Chapter 6. The Integumentary System

I. STRUCTURE OF THE SKIN (p. 112)

A. Epidermis
   a. Is the surface layer (strata) of the skin
   b. Is constantly lost through wear and tear (exfoliation)
   c. Is avascular (meaning it has no blood vessels)
   d. Made up of 2 layers:
      1. Stratum basale-
         ▪ Deepest layer of the epidermis
         ▪ Nourishment provided by capillaries (small vessels) in the dermis
         ▪ Only living cells exist here
         ▪ Cells are constantly dividing, pushing upward to the surface (a new layer each month)
         ▪ Produce melanin – a pigment that colors the skin (melanocytes produce this)
      2. Stratum corneum
         ▪ Uppermost layer of the epidermis
         ▪ Cells die from loss of nourishment
         ▪ Develop large amount of keratin (type of protein)
         ▪ Keratin thickens and protects the skin

B. Dermis
   a. Also called the corium
   b. Made up of elastic connective tissue tissue
   c. Is vascular: it has blood vessels and many nerves
   d. All appendages (structures that protrude) start here
   e. Thickness varies in different parts of the body
   f. Some portions extend into the epidermis to form papillae (ridges, fingerprints)
   g. Ridges (papillae) are determined by heredity

C. Subcutaneous Layer
   a. Under the dermis
   b. Sometimes called the superficial fascia or hypodermis
   c. Connects the skin to the muscles
   d. Consists of loose connective tissues and lots of fat
   e. Fat (adipose) is for insulation, cushioning and energy reserves
   f. Blood vessels supply cells with nutrients and regulate body temperature
   g. Lots of nerves and and nerve endings
II. ACCESSORY STRUCTURES OF THE SKIN (p. 114)

D. Glands

1. Sebaceous (Oil) Glands
   i. secrete oil called sebum
   ii. lubricates the skin and hair
   iii. Ducts open into the hair follicles
   iv. blackheads are mixtures of dried sebum and keratin
   v. pimples result if infections set in

2. Sudoriferous (Sweat) Glands
   i. Coiled, tube-like structures in dermis and subcutaneous layers
   ii. each one opens at a pore (eccrine glands)
   iii. regulate body temperature through regulation of sweat
   iv. sweat consists of small amounts of dissolved salts and wastes
   v. secretions from underarms (apocrine glands) mix with bacteria and cause body odor
   vi. Cerumious glands in the ear canal produce ear wax (cerumen)
   vii. Ciliary glands at the edge of the eyelids and secrete tears
   viii. Mammary glands in breast secrete milk

E. Hair
   a. covers almost all of the body except palms and soles
   b. composed of keratin and not living cells
   c. stars from cells at the bottom of hair follicles
   d. arrector pili muscle is attached to hair follicle causing goosebumps when contracted
   e. Shaft is the part that projects above the skin
   f. Root is the portions below the skin
   g. Purpose in animals is for a warning sign, and a means of conserving heat

F. Nails
   a. Protects fingers and helps in grasping objects
   b. Made of hardened keratin from cells in the epidermis
   c. New cells form at the nail root
   d. Remainder of the nail plate rests on the nail bed
   e. Lunula – pale end is lighter because it is thicker
   f. Sickness causes changes in color, thickness, shape, and texture
      i. heart disease
      ii. malnutrition
      iii. anemia
III. FUNCTIONS OF THE INTEGUMENTARY SYSTEM (p. 116) – Questions for you to answer!

1. Protection
   a. How does the skin *mechanically* protect the skin against infection? *Shedding of skin*
   b. What other substances does the skin keep out? – *bacterial toxins, and chemicals*

2. Dehydration
   a. Give the two main substances that the body uses to keep the skin from drying out. *Keratin of the epidermis and sebum from oil glands*

3. Regulation of body temperature
   a. How does the body cool itself down when it gets too hot? *Blood vessels dilate; sweating*
   b. What happens in the skin when it is exposed to cold conditions? *Blood vessels constrict*

4. Collection of Sensory Information
   a. Why is the skin regarded as one of the most sensory organs of the body? *Many nerve endings*
   b. How are pain and changes in temperature detected? *Free nerve endings*
   c. What major part of the body do the skin receptors work with in order to do all these things? *Brain and spinal cord*

5. List at least three other functions that the skin is able to do
   a. Allows for absorption of medications (through patches attached to skin)
   b. Excretion - Minimal amounts of water and electrolytes
   c. Manufactures vitamin D (needed for bone development) by UV radiation exposure

6. Color – *melanin:*
   a. How is skin color determined? *By the pigments present in the skin and blood*
   b. What is *discoloration?* Any distinct change in color of the skin
   c. In what other structures in the body can melanin be found? *The eye, hair, and some tumors*
   d. How is melanin helpful to the skin? *Protects the skin from harmful UV radiation*
   e. What is tanning? *UV rays trigger melanocytes to produce an increase in melanin, giving a darker color to skin*
7. Color – hemoglobin, carotene and bile
   a. What is hemoglobin? Pigment found in red blood cells that make them red
   b. Pallor is paleness of the skin caused by reduced blood flow
   c. Flushing is redness caused by increased blood flow to skin
   d. Cyanosis is blueish color due to not enough oxygen in blood, such as asthma
   e. Where is carotene found and how does its lack/presence affect skin color? Pigment from carrots and other orange veggies; excess amounts produce an yellow-red (orange) tinge to the skin
   f. What is jaundice and what causes it? Yellow color due to excess bile pigments (from liver)

8. Explain the difference between surface lesions and deep lesions, and give some examples of each.
   Surface lesions only go as deep as the epidermis; examples are pimples and blisters (macula, papule)
   Deep lesions reflect wounds that break the skin and go into the dermis; eg. lacerations, ulcers, & fissures

9. What are burns? A reddening, swelling or blistering of the skin, due to chemical, heat or hot objects
   (Rule of nines – how to tell what percentage of your body has been burned, see pg 120)
10. Describe the four levels of burns:
   a. Superficial, involves the epidermis only; called first degree burn
   b. Superficial partial thickness; epidermis and part dermis; severe sunburn or scalding
   c. Deep partial thickness involves epidermis and dermis; blistering, nerve damage; second degree
   d. Full thickness; involves skin and possibly muscle; third degree burn

<table>
<thead>
<tr>
<th>Disease</th>
<th>What is it?</th>
<th>What does it look like or do to the skin?</th>
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<tbody>
<tr>
<td>Dermatitis</td>
<td>Inflammation of the skin</td>
<td>Causes redness, itching, lesions</td>
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<tr>
<td>Sunburn</td>
<td>Excessive exposure to the UV sun rays</td>
<td>Becomes swollen, blistered, red</td>
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<td>Cancer</td>
<td>melanoma; Basil cell carcinoma, can be benign (not deadly) or malignant (deadly)</td>
<td>Develops tumors; melanoma is deadly;</td>
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<td>Common acne</td>
<td>Disease of sebaceous glands</td>
<td>Pimples and blackheads</td>
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<td>Impetigo</td>
<td>Staph infection</td>
<td>Acute blisterlike lesions, very contagious</td>
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<tr>
<td>Alopecia</td>
<td>Male pattern Baldness</td>
<td>Loss of hair from the head</td>
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<tr>
<td>Athlete's foot</td>
<td>Fungal infection</td>
<td>Rash or lesions generally between toes</td>
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