrificed on GD 20, along with a sterile saline control group. The anatomical uterine positioning of the fetuses within the uterus was identified, and weights were measured and recorded. Preliminary data indicates pups from exposed dams were significantly smaller than control (2.59±0.02g vs. 2.68±0.02g, respectively). This outcome was driven by pups in the middle of the uteri wherein exposed pups were significantly smaller than control (2.56±0.03g vs. 2.70±0.03g, respectively). Interestingly, fetuses in the vaginal end have the highest average weight in either the control or exposed group from the positions analyzed although this is not to significance. The results found in this study further expand our knowledge on the developmental toxicity of nanoplastics and help to achieve more accurate conclusions from reproductive toxicological studies that utilize rodent models. Supported by NIEHS R00ES024783, P30ES005022, T32ES007148, R25ES020721, and the SOT Intern Program.