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Research continues on topical cream that could tan skin, prevent melanoma

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In 2006, UC researchers were given $1 million from the National Cancer Institute to develop a topical treatment that would not only make skin tan but would also work to both block harmful ultraviolet rays (UV) and repair damage caused by sun exposure, which could lead to skin cancer.

Today, that research continues and initial results have led to a pending patent for a product that could one day be sold to consumers, possibly reducing the incidence of skin cancer while giving that desired bronze glow that has been trending in our society for decades.

Zalfa Abdel-Malek, PhD, a member of the Cincinnati Cancer Center, a professor in the department of dermatology and a member of the UC Cancer Institute, leads this research which since its initiation has also gained institutional funding from a Dean's Discovery Award, a UC Technology Accelerator Award and most recently from a pilot project from the Center for Environmental Genetics.

"Melanoma is the deadliest forms of skin cancer if not detected early and is responsible for 80 to 85 percent of skin cancer fatalities," Abdel-Malek says. "This truly translational research is working at the cellular level to protect and repair the skin, and to increase pigmentation without sun exposure, which is the desired outcome that reduces UV-induced damage in the first place."

This project is multidisciplinary in nature. Initial research involved the chemical modification of a hormone called alpha-melanocyte stimulating

hormone (alpha-MSH) which was accomplished in collaboration with James Knittel, PhD, a former faculty member at the James L. Winkle College of Pharmacy. Known to increase skin pigmentation, alpha-MSH has also been found to repair precancerous damage that UV rays cause to skin cell DNA, the genetic material within cells, a major discovery in Abdel-Malek's laboratory.

"We showed that alpha-MSH repairs DNA damage caused by excessive sun exposure, reversing the cancer-causing effects of UV radiation," says Abdel-Malek.

To make it easier for the hormone to penetrate the fatty lipid layer of the skin, researchers reduced alpha-MSH from its original peptide chain of 13 amino acids to a chain of only four amino acids and then three to make it more effective at penetrating the skin to target the melanocytes.

Abdel-Malek says colleagues from the Winkle College of Pharmacy, including Kevin Li, PhD, and from the UC Department of Cancer Biology, including Ken Greis, PhD, then studied the synthesized peptides on fresh human cadaver skin to determine whether, if applied as a topical cream, they could be absorbed through the skin and delivered to the melanocytes.

"Our results have been promising," she continues, adding that absorption was possible and that both repair and increased pigmentation were observed in cultured human skin substitutes and intact human skin.

"Melanoma cells tend to be resistant, and treatment is not often effective, as many reemerge more aggressively. Prevention is so important, and the development of a topical cream that could prevent skin cancer by increasing skin pigmentation and repairing DNA damage caused by UV exposure could tremendously reduce the incidence of melanoma and all forms of sun-induced skin cancer."

She says she's hoping to see this technology tested in clinical trials in the next two to three years.

"It would especially benefit people with known high risk for skin cancer in general, especially those with fair skin and red hair, and might ultimately reduce the incidence of melanoma and prevent its recurrence in these highly susceptible individuals."

Provided by University of Cincinnati

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