

Wear your vegetables: Could broccoli hold the key to skin cancer prevention?

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With skin cancer emerging as one of the world's most prevalent forms of cancer, researchers are using every tool at their disposal to fight this disease. The tool of choice for Sally Dickinson? Broccoli.

A diet heavy in <u>cruciferous vegetables</u>, such as broccoli sprouts, has shown potential risk-reduction properties for colorectal, prostate and various other forms of cancer. Dickinson's research currently focuses on how sulforaphane – a naturally occurring compound in broccoli with established chemopreventive properties – could possibly be used to help patients reduce their risk for <u>skin cancer</u>.

What sets Dickinson's research apart? Instead of eating broccoli to unlock the risk-reduction nutrients, she's asking patients to apply small doses of sulforaphane to their skin. Think of it as a broccoli-based sunscreen additive.

"Even though there is heightened awareness about the need for limited <u>sun exposure</u> and use of sunscreens, we're still seeing far too many cases of skin cancer each year," Dickinson said. "We're searching for better methods to prevent skin cancer in formats that are affordable and manageable for public use. Sulforaphane may be an excellent candidate for use in the prevention of skin cancer caused by exposure to <u>ultraviolet rays</u>."

Dickinson, a research assistant professor in the pharmacology department at the University of Arizona and a UA Cancer Center



member, began investigating broccoli's chemopreventive properties when she began her postdoctoral studies in 2005 in the laboratory of Tim Bowden, one of the UACC's most influential research scientists. Prior to joining Dr. Bowden's laboratory, Dickinson earned her doctorate through the Genetics Graduate Interdisciplinary Program at the UA, studying oxidative stress and heart disease.

Under Bowden's guidance, Dickinson pursued her postdoctoral training and built up an impressive list of credentials in her own right. As Dr. Bowden transitions into retirement, Dickinson will take over the majority of his lab's ongoing projects, including this in-depth look into sulforaphane.

"I learned so much from working with Dr. Bowden," Dickinson said. "He is a hypothesis-driven, old-school scientist who quietly extracts the best out of everyone around him. I'm truly honored that he's handing his lab's reins over to me."

So how would topical broccoli-based ointments differ from the products currently available in stores? Dickinson's research shows that sulforaphane is a highly adaptable, highly effective agent when it comes to inhibiting cancer-causing pathways (such as the AP-1 protein), while activating chemoprotective genes (such as the Nrf2 gene).

Her pilot study in collaboration with Johns Hopkins University will test a topical <u>broccoli</u> sprout solution on the skin a group of patients to see if the compound is effective in the context of solar simulated light. Previous studies have shown that the extract is quite safe for both topical and oral administration.

If the research proves to be successful, Dickinson believes this could lead to even more applications for sulforaphane.



"Sulforaphane is the kind of compound that has so many incredible theoretical applications if the dosage is measured properly," Dr. Dickinson said. "We already know that it is very effective in blocking sunburns, and we have seen cases where it can induce protective enzymes in the skin."

Someday, patients with compromised immune systems may be able to apply sulforaphane to their skin in order to reduce their risk of skin cancer. Sulforaphane is one of the many natural products and pharmaceutical agents being explored for use in topical prevention of UV-induced skin cancers through the Chemoprevention of Skin Cancer Program Project Grant, headed by Bowden and UACC's Dr. David Alberts.

Dickinson's research could potentially lead to a day when parents are instructing their children to not only eat their vegetables, but to wear them, as well.

Provided by University of Arizona

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