

Early-life exposure to BPA may affect testis function in adulthood

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"We are seeing changes in the testis function of rats after exposure to BPA levels that are lower than what the Food and Drug Administration and Environmental Protection Agency consider safe exposure levels for humans," said Benson Akingbemi, PhD, the study's lead author and an associate professor at Auburn (Ala.) University. "This is concerning because large segments of the population, including pregnant and nursing mothers, are exposed to this chemical."

Many hard plastic bottles and canned food liners contain BPA, as do some dental sealants. BPA acts in a similar manner as the female sex hormone estrogen and has been linked to female infertility. This chemical is present in placenta and is able to pass from a mother into her breast milk. In their study of the male, Akingbemi and colleagues saw harmful effects of BPA at the cellular level, specifically in Leydig cells. These cells in the testis secrete testosterone, the main sex hormone that supports male fertility. After birth, Leydig cells gradually acquire the capacity for testosterone secretion, Akingbemi explained.

The process of testosterone secretion was decreased in male offspring of female rats that received BPA during pregnancy and while nursing. The mothers were fed BPA in olive oil at a dose of either 2.5 or 25 micrograms of BPA per kilogram of body weight. Akingbemi said this is below the daily upper limit of safe exposure for humans, which federal guidelines currently put at 50 micrograms per kilogram of body weight. A control group of pregnant rats received olive oil without BPA. Male offspring, after weaning at 21 days of age, received no further exposure to BPA.

Using a combination of analytical methods, the investigators studied the development of Leydig cells in male offspring. The capacity for testosterone secretion was assessed at 21, 35 and 90 days of age. The amount of testosterone secreted per Leydig cell was found to be much lower in male offspring after early-life exposure to BPA than in offspring from control unexposed animals.

"Although BPA exposure stopped at 21 days of age, BPA's effects on Leydig cells, which were seen immediately at the end of exposure and at 35 days, remained apparent until 90 days of age, when the rats reached adulthood," Akingbemi said. "Therefore, the early life period is a sensitive window of exposure to BPA and exposure at this time may affect testis function into adulthood."

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