Chapter 6 Part 1 Objectives:

• Define organ, and associate the skin as an organ of the integumentary system.
• List the general functions of the skin.
• Describe the structure of the layers of the skin.
• Summarize the factors that determine skin color.
• Relate the anatomy and physiology of each accessory structure of the skin.

Integumentary System

• Organs are body structures composed of two or more different tissues.
• The skin and its accessory organs make up the integumentary system.
• The skin consists of an outer epidermis and a dermis, connected to underlying tissue by the subcutaneous layer (hypodermis).

Skin = Integument = Cutaneous Membrane

• 7 Functions:
  • Protective covering
  • Regulates body temperature
  • Manufactures Vitamin D
  • Sensory function
  • Temporary storage of fat, glucose, water and salts
  • Screens out harmful ultraviolet radiation
  • Absorbs certain drugs

The Structure of Skin

• 2 basic layers
  • Epidermis
    • Outermost covering
    • Stratified Squamous epithelium
    • Avascular
  • Dermis
    • True skin
    • Connective tissue
    • Vascular

Epidermis

• Five layers:
  • Stratum corneum
  • Stratum lucidum
  • Stratum granulosum
  • Stratum spinosum
  • Stratum basale

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*Image of skin anatomy and physiology.*
• Top four layers of cells lack blood vessels but the stratum basale is close to the dermis and is nourished by dermis blood vessels.
• Cells are pushed outward as new cells are formed, and become keratinized as they die.
• All layers are present in skin except stratum lucidum is only found in the thicker palms and soles.

Skin Color
• Melanocytes, which lie deep in the epidermis and underlying dermis, produce a pigment called melanin that protects deeper cells from the sun's ultraviolet rays.
• Melanocytes pass melanin to nearby cells through cytocrine secretion.

• Skin color results from a combination of genetic, environmental, and physiological factors.
• Genetic differences in skin color result from differing amounts of melanin produced and in the size of melanin granules.
• Exposure to sunlight causes darkening of skin as melanin production increases.
• Circulation within dermal blood vessels affects skin color.

• PAPILLAE
  • Ridges in stratum basale that arise from dermis
  • Create permanent ridges in fingers, palms and soles of feet
  • These “friction ridges” help with grip
  • Cause “fingerprints”

• Clinical observations
  • freckles or liver spots = melanocytes in a patch
  • albinism = inherited lack of tyrosinase; no pigment
  • vitiligo = autoimmune loss of melanocytes in areas of the skin produces white patches
Skin Color as Diagnostic Clue

- Jaundice
  - yellowish color to skin and whites of eyes
  - buildup of yellow bilirubin in blood from liver disease
- Cyanotic
  - bluish color to nail beds and skin
  - hemoglobin depleted of oxygen looks purple-blue
- Erythema
  - redness of skin due to enlargement of capillaries in dermis
  - during inflammation, infection, allergy or burns

Dermis

- Thicker inner layer that contains:
  - Connective tissue
  - Blood vessels
  - Nerve endings
  - Muscles
  - Hair follicles
  - Oil and sweat glands
  - Fat cells

Nerve Receptors in Dermis

- Sensory nerves
  - heat, cold, touch, pain and pressure
- Touch receptors
  - close to the surface
- Pressure receptors are deeper

Subcutaneous Layer

- Also called the hypodermis
- Lies under the dermis (not really part of integumentary system)
- Made up of loose connective tissue
- Contains half of the body’s stored fat

Accessory Structures

- Hair
- Nails
- Sweat Glands
- Sebaceous Glands
Hair

- Almost everywhere on the body
- Length, thickness, type and color varies
  - Outer layer = CORTEX
  - Inner layer = MEDULLA
  - Part under the skin = ROOT
  - Part outside the skin = SHAFT
- FOLLICLE = pocket in epidermis, hair inside
- PAPILLA = tuft of tissue in root, contains capillaries
- A bundle of smooth muscle cells, called the *arrector pili muscle*, attaches to each hair follicle. These muscles cause goose bumps when cold or frightened.
- Hair color is determined by genetics; melanin from melanocytes is responsible for most hair colors. Dark hair has *eumelanin* while blonde and red hair have *pheomelanin*.

Nails

- Nail is formed in the nail bed or MATRIX
- Epidermal cells fused together and fill with keratin

Sweat Glands

- Also known as sudoriferous glands – exocrine.
- Perspiration is 99% water
- Distributed over the entire skin surface
- Large numbers under the arms, palms of hands, soles of feet and forehead
- Duct extends to form a pore in the skin, perspiration excreted through the pores
- May be activated by heat, pain, fever and nervousness
- Average fluid loss is 500 ml per day

Sebaceous Glands

- Sebaceous glands (holocrine glands) are associated with hair follicles and secrete *sebum* that waterproofs and moisturizes the hair shafts.
Chapter 6 Part 2 Objectives:

- Explain how skin helps regulate body temperature.
- Describe how to calculate burns and the symptoms of the three degrees of burns.
- Describe the events that are part of wound healing.
- List various diseases of the skin and describe their symptoms and cures.