

# Plastics chemical retards growth, function of adult reproductive cells

July 8 2009

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Veterinary biosciences professor Jodi Flaws and her colleagues found that mouse follicle cells that were exposed to bisphenol A, a chemical found in many plastics, produced lower levels of steroid hormones than other cells. Credit: Photo by L. Brian Stauffer, U. of I. News Bureau.

Bisphenol A, a chemical widely used in plastics and known to cause reproductive problems in the offspring of pregnant mice exposed to it, also has been found to retard the growth of follicles of adult mice and hinder their production of steroid hormones, researchers report.

Their study is the first to show that chronic exposure to low doses of BPA can impair the growth and function of adult [reproductive cells](#). The researchers will describe their findings this month at the annual meeting of the Society for the Study of Reproduction.

A healthy, mature follicle, called an antral follicle, includes a single egg cell surrounded by layers of cells and fluid which support the egg and produce steroid hormones, said University of Illinois veterinary biosciences professor Jodi Flaws, who led the study with graduate student Jackye Peretz.

"These are the only follicles that are capable of ovulating and so if they don't grow properly they're not going to ovulate and there could be fertility issues," Flaws said. "These follicles also make sex steroid hormones, and so if they don't grow properly you're not going to get proper amounts of these hormones." Such hormones are essential for reproduction, she said, "but they're also required for healthy bones, a healthy heart and a healthy mood."

BPA is widely used in plastics and is a common component of food containers and [baby bottles](#).

The chemical structure of BPA is similar to that of estradiol, a key steroid hormone, and it can bind to estrogen receptors on the surface of some cells. It is not known whether BPA blocks, or mimics or enhances estrogen's activity on these cells, Flaws said.

Human studies have found BPA in many tissues and fluids, including urine, blood, breast milk, the amniotic fluid of pregnant women and the antral fluid of mature follicles. A national survey conducted by the federal Centers for Disease Control and Prevention in 2003-2004 found BPA in 93 percent of the 2,517 people (age 6 and up) who were tested.

BPA has a short half-life, Peretz said, and the chemical is quickly eliminated from the body. The fact that so many people tested positive "probably means that we're being constantly exposed to BPA," she said. The new study found that follicle growth was impaired after 48 hours of exposure to BPA, Peretz said. Reductions in three key steroid hormones

- progesterone, testosterone and estradiol - were also seen after 120 hours of exposure to BPA.

The drop in steroid hormone production was quite dramatic. After 120 hours in a medium that included 10 micrograms per milliliter of BPA, mouse follicle cells produced about 85 percent less estradiol, 97 percent less progesterone and 95 percent less testosterone. Lower doses of BPA had a less dramatic - but still considerable - dampening effect on steroid hormone levels. And at 120 hours, follicle cells grown in the BPA medium were 25 percent smaller than normal, the researchers report.

A review of the health risks of BPA by the National Toxicology Program of the U.S. Department of Health and Human Services concluded in 2008 that while BPA has been shown to harm the reproductive health of laboratory animals in some studies, such adverse effects "are observed at levels of exposure that far exceed those encountered by humans."

However, the NTP reported that laboratory studies that showed effects in animals exposed to low doses of BPA led it to have "some concern for effects on the brain, behavior and prostate gland in fetuses, infants and children at current human exposures to bisphenol A."

The new study points to possible concerns in adults as well, Flaws said.

"I think there's a need for more studies where people look in adult humans to see if BPA is affecting follicle growth and steroid hormone levels," she said. If it is, that might help explain some infertility or menopausal symptoms, she said.

Source: University of Illinois at Urbana-Champaign ([news](#) : [web](#))

Citation: Plastics chemical retards growth, function of adult reproductive cells (2009, July 8)  
retrieved 9 April 2024 from  
<https://phys.org/news/2009-07-plastics-chemical-retards-growth-function.html>

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