

BPA linked to thyroid hormone changes in pregnant women, newborns

October 4 2012

Bisphenol A (BPA), an estrogen-like compound that has drawn increased scrutiny in recent years, has been linked to changes in thyroid hormone levels in pregnant women and newborn boys, according to a new study by researchers at the University of California, Berkeley.

Normal [thyroid function](#) is essential to the healthy growth and cognitive development of fetuses and children. Yet, until this study, to be published Thursday, Oct. 4, in the journal [Environmental Health Perspectives](#), little was known about the effects of [BPA](#) exposure on thyroid hormones in pregnant women and newborns.

The new findings add to growing health concerns about BPA, a chemical found in hard plastics, linings of canned food, [dental sealants](#), and sales receipts on thermal paper, which is coated with a chemical that changes color when exposed to heat. In July, the U.S. [Food and Drug Administration](#) officially banned the chemical in [baby bottles](#) and cups, something the industry began doing voluntarily in recent years in response to consumer concerns about the potential risks of BPA.

The researchers analyzed BPA levels in the urine samples of 335 women during the second half of pregnancy, and thyroid hormone levels in blood samples taken from the mothers during pregnancy and from the newborns within a few days of birth. The participants were part of the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) study led by Brenda Eskenazi, UC Berkeley professor of epidemiology and of [maternal and child health](#).

The researchers found that for each doubling of BPA levels, there was an associated decrease of 0.13 micrograms per [deciliter](#) of total [thyroxine](#) (T4) in mothers during pregnancy, which suggests a hypothyroid effect. For newborn boys, each doubling of BPA levels linked to a 9.9 percent decrease in [thyroid stimulating hormone](#) (TSH), indicating a hyperthyroid effect.

"Most of the women and newborns in our study had thyroid hormone levels within a normal range, but when we consider the impact of these results at a population level, we get concerned about a shift in the distribution that would affect those on the borderline," said study lead author Jonathan Chevrier, research epidemiologist at UC Berkeley's Center for Environmental Research and Children's Health (CERCH). "In addition, studies suggest that small changes in thyroid level, even if they're within normal limits, may still have a cognitive effect."

It was not clear why an association was not found among newborn girls, but animal studies may provide some clues. One study in neonatal rats found a similar hyperthyroidic effect in males, but not females. Another study found that female rats had higher levels of an enzyme important in metabolizing BPA when compared with their male counterparts. Whether that same relationship holds true for humans is not yet clear.

"In addition, studies in rodents are increasingly showing that BPA can have different effects in males and females, particularly in brain development and behavior," said the study's senior author, Kim Harley, adjunct associate professor of public health and associate director of CERCH.

The researchers pointed out that several studies in recent years have linked lower thyroid hormone levels to delays in cognitive and motor development in young children. Two years ago, the same group of UC Berkeley researchers also found links between PBDEs (polybrominated

diphenyl ethers), a class of flame retardants, and changes in [thyroid hormone](#) levels.

They were confident that the BPA was acting on thyroid hormones independently from PBDEs, because levels of the two compounds were not correlated.

"There is good reason to be concerned about PBDEs and BPA, because both of these compounds are ubiquitous in our environment," said Harley. "More than 90 percent of women of reproductive age have detectable levels of BPA in their urine, and some 97 percent of U.S. residents have detectable levels of PBDEs in their blood. Until we learn more about the human health effects of these chemicals, it would make sense to be cautious and avoid exposure when possible, particularly for those who are pregnant."

Provided by University of California - Berkeley

Citation: BPA linked to thyroid hormone changes in pregnant women, newborns (2012, October 4) retrieved 6 May 2024 from <https://medicalxpress.com/news/2012-10-bpa-linked-thyroid-hormone-pregnant.html>

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