

## Gender linked to development of skin cancer

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Inherent gender differences – instead of more sun exposure – may be one reason why men are three times more likely than women to develop certain kinds of skin cancer, say researchers at Ohio State University Medical Center.

Squamous cell carcinoma is the second most common form of skin cancer, accounting for nearly 200,000 new cases in the United States each year. While occurring more often than melanoma, squamous cell carcinoma is not nearly as worrisome. Still, it can be lethal in some patients, especially those with suppressed immune systems, including transplant recipients or people who are HIV-positive.

Many studies have shown that the risk of squamous cell carcinoma increases with greater exposure to the sun. For years, investigators assumed that lifestyle had a lot to do with the disparity in the incidence of SCC – believing that men spend more time outside and are less likely to use sun protection than women.

While that may be true, scientists at Ohio State have shown that there may be another, even more critical factor involved – gender-linked differences in the amount of naturally occurring antioxidants in the skin.

The study appears in the April 1 issue of Cancer Research.

Dr. Tatiana Oberyszyn, an assistant professor of pathology and of molecular virology, immunology and medical genetics at Ohio State University Medical Center, has been studying non-melanoma skin



cancers for years. She had a hunch there might be gender-related variables that accounted for the difference between male and female rates of developing these malignancies, and designed an experiment to find out what they might be.

A doctoral student in Oberyszyn's laboratory, Jennifer Thomas-Ahner, subjected male and female mice to a single, identical, acute exposure to UVB light. It is UVB rays, as opposed to UVA or UVC rays in sunlight, that cause the most damage to the skin. Even a single, prolonged exposure is enough to cause inflammation (sunburn) and its attendant redness, swelling and increased vascular flow.

Thomas-Ahner compared various measures of the inflammatory response in the male and female groups, noting the degree of swelling, antioxidant levels, DNA damage in the skin and the levels of myeloperoxidase in the tissue. Myeloperoxidase is an enzyme that reflects the extent of neutrophil infiltration, the first step in the inflammatory response. Antioxidants help repair damaged DNA and also help clean up toxic byproducts of injured tissue.

She discovered significant differences between the two groups. The male mice registered a weaker inflammatory response than did the females, as measured by the thickness of their skin and myeloperoxidase levels. They also had more extensive DNA damage in their skin and lower antioxidant levels in their skin than the females.

In a second experiment, Thomas-Ahner exposed male and female mice to longer, chronic sun exposure, irradiating them three times weekly for 16 weeks. When the mice were 25 weeks old, she examined them for differences in tumor growth, size and number.

She found that male mice developed tumors earlier and had more tumors than did female mice. The tumors in the male mice also tended to be



larger and more aggressive than were those in the female mice.

Oberyszyn and Thomas-Ahner also noted that the difference in the antioxidant capacity between male and female mice was present in the untreated skin as well as the treated skin. Oberyszyn, a member of the Ohio State University Comprehensive Cancer Center, believes that the greater amount of naturally occurring antioxidant capacity in the females accounted for their ability to thwart a certain degree of tumor growth and spread.

"This is the first time anyone has ever looked at the effect of gender on the development of UVB-induced skin cancers in such a controlled environment," says Oberyszyn. "It's given us clear evidence of a biological basis for the gender bias in developing squamous cell carcinoma."

Oberyszyn says other studies need to be done to validate the findings, but noted the data are compatible with other studies suggesting a potential biological basis for gender difference in the development of cancer and other diseases.

Source: Ohio State University Medical Center

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