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The Healthy Skeptic: How effective are skin products with DNA-repairing enzymes?

Sunscreens and creams purported to repair sun-damaged skin might have some merit, some dermatologists say.

By Chris Woolston, Special to the Los Angeles Times *June 6, 2011*

The UV rays blasting down from the sun do more than burn your skin. They attack you right down to your DNA. That's why there's such a strong link between sun exposure and skin cancer.

If you could somehow repair the sun-damaged DNA in your skin, you could go a long way toward reducing your risk of skin cancer. As a bonus, your skin would look younger and healthier.

Every skin cell has a toolbox of enzymes that fix broken DNA, but what can you do when natural repairs aren't enough? If you're willing to reach into your wallet, you might be tempted to try a relatively pricey sunscreen or skin cream that contains DNA-repairing enzymes.

One option is a Neova DNA Damage Control sunscreen from PhotoMedex. Along with antioxidants, zinc oxide and other familiar ingredients, the sunscreens contain an enzyme called UV-endonuclease that's harvested from an extract of ocean bacteria. This extract, called micrococcus lysate, is enclosed in a tiny package of fat (called a liposome) that supposedly helps deliver the enzyme deep into the skin. A 3-ounce tube of Neova Active (SPF 45) costs \$46 on the company website. A 2.5-ounce tube of Neova Everyday (SPF 43) costs \$39.

DNA EGF Renewal is a line of skin-care products developed by Dr. Ronald Moy, a professor of dermatology at UCLA's David Geffen School of Medicine. These products contain "the highest concentrations of DNA repair enzymes" derived from a variety of sources, including plankton, micrococcus and botanical sources, Moy says. They also include epidermal growth factor, a protein isolated from barley by a biotech company in Iceland. The company website sells a 1.7-ounce tube of the sunscreen (SPF 30) for \$45. A single ounce of the company's DNA Intensive Renewal lotion costs \$125.

DNA Repair Serum from Skin Care Heaven contains DNA repair enzymes from micrococcus lysate along with antioxidants and caffeine, which are said to fight redness. A 1.7-ounce tube costs about \$112 on the company website.

The claims

The Neova website says that "smart" sunscreens are the "newest, most powerful" therapy for sun-damaged skin. Barbara Hayes, vice president of marketing for PhotoMedex, says that the

sunscreens will lighten age spots, reduce fine lines and even out skin tone within about four weeks. "It's really quite amazing when you see someone who has used this product," she says.

The DNA EGF Renewal website says that the products offer a "futuristic approach to skin renewal and protection." Moy, the dermatologist who founded the company, says that many studies have shown that DNA-repairing enzymes in lotions and creams really can revitalize skin, reverse sun damage and reduce the risk of skin cancer. He recommends the products for his patients at heightened risk for skin cancer, including those with very fair skin.

The Skin Care Heaven website says DNA Repair Serum will "delay the signs of aging and stimulate the natural recovery process of your skin." Kathy Everett, a medical esthetician with the company who sells the product at a spa in Carlsbad, says the enzymes work "synergistically" with antioxidants to remove fine lines and lighten age spots with several weeks of use. "My clients are impressed with the results," she says.

The bottom line

The idea that anything in a lotion could actually repair something as fragile and complicated as DNA may sound far-fetched, but DNA-repairing enzymes have a proven ability to heal and protect, says Dr. Steven Q. Wang, director of dermatologic surgery and dermatology at Memorial Sloan-Kettering Cancer Center in Basking Ridge, N.J.

In simple terms, endonucleases work by cutting out the damaged bits of DNA, which are then regenerated. Many studies in the last decade have shown that adding extra enzymes to the skin "enhances the body's innate mechanisms for repairing DNA damage," Wang says. For one example, a 2010 study in the Journal of Drugs in Dermatology by Moy and colleagues at UCLA found that using a cream with DNA repair enzymes for 48 weeks significantly reduced actinic keratoses (scaly precancerous growths) in 17 people with severely sun-damaged skin. (The product used in the study is not commercially available.)

But because Neova and similar products haven't been thoroughly tested in clinical trials, Wang says he has some questions about their real-world benefits. His main concern is that the products may not deliver enzymes deeply enough to have any noticeable effect on fine lines and age spots. "If you have money and want to try it, I say go for it," he says. "But it may not be worth it."

Dr. Suzanne Kilmer, a board member of the American Society for Dermatologic Surgery who runs a clinic in Sacramento, has used Neova herself and recommends it for her patients. She believes **DNA-repairing enzymes could be the next big advance in sunscreens. If they catch on, she says, they could help reduce the incidence of skin cancer 10 to 20 years from now.**

"Zinc oxide already blocks almost all of the UV, and the enzymes help repair the damage from any UV that manages to get through," Kilmer says. "It's my hope that all sunscreens will eventually have this stuff." When discussing the products with patients, Kilmer mainly talks about preventing wrinkles and age spots, not melanoma. "They don't always jump on board if you make it all about skin cancer," she says.