

Students & Scientists Breast Cancer Environment Research Program Essays, 2022

By Eric Sodhi

Great Neck South High School

Great Neck Breast Cancer Coalition

University of Massachusetts Amherst, Vandenberg Lab

Endocrine-disrupting chemicals (EDCs) are substances present in the environment that interfere with hormones in the body. Specifically, they can mimic other hormones (agonists), disrupt hormonal activity (antagonists), and/or impact the production of hormones. We chose to study two EDCs, Bisphenol S and Ethinyl estradiol, and their effects on morphology and development in mice. Bisphenol S (BPS), an analog and replacement of BPA, is an EDC present in personal care, paper, and food products. Recent studies have demonstrated the estrogenic activity of BPS, as it binds to estrogen receptors in cells. Ethinyl estradiol (EE) is a common chemical present in birth control. It is a synthetic derivative of estradiol; EE binds to estrogen receptors by mimicking estradiol. While previous studies have illustrated that exposures to EDCs such as BPS and EE at high and low doses can alter mammary gland development in F0 and F1 pubertal mice, these effects have not been properly studied in the F2 generation. During pregnancy, the fetus and its germ cells are exposed to any EDC exposure the mother faces, which opens the risk of adverse health effects manifesting in all three generations. We hypothesize low and high doses of BPS and EE will alter morphometric measurements in the mammary glands of F2 pubertal mice by increasing the rate of pubertal development as direct chemical administration to one generation results in the F2 generation also being exposed as germ cells. Our results found in the F2 generation mice during puberty were high doses of BPS decreased mammary gland development, low doses of BPS increased mammary gland development, and high doses of EE may have increased mammary gland development.