Studies link chemicals to genital, breast development

Jane Kay, Chronicle Environment Writer Published 4:00 am, Friday, May 27, 2005

Researchers have reported for the first time that they have found a highly significant link between human exposure tö chemicals used in consumer products and adverse changes in the genitals of baby boys.

The sons whose mothers' urine contained higher levels of phthalates, a family of compounds used to soften vinyl and other plastics, were more likely to show the physical changes, according to the Jniversityof Rochester study released Thursday.

A second study, released Wednesday, looked at another chemical, bisphenol A, and found that pregnant lab animals exposed to very low levels of it produced offspring with impaired mammary-gland development. The exposure levels in the study, conducted by researchers at heTufts University School of Medicine, were 2,000 times lower than the Environment Protection Agency's safe dose for the chemical.

The EPA and the National Institutes of Health contributed funds for the studies to learn more about possible ill health effects from these industrial chemicals, which are produced in billions of pounds worldwide.

In low levels, neither is illegal in the United States, but the California Legislature is considering two separate bills that would place curbs on the chemicals.

The legislation is opposed by representatives of the chemical- manufacturing industry, who criticized the new studies Thursday, saying they don't document a link to testicular or breast cancer in humans.

Bisphenol A has been used for decades in tough polycarbonate plastic. Polycarbonate plastic makes up the hard, brittle drinking water bottles, which may be clear or tinted, sold under the name of Nalgene and other brands, as well as baby bottles and tableware. The chemical is also used in dental sealants, medical devices and in the resin lining of most food cans.

Phthalates are used in soft vinyl products and some perfumes, shampoos, soaps, makeup, pesticides, pill coatings and paints. Two forms, DBP and DEHP, are listed as reproductive toxicants and carcinogens by the state EPA, and the European Union has banned both in cosmetics. The chemical has been found at low levels in milk, drinking water and household dust.

Lead author of the phthalates study, Dr. Shanna H. Swan, professor in obstetrics and gynecology at the University of Rochester School of Medicine and Dentistry, launched her study based on previous animal studies.

In clinical settings in Los Angeles, Minneapolis and Columbia, Mo., researchers examined 134 babies ages 3 months to 24 months, assessing the development of male genitals and the distance between the anus and the genitals.

In animals, the "ano-genital" distance has served as an important marker, associated with immediate physiological changes in the reproductive system, as well as later changes at puberty and adulthood, including alterations in behavior.

In the study, published in Environmental Health Perspectives, the researchers sent the urine from 85 of the pregnant mothers to the Centers for Disease Control in Atlanta for testing of phthalates.

The researchers found that the boys' ano-genital distance was significantly associated with the level of metabolites, or breakdown products, of four commonly used phthalates in their mothers' urine.

"These changes are seen at phthalate levels below those found in one- quarter of the female population of the United States," Swan said at a telephone press conference.

Twenty-one percent of the boys with short ano-genital distances had incomplete testicular descent, compared to 8 percent of other boys, and a short ano-genital distance was significantly correlated with a smaller penis.

The strongest associations were seen when the mother was exposed to high levels of multiple phthalates. Eleven of the 12 boys with the highest exposure to these phthalates had a short ano-genital distance.

Swan said the study's samplé was relatively small but the results "highly significant," indicating a need for additional study with a larger body of subjects. The researchers also want to follow the 134 boys to adulthood.

Marian Stanley, manager of the Phthalate Esters Panel, an industry group, said, "The authors are not reporting any negative health effect on the male reproductive system." The ano-genital distance "has no known significance, and is in fact a biomarker of.exposure only." The distance could be a natural variability, she said.

In the bisphenol A study, published in the journal Endocrinology, Tufts University School of Medicine researchers said they used extremely low levels of the chemical, yet still found changes in patterns of mammary-gland development at the time of puberty in the rodents.

The researchers said the changes in the mammary glands in the lab animals when exposed to bisphenol A were consistent with changes that in humans are associated with a higher risk of breast cancer, such as an increase in the number of "terminal end buds" in the tissue.

Steve Hentges, a spokesman for the American Plastics Council, said the study only hypothesizes that mammary gland problems in rodents would portend breast cancer in humans.

Because the EPA's safe-dose is based on oral exposure to humans, it can't be compared to the level given to the lab animals, Hentges said, which get their doses by inoculation.

Assignment:_____

This article describes two, separate research projects. Your job as a student is to "dissect" this article into the two research projects.. Make two tables below, one for each study. In each table, describe the study, describe what how they did it and what they found. Also, reflect on what the scientists concluded and how that differs from what the average citizen might conclude.