

The Influence of Diet, Supplements, and Topical Antioxidants on Cutaneous Health

Though more research is needed, evidence shows that good nutrition and supplementation can support topical interventions to promote healthy skin.

A Q&A with Jeannette Graf, MD

From the apparent influence of low-glycemic load diets on acne or an onslaught of advice about diets intended to prevent skin aging to debate over the merits of vitamin D supplementation, the notion that what one ingests can influence the health of the skin has gained prominence in recent years. Still, data on the topic are limited, and many clinicians are unclear about what advice they should provide to patients. Below, Jeannette Graf, MD, a clinical dermatologist in New York, as well as a research scientist and product developer, helps make sense of the influence of diet on the skin, the role of vitamins and supplements in skin care, and the proper use of topical antioxidants and anti-aging agents.

What do we know and what do we need to learn about ingested agents and their benefits for the skin?

In terms of rigorous scientific data regarding the cutaneous benefits of diet or orally ingested supplements, clinicians do “not have as much as we should, not as much as we’d like,” Dr. Graf says. She notes that it is very difficult to directly assess the

influence of diet on the skin in any controlled way. However, there is compelling indirect evidence. For example, milk and dairy consumption have been linked to an increase in the incidence of acne, while low-glycemic load diets in under-developed parts of the world are associated with reduced incidence of acne. While there may still be insufficient evidence to conclude that certain foods or types of food exacerbate or prevent acne, there is ample evidence to show that diet can be at least one factor that influences the common disease.

The accumulated data show that when it comes to skin health, “you can’t ignore nutrition,” Dr. Graf

Take-Home Tips. From the apparent influence of low-glycemic load diets on acne or an onslaught of advice about diets intended to prevent skin aging to debate over the merits of vitamin D supplementation, the notion that what one ingests can influence the health of the skin has gained prominence in recent years. While there remains much to learn, enough evidence exists to show that good nutrition and supplementation can support topical interventions to promote healthy skin. ●

says. “The skin is an organ and it is a representation of other organs...People who are healthier on the inside are healthier on the outside.”

To further highlight the influence of diet on the skin, Dr. Graf turns to the issue of probiotics. Low maternal levels of probiotics during pregnancy or low levels of probiotics in infancy have been linked to the development of eczema or asthma, Dr. Graf observes. A direct correlation has not yet been proven, and studies have failed to consistently show a benefit for probiotic supplementation. Yet, according to Dr. Graf, the association between probiotic deficiency and an inflammatory dermatitis is theoretically sound: It could be linked to the function of the colon and its influence on the skin.

The skin, Dr. Graf points out, is an organ of elimination, like the colon, lungs, or kidneys. When one organ is placed under stress, the other organs are forced to work harder and are therefore stressed, as well. In the case of the colon, fiber and probiotics are two essential elements for healthy function. Probiotics detoxify and neutralize potentially harmful substances, Dr. Graf explains. Insufficient levels of probiotics reduce the ability of the colon to remove toxins from the system. This, in turn, permits those toxins to interact with other organ systems—such as the skin—and may, at the same time, require more work by other organs to detoxify the body or eliminate wastes.

Similarly, skin rashes and other cutaneous eruptions associated with irritable bowel disease could also be linked to inefficient colon function and reduced probiotic levels.

Is there such a thing as an anti-aging or a healthy skin diet?

The free radical theory of aging developed out of the free radical theory of disease, Dr. Graf explains. However, it is just a theory, and while antioxidant



supplementation has been shown helpful in fighting certain processes associated with diseases, it has not been shown to increase lifespan. With these thoughts in mind, Dr. Graf has turned her attention to the body's own antioxidants, such as GTP binding proteins, and the role of nutrition again comes to the fore.

The body functions best when it is properly pH balanced, that is, slightly alkaline. Ideal pH for human blood is 7.4, and the body will undertake any necessary processes to maintain that pH, Dr. Graf says. Habits such as smoking, drinking colas, and eating fast foods all increase the acid levels of the blood and force the body to focus on reducing its pH. “The overloaded blood pours acids into the organs and tissues; it affects cellular function,” Dr. Graf explains. Cola drinks are especially problematic, Dr. Graf, asserts: the blood seeks minerals to neutralize the acidity of the carbonated beverage and draws calcium and minerals from bones, the body's primary mineral stores.

Metabolic acidosis leaves the body more susceptible to disease, Dr. Graf says, noting that high acidity is directly linked to cancer.

While there are specific foods—fatty, processed foods, colas, etc.—and habits (smoking), that patients should avoid, there are fewer specific foods that individuals should eat to maintain cutaneous health and prevent skin aging. However, certain types of foods associated with low acidity may be best to promote healthy skin. A “Mediterranean” type diet, featuring green leafy vegetables, olive oil, and lemons and

limes and that avoids refined sugars and flours seems to be the best type of diet for maintaining the body's pH. Improving the diet can have direct, positive effects on the skin, Dr. Graf maintains.

Does it matter whether certain vitamins and antioxidants are ingested orally or applied topically?

There is evidence that certain ingested agents can reach the skin and directly influence skin health. For example, in cultures with high rates of green tea consumption, Dr. Graf says, there are generally lower rates of skin cancers compared to other countries. Of note, studies confirm the presence of green tea antioxidants in the skin of patients with high levels of consumption.

On the other hand, there is clear evidence that ingesting certain foods can negatively affect the skin, Dr. Graf says, noting the influence of certain "trigger foods" on rosacea. Spicy foods, acidic foods, and chocolate are all linked to exacerbation of the flushing response in rosacea.

Although other species produce their own vitamin C, humans do not. Nonetheless, vitamin C is essential to healthy functioning in humans. While there's no debate on that point, Dr. Graf notes, there is uncertainty regarding how much vitamin C an individual needs and how to best acquire the vitamin throughout the day. Some experts advocate about 5-6g of vitamin C taken throughout the day, she says, while others advocate a dosage in the "10s and 20s of grams."

One challenge is that interest in vitamin C largely developed around the problem of scurvy, now largely unheard of in the developed world, and the amount of vitamin C needed to avoid the disease. However, science has since confirmed that vitamin C plays a role in immune health, the prevention of cancer, and maintenance of healthy connective tissues. It remains less clear how much vitamin C is necessary to support these functions.

Obtaining adequate systemic levels of vitamin C each day supports overall health and thus had an indirect influence on the skin, however, Dr. Graf says that co-administration of vitamin C topically is recommended for maximum cutaneous benefit.

Vitamin D, by contrast, is best ingested. Vitamin D presents an interesting area for consideration, according to Dr. Graf, largely due to a recent increase of knowledge about the vitamin. Previously, vitamin D was considered a fat-soluble vitamin that is toxic at high doses. Now, Dr. Graf says, research has reconceptualized vitamin D as a pre-hormone that resides in the skin until it is synthesized via the action of UVB to vitamin D₃. Vitamin D₃ receptors are located in the skin and throughout the whole body. Vitamin D has been linked with proper immune system function, while deficiency in D₃ is associated with increased risk for cancers and hypertension. Vitamin D₃ is "absolutely essential for skin repair," Dr. Graf asserts. Vitamin D supplementation can aid tissue repair following surgery or after environmental insult, she says.

Unlike vitamin C, clinicians have a better sense of how much vitamin D the average person needs, and ingested vitamin D provides benefits to all organ systems, including the skin. Therefore, patients can be assured that taking a daily supplement of 2,000-4,000IU daily of vitamin D satisfies their daily requirements. Plus, Dr. Graf points out, patients who take a supplement every day will know exactly how much vitamin D they are ingesting daily.

Supplementation is more reliable than diet, Dr. Graf maintains. While many foods high in vitamin D are healthy and probably should be part of the average person's diet, most people obtain only about 25 percent of the necessary levels of vitamin D through diet. And while regular UV(B) exposure enables the body to synthesize vitamin D, no one knows for certain how much exposure a given individual needs to synthesize sufficient vitamin D₃. Furthermore, UV exposure is associated with increased risks of skin cancer, Dr. Graf warns.

For topically-applied agents, does the manner of application matter?

"We know that when we apply certain things to the skin, they will get through," Dr. Graf says. "We can ascertain the bioavailability of topically-applied agents far more effectively than we can for supplements." Therefore, topical product application is a cornerstone

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of antiaging and basic skin health regimens.

All patients should use a basic protective skincare regimen, which consists of topically applied antioxidants and sunblocks, and strive for a healthy diet. "When and how patients apply products matters," Dr. Graf says. Increasingly, research confirms that the skin follows circadian rhythms: protective mode during the day; reparative mode at night.

The daytime protective mode makes sense, Dr. Graf says, given that the skin is exposed to UV and other pollutants during the day. That's when patients must wear a good quality sunscreen, she says, and should apply protective antioxidants.

At night, the skin's pH changes; there is an increase in microcirculation and in transepidermal water loss (TEWL) in order to support skin repair, Dr. Graf says. Nighttime is ideal for application of moisturizers, reparative peptides, and/or topical retinoids.

Virtually any moisturizer is suitable for patients, Dr. Graf says, noting that significant changes in manufacture have virtually eliminated the risk that products will induce "breakouts." The non-comedogenic or non-acnegenic tags lack standard definition, anyway, she points out.

What's Old is New

In the end, the diet/dermatology connection is nothing new. Certain dermatologic complaints have long been associated with diet, such as brittle hair and nails, Dr. Graf points out. Hair and nail damage is a common symptom of systemic diseases and is associated with poor nutrition. In fact, sometimes, brittle hair and nails are directly attributed to conditions such as gluten intolerance, where even if the patient is consuming nutritionally appropriate foods, gastrointestinal dysfunction may impede absorption of needed vitamins and minerals.

Patients may not even ask the dermatologist about treatment for hair and nail problems, assuming no therapeutic options exist. However supplementation with 5000micrograms biotin is shown to increase the thickness and flexibility of the hair and nails and promote growth.

Recently, dermatologists have "rediscovered" the influence of diet and ingested vitamins on the health of the skin. While there remains much to learn, enough evidence exists to show that good nutrition and supplementation can support topical interventions to promote healthy skin. ■



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