The Skin (Integumentary System)

Basic Structure of the Skin

1. Complete the following statements by writing the appropriate word or phrase on the correspondingly numbered blank:

   The two basic tissues of which the skin is composed are dense connective tissue, which makes up the dermis, and __________, which forms the epidermis. Most cells of the epidermis are __________. The protein __________ makes the dermis tough and leatherlike. The specialized cells that produce the pigments that contribute to skin color are called __________.

   1. epithelium
   2. keratinocytes
   3. collagen
   4. melanocytes

2. Four protective functions of the skin are __________, __________, __________, and __________.

   protection from mechanical damage, chemical damage, thermal damage, and __________

3. Using the key choices, choose all responses that apply to the following descriptions.

   Key: stratum basale  stratum corneum  stratum granulosum  stratum lucidum  stratum spinosum  papillary layer  reticular layer  epidermis (as a whole)  dermis (as a whole)

   __________ 1. layer containing sacs filled with fatty material or keratin subunits
   __________ 2. dead cells
   __________ 3. the more superficial dermis layer
   __________ 4. avascular region
   __________ 5. major skin area where derivatives (nails and hair) reside
   __________ 6. epidermal region exhibiting the most mitoses
   __________ 7. most superficial epidermal layer
   __________ 8. has abundant elastic and collagenic fibers
   __________ 9. region where melanocytes are most likely to be found
   __________ 10. accounts for most of the epidermis
4. Label the skin structures and areas indicated in the accompanying diagram of skin.

5. What substance is manufactured in the skin (but is not a secretion) to play a role elsewhere in the body?

   The skin is the site of vitamin D synthesis for the body.

6. How did the activity “Visualizing Changes in Skin Color Due to Continuous External Pressure” relate to formation of decubitus ulcers? (Use your textbook if necessary.)

   Any restriction of the normal blood supply to the skin results in cell death and, if severe or prolonged, will cause decubitus ulcers.

7. Some injections hurt more than others. On the basis of what you have learned about skin structure, can you determine why this is so? The dermis has a rich nerve supply; some with nerve endings that respond to pain. If these bare nerve endings are stimulated by injection, a pain message will be transmitted to the central nervous system for interpretation.
8. What was demonstrated by the two-point discrimination test? The relative density of touch receptors in various body areas (lips, fingertips, etc.)

9. Two questions regarding general sensation are posed below. Answer each by placing your response in the appropriately numbered blanks to the right.

1–2. Which two body areas tested were most sensitive to touch? 
   1–2. lips, fingertips

3–4. Which two body areas tested were the least sensitive to touch? 
   3–4. back of calf, back of neck

10. Define adaptation of sensory receptors: Decline in receptor sensitivity and stimulation with prolonged unchanging stimuli.

11. Why is it advantageous to have pain receptors that are sensitive to all vigorous stimuli, whether heat, cold, or pressure? Because all of these stimuli, if excessive, cause tissue damage. Pain receptors do not adapt. Why is this important? Pain is a warning of actual or potential tissue damage.

12. Imagine yourself without any cutaneous sense organs. Why might this be very dangerous? Many external stimuli (heat, cold, pressure), which can threaten homeostasis, might go undetected and proper protective measures might not be taken.

Appendages of the Skin

13. Using the key choices, respond to the following descriptions. (Some choices may be used more than once.)

<table>
<thead>
<tr>
<th>Key:</th>
<th>arrector pili</th>
<th>cutaneous receptors</th>
<th>hair follicle</th>
<th>sweat gland—apocrine</th>
<th>sweat gland—eccrine</th>
<th>sebaceous glands</th>
</tr>
</thead>
</table>

  sebaceous glands

  hair follicle

  sweat gland—eccrine

  hair follicle

  sweat gland—apocrine

  sebaceous glands/hair follicle

  hair/nail

  arrector pili

  sebaceous glands

  nail

1. Acne is an infection of a(n)

2. Structure that houses a hair.

3. More numerous variety of perspiration gland that produces a secretion containing water, salts, and vitamin C; activated by rise in temperature.

4. Sheath formed of both epithelial and connective tissues.

5. Type of perspiration-producing gland that produces a secretion containing proteins and fats in addition to water and salts.

6. Found everywhere on body except palms of hands and soles of feet.

7. Primarily dead/keratinized cells.

8. Specialized structures that respond to environmental stimuli.

9. Its secretion contains cell fragments.

10. “Sports” a lunula and a cuticle.
14. How does the skin help to regulate body temperature? (Describe two different mechanisms.)

1. Capillaries in the papillary layer of the dermis allow heat to radiate to the skin surface to cool off the body and will constrict blood flow to the dermis temporarily when body heat needs to be conserved.

2. Sweat glands secrete perspiration that evaporates and carries large amounts of body heat with it.

15. Several structures or skin regions are lettered in the photomicrograph below. Identify each by matching its letter with the appropriate description that follows.

- **f** adipose cells
- **e** dermis
- **a** epidermis
- **b** hair follicle
- **d** hair shaft
- **c** sloughing stratum corneum cells

**Plotting the Distribution of Sweat Glands**

16. With what substance in the bond paper does the iodine painted on the skin react? **Starch**

17. Which skin area—the forearm or palm of hand—has more sweat glands? **Palm of hand**

Which other body areas would, if tested, prove to have a high density of sweat glands? **Soles of feet, underarms, forehead**

18. What organ system controls the activity of the eccrine sweat glands? **Nervous system**