

**MC101 Anatomy and Physiology Laboratory**  
*Dry Laboratory (2-Hour Activity)*

**Student Information**

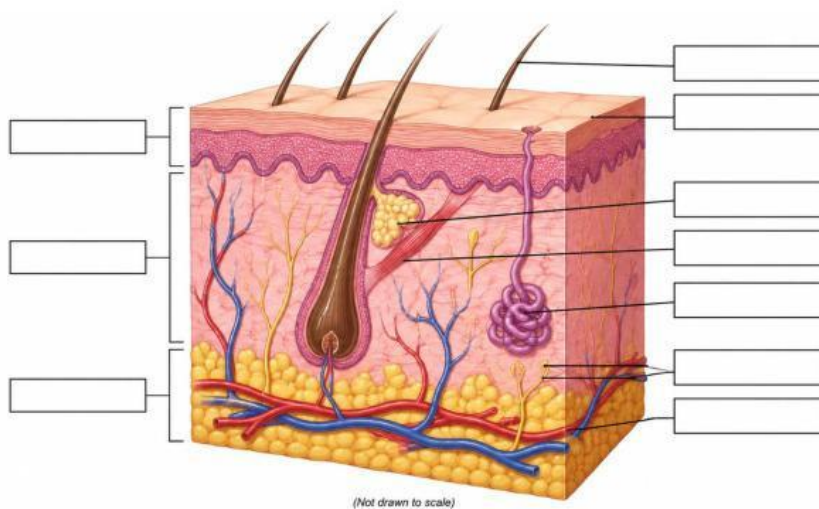
| Name | Year & Section | Date | Score |
|------|----------------|------|-------|
|      |                |      |       |

**Objectives**

- Identify the major layers of the skin.
- Describe the accessory structures of the integumentary system.
- Explain the major functions of the skin.
- Recognize common skin injuries.

**Activity 1. Label the Skin**

Using the skin diagram, label the epidermis, dermis, hypodermis, hair follicle, hair shaft, sebaceous gland, sweat gland, arrector pili muscle, blood vessels, and sensory nerve.



**Guide Questions:**

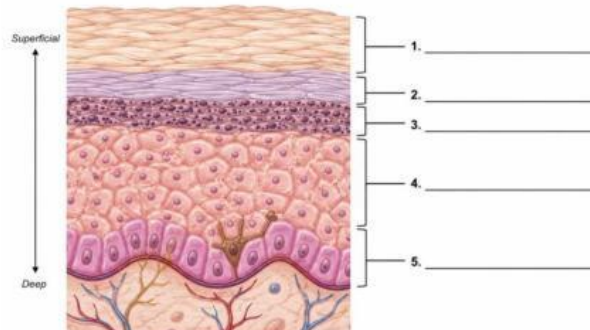
1. Which layer contains blood vessels? \_\_\_\_\_
2. Which layer contains adipose tissue? \_\_\_\_\_
3. Which layer protects against microorganisms? \_\_\_\_\_

**Activity 2. Epidermal Layers**

Label: Stratum corneum, stratum lucidum, stratum granulosum, stratum spinosum, and stratum basale.

**ACTIVITY 2. EPIDERMAL LAYERS**

Label the five layers of the epidermis using the terms provided.



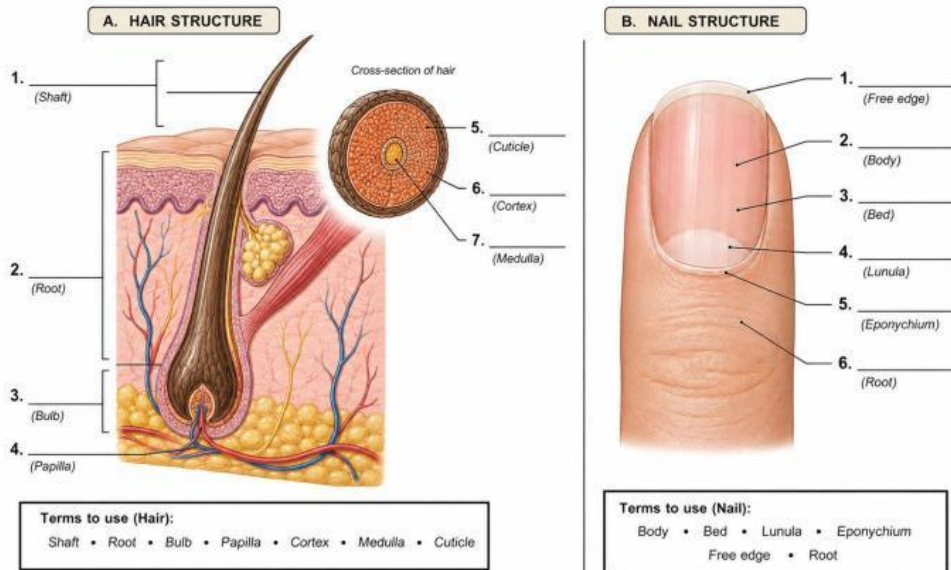
**Terms to use:**  
 Stratum corneum • Stratum lucidum • Stratum granulosum • Stratum spinosum • Stratum basale

**Guide Questions:**

1. Which layer produces new skin cells? \_\_\_\_\_
2. Which layer contains melanocytes? \_\_\_\_\_
3. Which layer is found only in thick skin? \_\_\_\_\_

### Activity 3. Hair and Nail Structures

Label the parts of the hair (shaft, root, bulb, papilla, cortex, medulla, cuticle) and nail (body, bed, lunula, eponychium, free edge, root).



Questions:

1. Function of hair: \_\_\_\_\_
2. Function of nails: \_\_\_\_\_

### Activity 4. Skin Functions

Complete the following:

- Match skin structures with their functions.

**Directions:** Write the letter of the correct function on the blank before each skin structure.

| SKIN STRUCTURES                                        | FUNCTIONS                                                                                    |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------|
| _____ 1. Sweat (sudoriferous) gland                    | A. Produces oil (sebum) to lubricate and waterproof the skin and hair.                       |
| _____ 2. Sebaceous (oil) gland                         | B. Produces sweat to cool the body and excrete wastes.                                       |
| _____ 3. Melanocytes                                   | C. Detects light touch and fine touch.                                                       |
| _____ 4. Hair                                          | D. Detects deep pressure and vibration.                                                      |
| _____ 5. Touch (Meissner's) corpuscle                  | E. Produces pigment (melanin) that gives skin color and protects from UV radiation.          |
| _____ 6. Pacinian (lamellated) corpuscle               | F. Provides the body's first line of defense against microorganisms and prevents water loss. |
| _____ 7. Blood vessels                                 | G. Helps regulate body temperature by vasodilation and vasoconstriction.                     |
| _____ 8. Keratinized stratified epithelium (epidermis) | H. Detects pain, temperature, and itch.                                                      |
| _____ 9. Nerve endings (free nerve endings)            | I. Provides insulation and helps protect the scalp.                                          |
| _____ 10. Arrector pili muscle                         | J. Causes hair to stand up ("goosebumps") and helps squeeze sebum toward the skin surface.   |

• Complete the Skin Pigments table.

Part B. Complete the Skin Pigments table.

| PIGMENT                                                                                               | PRODUCED BY (Cells) | COLOR | FUNCTION(S)             | WHERE FOUND             |
|-------------------------------------------------------------------------------------------------------|---------------------|-------|-------------------------|-------------------------|
| 1. Melanin<br>       | _____               | _____ | _____<br>_____<br>_____ | _____<br>_____<br>_____ |
| 2. Carotene<br>      | _____               | _____ | _____<br>_____<br>_____ | _____<br>_____<br>_____ |
| 3. Hemoglobin<br>    | _____               | _____ | _____<br>_____<br>_____ | _____<br>_____<br>_____ |
| 4. Bilirubin<br>     | _____               | _____ | _____<br>_____<br>_____ | _____<br>_____<br>_____ |
| 5. Oxyhemoglobin<br> | _____               | _____ | _____<br>_____<br>_____ | _____<br>_____<br>_____ |

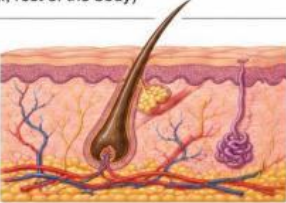
**Word Bank** (use as needed):

Melanocytes | Keratinocytes in hair follicle bulb | Yellow to orange | Brown to black | Red | Yellow  
 Gives skin, hair, and eye color; absorbs UV radiation and protects DNA | Found in epidermis (basal layer)  
 Found in diet (fruits and vegetables) | Found in dermis (blood in capillaries) | Found in bruises  
 Found in liver; deposited in skin | Gives yellow color to skin and sclera in jaundice

• Compare Thick Skin and Thin Skin.

Part C. Compare Thick Skin and Thin Skin.

Directions: Complete the table by writing the differences between thick skin and thin skin.

| FEATURE                        | THICK SKIN                                                                                                                                      | THIN SKIN                                                                                                                                                                  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Location                    | Found on _____<br>(e.g., palms of hands, soles of feet)                                                                                         | Found on _____<br>(e.g., rest of the body)                                                                                                                                 |
| 2. Diagram                     |                                                              |                                                                                        |
| 3. Epidermis                   | _____ (thick / thin)<br>Very thick stratum corneum                                                                                              | _____ (thick / thin)<br>Thin stratum corneum                                                                                                                               |
| 4. Hair                        | _____ (present / absent)                                                                                                                        | _____ (present / absent)                                                                                                                                                   |
| 5. Sebaceous (oil) Glands      | _____ (present / absent)                                                                                                                        | _____ (present / absent)                                                                                                                                                   |
| 6. Sweat Glands                | _____ (more / fewer)<br>(mostly eccrine)                                                                                                        | _____ (more / fewer)<br>(eccrine and apocrine)                                                                                                                             |
| 7. Sensory Receptors           | _____ (fewer / more)<br>(mainly pressure receptors)                                                                                             | _____ (fewer / more)<br>(touch, pain, temperature receptors)                                                                                                               |
| 8. Main Functions/ Adaptations | <ul style="list-style-type: none"> <li>Provides protection against _____</li> <li>Withstands _____</li> <li>Helps prevent _____ loss</li> </ul> | <ul style="list-style-type: none"> <li>More flexible and _____</li> <li>Allows for _____ (e.g., hair movement, sensation)</li> <li>Helps in _____ and sensation</li> </ul> |

• Complete the Skin Functions table.

| Function               | Description | Example |
|------------------------|-------------|---------|
| Protection             |             |         |
| Temperature Regulation |             |         |
| Sensation              |             |         |
| Vitamin D Synthesis    |             |         |
| Excretion              |             |         |



### Activity 5. Burns and Rule of Nines

Complete the burn classification table

| Burn Degree        | Skin Layers Affected | Characteristics | Two Common Causes | Two Treatments |
|--------------------|----------------------|-----------------|-------------------|----------------|
| First-Degree Burn  |                      |                 | 1.<br>2.          | 1.<br>2.       |
| Second-Degree Burn |                      |                 | 1.<br>2.          | 1.<br>2.       |
| Third-Degree Burn  |                      |                 | 1.<br>2.          | 1.<br>2.       |
| Fourth-Degree Burn |                      |                 | 1.<br>2.          | 1.<br>2.       |

**Directions:** Using the body diagram provided by your instructor, calculate the **Total Body Surface Area (TBSA)** burned.

**RULE OF NINES**

*Directions:* Use the body diagram to calculate the Total Body Surface Area (TBSA) burned.

**ANTERIOR VIEW**

**POSTERIOR VIEW**

**RULE OF NINES KEY**

|                         |     |
|-------------------------|-----|
| Head and neck           | 9%  |
| Each arm                | 9%  |
| Anterior trunk          | 18% |
| Posterior trunk         | 18% |
| Each leg                | 18% |
| Perineum (genital area) | 1%  |

**Total Body Surface Area (TBSA)**  
for adults = 100%

**CALCULATE THE TBSA**

- Entire right arm = \_\_\_\_\_ %
- Anterior trunk = \_\_\_\_\_ %
- Left leg = \_\_\_\_\_ %
- TOTAL TBSA BURNED = \_\_\_\_\_ %**

**GUIDE QUESTIONS**

- Which body part has the largest percentage (excluding head and neck)? \_\_\_\_\_
- Why is the Rule of Nines considered only an estimate? \_\_\_\_\_
- Why is it important to quickly estimate the TBSA in burn patients? \_\_\_\_\_

### Activity 6. Case Analysis

Case 1: A student developed sunburn after prolonged exposure to sunlight.

- Which skin layer was primarily affected?
- Which pigment protects against UV rays?

Case 2: A person touched a hot pan and immediately withdrew the hand.

- Which receptors detected the heat?
- Which skin function is demonstrated?