

SECTION 4 **The Integumentary System**

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What is the integumentary system?
- What are the functions of the skin, hair, and nails?

National Science Education Standards
LS 1c, 1d, 1e, 1f, 3a, 3b

What Is the Integumentary System?

Your **integumentary system** is made up of your skin, hair, fingernails, and toenails. The Latin word *integere* means “to cover.” Your integumentary system covers your body and helps to protect it. Your integumentary system also helps your body to maintain homeostasis.



Compare As you read, make a table comparing skin, hair, and nails. In the table, describe each structure and list its functions.

THE SKIN

Your skin is the largest organ in your body. It is an important part of the integumentary system. The skin has four main functions.

- Skin protects your body. It keeps water inside your body, and it keeps many harmful particles outside your body.
- Skin keeps you in touch with the world. Nerve endings in your skin let you feel things around you.
- Skin helps to keep your body temperature from getting too high. Small organs in the skin called *sweat glands* make sweat, which flows onto the skin. When sweat evaporates, your body cools down.
- Skin helps your body get rid of some wastes. Sweat can carry these wastes out of your body.

As you know, skin can be many different colors. The color of your skin is determined by a chemical called *melanin*. If your skin contains a lot of melanin, it is dark. If your skin contains very little melanin, it is light.

Melanin helps to protect your skin from being damaged by the ultraviolet radiation in sunlight. People’s skin may darken if they are exposed to a lot of sunlight. This happens because the cells in your skin make extra melanin to help protect themselves from ultraviolet radiation.

Critical Thinking

1. Apply Concepts Why are you more likely to get sick if you touch a dirty surface with damaged skin than if you touch it with healthy skin?

SECTION 4 The Integumentary System *continued*

LAYERS OF SKIN

Your skin has two main layers: the epidermis and the dermis. The **epidermis** is the outermost layer of skin. It is the layer that you see when you look at your skin. The prefix *epi-* means “above.” Therefore, the epidermis lies above the dermis. The **dermis** is the thick layer of skin that lies underneath the epidermis. ✓

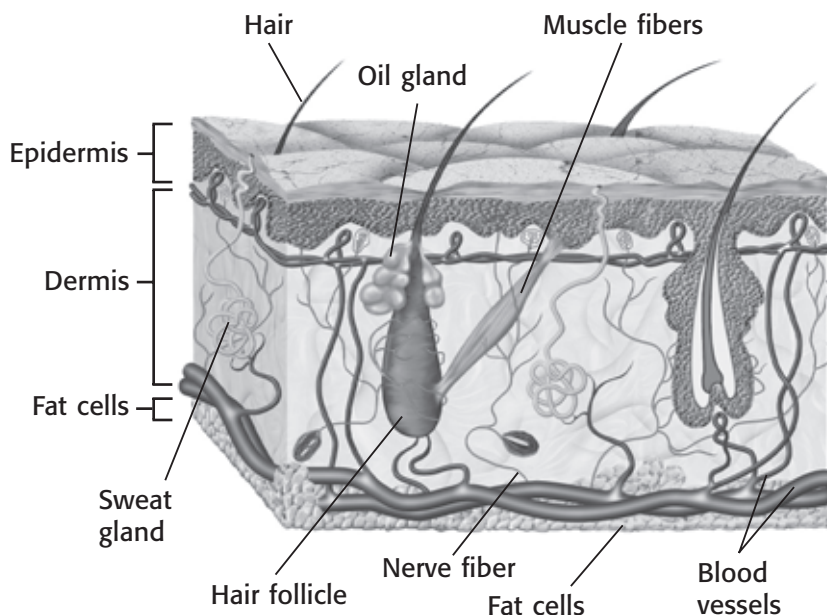
READING CHECK

2. List What are the two main layers of skin?

The epidermis is made of *epithelial tissue*. These tissues are made of many layers of cells. However, on most parts of your body, the epidermis is only a few millimeters thick.

Most of the cells in the epidermis are dead. The dead cells are filled with a protein called *keratin*. Keratin helps to make your skin tough.

The dermis is much thicker than the epidermis. It contains many fibers made of a protein called *collagen*. Collagen fibers make the dermis strong and let the skin bend without tearing. The dermis also contains many small structures, as shown in the figure below.



TAKE A LOOK

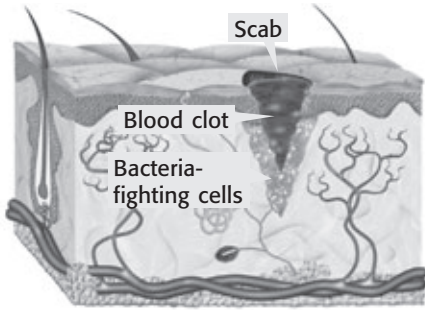
3. Identify Give three structures that attach to hair follicles.

SKIN INJURIES

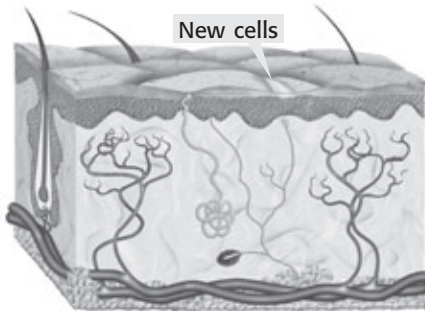
Your skin is always coming into contact with the outside world. Therefore, it is often damaged. Fortunately, your skin can repair itself. The figure on the top of the next page shows how a cut in the skin heals.

Some skin problems are caused by conditions inside your body. For example, hormones can cause your skin to make too much oil. The oil can combine with bacteria and dead skin cells to form acne.

SECTION 4 The Integumentary System *continued*



❶ A blood clot forms over a cut to stop bleeding and to keep bacteria from entering the wound. Bacteria-fighting cells then come to the area to kill bacteria.



❷ Damaged cells are replaced through cell division. Eventually, all that is left on the surface is a scar.

TAKE A LOOK

4. Explain How do blood clots help protect your body?

HAIR AND NAILS

Your hair and nails are also important parts of your integumentary system. Like skin, hair and nails are made of both living and dead cells. Hair and nails grow from your skin.

A hair forms at the bottom of a tiny sac called a *hair follicle*. The hair grows as new cells are added at the hair follicle. Older cells get pushed upward. The only living cells in hair are found in the hair follicle. ✓

Like skin, hair gets its color from melanin. Hair helps protect skin from being damaged. The hair in and around your nose, eyes, and ears helps keep dust and other particles out of your body. Your hair also helps to keep you warm. When you feel cold, tiny muscles cause your hair to stand up. The raised hairs act like a sweater. They trap warm air near your body.

A nail forms at the *nail root*. A nail root is found at the base of the nail. As new cells form in the nail root, the nail grows longer. The hard part of the nail is made of dead cells that are filled with keratin. Nails protect the ends of your fingers and toes. They allow your fingers and toes to be soft and sensitive to touch.

READING CHECK

5. Describe How does hair grow?

Section 4 Review

NSES LS 1c, 1d, 1e, 1f, 3a, 3b

SECTION VOCABULARY

dermis the layer of skin below the epidermis epidermis the surface layer of cells on a plant or animal	integumentary system the organ system that forms a protective covering on the outside of the body
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1. **Identify** Name three functions of the integumentary system.

2. **Compare** Give three differences between the dermis and the epidermis.

3. **Infer** The epidermis on the palms of your hands and the soles of your feet is thicker than it is on other parts of your body. What do you think is the reason for this?

4. **Explain** Why can skin get darker if it is exposed to a lot of sunlight?

5. **Identify** Give two ways that hair helps to protect your body.

6. **Infer** Blood clots help to prevent bacteria from entering your body through a cut. Why do bacteria-fighting cells travel to a cut, even though there is a blood clot there?
