Melanoma

The Most Lethal Form of Skin Cancer

Although it accounts for less than five percent of skin cancer cases, melanoma causes more than 75 percent of skin cancer deaths. It is now estimated that one in every 55 people will be diagnosed with melanoma. The incidence also is rising at a rate faster than that of the seven most common cancers, increasing 45 percent (or 3.1 percent annually) between 1992 and 2004. This increase is reflected here at Northwestern where, from 2012 and by the end of 2013, approximately 1,625 patients will have sought care for melanoma, more than 1,000 of whom will have been seen directly through the Department of Dermatology. This indicates a growing number of patients seeking care for melanoma in the department during the past three years.

Patient Care and Education

Here at Northwestern in our Melanoma Multidisciplinary Clinic, our physicians work closely with patients at high risk for developing melanoma to coordinate their dermatologic, medical, and surgical oncologic care. Using the latest techniques, we map moles in all patients using dermoscopy and, when needed, whole body photography. We also utilize MelaFind, a new imaging system that captures digital and dermoscopic images deep in the skin. Using software analysis, MelaFind compares these images to the known patterns of melanoma. In addition to offering outstanding clinical care, we have a vast expertise in histology and molecular diagnostics, as well as access to the latest clinical trials for melanoma. This unique combination helps us ensure that a patient’s diagnosis and care are as tailored and effective as possible.

The Molecular Diagnostics Laboratory at Northwestern is one of only four laboratories in the nation to perform sophisticated fluorescence in situ hybridization (FISH) analysis, which has helped distinguish benign pigmented lesions from malignant melanoma in thousands of specimens with unclear diagnoses sent from throughout the United States. Our pathologists are thus some of the most experienced in the world. In addition to routine procedures, we consistently integrate molecular diagnostic techniques into our evaluation to optimize accuracy. Northwestern has become a world-referral center for helping patients and their doctors determine whether a tumor is benign or malignant.

Northwestern is also a trailblazer in education that focuses on preventing and detecting skin cancer. Through rigorous research and out-of-the-box thinking about how people learn and what motivates them to change their behaviors, we are working directly with patients, research fellows, and medical students to spread the word about melanoma prevention.

Breakthrough Research

Skin Cancer Institute researchers have begun leveraging advances in nanotechnology to increase our understanding of melanoma and to develop new tools for diagnosing and treating advanced melanoma. These approaches utilize studies in a wide variety of melanoma cell lines and mouse models, all housed at Northwestern, to either turn aggressive melanoma cells into controllable cells or target them for destruction. Investigators also are using nanotechnology to understand why melanoma cells become resistant so quickly to new therapies. In addition, investigators have discovered a new metastatic molecule found only on the surface of more aggressive melanomas and not on normal cells or early, nonaggressive melanomas. This exciting discovery provides a target for both diagnosis and therapy.
Faculty

Dr. Mary Martini, director of the Pigmented Lesion and Melanoma Clinic and associate professor of dermatology, diagnoses melanoma in more than 1,000 patients annually and performs their primary excisional surgery. She is using a special painless adhesive tape to collect genetic material from pigmented lesions that are suspicious for melanoma prior to their removal. The genetic material from the atypical growth is then compared with genetic markers seen in melanoma.

Dr. Pedram Gerami, associate professor of dermatology, is a clinical dermatologist, dermatopathologist, and researcher focused on melanocytic neoplasms. He leads in the clinical utilization and research of molecular diagnostic techniques for melanoma. This includes: using tape stripping to non-invasively evaluate pigmented skin lesions, using molecular diagnostics such as FISH to help in the interpretation of histologically borderline melanocytic neoplasms, and using genetic markers to better predict behavior of conventional melanomas. He is sent more than 2,000 specimens annually from throughout the United States and internationally for pathologic interpretation primarily due to concern about melanoma.

Dr. Jeffrey Wayne, chief of surgical oncology’s melanoma and soft tissue program, and Dr. Karl Bilimoria, assistant professor of surgical oncology, have developed the region’s largest center for the surgical treatment of advanced melanoma. They offer the latest techniques, including: sentinel lymph node biopsy, minimally invasive complex lymph node dissections for the treatment of disease that has spread to the lymph nodes, and isolated limb infusion for difficult cases that metastasized to the skin to spare their patients possible amputation.

Dr. Timothy Kuzel, professor of medicine and dermatology and director of the Walter S. and Lucienne Driskill Immunotherapy Research Program, has spearheaded clinical research in the use of immunotherapy for the treatment of melanoma, focusing on the use of agents that stimulate immune system activity. Dr. Kuzel also is developing novel investigational drugs and combinations of oral small molecule inhibitors to target melanoma and other skin cancers.

Dr. Xiaoqi Wang, research associate professor of dermatology, is studying why melanomas metastasize. She has discovered that melanoma cells that spread outside of the skin have a distinct molecule on their surface called d-GM3. This membrane component is not found on normal cells or on most melanoma cells that stay in the skin only, and can be detected easily by an assay on melanoma tissue. She is now testing approaches to target the enzyme that leads to the increase in d-GM3.

Dr. Mary Hendrix, professor at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, studies “vasculogenic mimicry,” the process by which aggressive melanomas develop their own vascular network to promote their rapid growth. She is identifying new targets for therapy based on our increased understanding of what underlies this process.

Dr. Amy Paller, Walter J. Hamlin Professor of Dermatology and chair of the department, and Dr. Chad Mirkin, head of Northwestern’s International Institute for Nanotechnology, are investigating new ways to personalize melanoma treatment through gene therapy. Once a specific genetic “signature” of a melanoma is known, it can be targeted with “Spherical Nucleic Acids” engineered at Northwestern. Current work in their laboratories is also using “nanoflares” to understand why melanomas become resistant to the new “Braf” targeting therapy.

Dr. Murad Alam, professor of dermatology, otolaryngology, and transplant surgery, found that light therapy, rather than the usual excision or chemotherapy, may prolong and improve the quality of life of patients with melanomas that metastasize to skin. He is now optimizing the effectiveness of this treatment.

Dr. June Robinson, research professor of dermatology, leads Project Skin Watch, an educational research study that teaches patients at high risk for melanoma and their partners how to perform accurate skin checks to promote early detection. Dr. Robinson hypothesizes that high-risk patients who learn how to perform accurate skin checks will avoid anxiety, unnecessary doctor visits, and high medical costs.