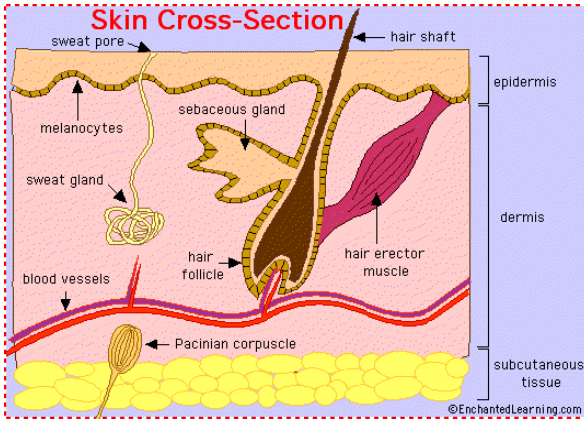
Name:_____ Period:_____ Date:_____

Integumentary System: Lab Exercises

The Integumentary system includes the skin, hair, nails, sebaceous glands, and sweat glands. These organs provide a protective covering for deeper tissues, aid in regulating body temperature, prevent water loss, get rid of wastes, and aid in communication using sensory receptors.

Lab 1: Visualizing Changes in Skin Color due to



Continuous External Pressure

1. Obtain a small glass plate.
2. Press the heal of your hand firmly against the plate for a few seconds and then observe and record the color of your skin in the compressed area by looking through the glass.

What is the color of the compressed skin? _____

Why does the color of the skin change? _____

What would happen if the pressure was continued for an extended period in this area?

_____

Lab 2: Testing Tactile Localization

Your skin has many sensory "touch" receptors. Tactile localization is the ability to determine which portion of the skin has been touched. Once the skin's sensory receptors have received a message it sends this message to the brain and then the brain interprets the location and "meaning" of the feeling. (rough, smooth, soft, tickly, painful, ect…) The more sensory receptors in an area of the skin, the more accurately the brain can interpret the location.

1. Make sure your subject's eyes are closed. The experimenter touches the palm of the subject's hand with a marker. The subject should then try to touch the exact point with his/her own marker (different color).
2. Using a ruler, measure the error of localization in millimeters (the distance between the 2 marks).
3. Repeat the test in the same spot two more times, recording the error of localization for each test.
4. Average the results of the three trials and record your data in the chart.
5. Repeat this procedure on the fingertip, ventral forearm, and the back of hand.

Testing Tactile Location

Body Area Tested	Average error of localization
Palm of hand	_____
Fingertip	_____
Ventral forearm	_____
Back of hand	_____

Does the ability to localize the stimulus improve the second time?_____The third time? _____

Why do you think this happened? _____

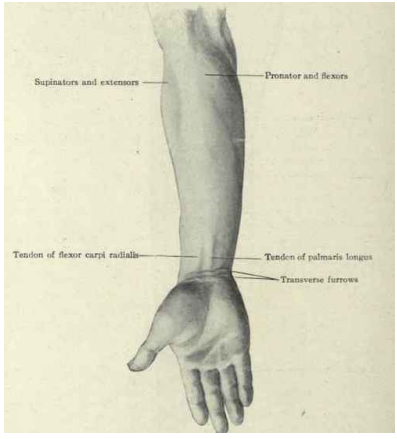
_____

Which area has the smallest error of localization and is therefore the most sensitive to touch?

_____

Lab 3: Demonstrating Adaptation of Touch Receptors

In many cases, when a stimulus is applied for a long period of time, the rate at which the receptors respond slows down. Your awareness of the stimulus declines or is lost until a change in the stimulus occurs. This is referred to as ADAPTATION. The touch receptors adapt.



1. Make sure your subject's eyes are closed.
2. Place a coin on the anterior surface of the subject's forearm, and determine how long the sensation persists for the subject. Using a timer, record the duration of the sensation in seconds in the chart.
3. Repeat the test, placing the coin at a different forearm location. Record the duration of the sensation.
4. After awareness of the sensation has been lost at the second site, stack three more coins atop the first one. Ask, does the pressure sensation return? If so,

record the duration of the sensation.

Are the same receptors being stimulated when the four coins, rather than one coin, are used? Explain your reasoning_____

_____

Lab 4: Plotting the Distribution of Sweat Glands

The appendages of the skin (hair, nails, sweat glands and oil glands) are all seen on the epidermis, but they begin in the dermis. Pores are the outlets for sweat glands and are widely distributed in the skin.

The sweat glands are controlled by the nervous system and are an important part of regulating the temperature of the body. The sweat glands secrete perspiration when the body temperature gets too high. When the perspiration evaporates off the skin it carries large amounts of body heat with it.

1. Using the iodine solution, paint an area of the left palm of your hand (avoid the creases) and a region of your left forearm. The painted area should be slightly larger than the paper squares to be used.
2. Allow the iodine to dry.
3. Mark one paper square with an "H" (for hand) and the other with an "A" (for arm). Tape each paper square over each iodine-painted area, and leave them in place for 15 minutes.
4. While waiting, continue to the next lab.
5. After 15 minutes, remove the paper and count the number of blue-black dots on each square. The appearance of a blue-black dot indicates the appearance of an active sweat gland. (The iodine in the pore dissolves in the sweat and reacts with the starch in the paper to produce the color.)

Which skin area tested has more sweat glands?_____

Lab 5: Microscopic Examination of Hair

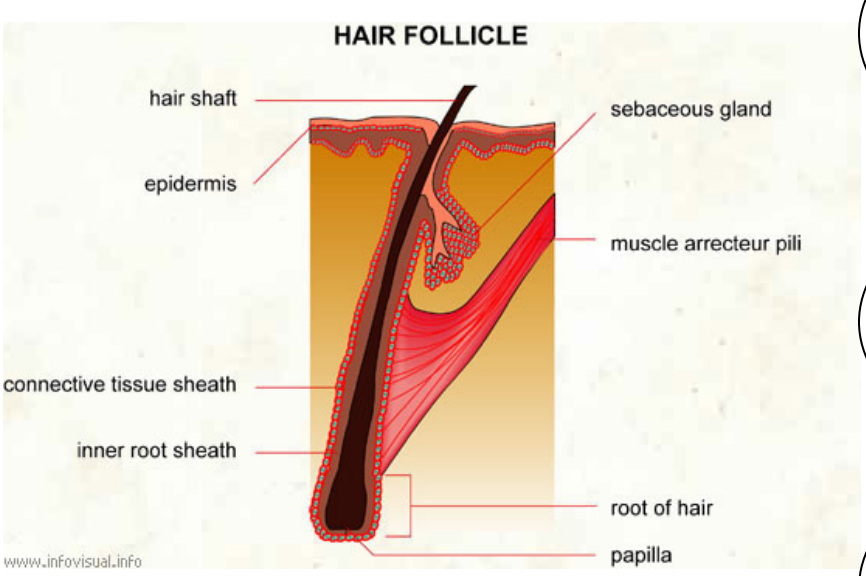
Hair is a form of protection and helps to maintain body temperature. The hair follicle is structured from both the epidermal and dermal cells. If you look carefully at the structure of the hair follicle you will see that it generally is in a slanted position. Small bands of smooth muscle cells – arrector pili – connect each hair follicle to the dermis. When these muscles contract the hair follicle is pulled upright, dimpling the skin surface causing the appearance of *goosebumps*.

1. Rub your fingers across your eyebrow and see it you can pluck an eyebrow hair to view under the microscope.
2. Once you've obtained your piece of hair, make a dry mount slide and view it under the microscope.
3. Examine it under low power, then medium, and then high power. Look for the small scale like structures of the hair shaft and the bulb. Illustrate your observation when viewing under medium or high power. Be sure to document the total magnification of the image your drew.

4. Repeat steps 2 & 3 using an eyelash and a piece of hair from your head.

How were the hairs similar?_____

How were the hairs different?_____



Eyebrow _____x

Eye lash _____x

Head Hair _____x