TISSUE…… the primary role

● Def: groups of cells with similar structure providing similar functions

● 5 Functions
  ○ Covering
  ○ Support
  ○ Movement
  ○ Control
  ○ Create organs/linings/ glands
Epithelial Tissue, pp115-116 Fig.4.2

Definition: sheet of cells that makes 2 physiological types:

1. Covers/forms linings
2. Forms glands- a group of tissues that secrete hormones, oils, sweat, and milk
## Classification of Epithelia, Fig. 4.2, pg. 116

<table>
<thead>
<tr>
<th>Layers</th>
<th>One</th>
<th>Simple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi</td>
<td></td>
<td>Stratified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shapes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td>2D</td>
<td>squamous</td>
</tr>
<tr>
<td>Short cube</td>
<td>3D</td>
<td>cub(e)oidal</td>
</tr>
<tr>
<td>Long column</td>
<td>3D</td>
<td>columnar</td>
</tr>
</tbody>
</table>
Simple Squamous Epithelial, Fig. 4.3, pg. 117

Flat, evenly spaced layer of cells
Simple cuboidal epithelium, Fig 4.3, pg.118
Short, even layers where nuclei are aligned
Simple Columnar Epithelium, Fig. 4.3, pg. 118

Tall, straight columns of cells where the nuclei are all at the same level
Pseudostratified columnar epithelium, Fig. 4.3, pg. 119

Single, tall layer of crowded short and tall cells
Stratified squamous epithelium, fig. 4.3, pg. 120

Thick, multi-layered with irregular cells in shape and size
Transitional epithelium, fig. 4.3, pg. 120

Fuller, irregular cuboidal tissue resembling a sponge
<table>
<thead>
<tr>
<th></th>
<th>Simple Duct</th>
<th>Compound duct</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tubular secretory structure</strong></td>
<td><img src="image1.png" alt="Simple Duct" /></td>
<td><img src="image2.png" alt="Compound duct" /></td>
</tr>
<tr>
<td><strong>Alveolar secretory structure</strong></td>
<td><img src="image3.png" alt="Simple Duct" /></td>
<td><img src="image4.png" alt="Compound duct" /></td>
</tr>
</tbody>
</table>

Glandular Epithelia, Fig. 4.6, pg. 123
Connective Tissue, Table 4.1, pg. 134

Most abundant in the body

4 types: connective, cartilage, bone and blood

Traits: vascular and made up of nonliving extracellular matrix
11 Types of Connective Tissue, Fig. 4.8, pp. 127-128

A. Loose

1. Areolar- wraps and cushions organs
2. Adipose- insulates, supports & protects organs
3. Reticular- forms soft internal skeleton
B. Dense

4. Regular- attaches muscle to bone

5. Irregular- provides strength & withstand tension

6. Elastic- stretches and recoils
C. Cartilage - avascular support, flexibility, and resistance to compression

7. Hyaline
8. Elastic
9. Fibrocartilage
10. Bone

11. Blood
Nervous Tissue, Fig. 4.9, pg. 135

Aka NEURONS
### 3 Types of Muscle Tissue, Fig.4.10, pp136-137

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeletal</td>
<td>Attached to bone</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Blood circulates as muscle contracts; involuntary control</td>
</tr>
<tr>
<td>Smooth</td>
<td>Moves substances along passageway</td>
</tr>
</tbody>
</table>
Ch. 5
Integumentary System

Layers of Skin
Appendages of the Skin
Homeostatic Imbalances
Skin STATS & FACTS

- Surface area: 23 square feet (twin size bed)
- Weighs: approx 10 lbs
- 7% of total body weight
- 1.5-4.4 mm thick
- Functions:
  - Protects from bacteria
  - Insulates water and heat
  - Synthesizes vita D

US & UK The Least Concerned About Climate Change

% of people who think climate change is 'not a serious problem'
3 Strata (layers) of the Skin
From superficial to deep:
1. Epidermis
2. Dermis
3. Hypodermis
1st layer: Epidermis has 5 strata from superficial to deep:

**Stratum Corneum**

St. Lucidum

St. Granulosum

St. Spinosum

St. Basale
Corneum

Protects the integument
Lucidum

- 2nd stratum
- Known as the ‘clear’ layer
Granulosum

- KERATINOCYTES form fibrous protein to waterproof skin
Spinosum
Contains
1. spiked shaped keratinocytes
2. Melanocytes
3. Dendritic cells - a specialized phagocyte
Basale

New Keratinocytes are going under mitosis

Dendritic cells aka Langerhans cells similar to phagocytes

Tactile cells aka Merkel are senosory receptors for touch
2nd layer: The Dermis

Made up of 2 strata: fibrous, connective tissue that is highly vascularized: rich in nerves, blood vessels and glands

Papillary

Reticular
Papillary

Includes the phagocytes, tactile cells and sweat pores

Made of areolar connective tissue

FRICITION RIDGES, a type of skin marking, allow for more traction and create the fingerprints - sweat allows them to mark surfaces
Reticular

80% is irregular dense fibrous connective tissue

Collagen fibers are deep to the epidermis forming CLEAVAGE/TENSION lines. Surgeons use these guidelines and incise parallel to a speedy recovery.

FLEXTURE LINES- are dermal folds near joints/palms, fingers/toes
Hypodermis

Stores fat - this layer thickens as a person gains weight

Females: breast & thighs  Males: ‘beer belly’

 Anchors the skin to muscles

The fatty layer absorbs shock

Insulates that retains heat
Skin Color, pp 154-155

3 pigments:

A. Melanin- yellow- tan-brown- black; only pigment made in the body; found in epidermis. Known as a natural sunscreen

B. Carotene- yellow-orange from plants

C. Hemoglobin- pinkish red; capillaries circulate in dermal layer that shows up on the transparent epidermis
Appendages of the Skin- Accessory Structures

- Nail
- Sweat gland
- Oil gland
- Hair
SWEAT GLANDS: 3,000,000 found all over the body

3 types:

Eccrine: forehead, palms, and soles of feet; made up of water, vitaC, antibodies and metabolic waste; pH of 4-6.

Mammary glands secrete milk

Apocrine: armpit (axillary) and genital/anus (anogenital) areas. Larger than eccrine and found in the dermis & hypodermis stratum. Contains sweat, fatty acids and proteins- milky or yellowish color; Ceruminous glands are a modified apocrine gland containing a waxy secretion+sebum
Hair aka Pili....PROTECT!

EX: Eyelashes and nose hairs prevent foreign invaders, hair on the head protects from sun.

<table>
<thead>
<tr>
<th>Type of Hair</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vellus</td>
<td>Body hair (peach fuzz) is soft, thin</td>
</tr>
<tr>
<td>Terminal</td>
<td>Coarse hair; Dead keratinocytes for durability and not split as easily. Shape of shaft determines texture. Melanin gives color (blonde, brown, red, black)</td>
</tr>
</tbody>
</table>
Nails

- Practical instrument made of hard keratin
- Physical feature can seek for further diagnosis
  - Yellow: respiratory or thyroid gland disorder
  - thick/yellow: fungal infection
  - Concave: possible iron deficiency
  - Horizontal lines: malnutrition
**ABCDE Rule** - recognize MELANOMA (cancer of melanocytes)

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Asymmetry Unmatching sides</td>
</tr>
<tr>
<td>B</td>
<td>Border Irregularity Indentations</td>
</tr>
<tr>
<td>C</td>
<td>Color Combinations of color in one mole: blue, red, brown, tan</td>
</tr>
<tr>
<td>D</td>
<td>Diameter Larger than eraser attached to pencil</td>
</tr>
<tr>
<td>E</td>
<td>Elevation Raised</td>
</tr>
</tbody>
</table>
2 Methods of how to assess burns:

**Palmar** estimate small burns (< 15% of total surface area) or very large burns (> 85%, when unburnt skin is counted). For medium sized burns, it is inaccurate.

**Rule of 9’s** to determine how much of the body surface is burned, this method divides the body into 11 sections, each worth 9%. The genitals=1%.
How Burns Affect the Body

On the cellular level: burns kill proteins and cause cell death in the affected areas.

Life-threatening: when the loss of body fluids contain proteins and electrolytes, results in dehydration and electrolyte imbalance. Renal shutdown and circulatory shock.

Treatment: IV to replace lost fluids
Homeostatic Imbalances of the Skin

ALBINISM

Inherited condition

Melanocytes do not make melanin

Skin is pink, hair is white, and irises are unpigmented
Boils & Carbuncles

Inflammation of hair follicles and sebaceous glands spreading to the hypodermis

Caused by a bacterial infection
Cold Sore

Small blisters that itch occurring around lips/in mouth

Virus activated by stress, fever, sunburn
Impetigo

Pink, raised bumps that develop yellow crust

Caused by staph infection & very infectious
Psoriasis

Chronic autoimmune condition

Red patches covered with silvery scales that itch, burn and crack
Eczema

Skin rash that itches, blisters and oozes

Common allergic reaction
Vitiligo

Autoimmune disease

Loss of melanocytes, causing spotted patches