

HUNGRY? HOW WHAT YOU EAT AFFECTS YOUR SKIN

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YOUNG REVIEWER:



LETICIA

AGE: 13

Foods can affect the physical, mental, and emotional aspects of our lives and determine our overall health and productivity. Whether we eat chicken nuggets, apples, or watermelon, food is a vital source of energy that keeps the body's tissues and organs going during our day-to-day activities. In this article, we examine how various nutrients from foods affect the skin and its ability to protect the body from infections and the elements of the environment. In addition, we briefly discuss a patient who had a wound that was taking a long time to heal, which required surgery to fix. Recommending the right nutrition led to complete healing and cancellation of the surgery.

THE SKIN

The skin is the largest organ in the human body, and it serves as a barrier between the body and the environment. The skin is made of 3 main layers: the epidermis, dermis, and subcutaneous fat (Figure 1).

Figure 1

The anatomy of the skin created with Biorender.com. The three main layers of the skin are the epidermis, dermis and subcutaneous fat. Hair, which grows out of hair follicles, and blood vessels as well as sweat pores, or glands, and nerves are also parts of the skin.

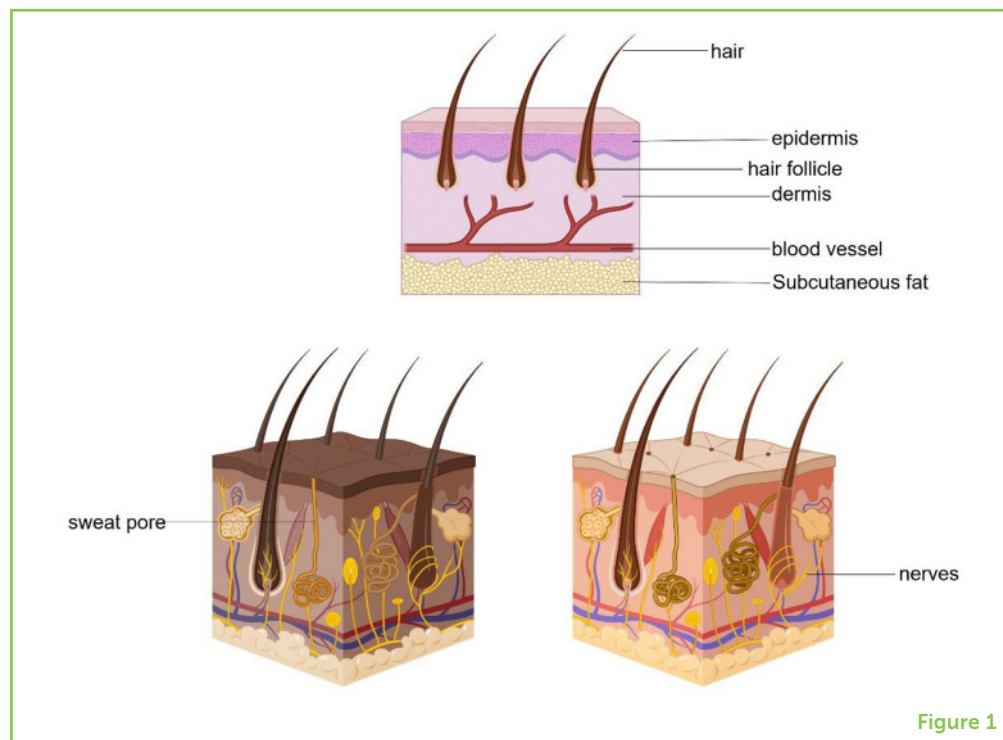


Figure 1

EPIDERMIS

The top layer of the skin, which is made up of cells called keratinocytes.

KERATINOCYTES

Flat cells that are primarily found in the epidermis.

MICROBIOME

A term that describes all the microorganisms in the human body.

The **epidermis** contains cells called **keratinocytes**. The dermis contains cells called fibroblasts as well as connective tissue. The subcutaneous fat is made of cells called adipocytes. The skin also contains blood and lymph vessels, nerves, hair follicles, and immune cells throughout its structure.

The skin plays a critical role in wound healing. Ideally, skin wounds should heal within 4–6 weeks [1]. The skin has a special group of microorganisms called the **microbiome**. The microbiome prevents infection by competing with dangerous microorganisms that could make us sick. Both the microbiome and the keratinocytes in the skin secrete chemicals that fight dangerous microorganisms. The skin also prevents dehydration and regulates body temperature. The nails are outgrowths of the skin that protect the tip of the fingers.

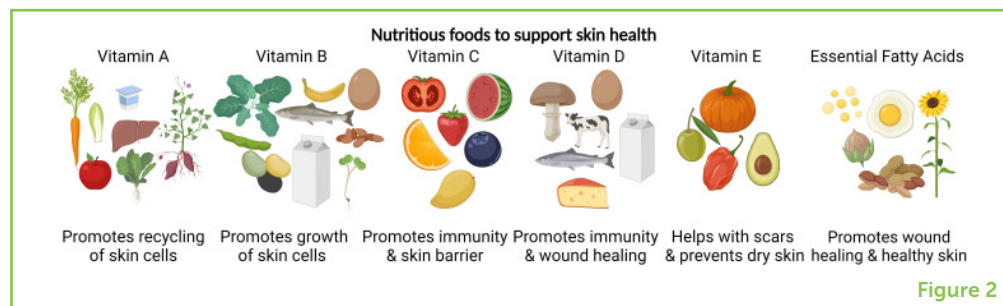
PROPER NUTRITION IS IMPORTANT FOR THE SKIN

The skin can reflect a lack of adequate nutrition. To perform its important functions, the skin and nails depend on nutrients from the foods we eat, including vitamins A, B, C, D, and E, protein, and essential fatty acids (Figure 2).

When these nutrients are lacking, the skin loses its ability to protect the body causing certain diseases and disorders to develop. Some general signs include redness, pain, swelling, rashes, and delayed wound healing or improper scar formation. Eating foods that are rich in vitamins, taking vitamin supplements, or using products such as vitamin E oil on the skin can help treat these problems. Staying

Figure 2

Examples of vitamins and food sources that support healthy skin. Created with Biorender.com.

**Figure 2**

hydrated is also important for healthy skin! Keep reading to learn how some important nutrients affect skin health.

VITAMIN A

Foods including liver, dairy, fish, carrots, green leafy vegetables, and orange-fleshed sweet potatoes are rich in vitamin A and play an essential role in recycling skin cells. When the skin cells are weak and old, the body sheds the old skin to allow fresh, new skin to appear. This same process also occurs when we clean our bodies by bathing. Several studies have shown that vitamin A has an important role in maintaining skin health. Vitamin A is helpful for treating skin conditions such as **eczema**, **acne**, and sunburns. Other studies have also shown an association between vitamin A intake and a reduction in skin cancer risk [2–4]. Vitamin A is directly absorbed by the small intestines and stored primarily in the liver. Therefore, patients with diseases of the liver and small intestines are at risk of vitamin A deficiency, as are people who do not eat enough foods that are rich in vitamin A. Vitamin A deficiency can present as dry skin, dry eyes, dry mouth, and rough, toad-like skin on the arms and legs.

VITAMIN B

Green leafy vegetables, seafood, whole grains, fruits, legumes, seeds, nuts, milk, eggs, red meat, fish, and poultry are rich in vitamin B. Vitamin B is a family of vitamins that play an essential role in the growth of skin cells and other organs, such as the brain, spinal cord, and red blood cells. B vitamins include vitamins B1, B2, B3, B5, B6, B7, B9, and B12. People with discolored patches on their skin, acne, redness, inflammation of the skin, and infections may benefit from B vitamins. Some studies have suggested an association between B vitamins and a reduction in a person's risk of skin cancer [5]. A deficiency in any of the B vitamins can manifest as dry scaly skin, dry mouth, brittle nails, and coiled hair.

VITAMIN C

Oranges, lemon, pineapples, berries, broccoli, cauliflower, tomatoes, and peppers are rich in vitamin C. Vitamin C is an essential vitamin

ECZEMA

A chronic skin condition characterized by itching and inflamed skin.

ACNE

A chronic skin condition consisting of small bumps caused by bacteria that live off of skin oils.

SCURVY

Describes the painful sores in the mouth and gum caused by a lack of vitamin C.

PSORIASIS

A skin condition characterized by red, scaly skin, usually involving the elbows, knees, and scalp.

ANTI-INFLAMMATORY

“Against” inflammation (redness, swelling, pain, and loss of function).

that aids many chemical reactions in the body. It boosts the immune system and supports the skin’s barrier function. Vitamin C is necessary for wound healing and protects the skin from sunburns. Many research studies have shown that vitamin C improves a variety of skin conditions, including eczema and acne [6]. Vitamin C deficiency may manifest as easy bruising, bleeding around the hair follicles, gum bleeding, coiled hair, delayed wound healing, and increased risk of infections. Vitamin C deficiency can cause a disease called **scurvy**. Scurvy causes painful sores in the mouth. Eating citrus fruit can help prevent or reverse scurvy. Vitamin C deficiency is common among children who do not eat enough vitamin C-rich foods. Eating vitamin C-rich foods is good for the skin, but it also protects against infections of the lungs and other organs.

VITAMIN D

Cheese, oily fish (such as salmon, sardines, herring, and mackerel), red meat, eggs, liver, and mushrooms are rich in vitamin D. Vitamin D is an important vitamin obtained primarily from the sun; however, factors such as geographic location, seasons, and skin pigmentation can affect the amount of vitamin D the body receives. For example, people who live in areas with less sunshine are at risk of vitamin D deficiency. Therefore, certain food products, such as dairy products, are fortified with vitamin D. Vitamin D helps our bodies absorb calcium and promotes solid bones and teeth. It also supports the immune system and protects the body’s cells from being attacked by its own immune cells. Vitamin D improves wound healing, prevents skin cancer, hair loss, infections, acne, and **psoriasis** [7].

VITAMIN E

Green vegetables, red bell peppers, mangoes, avocados, asparagus, and almonds are rich in vitamin E. Vitamin E is an essential vitamin that enhances the skin’s texture and maintains the immune system and brain function. It has **anti-inflammatory** properties and is helpful during wound healing. It helps to protect the skin from sun damage, environmental pollutants, and certain drugs. Studies show that vitamin E is effective in preventing skin cancer, yellow nails, and ulcers [8]. Vitamin E deficiency manifests as dull-appearing dry skin or wrinkling, along with loss of sensation in the fingers and toes. Eating vitamin E-rich foods improves wound healing and the general appearance of the skin. Some lotions and ointments are fortified with vitamin E, and some people even use liquid vitamin E directly on a scar to improve its appearance.

ESSENTIAL FATTY ACIDS

Peanuts, soybeans, salmon, herring, tuna, sardines, canola oil, flaxseeds/oil, chia seeds, pumpkin seeds, sunflower seeds, red meat, eggs, and walnuts are rich in essential fatty acids. Essential fatty acids are vital for maintaining the skin's function. Studies show that essential fatty acids are beneficial in reducing the severity of inflammatory skin diseases and protecting the skin from allergy and cancer [9, 10]. A lack of essential fatty acids can manifest as growth problems, hair loss, and poor wound healing.

A REAL-LIFE EXAMPLE

As an example of the power of nutrition on skin health, let us discuss a patient with a wound that took a long time to heal. After trying several treatment options that did not work, the patient's doctor decided to perform some blood tests, which revealed a lack of protein and essential fatty acids. The patient was prescribed protein and essential fatty acids, in addition to a surgical procedure to close the wound to hasten the healing process. One week after eating enough protein and essential fatty acids, the patient's wound began to heal, and the wound healed completely in 2 weeks. This example demonstrates the role of protein, fatty acids, and other nutrients in maintaining the health of the skin. Including healthy foods in your breakfast, lunch, and dinner will help your skin to look healthy and beautiful and will help keep your whole body healthy!¹

Vitamins A, B, C, D, E, and essential fatty acids all support skin health. Examples of foods that contain these vitamins are shown in the boxes below each vitamin-Figure 2.

¹ For more resources on healthy eating, you can check out <https://www.myplate.gov/>

Here is an idea for a fun game you can play with your friends and family. You could play in teams or as individuals.

How many colored fruits and vegetables do you know?

Rules:

1. Choose a color and ask the other players to name fruits and vegetables with that color.
2. You cannot repeat what someone has already mentioned.
3. When a player mentions a correct fruit or vegetable, they get 2 points.
4. The player with the highest points is the winner.

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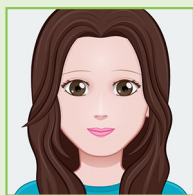
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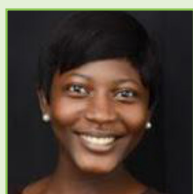
YOUNG REVIEWER



LETICIA, AGE: 13

I am 13 years old and live in England. I love sciences, I like to read fantasy novels and play the piano. I lived for many years in South America and I absolutely enjoyed living surrounded by huge volcanoes and discovering all kinds of exotic animals that helped me develop a passion for the sciences. I am fascinated by the world around me, outer space, and the evolution of species.

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Alice completed her bachelor's in medical science from the University of Ghana and obtained her medical degree at the University of Ghana Medical School. She is pursuing a career in dermatology and is performing skin research in Dr. Richmond's laboratory and with Dr. Bernice Kwong at Stanford. Alice is passionate about nutrition and education, particularly educating patients about the role of nutrition in skin health. She enjoys running, gardening, and cooking. *alice.amudzi@umassmed.edu



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