

Anne Johnson: Welcome to Environmental Health Chat, a podcast about how the environment affects our health from the National Institute of Environmental Health Sciences. I'm your host, Anne Johnson. Today's topic is one that has probably touched the life of someone in your community: breast cancer. Worldwide, breast cancer is the leading cause of cancer death in women. Most experts agree that it's caused by a combination of genetic, hormonal, and environmental factors. In part one of our two-part series on breast cancer and the environment, we're talking today with two scientists at the Breast Cancer and the Environment Research Center at Michigan State University, which is funded by NIEHS and the National Cancer Institute. Joining us are center director Dr. Sandy Haslam and Dr. Richard Schwartz, professor of microbiology and molecular genetics.

I asked Sandy to start by telling me what sorts of environmental factors might affect breast cancer risk.

Haslam: Environmental factors are really anything sort of outside the body, such as chemicals that arise from pollution, or drugs, or medicines that we take. They can be physical factors, such as irradiation or light, or they can also be any aspect of your lifestyle.

Johnson: Those lifestyle factors could include diet, exercise, and things like family income or the neighborhood you live in, which influence what you eat and the contaminants you may be exposed to. But because people are exposed to so many environmental factors throughout their lives, it's hard to pin down which factors might be to blame when a person gets ill. That's why scientists work with animals to study the direct links between environmental exposures and cancer. Sandy and Richard are using mice to study how diet affects cancer risk. They found that eating a high fat diet increases the likelihood a mouse will get cancer when it's exposed to a known carcinogen.

Haslam: What we have looked at is when in the lifespan does this diet have an important effect? And we started out by looking at puberty because we know puberty is an important period of sensitivity to factors that may increase breast cancer risk in adulthood.

Johnson: Yet another reason for teenagers to lay off the fast food hamburgers. But Sandy said puberty isn't the only sensitive period or "window of susceptibility" when a woman is especially vulnerable to environmental exposures.

Haslam: The mammary gland is a gland that undergoes changes on a regular basis in humans during each menstrual cycle, during pregnancy, during menopause, and all of these can be affected by environmental factors in a detrimental way.

Johnson: What makes these periods so critical? Richard explains it this way.

Schwartz: There is a lot of cell growth that goes on, and that's a common theme for cancer susceptibility. When cells are going through a lot of cell division, their DNA is more susceptible to mutations, and if there is a cell with a defective gene, after mutation it's going through a lot of division. Then there are more cells that have that same defect. And if it's in a gene that regulates growth, it could have a consequence in terms of cancer developing.

Johnson: In their study, Richard and Sandy are finding a few clues as to why a high fat diet during puberty might increase the susceptibility to cancer later on. First, the diet seems to boost some growth factors, which could encourage the development of abnormal cells and ultimately tumors. Also, the mice on the high fat diet have increased inflammation caused by the presence of some unusual immune cells in the breast tissue. Immune cells are critical for fighting disease and play an important role in organ development. But having the wrong type in the wrong place at the wrong time can lead to cancer.

Schwartz: And we find that even before these animals show tumors, there are some cell types that are augmented in the mammary gland by exposure to a high fat diet.

Johnson: As a next step Sandy and Richard are looking into ways to possibly undo the damage.

Haslam: We're taking animals that had the diet initiated during puberty and then changing them to a low fat diet in adulthood to see if we can reverse that pubertal effect. As Dr. Schwartz mentioned, we see these inflammatory processes changing and we're looking to see if simple anti-inflammatories can reverse those effects.

Johnson: Their research is ongoing, and it's important to keep in mind that they are studying mice, not humans. But I couldn't let Sandy and Richard go without asking what all this might mean for those of us who just want to lower our risk of getting breast cancer.

Schwartz: Just as a matter of precautionary principal, it may be wise to have a lower fat diet. It can't hurt you, and it can only help you.

Johnson: Sandy added that people can also try to reduce their exposure to other potentially harmful environmental factors. For example: there is mounting evidence that alcohol, radiation, and some chemicals can increase a person's breast cancer risk. Exercise, on the other hand, can lower the risk. In part two of our breast cancer and the environment series, we'll hear from Jeanne Rizzo of the Breast Cancer Fund. She focuses on how we can translate breast cancer research into the decisions we make in our everyday lives. Thanks to today's guests, Dr. Sandy Haslam and Dr. Richard Schwartz of Michigan State University.

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