The Integumentary System

Marieb Chapter 5
What is the Integumentary System?

Skin
Skin appendages*
  hairs
  glands
  nails
  *each is an organ
The Integument

The skin is your largest organ
epithelium
connective tissues
smooth muscle tissue
nervous tissue
Functions of the Skin

Protection
Temperature regulation
Excretion
Sensation
Synthesis of vitamin D
Layers of the Skin

Epidermis
   5 strata of epithelial cells
Dermis
   2 regions of C.T.
*Hypodermis
   variable thickness below the skin
A Diagram of the Skin. Figure 7.1

- Hair
- Sebaceous gland
- Sweat pore
- Stratum corneum
- Stratum granulosum
- Stratum spinosum
- Stratum basale
- Arrector pili muscle
- Sweat gland
- Arteriole
- Venule
- Motor nerve
- Sensory nerve
- Adipose tissue
- Hair bulb
- Epidermis
- Dermis
- Hypodermis
Epidermis

Tissue:
   Keratinized stratified squamous epithelium

Cells:
   keratinocytes  (produce keratin)
   melanocytes   (produce melanin)
   Merkel cells  (touch receptor)
   Langerhans cells (macrophages)
**Epidermal Strata**

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum basale</td>
<td>single row</td>
</tr>
<tr>
<td>Stratum spinosum</td>
<td>several rows</td>
</tr>
<tr>
<td>Stratum granulosum</td>
<td>3-5 rows</td>
</tr>
<tr>
<td>Stratum lucidum</td>
<td>few rows, variably visible</td>
</tr>
<tr>
<td>Stratum corneum</td>
<td>variable number of rows</td>
</tr>
</tbody>
</table>
Keratinization

Mitosis of keratinocytes
Produce keratohyaline & lamellated granules
  lamellated granules = secreted glycolipid
  extracellular waterproofing
keratohyaline becomes keratin
  a tough fibrous protein
**Dermis**

**Papillary layer**
- Areolar connective tissue “lamina propria”
  - dermal papillae
  - tactile (Meissner’s) corpuscles
  - dermal ridges -> epidermal friction ridges

**Reticular layer**
- Dense irregular connective tissue
  - lines of cleavage, flexure lines & stretch marks “striae”
The Hypodermis

AKA superficial fascia or subcutaneous layer
areolar & adipose connective tissues
lamellated (Pacinian) corpuscles (pg. 414)
Skin Color

Melanin
   amino acid (tyrosine) based pigment
   albinism vs. vitiligo

Carotene
   pigment from food (fruits/vegetables)

Hemoglobin
   iron containing pigment in RBC’s
   cyanosis vs. hematoma
Hairs

Longitudinal section
  shaft, root & bulb

Cross section
  medulla, cortex & cuticle

Around a hair
  follicle
    arrector pili (smooth) muscle
    hair root plexus

Color, texture, length & purpose?
The Structure of Hair and the Hair Follicle. Figure 7.9c

- Hair shaft
- Epidermis
- Sebaceous gland
- Hair follicle
- External root sheath
- Internal root sheath
- Hair root
- Hair bulb
- Matrix
- Dermal papilla
- Arrector pili muscle
- Blood vessels
Glands

Sebaceous “oil” glands
  simple branched alveolar on follicles
  holocrine secretion of sebum (a lubricant)
Sudoriferous “sweat” glands
  eccrine (perspiration): simple coiled tubular
  apocrine (body odor): larger, limited locations, on follicles

Modified sweat glands: ceruminous & mammary
Types of Skin Glands. Figure 7.11

- Sebaceous gland
- Sweat pore
- Hair
- Epidermis
- Dermis
- Hypodermis
- Hair follicle
- Apocrine sweat gland
- Eccrine sweat gland
Nails

Longitudinal view
  free edge
  body
  root
  hidden by eponychium
Nail bed
  grows from nail matrix “lunula”
  sits on hyponychium
Disorders & Changes

Aging
Burns
Cancer
The end...

Questions?