Squamous Cell Carcinoma

Integument

- Largest organ
- 30% of all clinical diagnoses
- 1/3 of all tumors

Melanoma

Epidermis
- Stratified, squamous keratinized epithelium
- Derived from ectoderm
- Appendages
  - hair follicles
  - nails
  - sweat glands
  - sebaceous glands
  - mammary glands

Dermis
- Dense, irregular connective tissue
- Derived from dermatome of somites (mesoderm)

Hypodermis
- Superficial fascia

Epidermis
- Papillary dermis: numerous cells
  - Fibroblasts
  - loose collagen
  - type III reticular fibers
  - type VII: anchoring fibrils
  - fine elastic fibers
  - Capillaries and arteriovenous anastomoses
  - Immune system cells
  - Mechanoreceptors
  - Free nerve endings
  - Meissner’s corpuscles
  - Krause’s corpuscles

- Reticular dermis: fewer cells
  - Fibroblasts
  - type I collagen
  - thick elastic fibers
  - Sweat glands
  - Hair follicles
  - Arrector pili muscles
  - Sebaceous gland
  - Mechanoreceptors
    - Pacinian corpuscles
    - Ruffini corpuscles

Sensory Mechanoreceptors in the Integument

- Free nerve endings
- Epidermis and dermis
- Pacinian
  - Reticular dermis
  - Pressure
  - Vibration
  - Course touch
  - Tension
- Meissner
  - Dermal papillae
  - Light touch
- Krause
  - Cold
  - Mechanical stimuli
- Ruffini (not shown)
  - Tensile force
**Cell Types in Epidermis**
- Keratinocytes:
  - Intermediate filament is keratin
- Langerhans Cells
  - Dendritic cells
  - Present antigen
  - Vermiform/Birbeck granules
- Merkel Cells: mechanoreceptors
- Melanocytes: produce melanosomes

**Keratinocyte Cytomorphosis**
- **Stratum basale**
  - Proliferative
- **Stratum spinosum**
  - Desmosomes
  - Lamellar/membrane-coating granules
  - Involucrin
- **Stratum granulosum**
  - Keratohyalin granules
  - Filaggrin
  - Organelle degradation begins
- **Stratum lucidum**
  - Thick skin
- **Stratum corneum**
Thick Skin
- Identify layers

Dermal-Epidermal Junction
- Basal lamina
- Rete apparatus = dermal papillae + epidermal ridges

Epidermal rete ridge
Dermal papillae/ridge

Malpighian layer = basal + spinous layers

Stratum Basale
Note melanin in keratinocytes

Melanocytes
- Melanin synthesized in melanosomes within melanocytes
- Melanin synthesized from tyrosine by tyrosinase enzyme
- Tyrosinase activity is UV-inducible
- Cytocrine secretion of melanin granules into keratinocytes
- Melanocyte is derived from neural crest

Epidermal Appendages
- Glands
  - Sweat
  - Eccrine
  - Apocrine
  - Sebaceous
  - Mammary
- Hair follicles
- Nails
**Eccrine Sweat Gland**
- Simple coiled tubular gland
- Sympathetic, cholinergic innervation
- Duct
  - Stratified cuboidal
  - Opens on surface of epidermis
  - Resorbs potassium, sodium and chloride ions
  - Excretes urea and lactic acid
- Secretory unit
  - Mixed cuboidal, columnar, and pseudostratified
  - Merocrine mechanism
  - Dark cells
  - Mucous secretion
  - Clear cells
  - Aqueous secretion
  - Interocellular canaliculi
  - Basal striations
  - Contractile myoepithelial cells

**Apocrine Sweat Gland**
- Simple or branched coiled tubular gland
- Sympathetic, adrenergic innervation
- Duct
  - Stratified cuboidal
  - Opens into hair follicle
- Secretory unit
  - Large lumen stores secretion
  - Cuboidal or columnar
  - Merocrine mechanism
  - Odorless viscous secretion
  - Hormonally responsive, begin to function at puberty
- Contractile myoepithelial cells
- Restricted distribution: axilla, anus, areola, auditory canal, eyelids

**Sebaceous Gland**
- Branched tubuloalveolar gland
- Duct
  - Stratified squamous
- Usually open into hair follicles
- Secretory unit
  - Acini contain small basal cells and large round cells that fill the lumen
  - Holocrine mechanism
  - Oily sebum secretion
  - Hormonally responsive
**Hair Follicles**
- Growth occurs by proliferation of keratinocytes in matrix of hair bulb
- Controlled by dermal papillae
- Phases: Anagen, Catagen, Telogen
- Hormonally responsive
- Melanocytes in matrix determine hair color
- Arrector pili muscle connects to papillary dermis
- Hard keratin filaments and trichohyalin

**Layers (outside to inside):**
- Connective tissue sheath
- Glassy membrane/basal lamina
- External root sheath
- Internal root sheath
- Hair
  - cuticle
  - cortex
  - medulla

**Nails**
- Nail plate lies in nail fold
- Eponychium at proximal fold forms nail cuticle
- Lateral nail fold forms nail grooves
- Nail bed underlies nail plate
- Nail root is in proximal nail fold
- Growth occurs in the matrix
- Matrix is visible through nail as lunula
- Hyponychium lies under distal end of nail plate

**Proximal Nail Fold**
Mammary Gland

- Compound tubuloalveolar gland
- 15-20 lobes separated by connective tissue (collagen and adipose)
- Each lobe is drained by a lactiferous duct leading to the nipple
- Lactiferous sinuses near distal end of duct
- Near nipple, duct is stratified squamous throughout duct and sinuses; stratified cuboidal
- Small ductules leading to lactiferous duct: simple columnar
- Identical in male/female until puberty
- Estrogen and progesterone (ovary)
- Prolactin (anterior pituitary)
- Inactive gland
  - Similar to lactating, but alveoli are not developed

Lactating Mammary Gland

- During pregnancy
  - Elevated progesterone and estrogen (ovary and placenta)
  - Ducts grow and branch
  - Alveoli develop and mature
  - Cuboidal cells
  - Myoepithelial cells
  - Colostrum accumulates
  - Will be ejected day 1-3
  - Contains lymphocytes, monocytes, antibodies, lactalbumin, minerals, electrolytes

- Prolactin surge (anterior pituitary)
  - Stimulates milk production
  - Day 4-continuous
  - Contains proteins, lipids, antibodies, lactose, vitamins, minerals, electrolytes
- Oxytocin (posterior pituitary)
  - Stimulates milk ejection