Study shows why synthetic estrogens wreak havoc on reproductive system

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Researchers at Yale School of Medicine now have a clearer understanding of why synthetic estrogens such as those found in many widely-used plastics have a detrimental effect on a developing fetus, cause fertility problems, as well as vaginal and breast cancers.

Preliminary results of the study will be presented at the 2008 Society for Gynecologic Investigation (SGI) Annual Scientific Meeting held March 26-29 in San Diego, California. The study was led by Hugh S. Taylor, M.D., professor in the Department of Obstetrics, Gynecology & Reproductive Science and section chief of Reproductive Endocrinology and Infertility at Yale School of Medicine.

Past research shows that exposure to the synthetic estrogen diethylstilbestrol (DES) alters the expression of HOXA10, a gene necessary for uterine development, and increases the risk of cancer and pregnancy complications in female offspring.

The team sought to understand why a developing female fetus exposed to DES might develop uterine cancer and other problems years after exposure. Even though DES is no longer on the market, the authors chose to study its effects to gain insight into how similar synthetic estrogens might work.

The team studied DNA from the offspring of 30 pregnant mice injected with DES. They found changes in certain regions of the HOXA10 gene. These alterations continued beyond the time of development and

persisted into adulthood, indicating that exposure to DES and similar substances results in lasting genetic memory, known as “imprinting.”

“We found that HOXA 10 protein expression was shifted to the bottom portion of the uterus in the female offspring,” said Taylor. “We also found increased amounts of the enzyme responsible for changes in the DNA. Rather than just changing how much of the protein is there, DES is actually changing the structure of the HOXA 10 gene.

“These findings bring us closer to understanding the way in which DES interacts with the developing reproductive system,” said Taylor.

Pregnant women are frequently exposed to other similar substances with estrogen-like properties, such as Bisphenol-A (BPA). BPA is found in common household plastics and has recently been linked to long-term fertility problems. Like DES, these other substances may also impact female reproductive tract development and the future fertility of female fetuses.

Source: Yale University