Hole’s Human
Anatomy and Physiology

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Chapter 6
Skin and the Integumentary System

• Composed of several tissues
• Maintains homeostasis
• Protective covering
• Retards water loss
• Regulates body temperature
• Houses sensory receptors
• Contains immune system cells
• Synthesizes chemicals
• Excretes small amounts of waste
Skin Cells

• help produce Vitamin D needed for normal bone and tooth development

• some cells (keratinocytes) produce substances that simulate development of some WBCs
Layers of Skin

- **Epidermis**
- **Dermis**
- **Subcutaneous layer**
  - beneath dermis
  - not part of skin
Subcutaneous Layer

- hypodermis
- loose connective tissue
- adipose tissue
- insulates
- major blood vessels
Epidermis

- lacks blood vessels
- **keratinized**
- thickest on palms and soles (0.8-1.4mm)
- **melanocytes** provide melanin
- rests on **basement membrane**
- stratified squamous
Epidermis

Layers of Epidermis
- stratum corneum
- stratum lucidum
- stratum granulosum
- stratum spinosum
- stratum basale
Dermis

- on average 1.0-2.0mm thick
- contains dermal papillae
- binds epidermis to underlying tissues
- irregular dense connective tissue
- muscle cells
- nerve cell processes
- specialized sensory receptors
- blood vessels
- hair follicles
- glands
Hair Follicles

- epidermal cells
- tube-like depression
- extends into dermis
- hair root
- hair shaft
- hair papilla
- dead epidermal cells
- melanin
- arrector pili muscle
Nails

• protective coverings
• nail plate
• nail bed
• lunula
Sebaceous Glands

- usually associated with hair follicles
- holocrine glands
- secrete sebum
- absent on palms and soles
Sweat Glands

- sudoriferous glands
- widespread in skin
- originates in deeper dermis or hypodermis
- eccrine glands
- apocrine glands
- ceruminous glands
- mammary glands
Regulation of Body Temperature
Problems in Temperature Regulation

**Hyperthermia** – abnormally high body temperature

**Hypothermia** – abnormally low body temperature
Skin Color

Genetic Factors
- varying amounts of melanin
- varying size of melanin granules
- albinos lack melanin

Environmental Factors
- sunlight
- UV light from sunlamps
- X rays
- darkens melanin

Physiological Factors
- dilation of dermal blood vessels
- constriction of dermal blood vessels
- accumulation of carotene
- jaundice
Healing of Cuts

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Healing of Burns

**First degree** burn – superficial partial-thickness

**Second degree** burn – deep partial-thickness

**Third degree** burn – full-thickness
- autograft
- homograft
- various skin substitutes
Rule of Nines

Anterior head and neck 4½%
Anterior trunk 18%
Anterior and posterior upper extremities 9%
Perineum 1%
Anterior and posterior lower extremities 36%
Posterior head and neck 4½%
Posterior trunk 18%
Posterior upper extremities 9%
Posterior lower extremities 18%

100%
Life Span Changes

- Skin becomes scaly
- Age spots appear
- Epidermis thins
- Dermis becomes reduced
- Loss of fat
- Wrinkling
- Sagging
- Sebaceous glands secrete less oil
- Melanin production slows
- Hair thins
- Number of hair follicles decrease
- Nail growth becomes impaired
- Sensory receptors decline
- Body temperature unable to be controlled
- Diminished ability to activate Vitamin D
Clinical Application

Acne Vulgaris

• most common skin disorder
• sebum and epithelial cells clog glands
• produces whiteheads and blackheads (comedones)
• anaerobic bacteria trigger inflammation (pimple)
• largely hormonally induced
• androgens stimulate sebum production
• treatments include antibiotics, topical creams, birth control pills