Study finds reproductive health effects from low doses of bisphenol-A

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New research from North Carolina State University and the National Institute of Environmental Health Sciences (NIEHS) shows significant reproductive health effects in rats that have been exposed to bisphenol-A (BPA) at levels equivalent to or below the dose that has been thought not to produce any adverse effects.

BPA is a chemical found in baby bottles, water bottles, canned foods and an array of other consumer products. The potential health effects of BPA are currently the subjects of intense debate.

The study found that female rats exposed to a BPA dose of 50 micrograms per kilogram of body weight (µg /kg) in their first four days of life experienced early onset of puberty. Female rats exposed to 50 milligrams per kilogram of body weight (mg/kg) during their first four days of life developed significant ovarian malformations and premature loss of their estrus cycle.

"The 50 mg/kg level is important," says lead researcher Dr. Heather Patisaul, "because it is equivalent to the U.S. Environmental Protection Agency's 'Lowest Observable Adverse Effect Level' for BPA. So, by definition, we should not have seen significant effects at or below this level, but we did."

Patisaul, an assistant professor of biology at NC State, explains that the 50 µg /kg level is also significant because it is EPA's listed reference dose for BPA - meaning it is the level of BPA that EPA says a person

can be exposed to on a daily basis without expecting any adverse effects after a lifetime of exposure.

Patisaul stresses that the research was done on rats, making it difficult to determine its applicability to humans, but notes that "this adds to a growing body of evidence that exposure to low doses of BPA during development can impact female reproductive health."

The female rats in the study were exposed during the first four days of life because that is a sensitive developmental window for the rats, similar to a sensitive developmental stage that takes place for humans when they are still in the womb.

While exposure to the lowest dose, 50 µg /kg, resulted in early onset of puberty in the rats, exposure to higher dose had more complicated results.

When exposed to the higher 50 mg/kg dose, the female rats developed cyst-like formations in their ovaries. The ovaries also developed fewer so-called "corpora lutea" structures than normal. Corpora lutea appear after ovulation and are essential to fertility because they produce a hormone called progesterone. If an ovary does not produce enough progesterone, it is impossible for a female to sustain a pregnancy. The lack of corpora lutea likely indicate that the female rats were no longer ovulating and would probably be infertile.

Exposure to the higher 50 mg/kg dose also resulted in the female rats prematurely losing their estrous cycle. The researchers determined this by observing a lack of change in the skin cells of the female reproductive tract of the rats across the estrous cycle. These cellular changes indicate a normal estrus cycle.

Source: North Carolina State University (news : web)