Skin (Integument)

- Consists of three major regions
  - Epidermis – outermost superficial region
  - Dermis – middle region
  - Hypodermis (superficial fascia) – deepest region

Epidermis

- Composed of keratinized stratified squamous epithelium, consisting of four distinct cell types and four or five layers
- Cell types include keratinocytes, melanocytes, Merkel cells, and Langerhans’ cells
- Outer portion of the skin is exposed to the external environment and functions in protection
Cells of the Epidermis

- Keratinocytes – produce the fibrous protein keratin
- Melanocytes – produce the brown pigment melanin
- Langerhans’ cells – epidermal macrophages that help activate the immune system
- Merkel cells – function as touch receptors in association with sensory nerve endings

Layers of the Epidermis: Stratum Basale (Basal Layer)

- Deepest epidermal layer firmly attached to the dermis
- Consists of a single row of the youngest keratinocytes
- Cells undergo rapid division, hence its alternate name, stratum germinativum

Layers of the Epidermis: Stratum Spinosum (Prickly Layer)

- Cells contain a weblike system of intermediate filaments attached to desmosomes
- Melanin granules and Langerhans’ cells are abundant in this layer
Layers of the Epidermis: Stratum Granulosum (Granular Layer)
- Thin; three to five cell layers in which drastic changes in keratinocyte appearance occurs
- Keratohyaline and lamellated granules accumulate in the cells of this layer

Layers of the Epidermis: Stratum Lucidum (Clear Layer)
- Thin, transparent band superficial to the stratum granulosum
- Consists of a few rows of flat, dead keratinocytes
- Present only in thick skin

Layers of the Epidermis: Stratum Corneum (Horny Layer)
- Outermost layer of keratinized cells
- Accounts for three quarters of the epidermal thickness
- Functions include:
  - Waterproofing
  - Protection from abrasion and penetration
  - Rendering the body relatively insensitive to biological, chemical, and physical assaults

Dermis
- Second major skin region containing strong, flexible connective tissue
- Cell types include fibroblasts, macrophages, and occasionally mast cells and white blood cells
- Composed of two layers – papillary and reticular
Layers of the Dermis: Papillary Layer

Papillary layer
- Areolar connective tissue with collagen and elastic fibers
- Its superior surface contains peglike projections called dermal papillae
- Dermal papillae contain capillary loops, Meissner’s corpuscles, and free nerve endings

Layers of the Dermis: Reticular Layer

Reticular layer
- Accounts for approximately 80% of the thickness of the skin
- Collagen fibers in this layer add strength and resiliency to the skin
- Elastin fibers provide stretch-recoil properties

Hypodermis

- Subcutaneous layer deep to the skin
- Composed of adipose and areolar connective tissue

Skin Color

Three pigments contribute to skin color
- Melanin – yellow to reddish-brown to black pigment, responsible for dark skin colors
  • Freckles and pigmented moles – result from local accumulations of melanin
- Carotene – yellow to orange pigment, most obvious in the palms and soles of the feet
- Hemoglobin – reddish pigment responsible for the pinkish hue of the skin
Sweat Glands

Different types prevent overheating of the body; secrete sebum, cerumen and milk

- Eccrine sweat glands – found in palms, soles of the feet, and forehead
- Apocrine sweat glands – found in axillary and anogenital areas

Sebaceous Glands

- Simple glands found all over the body
- Soften skin when stimulated by hormones
- Secrete an oily secretion called sebum

Cutaneous Glands

- Ceruminous glands – modified apocrine glands in external ear canal that secrete cerumen (earwax)
- Mammary glands – specialized sweat glands that secrete milk
Developmental Aspects of the Integument:

**Fetal**
- Lanugo – downy coat of delicate hairs covering the fetus
- Vernix caseosa – substance produced by sebaceous glands that protects the skin of the fetus

**Adolescent to Adult**
- Skin and hair become oilier and acne may appear
- Skin shows the effects of cumulative environmental assaults around age 30
- Scaling and dermatitis become more common

**Old Age**
- Decreased elasticity and loss of subcutaneous tissue leads to wrinkles
- Decreased numbers of melanocytes and Langerhans’ cells increase the risk of skin cancer