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# BPA changes fetal development of the mammary gland, can raise breast cancer risk

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A new culture system that tests the role of chemical exposure on the developing mammary gland has found that bisphenol A (BPA) directly affects the mammary gland of mouse embryos. The study results, to be presented Friday at the Endocrine Society's 98th annual meeting in Boston, show that these changes to embryonic mammary tissue occur at a dose comparable to that of humans' environmental exposure to BPA.

"We exposure in the womb to endocrine disruptors such as BPA may be a main factor responsible for the increased incidence of breast cancer in women," said the study's lead investigator, Lucia Speroni, PhD, a research associate and member of the Soto-Sonnenschein lab at Tufts University School of Medicine in Boston.

"We knew from our previous research that BPA causes changes to breast tissue associated with a higher predisposition to breast cancer later in life," said Speroni, who helped develop the new biological assay. "However, until now, we did not know whether this was a direct effect on the fetus or an indirect effect from the mother's exposure."

BPA is a hormone-like industrial chemical that appears in many plastic and resin household products and food containers. It has been detected in most urine samples representative of the U.S. population. Research links BPA to numerous adverse health effects in humans, and it can cross the placenta in the womb.

Unlike typical in vitro cultures of cells, the new culture method is ex

vivo, meaning that the growth of the whole mammary gland is examined outside the organism. The researchers extracted mammary buds, the early developing form of the mammary gland, from 14-day-old mouse embryos, which is a critical time for mammary development in rodents, according to Speroni. They then grew the mammary buds in culture dishes for five days. The mammary buds kept developing, allowing the investigators to observe how the mammary gland develops in real time, she said.

BPA is the first chemical the investigative team has tested using the new rapid bioassay. The study received funding from the National Institute of Environmental Health Sciences and the Art beCAUSE Breast Cancer Foundation in Framingham, Mass.

Speroni and her collaborators tested various BPA doses and compared the effects with estrogen. She said BPA increased growth of the mouse mammary bud at doses which were environmentally relevant. This effect is similar to what happened when the researchers exposed the mouse fetus through its mother in a previous study, she noted.

Many past studies have demonstrated that BPA has estrogen-like effects. However, Speroni and colleagues found that BPA did not have the same effect on the mouse mammary bud as did estrogen, which inhibited mammary gland growth. They plan to conduct more studies to learn the reason why and to try to find the mechanism by which BPA disrupts mammary gland development.

The researchers also hope to test other hormonally active chemicals that potentially cause breast cancer.

Speroni said, "We now have a way to test the impact of endocrine-disrupting chemicals on the development of the mouse mammary gland at different doses and obtain results in less than a week."

Provided by The Endocrine Society