**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_Skin tissue #**

The skin is the body’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It serves many important functions, including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ balance, and sensing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The skin keeps vital chemicals and nutrients in the body while providing a barrier against dangerous substances from entering the body. It also provides a shield from the harmful effects of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ emitted by the sun. In addition, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ help mark people as individuals. Anything that interferes with skin function or causes changes in appearance can have important consequences for physical and mental health.

The skin has three layers that each performs specific tasks:

* Epidermis
* Dermis
* Fat layer (also called the subcutaneous layer)

**Epidermis**

The epidermis is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Most of the cells in the epidermis are keratinocytes. They originate from cells in the deepest layer of the epidermis called the *basal layer*. New keratinocytes slowly migrate up toward the surface of the epidermis. Once the keratinocytes reach the skin surface, they are gradually shed and are replaced by newer cells pushed up from below.

The outermost portion of the epidermis, known as the **stratum corneum**, is relatively waterproof and, when undamaged, prevents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from entering the body. The epidermis also protects the internal organs, muscles, nerves, and blood vessels against trauma. In certain areas of the body that require greater protections (such as the palms of the hands and the soles of the feet), the outer keratin layer of the epidermis (stratum corneum) is \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Scattered throughout the basal layer of the epidermis are cells called **melanocyte**s, which produce the pigment \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, one of the main contributors to skin color. Melanin’s primary function, however, is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which damages DNA, resulting in numerous harmful effects, including skin cancer.

The epidermis also contains **Langerhans cells**, which are part of the skin’s\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Although these cells help detect foreign substances and defend the body against infection, they also play a role in the development of skin allergies.

**Dermis**

The dermis, the skin’s next layer, is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (made mostly of collagen, elastin, and fibrillin) that gives the skin its flexibility and strength. The dermis contains nerve endings, sweat glands and oil (sebaceous) glands, hair follicles, and blood vessels.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sense pain, touch, pressure, and temperature. Some areas of the skin contain more nerve endings than others. For example, the fingertips and toes contain many nerves and are extremely sensitive to touch.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_produce sweat in response to heat and stress. Sweat is composed of water, salt, and other chemicals. As sweat evaporates off the skin, it helps cool the body. Specialized sweat glands in the armpits and the genital region (apocrine sweat glands) secrete a thick, oily sweat that produces a characteristic body odor when the sweat is digested by the skin bacteria in those areas.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_secrete sebum into hair follicles. Sebum is an oil that keeps the skin moist and soft and acts as a barrier against foreign substances.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_produce the various types of hair found throughout the body. Hair not only contributes to a person’s appearance but has a number of important physical roles, including regulating body temperature, providing protection from injury, and enhancing sensation. A portion of the follicle also contains stem cells capable of re-growing damaged epidermis.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_provide nutrients to the skin and help regulate body temperature. Heat makes the blood vessels enlarge (dilate), allowing large amounts of blood to circulate near the skin surface, where he heat can be released. Cold makes the blood vessels narrow (constrict), retaining the body’s heat.

Over different parts of the body, the number of nerve endings, sweat glands and sebaceous glands, hair follicles, and blood vessels varies. The top of the head, for example, has many hair follicles, whereas the soles of the feet have none.

**Fat layer**

Below the dermis lies \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that helps insulate the body from heat and cold, provides protective padding, and serves as an energy storage area. The fat is contained in living cells, called fat cells, held together by fibrous tissue. The fat layer varies in thickness, from a fraction of an inch on the eyelids to several inches on the abdomen and buttocks in some people.

**Fight or Flight Response**

When our fight or flight response is activated, sequences of nerve cell firing occur and chemicals like **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are released into our bloodstream.

Some of the physical signs that may indicate that the fight-or-flight response has kicked in include:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Skin’s Response:

In the skin, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (adrenaline) binds to a receptor on an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** smooth muscle cell. This causes a signaling cascade that contracts the muscle, raising the hair on the surface of the skin. On the surface of sweat glands, epinephrine binds to Alpha-1 adrenergic receptors, triggering a signaling cascade that contracts the gland, squeezing **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to the skin’s surface.