

Consumption of natural estrogens in cow's milk does not affect blood levels or reproductive health

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Estrogen occurs naturally in cow's milk. Recently, there has been concern that consuming milk containing elevated amounts of estrogen could affect blood levels of the hormone in humans, leading to an increased risk of some cancers. A new study published in the *Journal of Dairy Science* investigated cow milk's effects on blood hormone levels in adult mice and found that naturally occurring levels, and even levels as high as 100 times the average, had no effect on the mice. The study further determined that only when the mice were given 1,000 times more estrogen than average did it have any impact on reproductive health.

Estrogens found in food are thought to play a negative role in human [reproductive health](#), but researchers are not yet sure of the exact connection between the two. One area of concern is bovine milk, which is known to contain naturally occurring estrogens. To complicate matters, [estrogen](#) levels in milk rise when a cow is pregnant, due to production in the placenta. Currently, cows are typically milked until 60 days before their expected calving, meaning milk from cows in their third trimester of pregnancy can contain up to 20 times more estrogen than milk from cows that are not pregnant.

In order to gain a better understanding about the relationship between estrogens in milk and blood estrogen levels, a team of researchers from the University of Ljubljana in Slovenia looked at the effects that

different levels of milk estrogen had on adult [mice](#). "The aim of our study was to evaluate whether the consumption of milk with known doses of estrogens (both naturally presented and added in concentrations 100 and 1,000 times higher) could affect blood hormone levels and reproductive organs in mice," explained senior co-author Tomaz Snoj, DVM, PhD, Veterinary Faculty at the Institute for Preclinical Sciences, University of Ljubljana, Ljubljana, Slovenia.

Specifically, the study examined how different concentrations of estrogens in milk affected the following parameters in mice: plasma levels of natural estrone (E1) and 17 β -estradiol (E2); uterine weight in females; and testosterone levels, testes weight, and seminal vesicle weight in males. The three levels of E1 and E2 tested were concentrations similar to native milk from a pregnant cow (0.093 ng/mL for E1 and 0.065 ng/mL for E2), milk with an added 10 ng/mL of E1 and E2, and finally milk with an additional 100 ng/mL of E1 and E2.

The results of the study demonstrated that consumption of milk from a pregnant cow did not raise plasma levels of E1 and E2 in mice. It also did not affect the weight of the sex organs examined in either male or female mice. The same results were found for the milk containing an additional 10 ng/mL of E1 and E2; however, investigators did find that when the concentration was raised to 100 ng/mL, effects were seen in the mice. "We did observe elevated plasma estrogens in both sexes, increased uterus weight in females, and decreased plasma testosterone levels in males from the group that received milk with an added 100 ng/mL of E1 and E2," said senior co-author Gregor Majdic, DVM, PhD, Vice Dean, Center for Animal Genomics, Veterinary Faculty, University of Ljubljana. "However, concentrations in the third group exceeded the physiological concentration of milk estrogens by 1,000 times, so it would be extremely unlikely to find such concentrations in native cow milk."

Previous studies have shown that the gastrointestinal and hepatic systems

are capable of inactivating large amounts of estrogens before they reach other parts of the body, and this fact may explain why naturally occurring estrogens in milk appeared to have little impact on the mice. "In our study," stated Dr. Snoj, "it is likely that plasma E1 and E2 did not increase in mice drinking pregnant cow's milk because the estrogens in the milk were at low enough levels to be metabolized during first liver passage and did not reach systemic circulation." Investigators caution, however, that these tests were done on mature mice and more research is needed to examine the effect estrogen from milk has on the development of the reproductive system before and during puberty.

This new research gives much needed insight into the relationship between native estrogen from [cow milk](#) and its effect on blood hormone levels. While further exploration into the issue is needed, this is a promising finding in [adult mice](#).

"Our results suggest that estrogens in milk, even when derived from cows in the third trimester of pregnancy, do not pose a risk to reproductive health," concluded Dr. Majdic. "Even estrogens at concentrations 100 times higher than usually found in native milk did not cause any physiological effects in the present study." This is indicative that naturally occurring hormones in [milk](#) are found in far too low concentrations to exert any biological effect on consumers.

More information: "Effect of dietary estrogens from bovine milk on blood hormone levels and reproductive organs in mice," by N. Grgurevic, J. Koracin, G. Majdic, and T. Snoj, *Journal of Dairy Science*, Volume 99, Issue 8 (August 2016)

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