

# **Chapter 4**

# **Tissue: The Living**

# **Fabric**

**Epithelial Tissue, pp115-124**

**Connective Tissue, pp124-134**

**Nervous Tissue, pp134-136**

**Muscle Tissue, pp136-138**

# 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:**

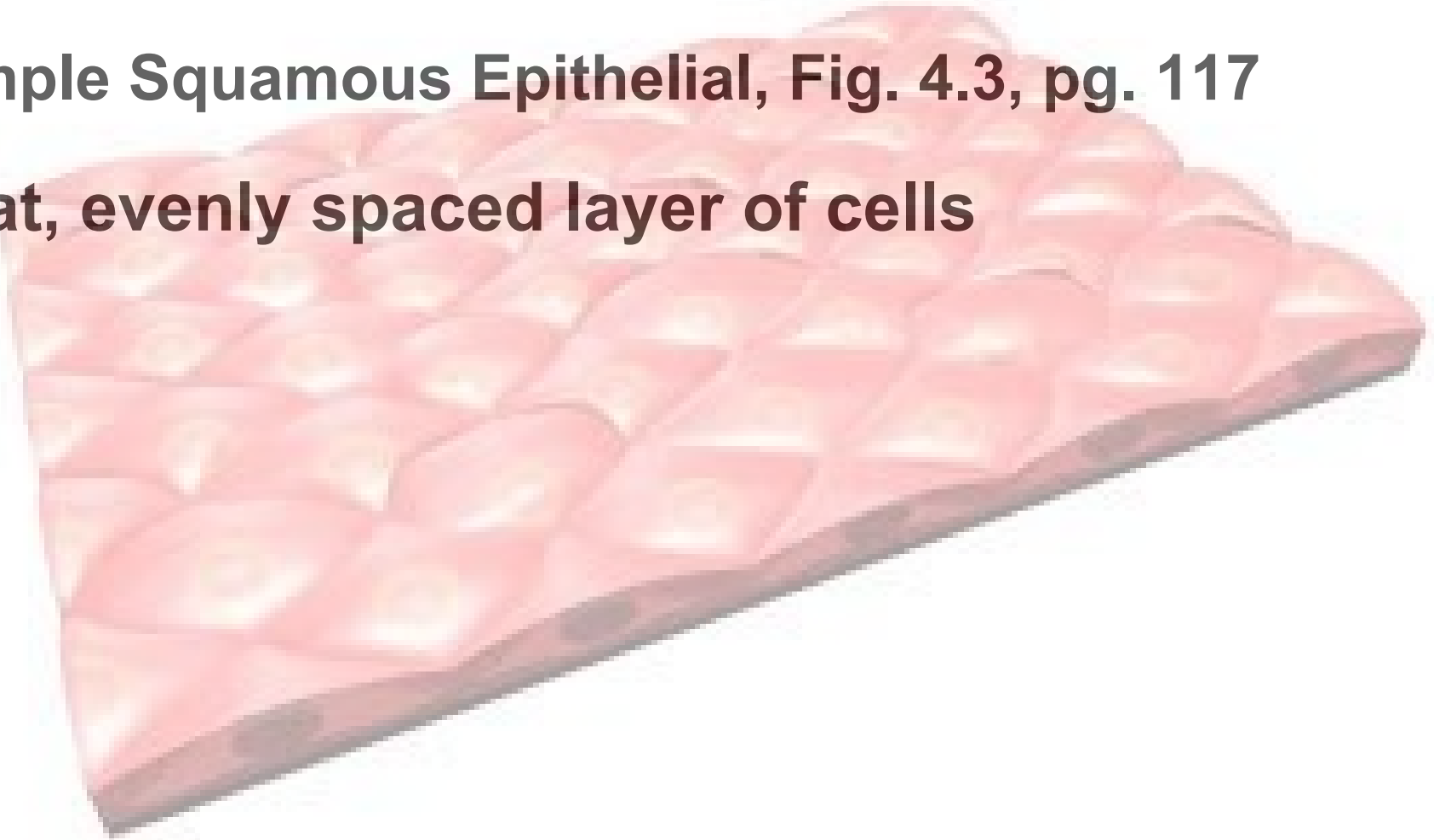
- 1. Covers/forms linings**
- 2. Forms glands- a group of tissues that secrete hormones, oils, sweat, and milk**

# Classification of Epithelia, Fig.4.2, pg.116

<b>Layers</b>	<b>One</b>	<b>Simple</b>	
	<b>Multi</b>	<b>Stratified</b>	
<b>Shapes</b>	<b>Square</b>	<b>2D</b>	<b>squamous</b>
	<b>Short cube</b>	<b>3D</b>	<b>cub(e)oidal</b>
	<b>Long column</b>	<b>3D</b>	<b>columnar</b>

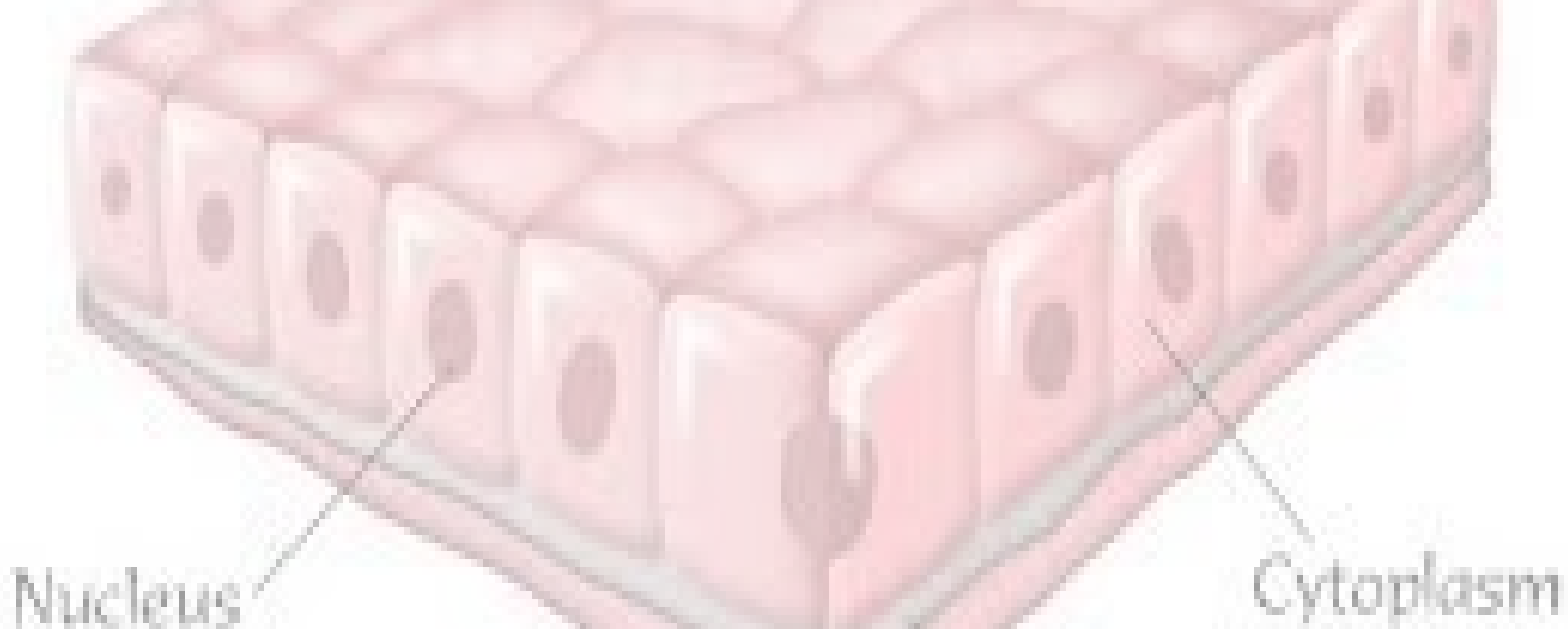
# **Simple Squamous Epithelial, Fig. 4.3, pg. 117**

**Flat, evenly spaced layer of cells**



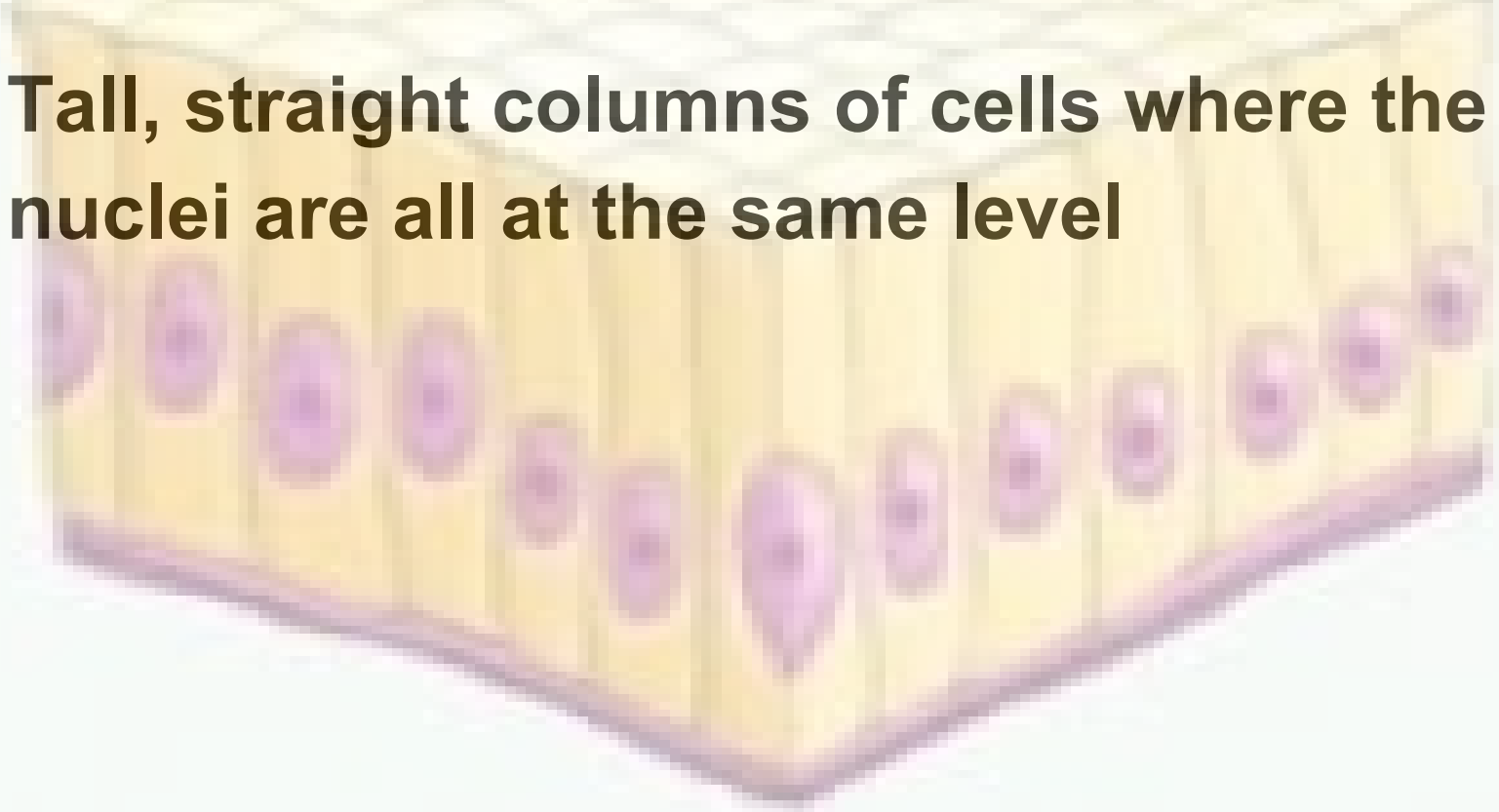
# Simple cuboidal epithelium, Fig 4.3, pg.118

Short, even layers where nuclei are aligned



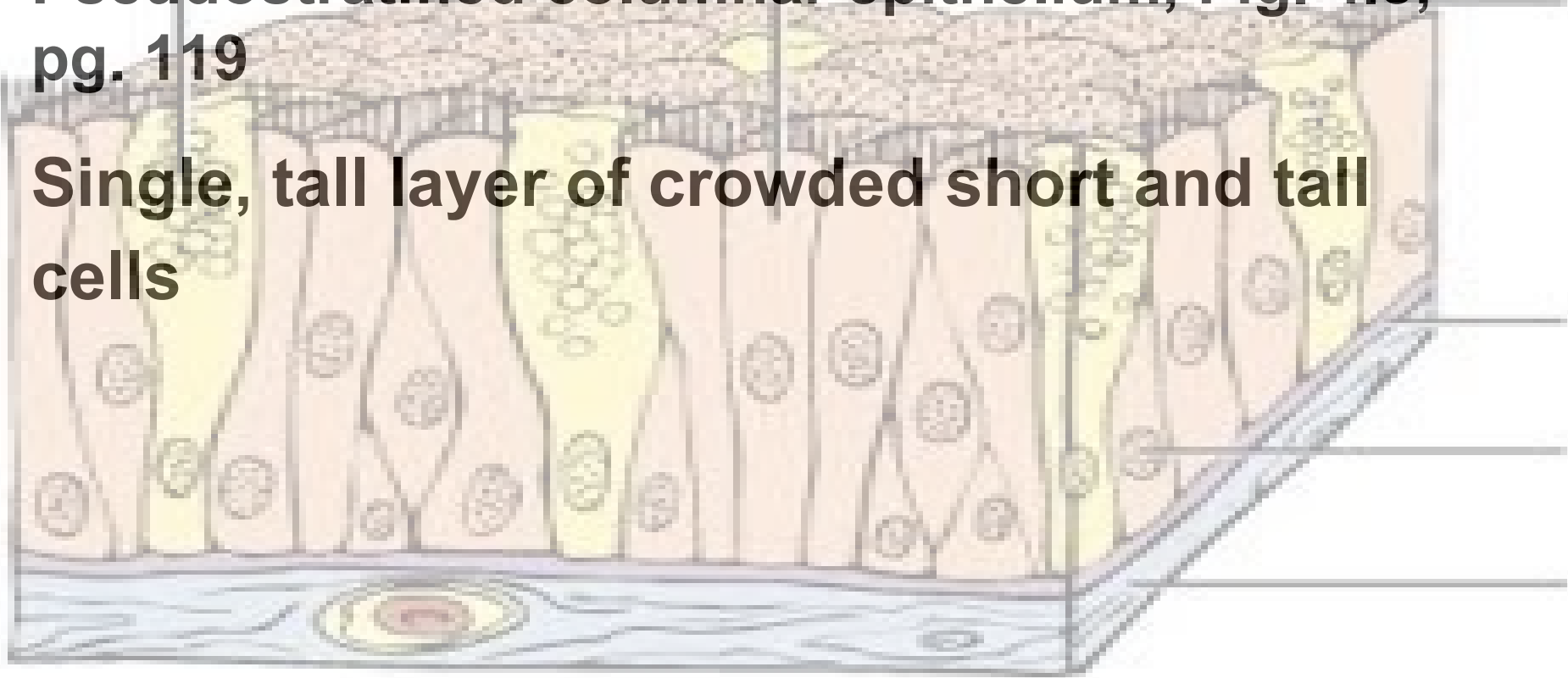
## **Simple Columnar Epithelium, Fig. 4.3, pg. 118**

**Tall, straight columns of cells where the nuclei are all at the same level**



**Pseudostratified columnar epithelium, Fig. 4.3,  
pg. 119**

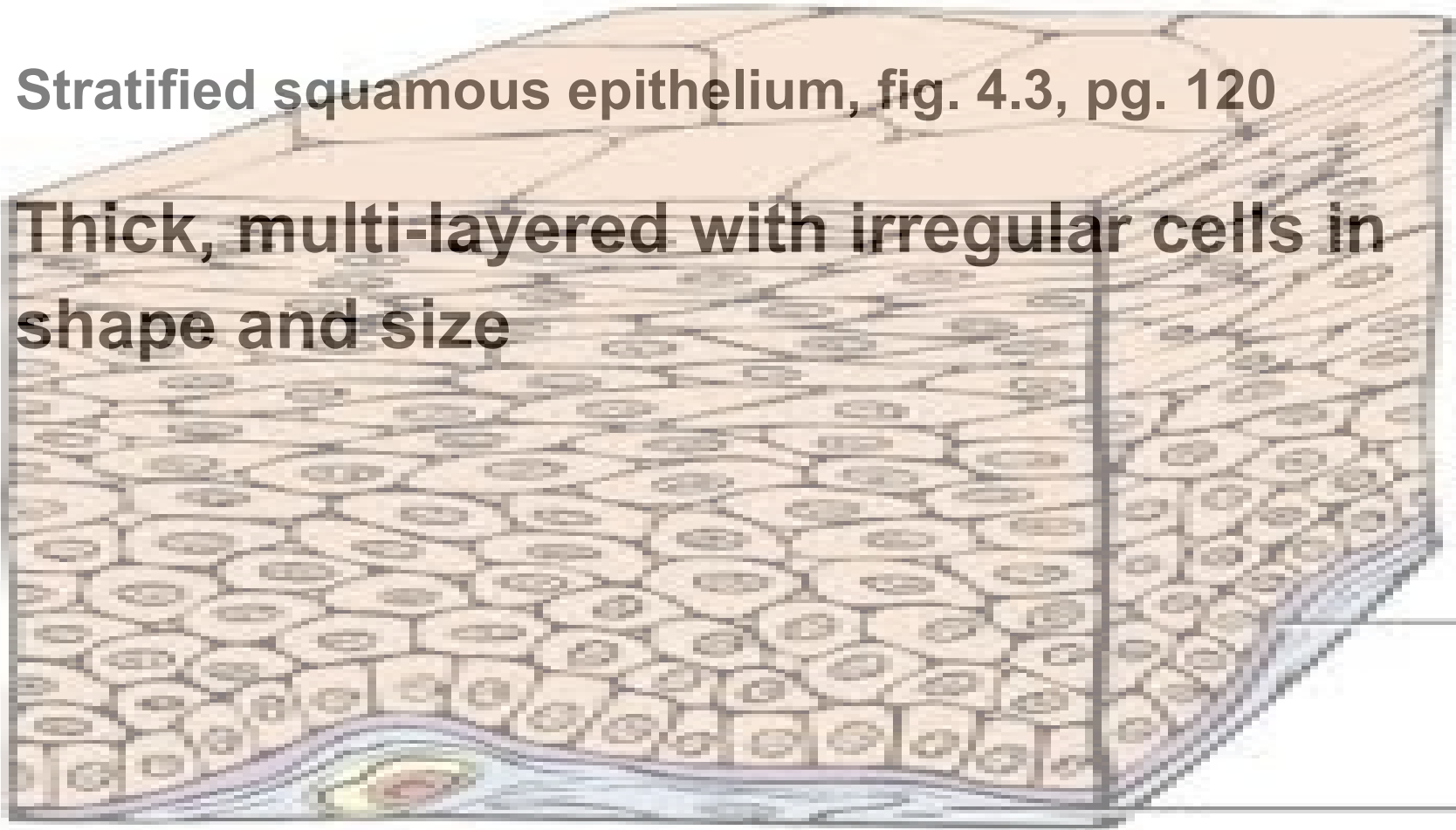
**Single, tall layer of crowded short and tall  
cells**





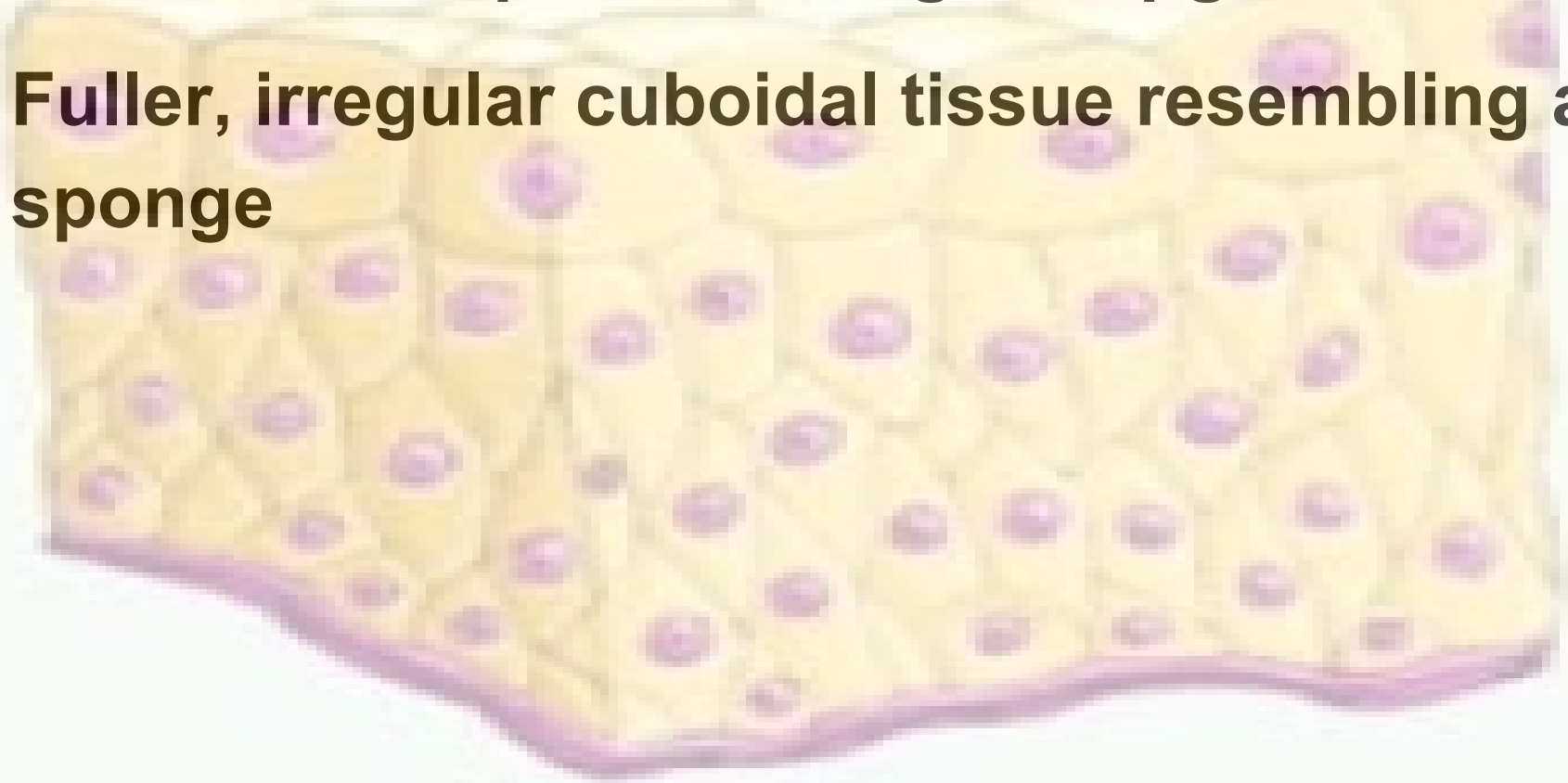
**Stratified squamous epithelium, fig. 4.3, pg. 120**

**Thick, multi-layered with irregular cells in shape and size**


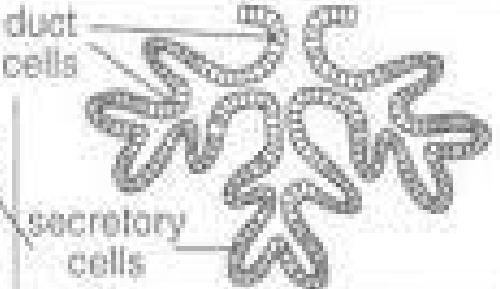
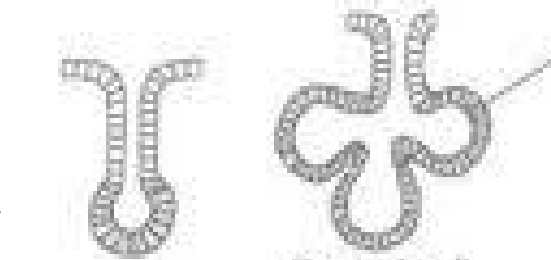
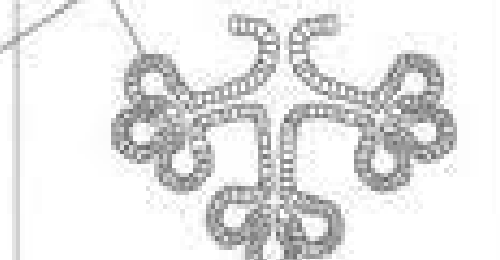


**Transitional epithelium, fig. 4.3, pg. 120**

**Fuller, irregular cuboidal tissue resembling a sponge**



# Glandular Epithelia, Fig. 4.6, pg. 123

	Simple Duct	Compound duct
Tubular secretory structure	 <p>(coiled) (branched)</p>	 <p>duct cells secretory cells</p>
Alveolar secretory structure	 <p>(branched)</p>	

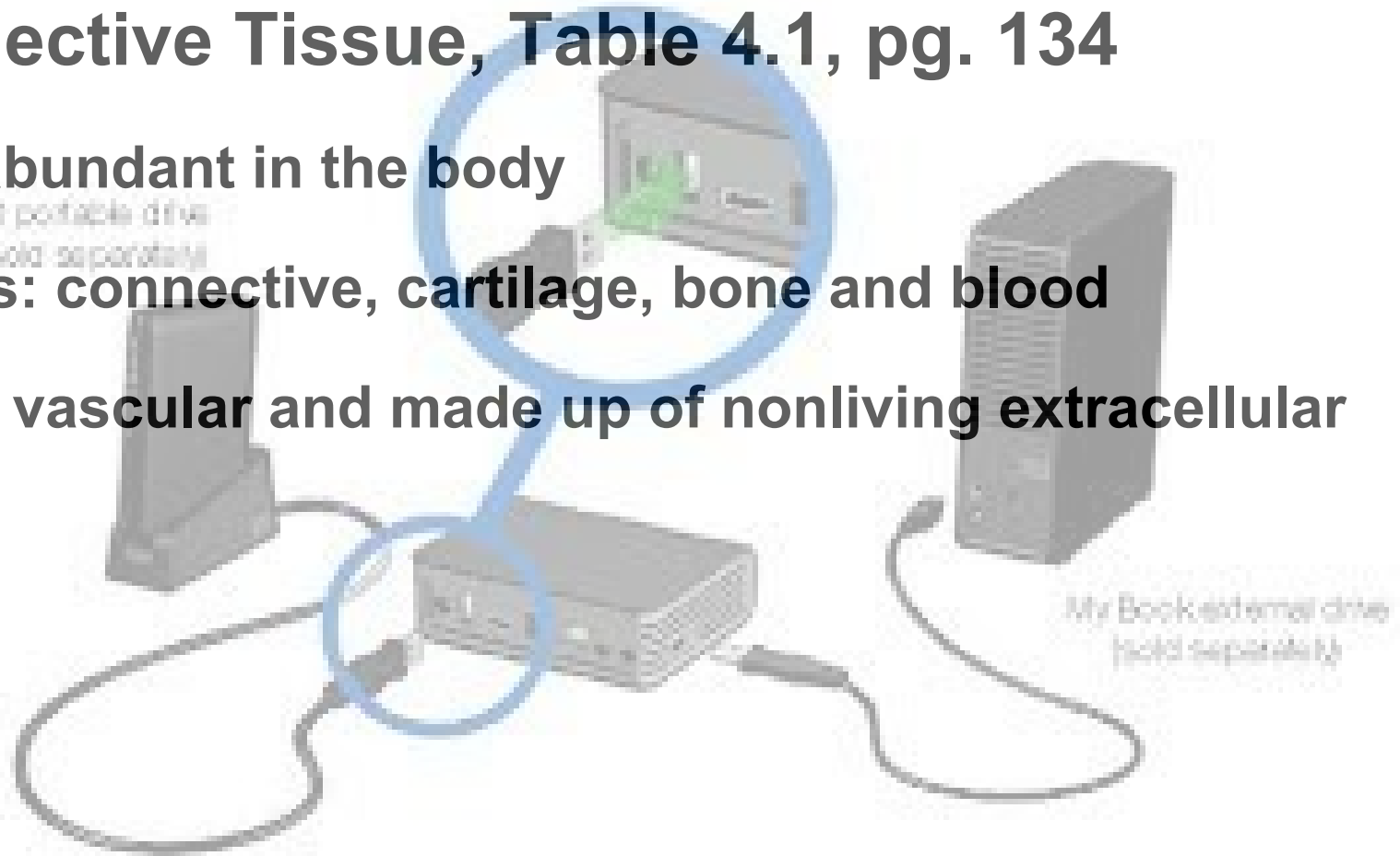
# Connective Tissue, Table 4.1, pg. 134

Most abundant in the body

My Passport portable drive  
(sold separately)

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



Attached Earlobes

A photograph of a human ear with an attached earlobe. A red double-headed vertical arrow is positioned on the side of the earlobe, indicating its attachment to the face.



Detached Earlobes

A photograph of a human ear with a detached earlobe. A red double-headed vertical arrow is positioned on the side of the earlobe, indicating its lack of attachment to the face.

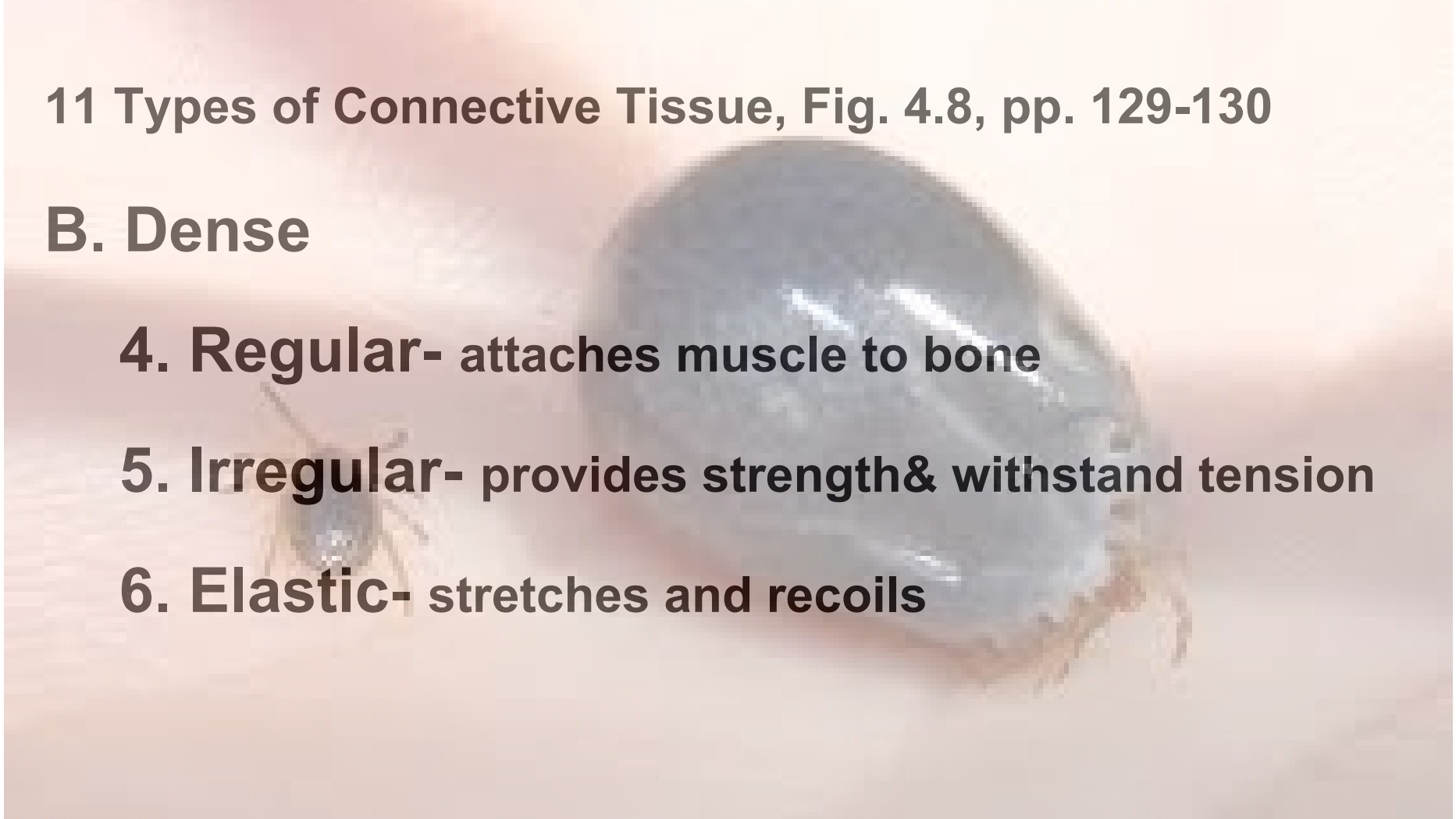
# 11 Types of Connective Tissue, Fig. 4.8, pp. 129-130

## B. Dense

4. **Regular-** attaches muscle to bone

5. **Irregular-** provides strength & withstand tension

6. **Elastic-** stretches and recoils



# 11 Types of Connective Tissue, Fig. 4.8, pp. 131-132

**C. Cartilage- avascular support, flexibility, and resistance to compression**

**7. Hyaline**

**8. Elastic**

**9. Fibrocartilage**

**11 Types of Connective Tissue, Fig. 4.8, pp.133-135**

**10. Bone**

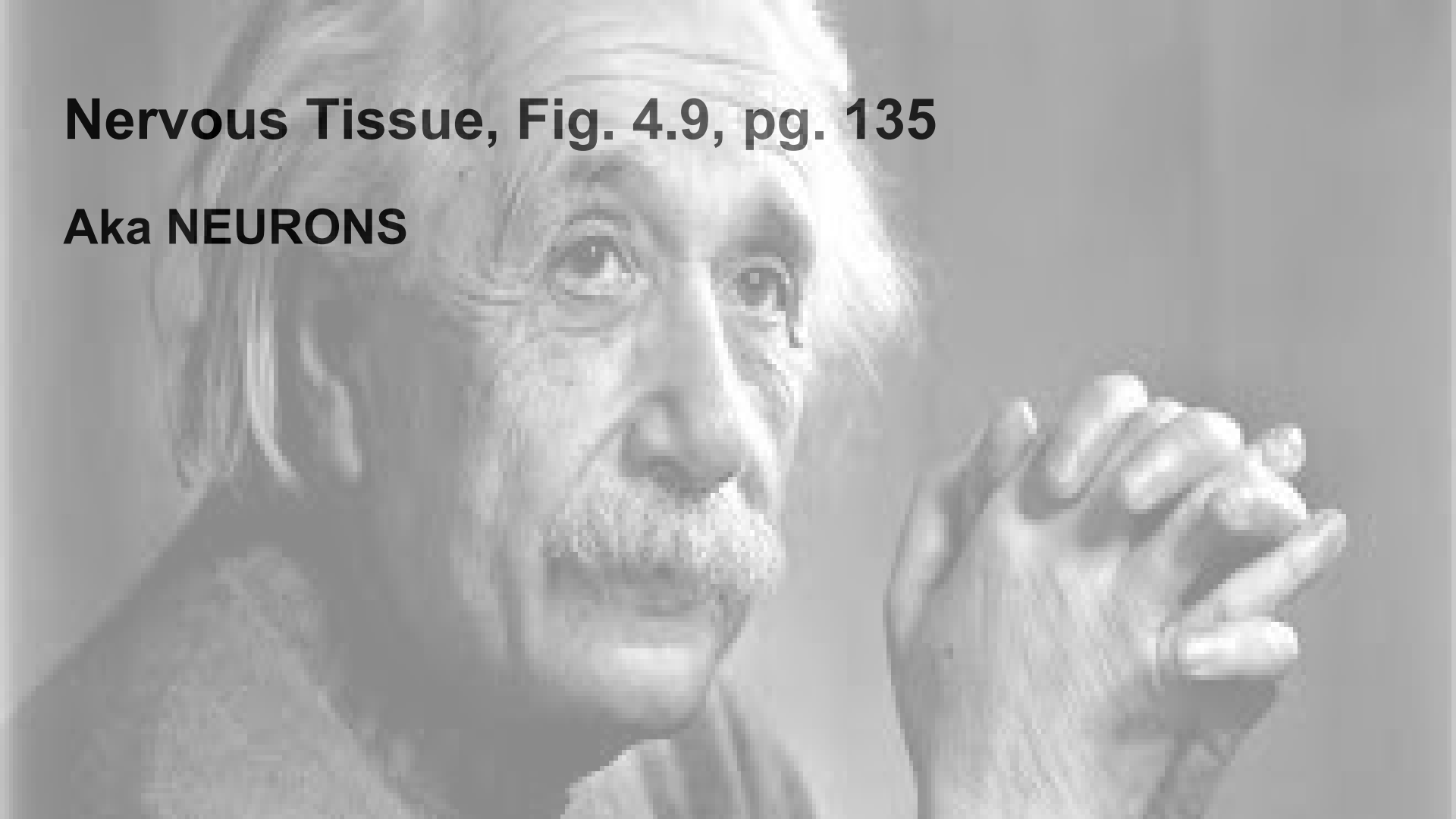
**11. Blood**





**Nervous Tissue, Fig. 4.9, pg. 135**

**Aka NEURONS**



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

<b>Muscle</b>	<b>Function</b>
<b>Skeletal</b>	<b>Attached to bone</b>
<b>Cardiac</b>	<b>Blood circulates as muscle contracts; involuntary control</b>
<b>Smooth</b>	<b>Moves substances along passageway</b>

# Ch. 5

# Integumentary

# System

Layers of Skin

Appendages of the Skin

Homeostatic Imbalances

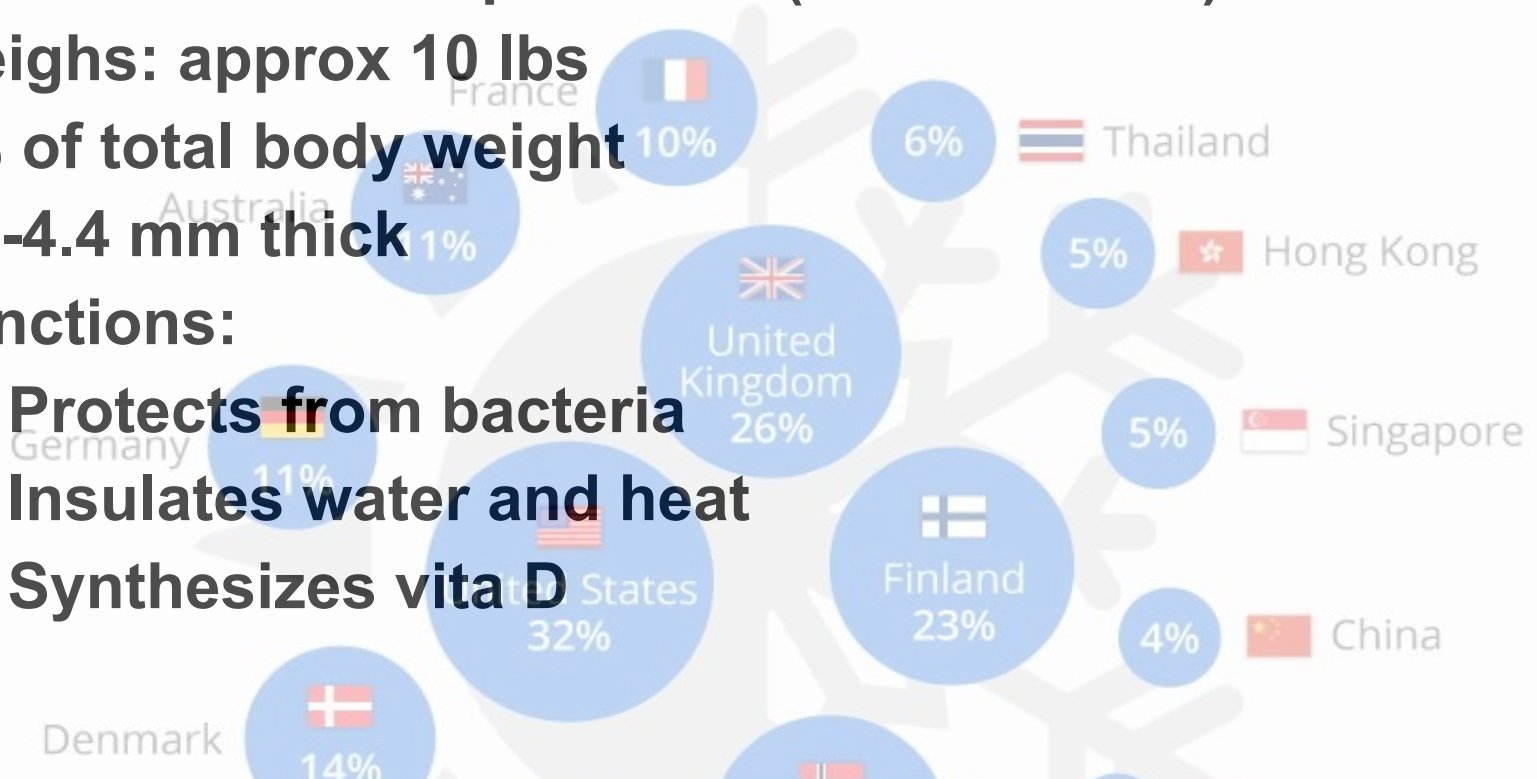


# Skin STATS & FACTS

## US & UK The Least Concerned About Climate Change

% of people who think climate change is 'not a serious problem'

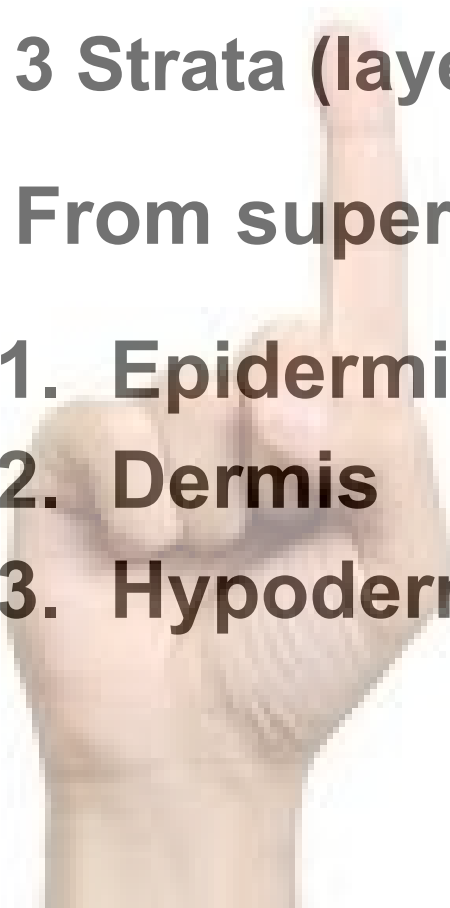
- **Surface area: 23 square feet (twin size bed)**
- **Weights: approx 10 lbs**
- **7% of total body weight**
- **1.5-4.4 mm thick**
- **Functions:**
  - **Protects from bacteria**
  - **Insulates water and heat**
  - **Synthesizes vita D**



# 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**

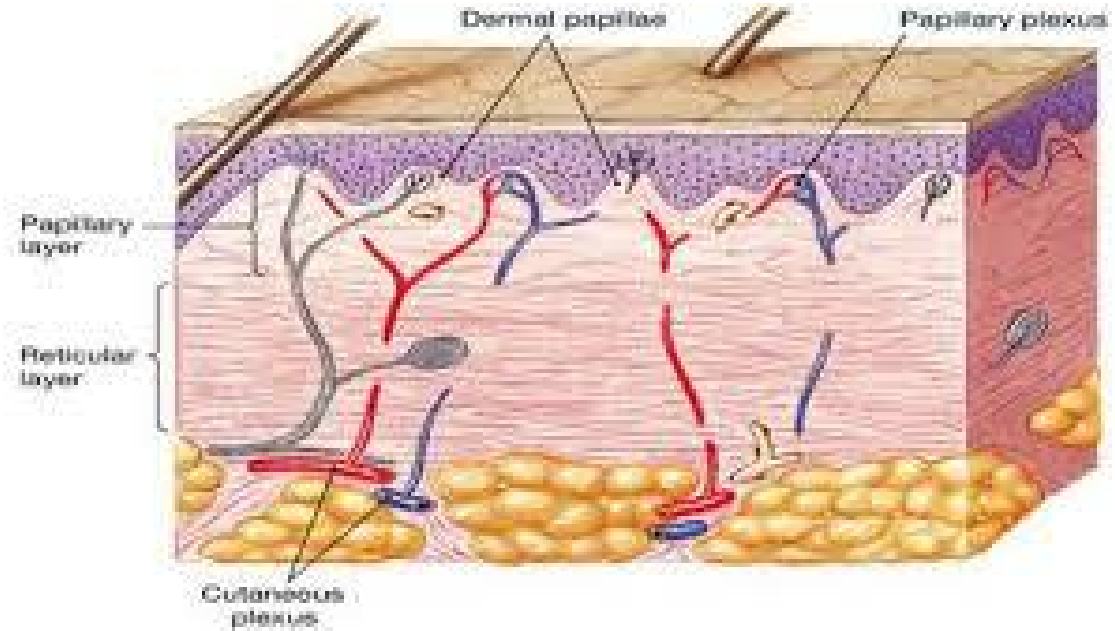
**Tactile cells aka Merkel are sensory receptors for touch**

## 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

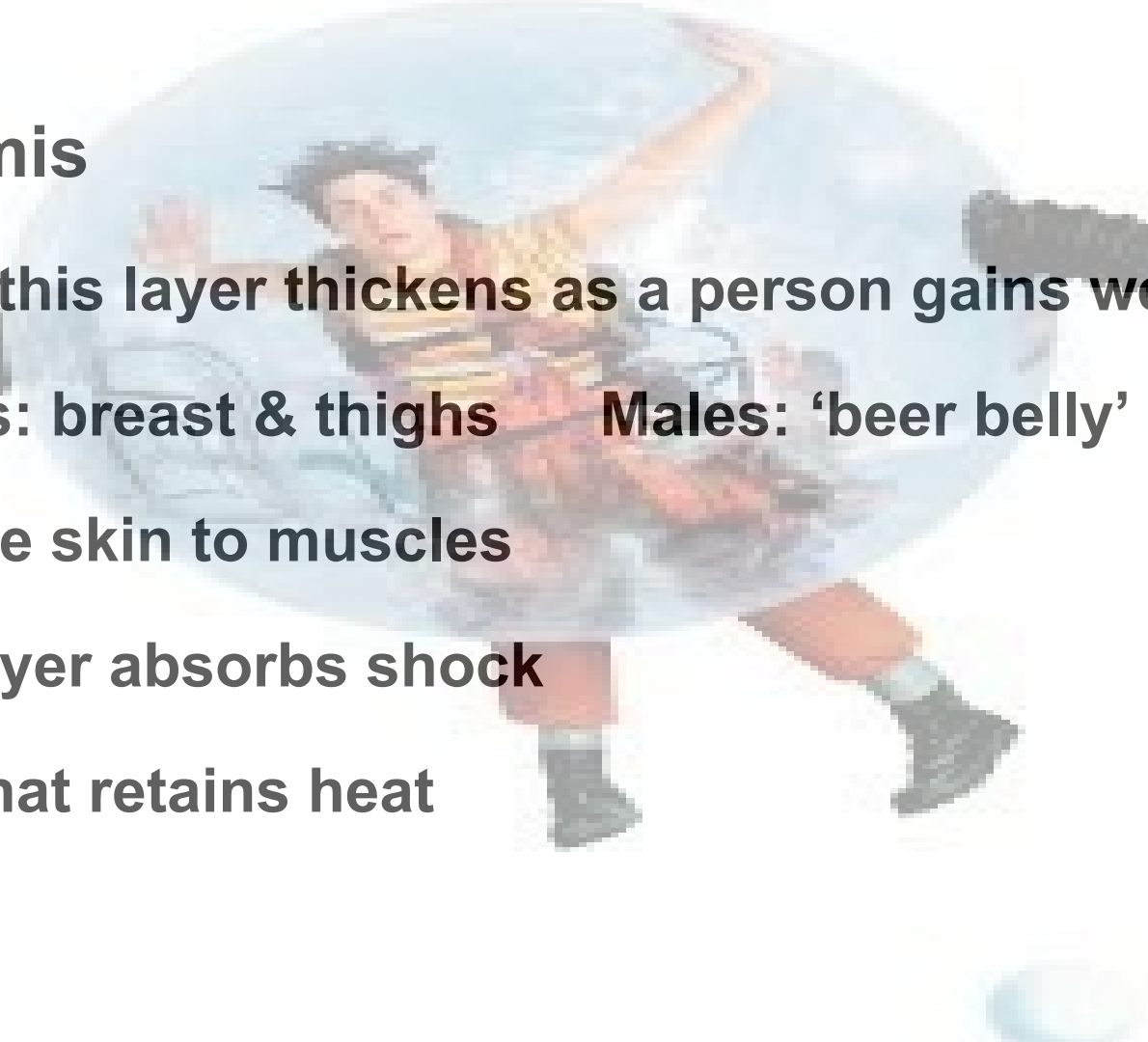
**Stores fat- this layer thickens as a person gains weight**

**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



A close-up photograph of a human face, focusing on the eyes and forehead. The image is slightly blurred, and the text is overlaid on the upper portion of the face.

**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.**

Type of Hair	Description
<b>Vellus</b>	Body hair (peach fuzz) is soft, thin
<b>Terminal</b> Hair, eyebrow, nose hair, face/chest, arm pit and genital area	Coarse hair; Dead keratinocytes for durability and not split as easily. Shape of shaft determines texture. Melanin gives color (blonde, brown, red, black)

# 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

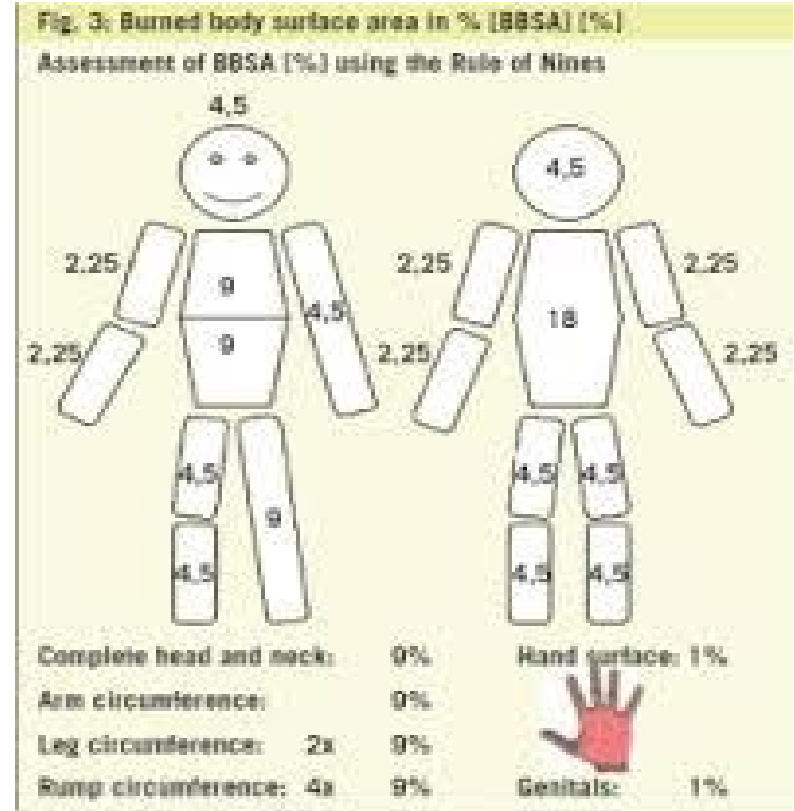
# ABCDE Rule- recognize MELANOMA (cancer of melanocytes)

	Word	Description
A	Asymmetry	Unmatching sides
B	Border Irregularity	Indentations
C	Color	Combinations of color in one mole: blue, red, brown, tan
D	Diameter	Larger than eraser attached to pencil
E	Elevation	Raised

## 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**

