

Bisphenol A at very low levels can adversely affect developing organs in primates

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Bisphenol A (BPA) is a chemical that is used in a wide variety of consumer products, such as resins used to line metal food and beverage containers, thermal paper store receipts, and dental composites. BPA exhibits hormone-like properties, and exposure of fetuses, infants, children or adults to the chemical has been shown to cause numerous abnormalities, including cancer, as well as reproductive, immune and brain-behavior problems in rodents. Now, researchers at the University of Missouri have determined that daily exposure to very low concentrations of BPA by pregnant females also can cause fetal abnormalities in primates.

"BPA is an endocrine disrupting chemical that has been demonstrated to alter signaling mechanisms involving estrogen, androgen and thyroid hormones," said Frederick vom Saal, Curators Professor of Biological Sciences in the College of Arts and Science at MU. "Previous studies in rodents have demonstrated that maternal exposure to very low doses of BPA can significantly alter [fetal development](#), resulting in a variety of adverse outcomes in the fetus. Our study is one of the first to show this also happens in primates."

Although BPA is considered a toxic chemical in other countries such as Canada, the U.S. has been slow to address the issue, said vom Saal. Until now, most studies involving BPA have been conducted on laboratory mice and rats, leading U.S. regulatory agencies to call for studies in primates. With funding provided by the National Institute of Environmental Health Sciences (NIEHS), a research institute of the

National Institutes of Health, vom Saal and his colleagues studied the chemical's blood levels in pregnant female [rhesus monkeys](#) and their fetuses, which are considered to be very similar to human fetuses.

After collecting tissue samples, other researchers analyzed the tissues to determine if BPA exposure was harmful to fetal development.

Researchers found evidence of significant adverse effects in mammary glands, ovaries, brain, uterus, lung and heart tissues in BPA exposed fetus when compared to fetuses not exposed to BPA. The abnormalities were caused by levels of BPA in the monkey fetuses that were very similar to levels reported in previous studies of BPA in human fetuses.

"The very low-level exposure to BPA we delivered once a day to the rhesus monkeys is far less than the BPA levels humans are exposed to each day, which reflects multiple exposures," vom Saal said. "Our findings suggest that traditional toxicological studies likely underestimate actual human exposure and show, unequivocally, that biologically active BPA passes from the mother to the fetus. Additionally, our latest study shows that BPA causes damage to developing systems of monkey fetuses, and this is of great concern for human [fetuses](#)."

Provided by University of Missouri-Columbia

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