

Bisphenol A alters mammary gland development in monkeys

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A new study finds that fetal exposure to the plastic additive bisphenol A, or BPA, alters mammary gland development in primates. The finding adds to the evidence that the chemical can be causing health problems in humans and bolsters concerns about it contributing to breast cancer.

"Previous studies in mice have demonstrated that low doses of BPA alter the developing mammary gland and that these subtle changes increase the risk of cancer in the adult," says Patricia Hunt, a [geneticist](#) in Washington State University's School of [Molecular Biosciences](#). "Some have questioned the relevance of these findings in mice to humans. But finding the same thing in a primate model really hits uncomfortably close to home."

The research appears in the latest [Proceedings of the National Academies of Sciences](#). Hunt and Tufts University School of Medicine researchers Ana Soto and Carlos Sonnenschein—all pioneers in the effects of BPA—co-designed the study with Catherine VandeVoort at the University of California at Davis, where the study was performed.

The Tufts researchers compared the structure of newborn mammary glands from BPA-exposed and unexposed female rhesus macaques. Pregnant monkeys were fed a piece of fruit containing a small amount of BPA each day during the gestational period corresponding to the human third trimester of pregnancy, resulting in blood levels of BPA comparable to those of many Americans today.

The researchers found that, at birth, the density of mammary buds was significantly increased in BPA-exposed monkeys, and the overall development of the mammary gland was more advanced compared to unexposed monkeys. Previous studies in the Soto and Sonnenschein laboratories have shown that exposing rodents to tiny amounts of BPA can alter mammary gland development, leading to pre-cancerous and cancerous lesions when the animals exposed in utero reach adult age.

The researchers say the primate research makes them confident that the rodent mammary gland is a reliable model to study developmental exposures to chemicals like BPA that disrupt a mammal's estrogen activity.

"This study buttresses previous findings showing that [fetal exposure](#) to low xenoestrogen levels causes developmental alterations that in turn increase the risk of mammary cancer later in life," says Soto. "Because BPA is chemically related to diethylstilbestrol, an estrogen that increased the risk of [breast cancer](#) in both rodents and women exposed in the womb, the sum of all these findings strongly suggests that BPA is a breast carcinogen in humans and human exposure to BPA should be curtailed."

BPA has been banned in some containers in 11 states, California being the most recent. In March, the U.S. Food and Drug Administration turned down an environmental group's petition to ban the use of the product but said it would continue research on its health effects.

More information: "Bisphenol A alters the development of the rhesus monkey mammary gland," by Andrew P. Tharp et al. *PNAS* (2012)

Provided by Washington State University

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