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High-fat diet during puberty linked to breast cancer risk later in life

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Girls eating a high-fat diet during puberty, even those who do not become overweight or obese, may be at a greater risk of developing breast cancer later in life, according to Michigan State University researchers.

The implications - that a high-fat diet may have detrimental effects independent of its effect to cause obesity - could drive new cancer prevention efforts.

The findings come from research at MSU's Breast Cancer and the Environment Research Center, established in 2003 and funded through 2010 by the National Institute of Environmental Health Sciences and the National Cancer Institute.

Physiology professor Sandra Haslam, director of the center, and Richard Schwartz, microbiology professor and associate dean in the College of Natural Science, are now expanding that research with a new, five-year, $2.3 million federal grant. They will use that funding to continue their work studying the impact of prenatal-to-adult environmental exposures that predispose women to breast cancer as part of the extended nationwide Breast Cancer and the Environment Research Program.

"The pubertal time period is crucial, as this is when the basic framework is created for mammary gland development," Haslam said. "What we are seeing from preliminary research in animals is that a high-fat diet during puberty can lead to the production of inflammatory products in the

[mammary glands](#) of adults, which can promote [cancer growth](#)."

The work builds on the team's previous research that found the [hormone progesterone](#) activates genes that trigger inflammation in the mammary gland; that inflammation may be a key factor in increasing the risk of breast cancer. Those findings were published last year in the Journal of Steroid Biochemistry and Molecular Biology.

Haslam and Schwartz discovered that a high-fat diet during puberty produced many of the same effects seen as part of their progesterone research.

"Understanding what genes were turned on by progesterone led us to look at some of the same suspects with high-fat diets," Schwartz said. "It appears both processes may lead to inflammation in the mammary glands."

Since these inflammatory changes first occur during the crucial time of puberty, a period of intense development and cell division, it can have effects lasting a lifetime.

To test their findings, Haslam and Schwartz will lead a team analyzing two different mouse models of breast cancer and the effects of high-fat diets during puberty. They also will test several anti-inflammation interventions designed to overcome the negative effects of a high-fat diet on inflammation.

The initial MSU Breast Cancer and the Environment Research Center brought together researchers from MSU's colleges of Natural Science, Human Medicine and Veterinary Medicine to perform research into environmental impacts during puberty that affect breast cancer risk, as well as researchers in the College of Communication Arts and Sciences to study how to best communicate breast cancer health messages to the

public.

The next phase of the studies will be through the expanded national Breast Cancer and the Environment Research Program. Besides performing biomedical research, the new project also will strive to communicate findings that can lessen the risk of breast cancer via awareness and avoidance of environmental risk factors. To that end, the Michigan Breast Cancer Coalition and colleagues in MSU's College of Communication Arts and Sciences are helping bring research findings to the public.

Provided by Michigan State University

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