

Pregnant rats exposed to obesity hormone lose birth's protective effect on breast cancer

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Like humans, young rats that give birth have a reduced risk of breast cancer later in life. But a new study shows that this protective effect in animals is negated if they're exposed to an obesity-linked hormone during pregnancy.

The study, to be published online Nov. 1 in *Cancer Prevention Research* by Georgetown Lombardi Comprehensive Cancer Center scientists, suggests an important direction for research in women's health, particularly given obesity rates worldwide.

In humans, pregnancy initially increases [breast cancer risk](#) within the first five to seven years after [birth](#), and then either permanently reduces the risk by nearly half in younger women, or increases the risk in women older than 30. The same pattern is seen in rats.

The link between obesity, pregnancy and breast cancer risk is only now being explored.

"We know that pregnant women who gain an excessive amount of weight have high blood levels of leptin—a hormone made by fat tissue—and that they have an increased risk of developing breast cancer after menopause," explains Leena Hilakivi-Clarke, PhD, a professor of oncology at Georgetown Lombardi, and lead author of the new study. "By studying these factors in animals, we hope to understand how they're linked."

For the study, the researchers looked at breast cancer risk after pregnant rats were exposed to leptin and what, if any, gene changes could be observed.

Their findings showed that similar to women, female rats had an initial increase in breast cancer risk after birth, but the risk eventually diminished to a level that was lower than in rats that did not give birth.

"This suggests pregnancy has a life-long protective effect against breast cancer in animals as it does in women," Hilakivi-Clarke explains.

But breast cancer risk in the rats exposed to leptin during pregnancy did not decrease. "This is concerning, as it suggests the exposure to the obesity-linked hormone negated the [protective effect](#) of birth on breast cancer risk."

To discover possible reasons for the differences in breast cancer risk, the researchers looked at gene patterns in the mammary glands of all the rats. "We saw a much different pattern among the rat groups," Hilakivi-Clarke says.

In women and animals, pregnancy permanently turns on genes that allow healthy breast cells to protect themselves against insults that can initiate cancer. These gene changes are believed to explain the dramatic drop in breast [cancer risk](#) in women who had a child before age 20.

"It appears that treating [rats](#) with leptin during [pregnancy](#) prevented the protective changes in genes from happening," Hilakivi-Clarke explains. "This work points to an important direction for research to prevent [breast cancer](#) in women since obesity is an epidemic," Hilakivi-Clarke concludes.

More information: Exposure to Excess Estradiol or Leptin during

Pregnancy Increases Mammary Cancer Risk and Prevents Parity-Induced Protective Genomic Changes in Rats. *Cancer Prevention Research*, October 2013.

Provided by Georgetown University Medical Center

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