

# THE INTEGUMENTARY SYSTEM

- OBJECTIVE:**
1. Describe the main structural features of the epidermis and explain their functional significance.
  2. Explain what accounts for individual differences in skin color, and discuss the response of melanocytes to sunlight exposure.
  3. Describe the interaction between sunlight and vitamin D<sub>3</sub> production.
  4. Describe the structure and functions of the dermis.
  5. Describe the structure and functions of the hypodermis.

## A. Function(s)

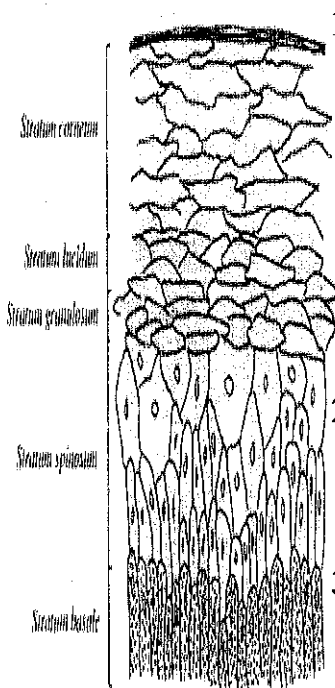
1. \_\_\_\_\_ : physical barrier, chemical barrier, bacteria, desiccation: water-proofing
2. \_\_\_\_\_ : maintenance : heat loss vs heat retention
3. \_\_\_\_\_ and \_\_\_\_\_ of nutrients : synthesizes vitamin D<sub>3</sub> stores lipids
4. \_\_\_\_\_ : touch, pressure, pain, temperature
5. Excretion and secretion : \_\_\_\_\_

## B. Components

1. Cutaneous membrane [Figure 5-1 (composite) p122]
  - a. Composition
    - 1) superficial epithelium (\_\_\_\_\_)
    - 2) underlying connective tissue (\_\_\_\_\_)
  2. Accessory organs
    - a. \_\_\_\_\_
    - b. \_\_\_\_\_
    - c. \_\_\_\_\_

## C. Cutaneous membrane (aka: skin) [Figure 5-2 p123]

1. \_\_\_\_\_ : thick skin → palms & soles vs thin → rest of body
  - a. Strata : \_\_\_\_\_



- 1) stratum \_\_\_\_\_ (aka: basale)
  - a) \_\_\_\_\_ layer firmly attached to basement membrane
  - b) forms epidermal \_\_\_\_\_ that extend into the dermis \_\_\_\_\_ for \_\_\_\_\_ of nutrients from blood vessels
  - c) ridge \_\_\_\_\_ increase \_\_\_\_\_ and are genetically determined (in finger tips → finger prints)
  - d) \_\_\_\_\_ generation and growth of new cells
  - e) contain \_\_\_\_\_
- 2) stratum \_\_\_\_\_
  - a) "spiney" layer
  - b) cells resemble miniature \_\_\_\_\_ due to cytoplasmic shrinkage
- 3) stratum \_\_\_\_\_
  - a) "grainy" from \_\_\_\_\_
  - b) durable, water-resistant, basic structure of hair, calluses, nails

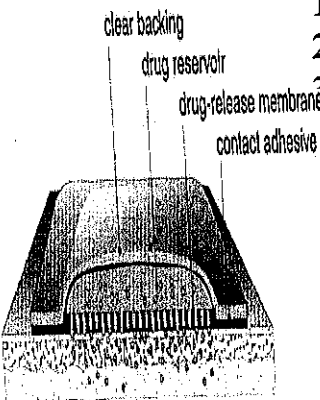
- 4) stratum \_\_\_\_\_
  - a) clear layer found \_\_\_\_\_ in \_\_\_\_\_
  - b) densely packed cells
- 5) stratum \_\_\_\_\_
  - a) 15-30 layers flattened, dead epithelial cells
  - b) tightly connected by desmosomes so shedding is in sheets
  - c) accumulate large amounts of keratin hence  
 “ \_\_\_\_\_ ”
  - d) \_\_\_\_\_ for cell to reach this layer
  - e) relatively dry so unsuitable for \_\_\_\_\_

**b. Pigmentation**

- 1) caused by interaction between pigments and blood flow
- 2) \_\_\_\_\_
  - a) yellow-orange pigment accumulating in epidermal cells
  - b) can be converted to vitamin A
- 3) \_\_\_\_\_
  - a) brown, yellow-brown, or black [Figure 5-3 p125]
  - b) produced by \_\_\_\_\_; synthesized from molecules of \_\_\_\_\_ & \_\_\_\_\_ w/i intracellular vesicles; \_\_\_\_\_ to germinativum and color entire epidermis
  - c) UV radiation from sunlight benefits by stimulating synthesis of vitamin D<sub>3</sub>
  - d) color differences are \_\_\_\_\_  
 \_\_\_\_\_  
 determined from \_\_\_\_\_ of melanocytes
- 4) alterations
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
  - c) \_\_\_\_\_

**c. drug administration**

- 1) lipid-soluble solvents can be carried across membrane
- 2) mvmt. is slow until dermal vessels is reached
- 3) transdermal administration via \_\_\_\_\_
  - a) highly concentrated
  - b) examples
    - (1) \_\_\_\_\_
    - (2) \_\_\_\_\_
    - (3) \_\_\_\_\_
    - (4) \_\_\_\_\_



**d. cancer : skin cancer is most common type [specifics with diseases lessons]**

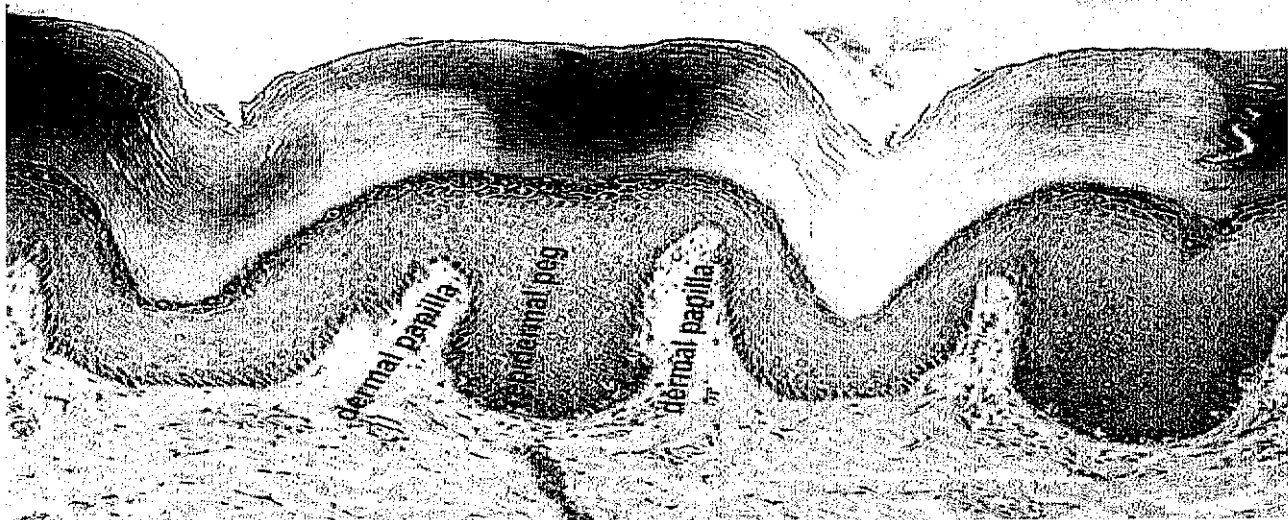
2. \_\_\_\_\_

**a. Function**

- 1) \_\_\_\_\_ dermis to epidermis
- 2) \_\_\_\_\_ w/ other systems (CV, lymph, nervous)

**b. Composition**

- 1) \_\_\_\_\_ (upper) region
  - a) loose c.t. that supports and nourishes the epidermis
  - b) dermal \_\_\_\_\_ : fingerlike projections extending upward btw epidermal ridges enhancing surface area for delivery of nutrients, etc.
  - c) contains capillaries and nerves supplying the surface of skin
- 2) \_\_\_\_\_ (lower) region
  - a) deeper meshwork of dense, irregular c.t.
  - b) composed of both elastic and collagen fibers for flexibility/ prevent damage
  - c) contains hair follicles, sweat glands, blood vessels, nerves, pressure receptors..
- 3) alterations in c.t. cause wrinkling and cancer



3. Subcutaneous (\_\_\_\_\_)

**a. Function**

- 1) \_\_\_\_\_ position of skin
- 2) \_\_\_\_\_

**b. Composition**

- 1) loose c.t. w/ fat cells
- 2) providing infants and small children w/ baby fat to reduce heat loss
- 3) provides for energy reserve and shock absorption

4) \_\_\_\_\_ so subcutaneous injections  
useful for administering drugs.

c. \_\_\_\_\_ beginning at puberty

- 1) men → neck, upper arms, lower back, buttocks
- 2) women → breasts, buttocks hips, and thighs
- 3) both to belly

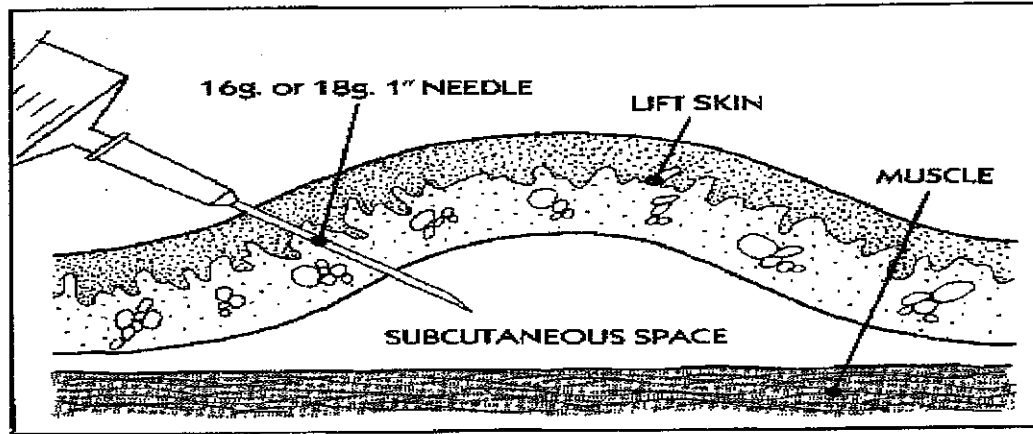


Figure 2. Subcutaneous Injection.

**Kid City** **PLANET**

**SKIN DEEP**

About 75 percent of the dust in your house could be your own skin! New skin replaces old skin, so people shed tiny bits of it everyday.

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Illustr. by Bill Basso

A cartoon illustration of a young child with spiky hair, wearing a striped shirt and shorts, sitting on the floor. The child is holding a vacuum cleaner hose and is looking at a small pile of dust. A speech bubble above the child says "Yuck!". To the left of the child is a vacuum cleaner. The background is a simple floor with some toys.