Rethinking melanoma and preventing skin cancer: NetWellness

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By Special to The Plain Dealer

Skin cancer exists in different types, body sites and people. The three most common forms of skin cancer are squamous cell carcinoma, basal cell carcinoma and melanoma.

Melanoma is the deadliest form of skin cancer. It occurs when the cells responsible for the skin's color (melanocytes) begin to grow and divide abnormally. Melanocytes produce melanin, the pigment that gives skin its natural color. When skin is exposed to the sun, melanocytes produce more pigment, causing the skin to tan, or darken. In most cases, melanocytes will continue to produce melanin after becoming cancerous; thus melanoma is often recognized as dark brown or black lesions on the skin.

Melanoma is aggressive, meaning that though the cancer may start on the skin, it can quickly spread to other parts of the body. Because melanoma spreads rapidly, it often is not discovered until it has reached its later stages when most treatments are ineffective.
One person dies from melanoma every hour, and it is the most common form of cancer to be found in young adults between the ages of 25 and 29. Melanoma rates are increasing in people with each passing year, especially in young women.

**Melanoma: different causes -- one effect**

Exposure to ultraviolet light has long been considered a risk factor for developing melanoma. Exposure to UV light is cumulative, meaning that our bodies accumulate more and more UV light as we age, which increases our risk for developing all three types of skin cancer.

This exposure can occur in a variety of ways, including from the sun’s rays and man-made sources such as tanning beds. In fact, people who use indoor tanning beds are 74 percent more likely to develop melanoma than those who have never used a tanning bed. Melanoma is often found on areas of the body that have been exposed to UV light.

There are exceptions to this rule. Melanoma has been known to develop on areas that have not received a great deal of UV light, such as between the toes and under folds of skin. Another important exception among this kind of skin cancer is color. While melanoma usually becomes visible as dark brown or black moles, it has also been known to be pink or light red in color.

If the accumulation of UV light is the chief risk factor for melanoma, how does this explain melanoma in a 10-year-old boy? Why does melanoma appear in areas that are rarely exposed to the sun? Why does melanoma appear as a black mole in one person and as a pink bump in another? The answer may lie in the genetic differences that can be shared and inherited among family members as well as genetic and molecular changes within the melanomas themselves that initiate and lead to their growth.

Similar to the broader category of skin cancer, there are actually different types of melanoma. Physicians and researchers have recognized this fact by examining cancerous skin cells under a microscope; however, it is only recently that these differences in melanoma are being investigated and new treatments are being developed to "target" specific types of melanoma. Realizing what genes and molecular changes are linked to skin cancer development will allow physicians to develop treatments to address it most effectively.

**Genetics and melanoma: prevention and treatment**
To prevent melanoma or find it during its treatable stages, it is important to identify who is at an increased risk for melanoma. There are several risk factors for melanoma:

- Fair Skin
- Red hair color
- Presence of freckles
- Tendency to sunburn
- Increased number of moles or the presence of unusual, or dysplastic, moles.

Many of these physical characteristics may be genetic, meaning that they are inherited and shared within families. In addition to genes that determine physical characteristics, there are other genes that, when altered, may lead to an increased risk of melanoma. These genes are important for controlling the division of cells in our body. When altered, there may be an increase in cell division and the development of cancer.

The only known environmental risk factor for melanoma is ultraviolet light (UV) exposure; however, researchers and physicians believe there are other environmental and genetic risk factors that have yet to be discovered.

By discovering these currently unknown risk factors, doctors can improve both the treatment and prevention of melanoma. Patients who are found to have genetic and physical traits that are tied to melanoma can be followed closely by their doctor to catch melanoma in its early, treatable stages. Patients who are exposed to environmental causes of melanoma can be educated on how to avoid these risks and also be examined by their caregiver into the future.

Researchers have studied melanoma cells in clinical laboratories and discovered that there are actually different types of melanoma. Each type looks and acts in a certain way. Determining what genetic, physical and environmental factors caused a patient's melanoma will allow doctors to craft treatments that are more tailored to that patient's specific kind of melanoma. New research will move from recognizing these melanoma differences in laboratories to recognizing them in doctor's offices, ushering in a new era of melanoma prevention and treatment.

**Research in action**

Patients diagnosed with melanoma will be invited to participate in a research project that aims to improve melanoma treatment and prevention. In this groundbreaking study, researchers will collect all of the known and possible risk factors for melanoma from the participants. In addition, genetic information will be collected to test whether changes in certain genes can increase the risk for melanoma.
The study will also keep track of the treatments that the patients receive and the outcomes they experience. Melanoma tissue will be collected from the patients and examined for genetic and molecular information. This research, conducted at the Case Western Reserve University School of Medicine, Department of Dermatology, will provide crucial information to help physicians determine what approaches and treatments are most effective for different types of melanoma.

From lab bench to bedside

Once the information from this study is collected and organized, it will be added to the discoveries already made in clinical laboratories nation and worldwide. From these data, experts will be able to sort out the different types of melanoma and the risk factors that enable them to form. Recognizing the genetic changes that cause melanoma will allow researchers to develop new, more specific treatments for this deadly disease. After all, melanoma may be only millimeters in size, but its effects are immeasurable.

To learn more about how researchers are rethinking melanoma, visit the NetWellness exclusive: "On the Horizon: Rethinking Melanoma."

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