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Activity 5.1.1: Under Your Skin

Introduction

The skin is the largest organ in the human body; if you spread it out, it would cover about twenty square feet of surface area and weigh about ten pounds. You are constantly shedding skin cells and replacing them with new ones. About 35,000 dead, flattened skin cells are shed from the skin every minute. At this rate, a person is likely to shed over nine pounds of skin every year. These fallen flakes, together with other dust and particles, contribute to the dust in our homes. Microscopic dust mites could be, at this very moment, feeding on the skin cells you shed last night.

Our skin, along with our hair and nails, make up an important human body system called the *integumentary system*. The integumentary system, especially the skin, provides the body’s first line of defense. Skin functions to keep out invaders and protect the body from injury, but it also works to keep important materials inside the body. Liquid oozes from the pores to both protect and regulate. Tiny sensors in the skin help a person feel touch, temperature and, unfortunately, pain. The skin is a living, functioning organ that plays a key role in maintaining the body’s homeostasis. The skin protects the human body, but it also allows us to connect with the outside world.

In this activity, you will draw of a cross section of the skin. You will examine the tissues that make up skin as well as the accessory organs, such as hair follicles and sweat glands that are found within the skin’s layers. You will also investigate the way in which your skin deals with stress and how the organ changes as you age. Your skin plays a huge role in protecting and regulating the body. See if you can come up with a list of all the ways this amazing organ keeps balance in your life.

Equipment

* Computer with Internet access
* Laboratory journal
* Colored pencils
* Reference textbook (optional)

Procedure

Procedure

1. Use reference textbooks or the websites listed in Step 5 to investigate the structure of the skin. Find detailed images of the skin and its associated accessory structures.
2. Imagine you could take a cube-shaped chunk of skin out of your arm. Create a drawing of this skin “chunk.” The drwaing should showcase the parts listed below.

* Epidermis
* Dermis
* Subcutaneous layer (fat lobules)
* Nerves
* Blood vessels
* Sebaceous gland
* Sweat gland
* Hair follicle
* Arrector pili muscle
* Dermal papillae

1. Use the internet to answer the following questions:
2. View what happens to the skin when you experience a shallow cut and when you experience a deep cut. What happens when it is cut, when it is repaired, and when it is healed?
3. In your laboratory journal, list the steps of healing that occur after a deep cut. Mention key skin layers that are affected as well as other human body systems that assist in the healing process.
4. How does your skin respond to sunlight. How does skin tone differ in its response to sunlight?
5. In your laboratory journal, describe what happens in the skin when a person tans versus when he/she burns. Also describe the potential consequences of prolonged sun exposure.
6. What happens to skin over a course over the course of a person’s lifetime.
7. In your laboratory journal, create a brief timeline that describes the changes in the skin that occur from infancy to old age. Mention key skin layers as well as the proteins involved.
8. With your partner, brainstorm a list of functions of the skin. You have looked at the structure of the skin. But how are all these components related the skin’s function in the body?
9. Create a formal list of functions of the skin in your laboratory journal. Leave space between items in your list. You may use the Internet or textbooks to check your brainstorm list and to add more items.
10. Circle each function on the list that relates to “protection” in the human body.
11. Next to or below each function, list other human body systems that are involved in this function.

Conclusion

1. How does the epithelial tissue found in the epidermis of the skin differ in structure from the connective tissue found in the dermis of the skin? How is this structure linked to the function of each layer?
2. Explain why a person is more likely to have acne during adolescence than during young adulthood. Make sure to mention the exocrine glands that are found in the skin.
3. Explain how the skin helps in regulating body temperature. Mention at least two of the structures you labeled in your model.
4. How do the skin proteins – keratin, melanin, elastin and collagen – each contribute to our physical identity? How about the dermal papillae?