

Will developmental exposure to bisphenol A affect bone tissue?

Ling Shen

Bisphenol A (BPA) is an industrial chemical that is used in the production of polycarbonate plastics and epoxy resins. These applications result in consumer exposure to BPA via packaged foods in the diet. The toxicity and hormonal activity of BPA in laboratory animals have been studied and hormone related cancers and metabolic disorders have been observed in rodents. The objective of this project was to study effects on bone tissues of rats exposed to low doses of BPA *in utero* and during lactation. 110 pregnant rats were randomly distributed into five groups and gavaged with (0, 0.025, 0.25, 5 or 50 mg BPA/kg body weight (b.w.)/day) from gestation day 7 until weaning at pup day 22. Thus, offspring were exposed *in utero* and during lactation. Body weights of the offspring were recorded and right femurs (upper leg long bones) were collected for geometry and densitometry measurements using peripheral quantitative computed tomography and also for analysis of biomechanical properties via three-point bending.

The major findings of the study: Increased femur length in female offspring of dams exposed to 0.025 mg BPA/kg b.w./day or 5 mg BPA/kg b.w./day; Increased cortical thickness of male offspring of dams exposed to 0.025 mg BPA/kg b.w./day. No effects of biomechanical properties were seen on the bones of either sex offspring.

In conclusion, this study demonstrates that developmental exposure to BPA at levels relevant to current human exposure alters femoral geometry in rat offspring. BPA showed endocrine disruptive effects on both female and male offspring bone tissue. The mechanisms behind these differences are unknown.