

Saladin 7E
Answer Key
Chapter 6, The Integumentary System

Testing Your Comprehension

1. Every blood vessel, nerve, cutaneous gland, and hair is an organ, as are such sensory receptors as lamellated corpuscles and tactile corpuscles. Since the skin (an organ in itself) contains all of these other, smaller organs, it serves as a good example of the point.
2. Without an evolutionary perspective on the human body and comparison to other species of mammals, it is difficult to make any sense out of such facts as the patchy distribution of human hair (thick in the scalp, eyebrows, beard, axillary, and pubic regions and sparse elsewhere), the reason for two types of sweat glands, and the reason apocrine glands don't develop until puberty and then grow and regress in phase with the menstrual cycle. We get considerably more insight into integumentary structure and function when we compare humans to other species of mammals and consider the evolutionary history of the human body.
3. The upper layer of dermis, the papillary layer, is composed of loosely organized areolar tissue well suited to the quick mobilization of immune cells against pathogens that break through the epidermal barrier. The lower layer of dermis, the reticular layer, is composed of densely interwoven collagen bundles well suited to lending strength and resilience to the skin. Thus, the dermis plays two roles (defense and providing a durable body covering) served by two different types of fibrous connective tissue.
4. In cold weather, the arteries of the dermis constrict so that blood is diverted away from the body surface and we lose less heat. With blood trickling slowly through the skin, oxygen is removed from it faster than fresh blood flows in to replace it. The deoxygenated blood shows through the epidermis with the bluish color of cyanosis.
5. UV radiation can mutate DNA and cause cancer, so it is important to protect the deep tissues of the body from excessive UV exposure. However, UV radiation also plays a role in the first step of synthesizing vitamin D, which is essential for bone development and maintenance. People who get too little exposure to UV radiation are subject to such degenerative bone disorders as rickets, osteomalacia, and osteoporosis unless they get supplemental vitamin D orally.