

## LAY ABSTRACT

TITLE: Exposure to low doses of oxybenzone during perinatal development alters mammary gland morphology in male and female mice.

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## SCIENTIFIC ABSTRACT

Oxybenzone (benzophenone-3) is an ultraviolet radiation filter commonly used in personal care products including sunscreens, textiles and inks, and food and beverage containers, among others. Due to its widespread use, human exposures to oxybenzone are widespread. Oxybenzone is considered an endocrine disrupting chemical due to its antiestrogenic and antiandrogenic properties. We evaluated the effects of oral exposures to oxybenzone on the growth and morphology of the mammary gland, body weight and anogenital distance in BALB/c mice exposed to 30, 212 or 3000 µg/kg/day *in utero* and during lactation. Developmental exposures to oxybenzone reduced the size and growth of mammary gland in males prior to and during puberty. In exposed females, oxybenzone reduced mammary cell proliferation, decreased the number of cells expressing estrogen receptor  $\alpha$ , and altered mammary gland morphology in adulthood. These results suggest that even low doses of oxybenzone can disrupt hormone sensitive organs during critical windows of development.

## LAY ABSTRACT

Oxybenzone (benzophenone-3) is a chemical commonly added to personal care products including sunscreens because it can block potentially harmful UV rays from the sun. It is also added to fabrics and plastics to protect products from sunlight. Due to its widespread use, many humans are exposed to oxybenzone. Oxybenzone is considered an endocrine disrupting chemical because it has the ability to mimic or block the actions of hormones including estrogen and testosterone. We evaluated the effects of oral exposures to oxybenzone on hormone sensitive breast development outcomes in mice by exposing mice to the chemical during fetal development (before birth) and the period

just after birth (infancy). We found that oxybenzone exposures during development reduced the size and growth of the mammary gland (breast) in males prior to and during puberty. In exposed females, oxybenzone reduced breast cell proliferation, and altered structures in the breast in adulthood. These results suggest that even low doses of oxybenzone can disrupt breast development to affect both males and females, and that early life is a critical time period of susceptibility to endocrine disruptors like oxybenzone.