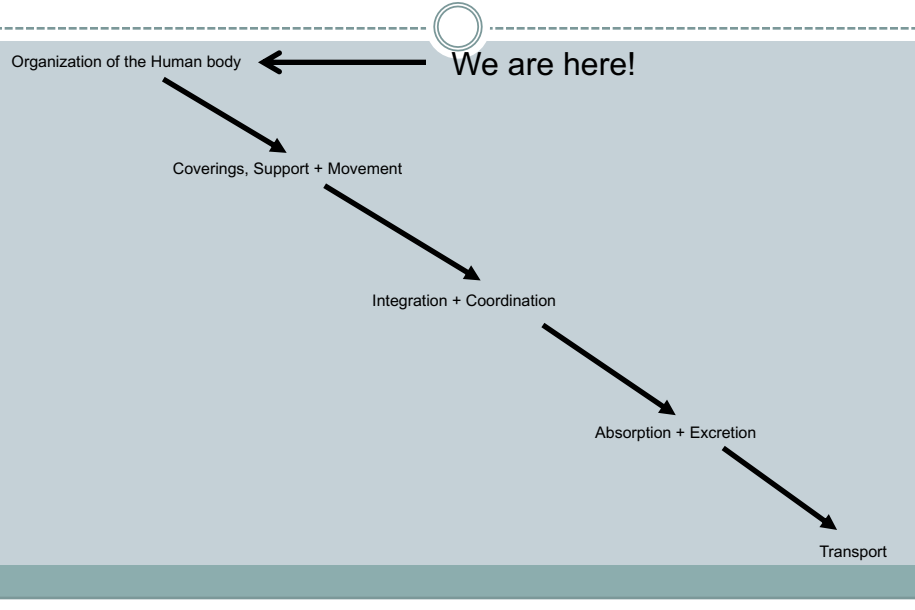


Human Anatomy & Physiology Overall Flow

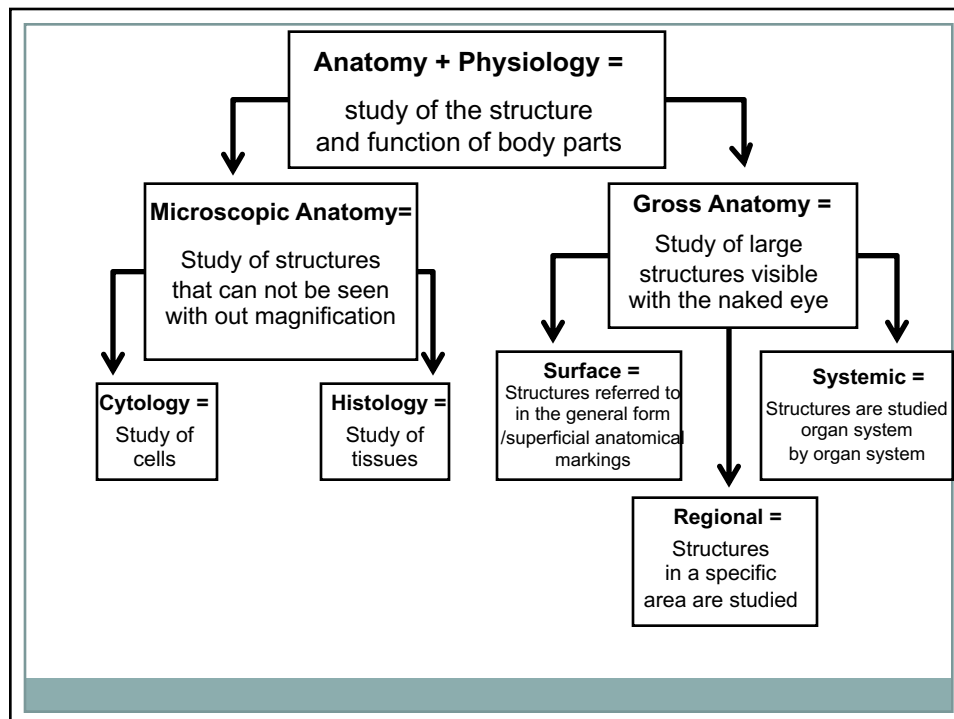


Organization of the Human Body

WHAT IS ANATOMY AND PHYSIOLOGY?

What's Your Function?

- All specific functions are performed by specific structure.
- Therefore – structure of something will determine function.



Microscopic to Gross Anatomy

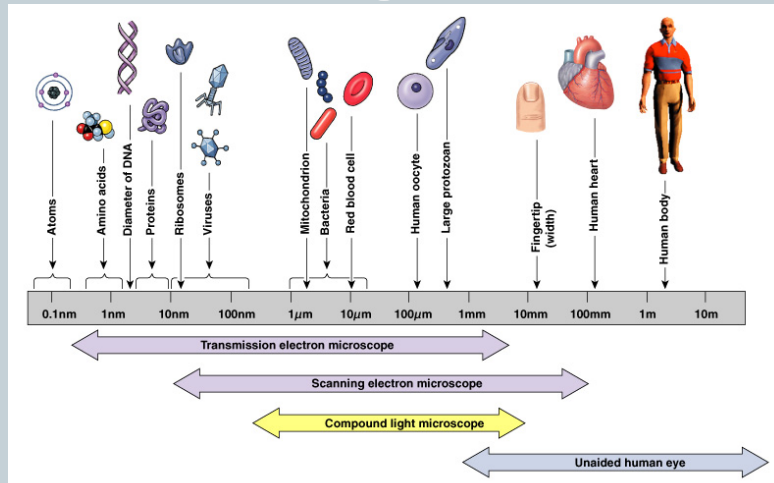
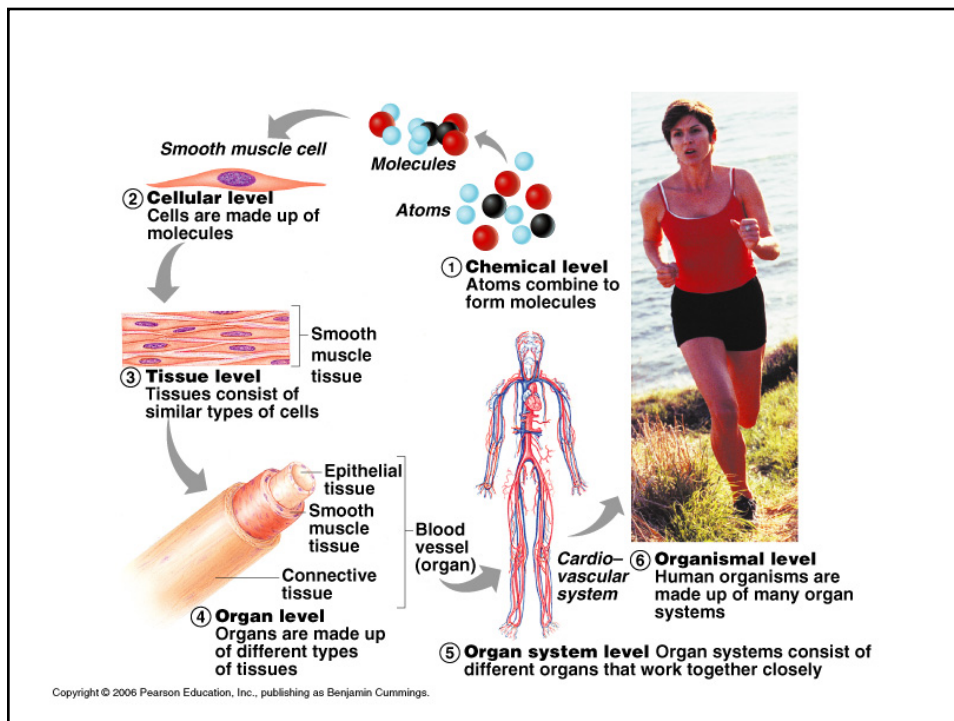
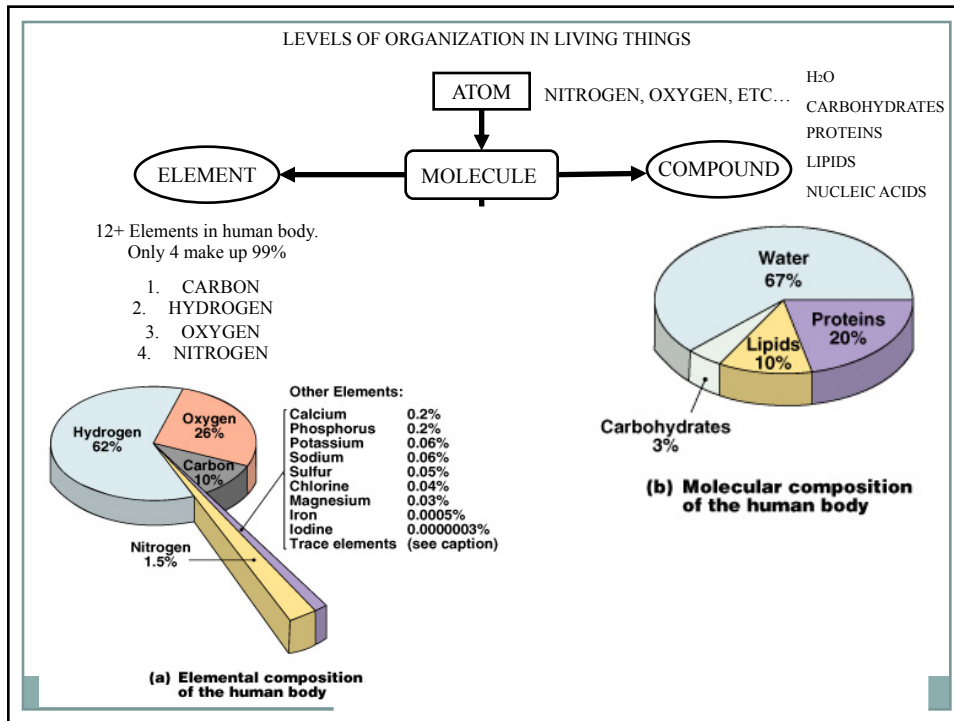


Figure 1.1 The Study of Anatomy at Different Scales

Other Perspectives on Anatomy

- **Developmental Anatomy:** structural changes over time
- **Embryology:** first two months of development
- **Comparative Anatomy:** considers different types of animals
- **Medical Anatomy:** anatomical changes during disease
- **Radiographic Anatomy:** noninvasive imaging procedures
- **Surgical Anatomy:** anatomical landmarks important to surgical procedures



Levels of Organization

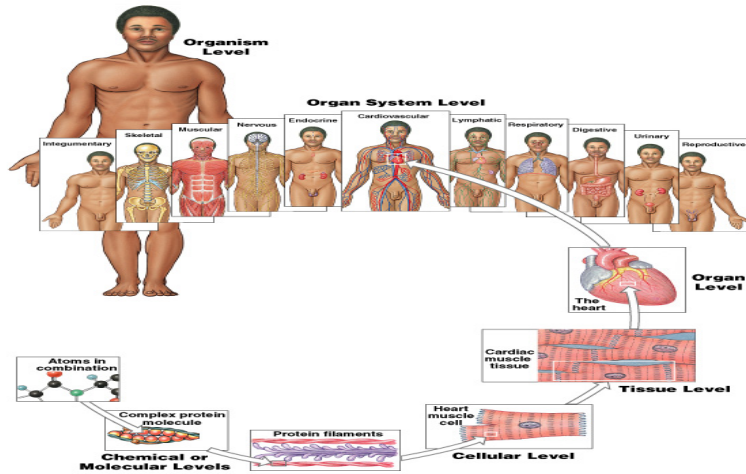
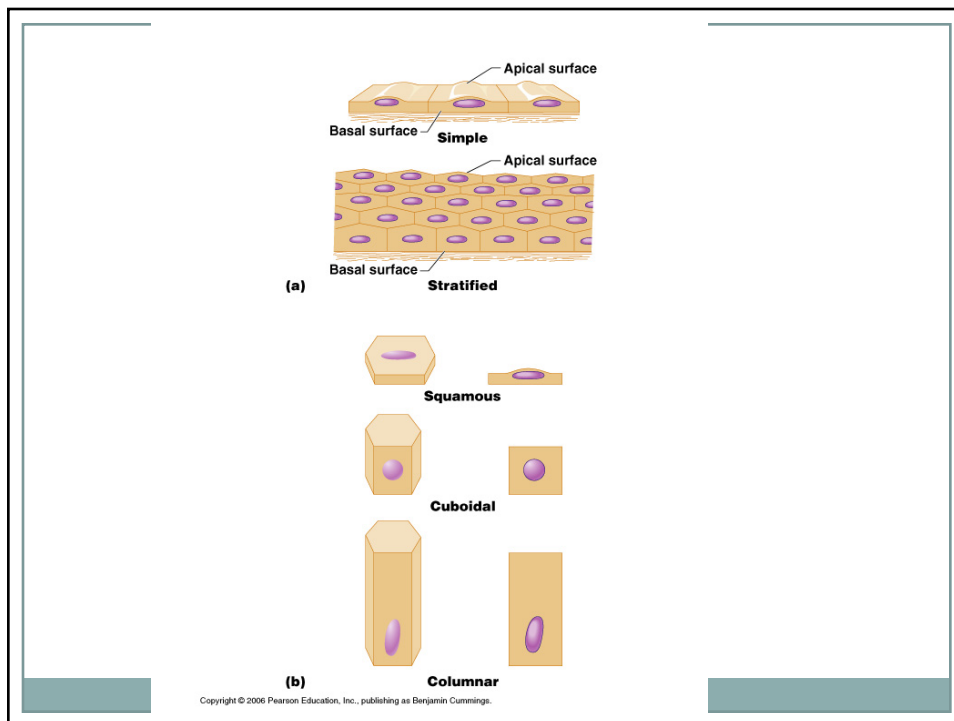
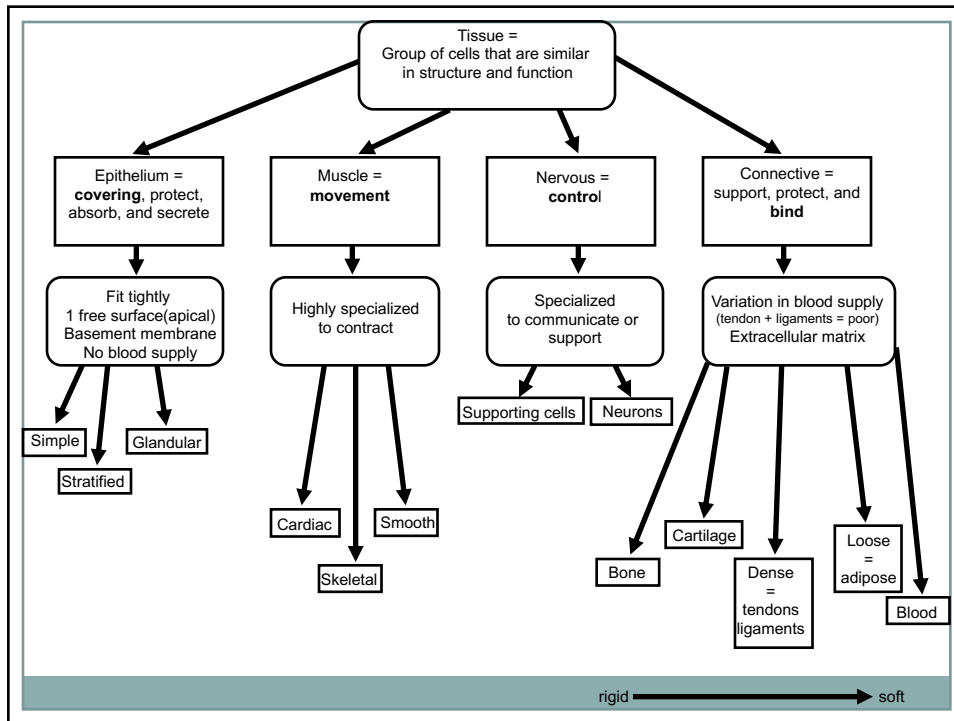
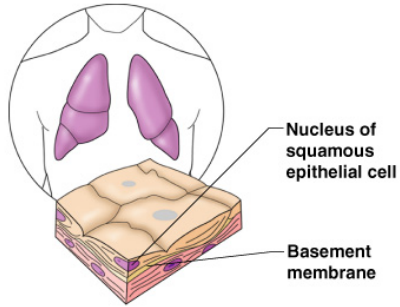


Figure 1.4 Levels of Organization

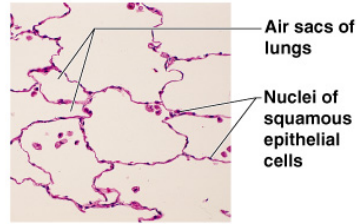
Organization of the Human Body

TISSUES



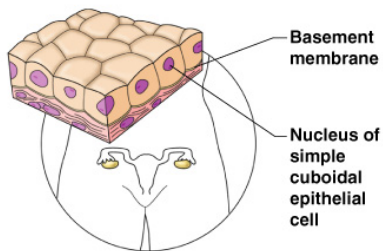


(a) Diagram: Simple squamous

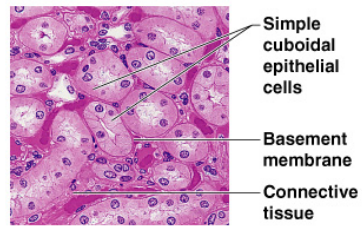


Photomicrograph: Simple squamous epithelium forming part of the alveolar (air sac) walls (400x).

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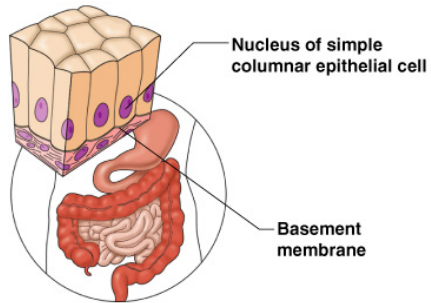


(b) Diagram: Simple cuboidal



Photomicrograph: Simple cuboidal epithelium in kidney tubules (400x).

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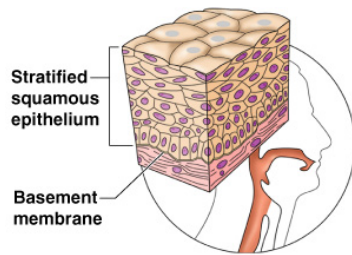


(c) Diagram: Simple columnar

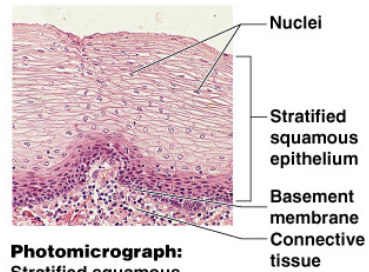


Photomicrograph: Simple columnar epithelium of the stomach lining (1300x).

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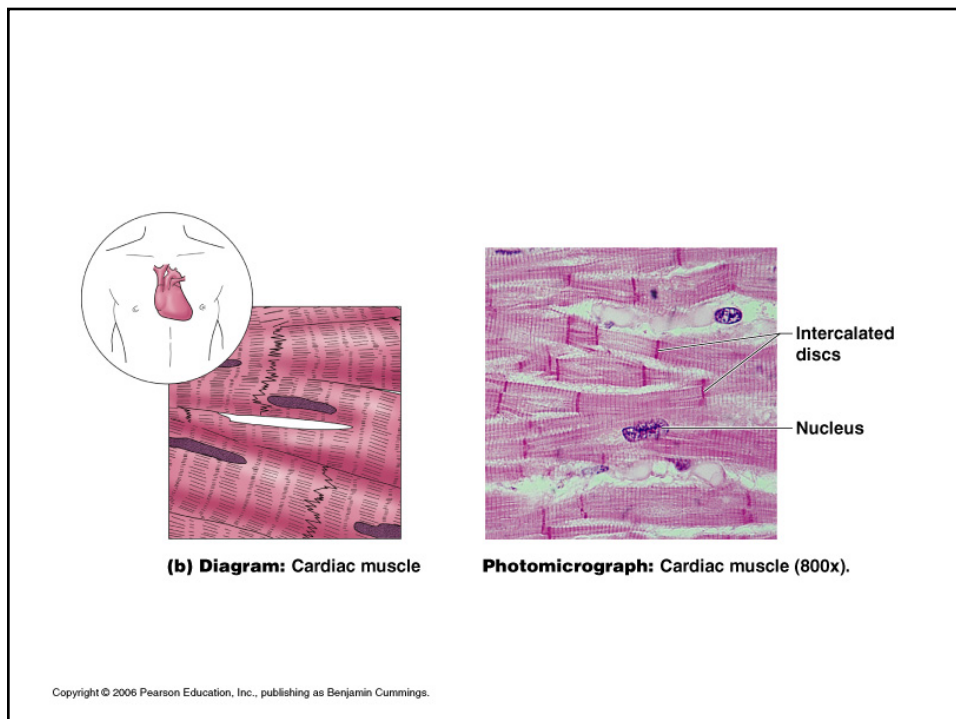
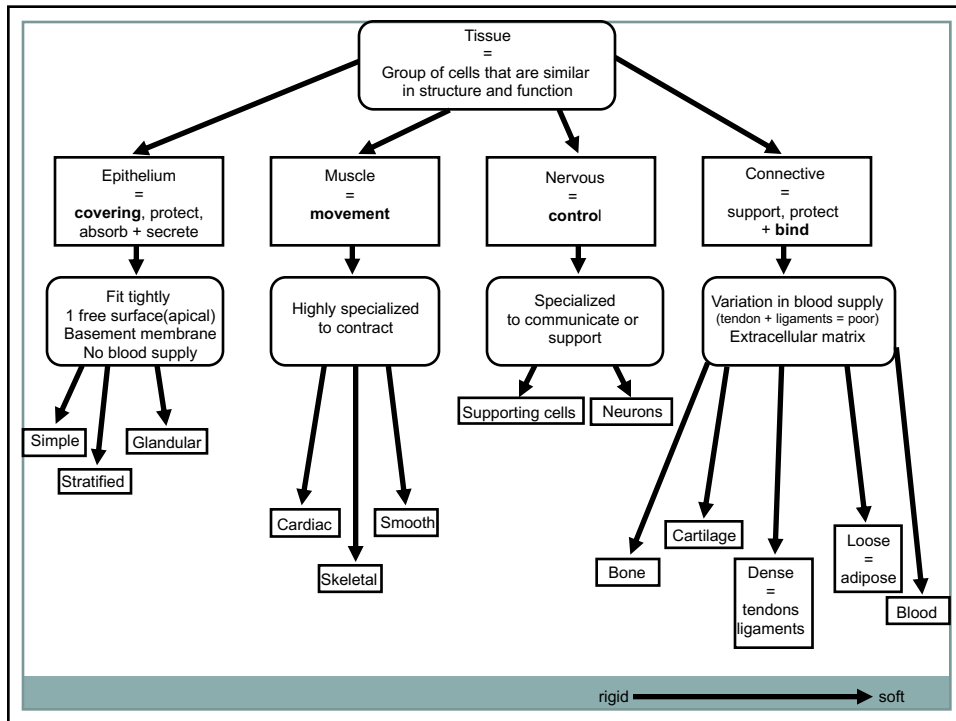


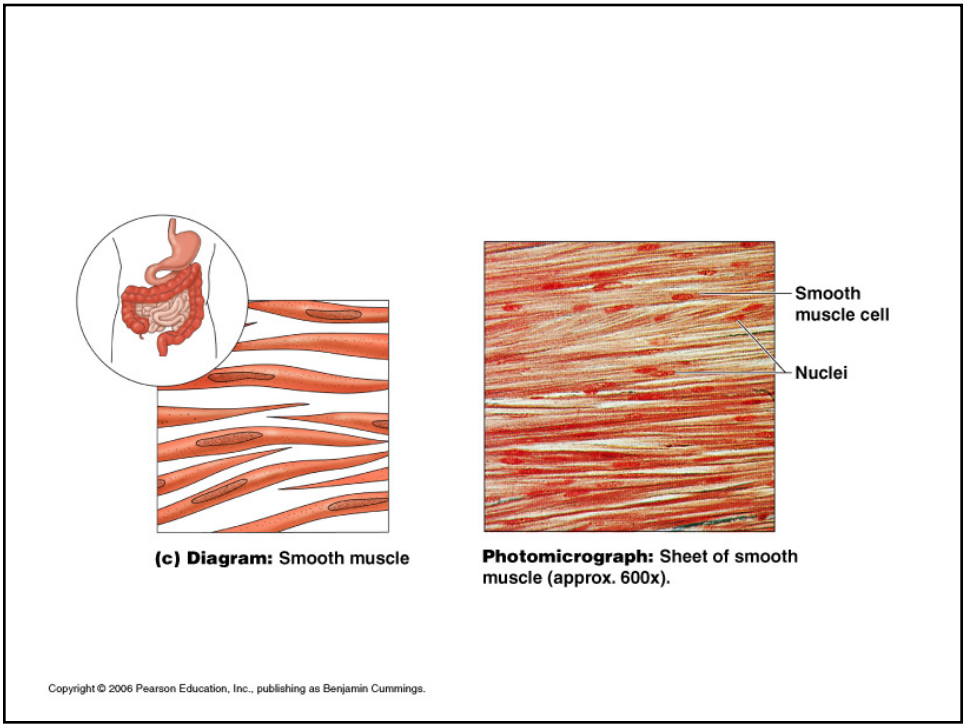
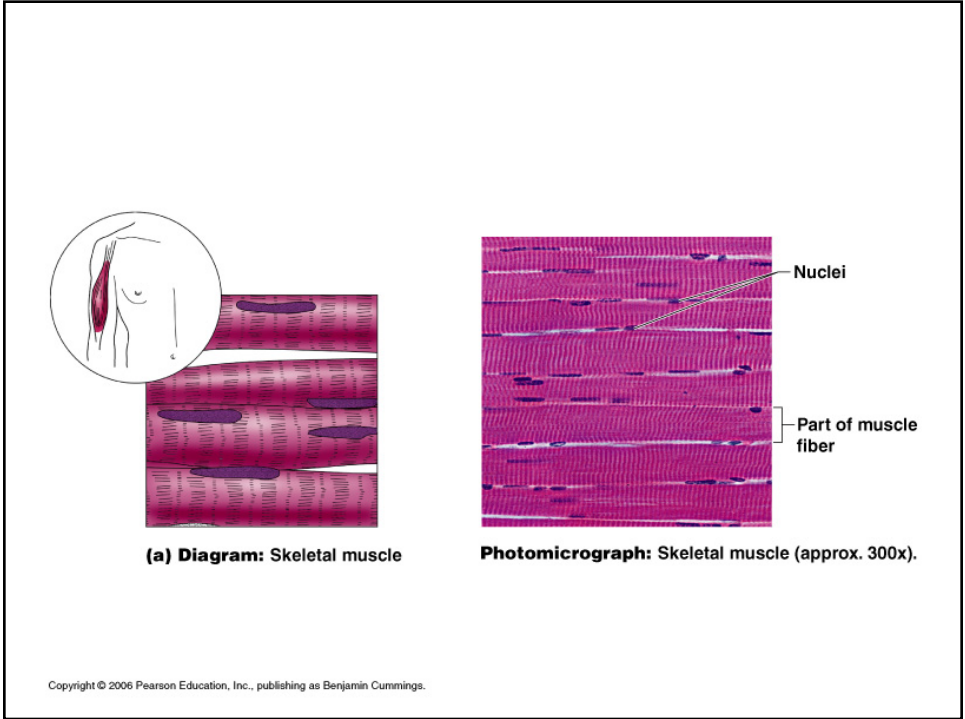
(e) Diagram: Stratified squamous

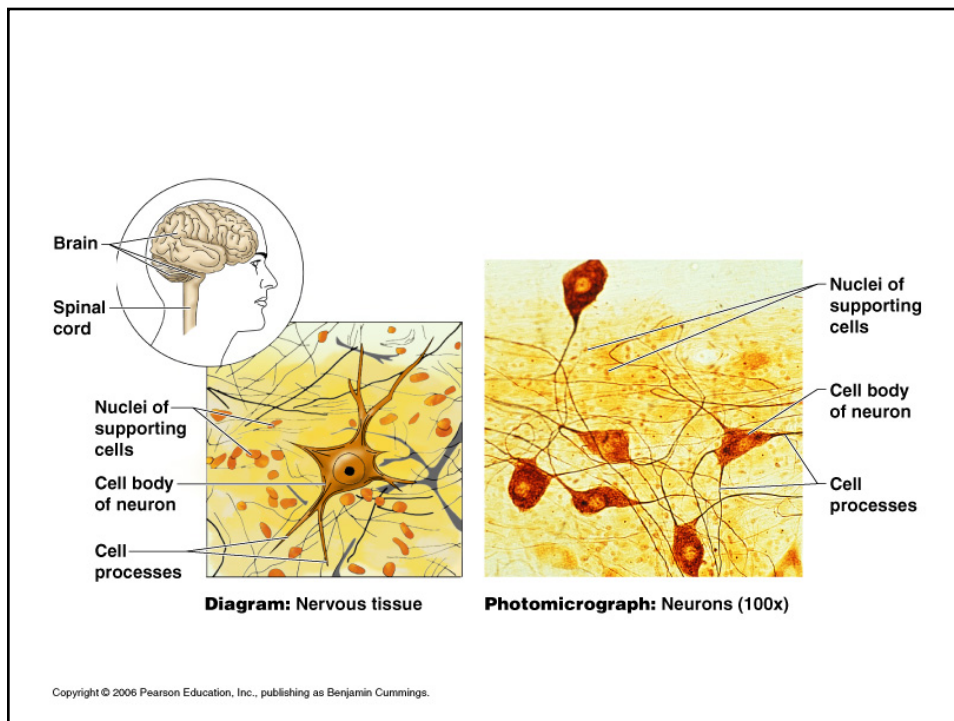
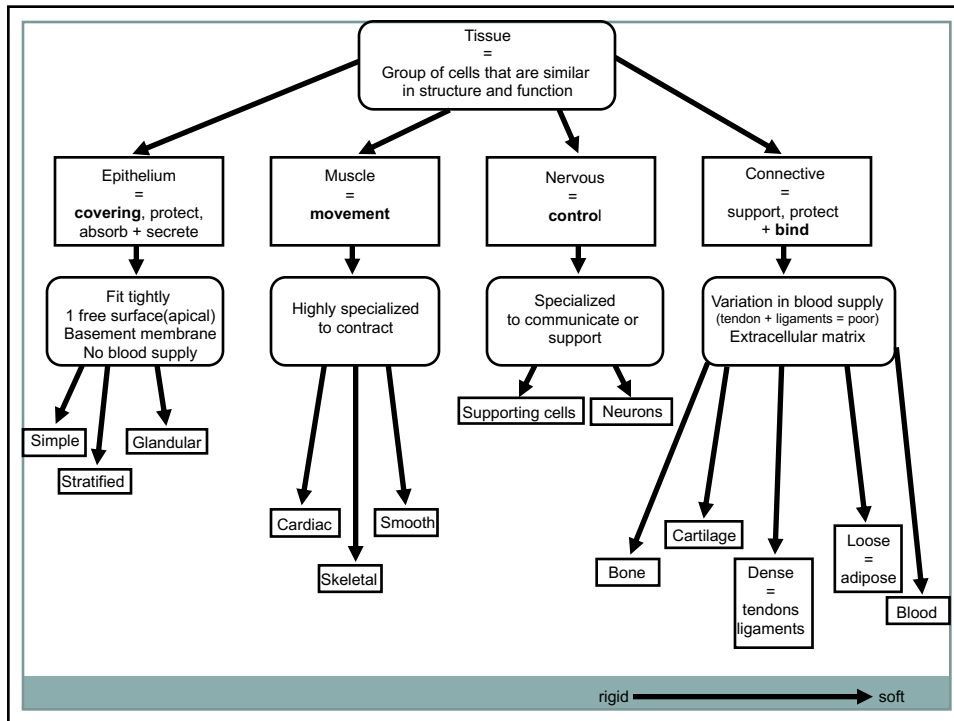


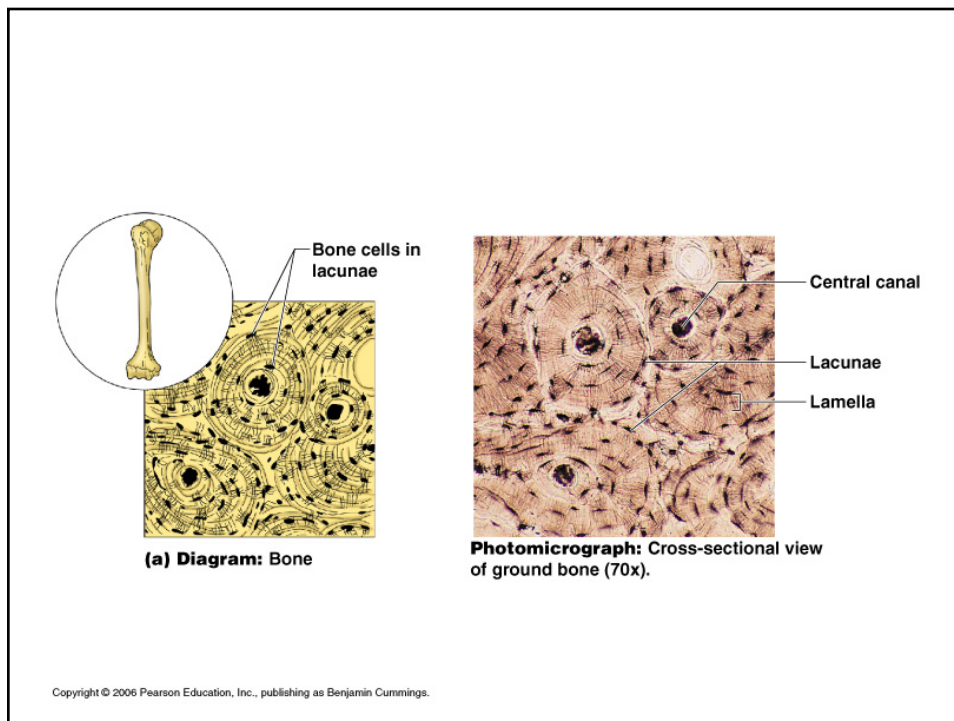
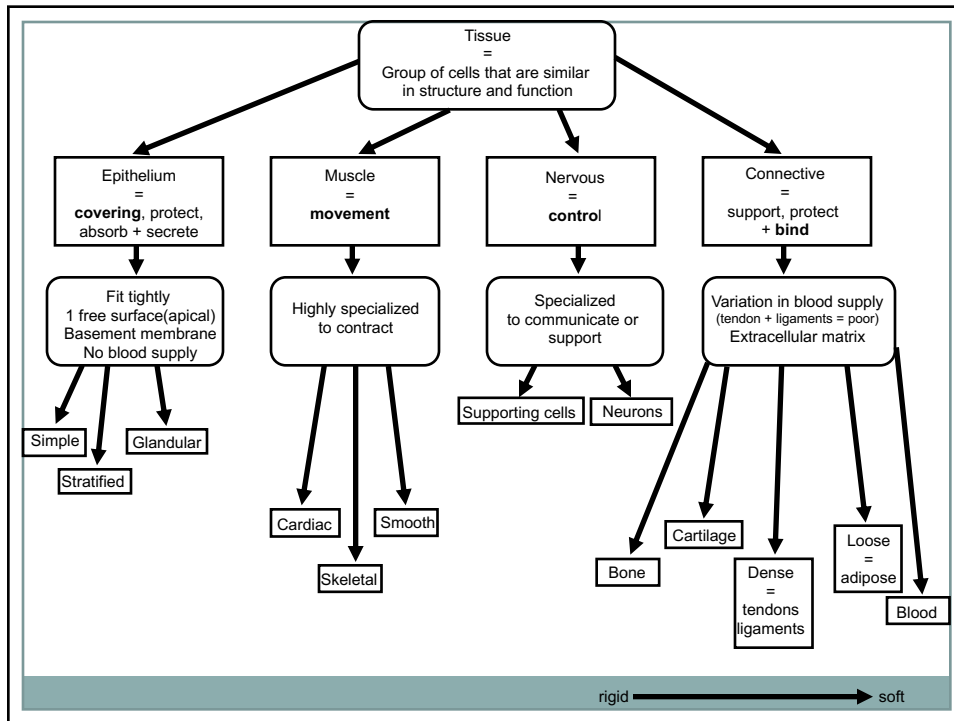
Photomicrograph: Stratified squamous epithelium lining of the esophagus (300x).

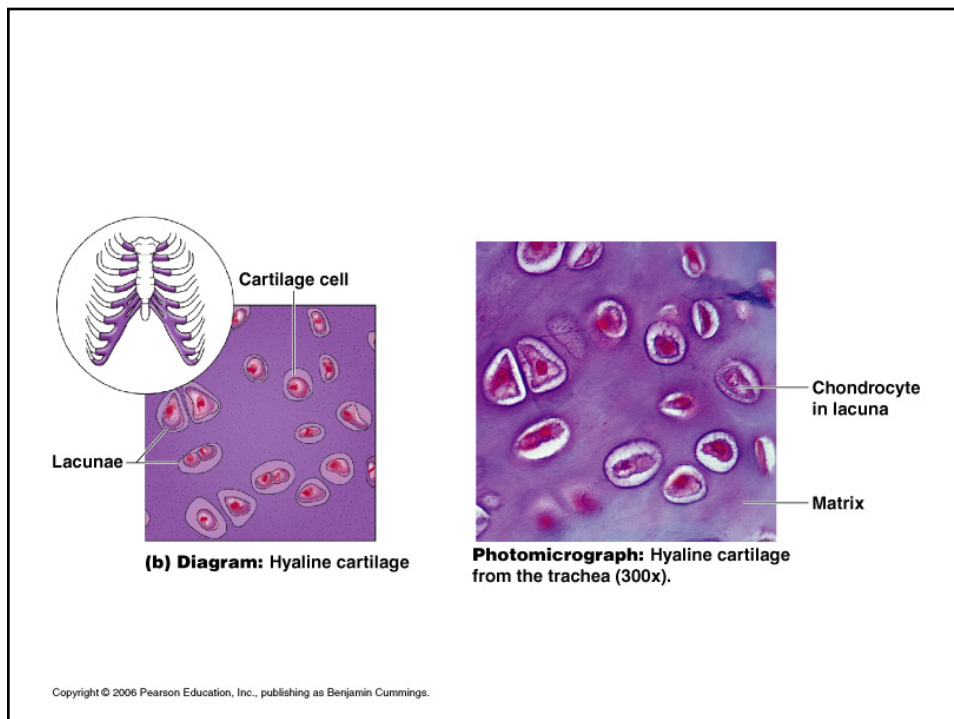
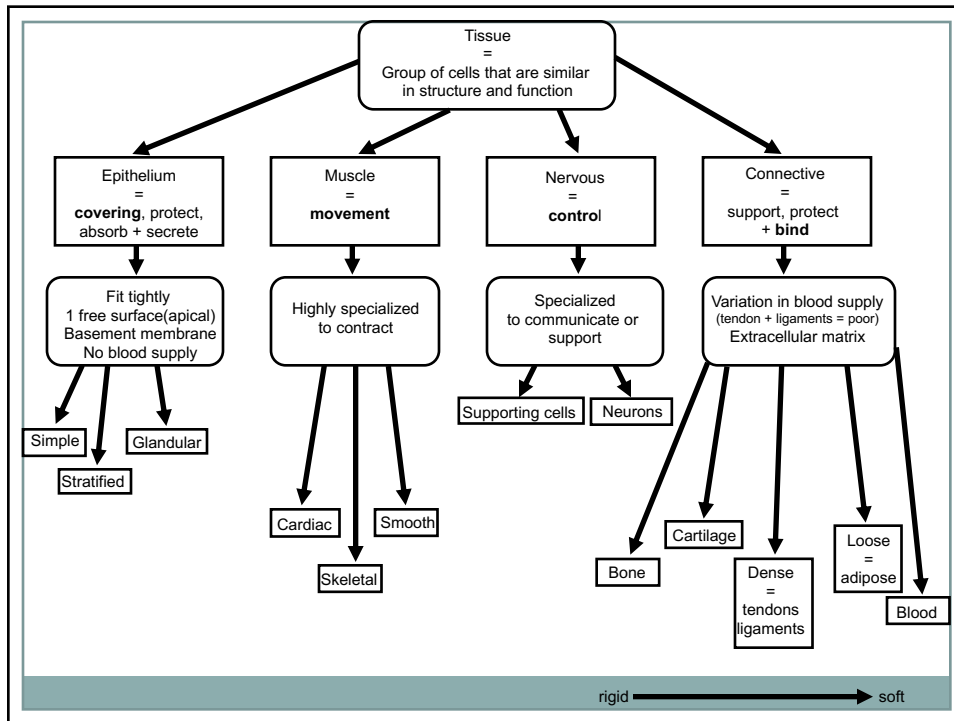
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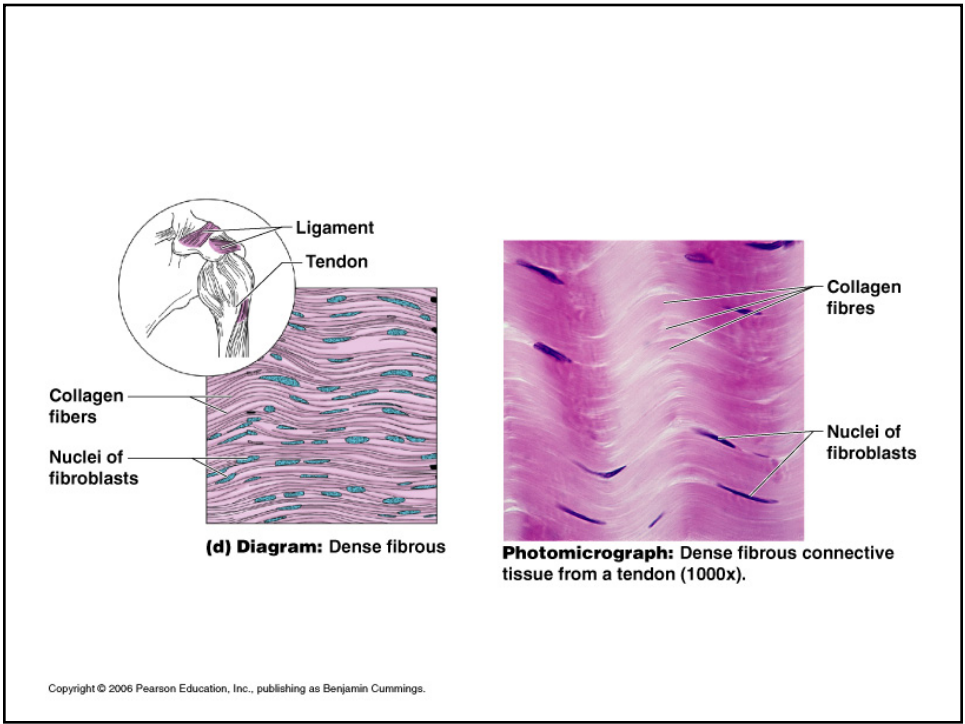
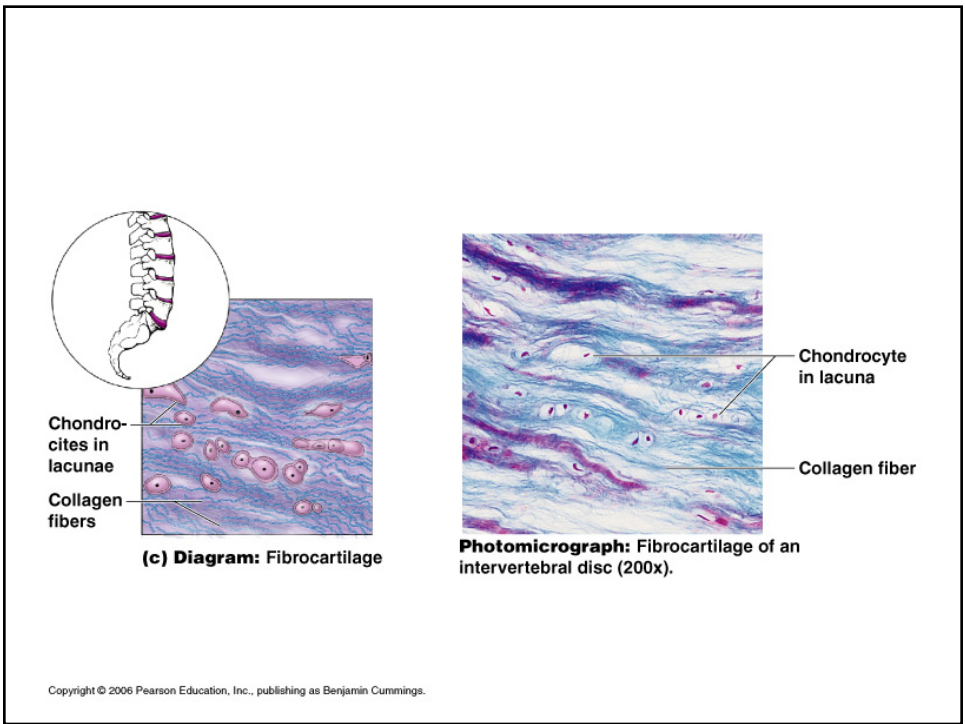


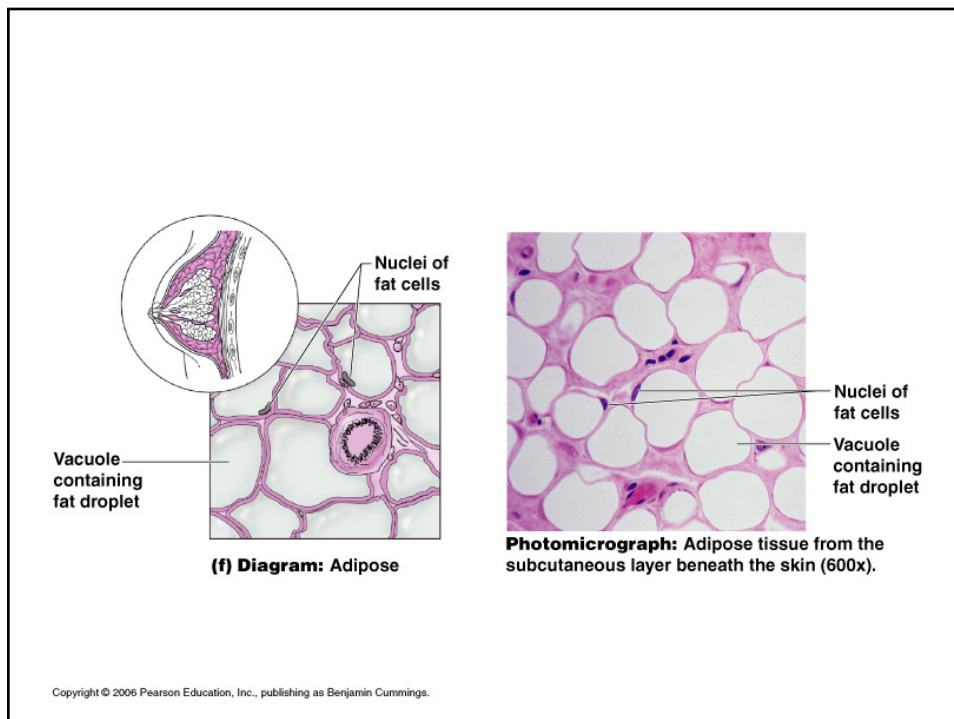
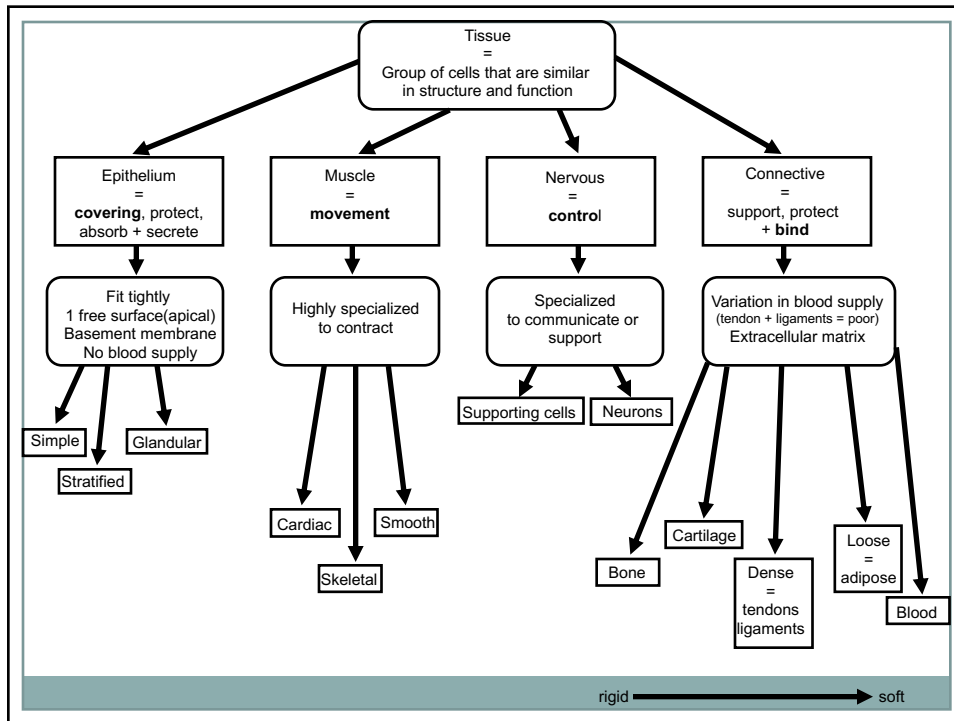


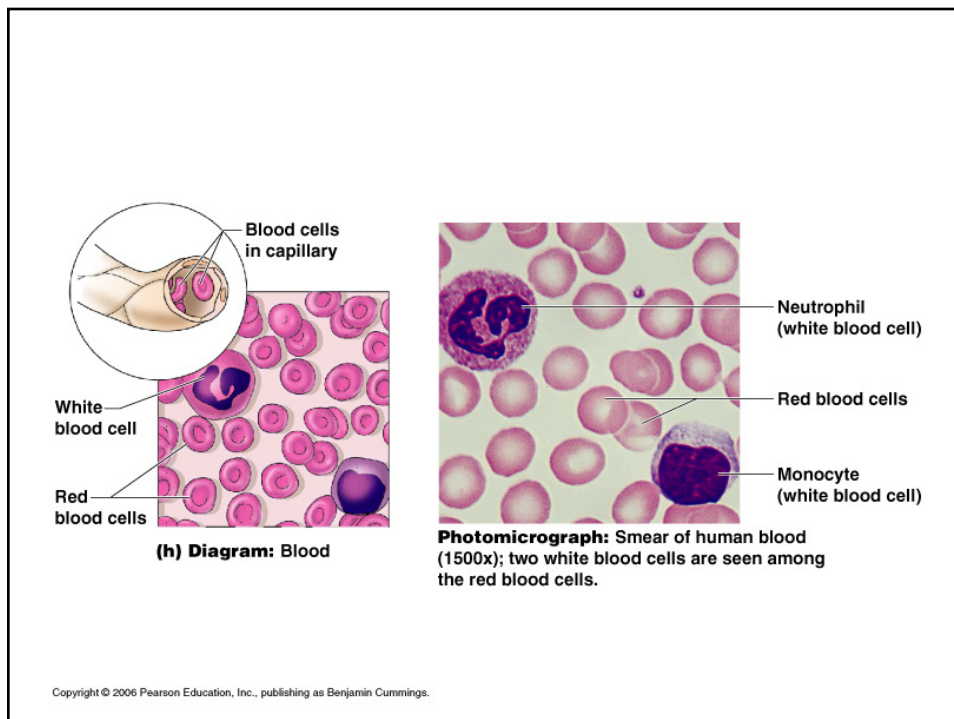
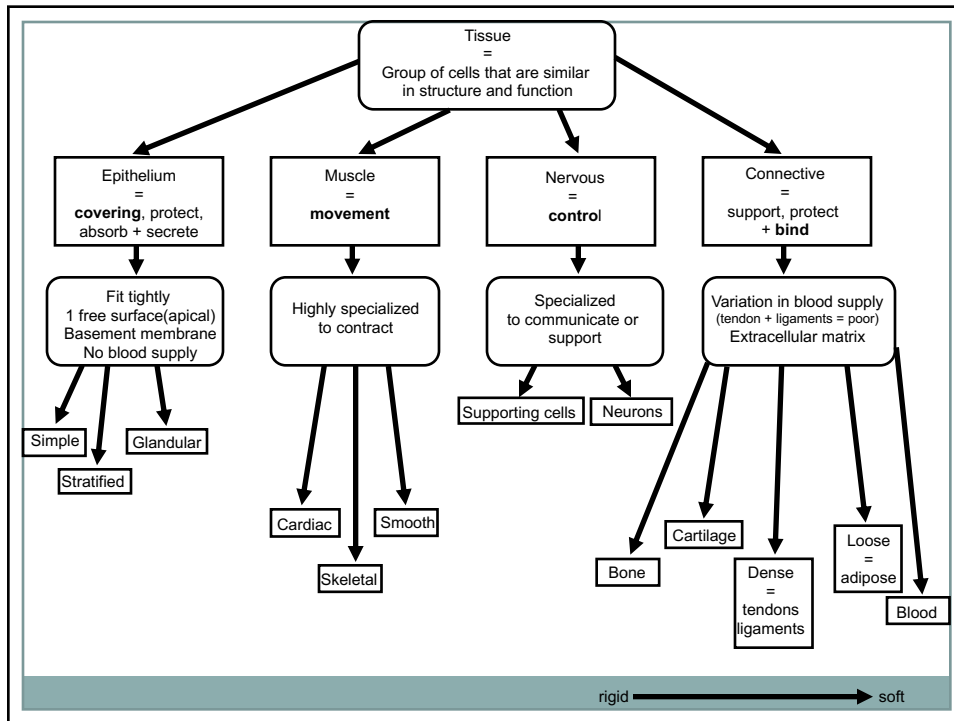






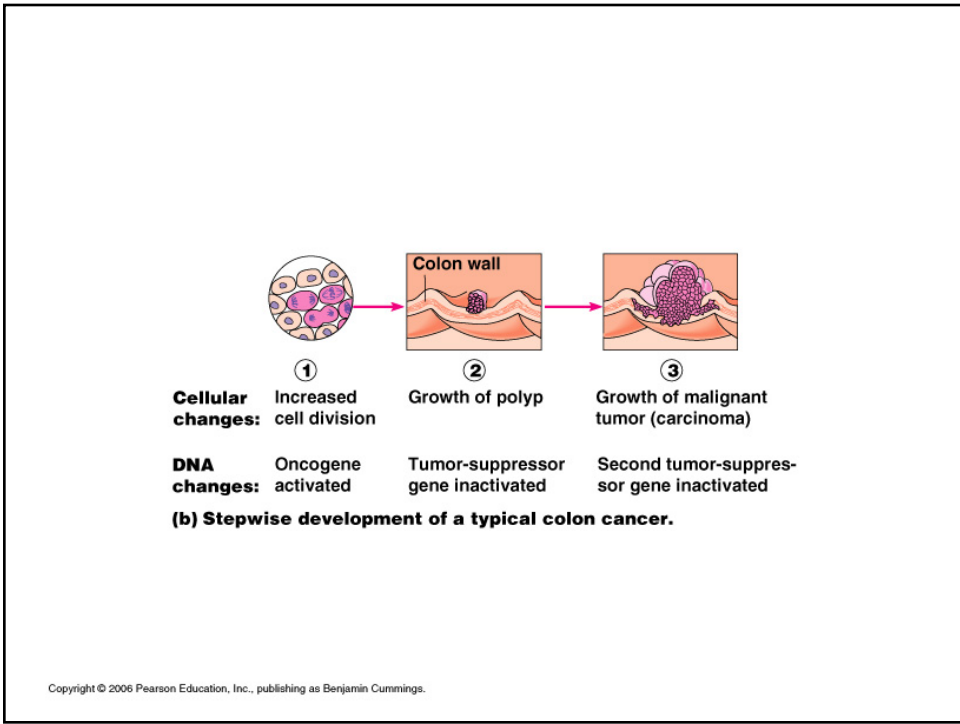
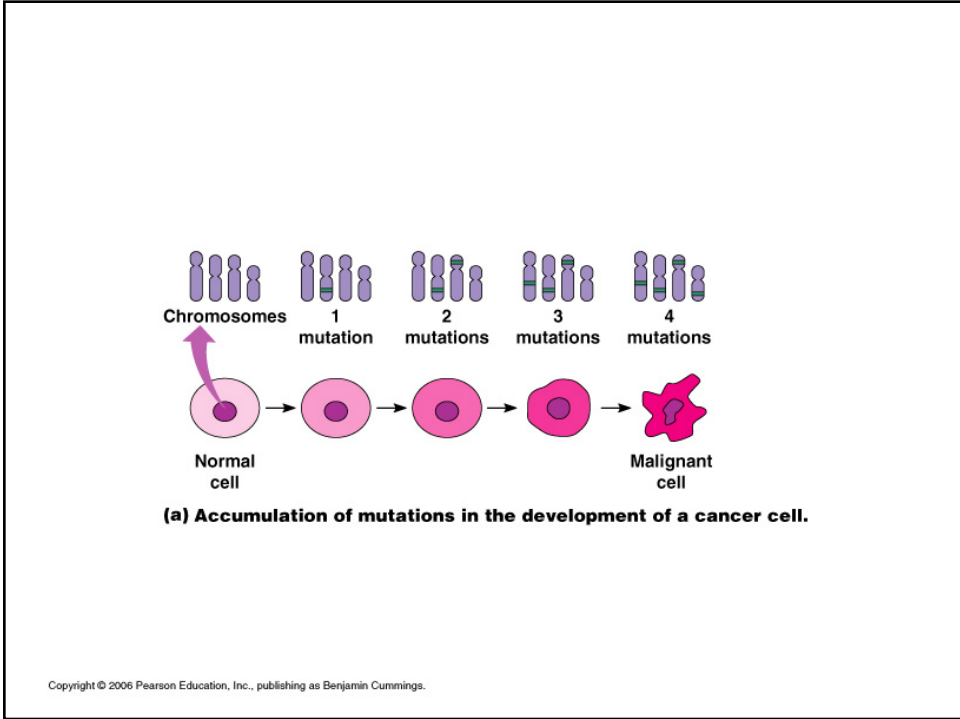


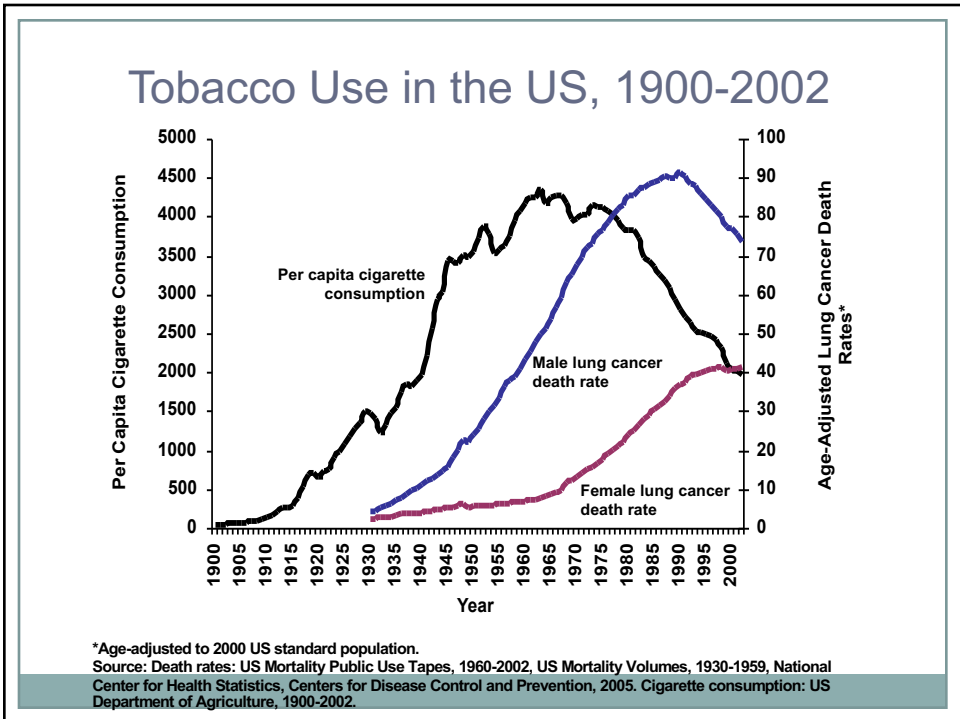
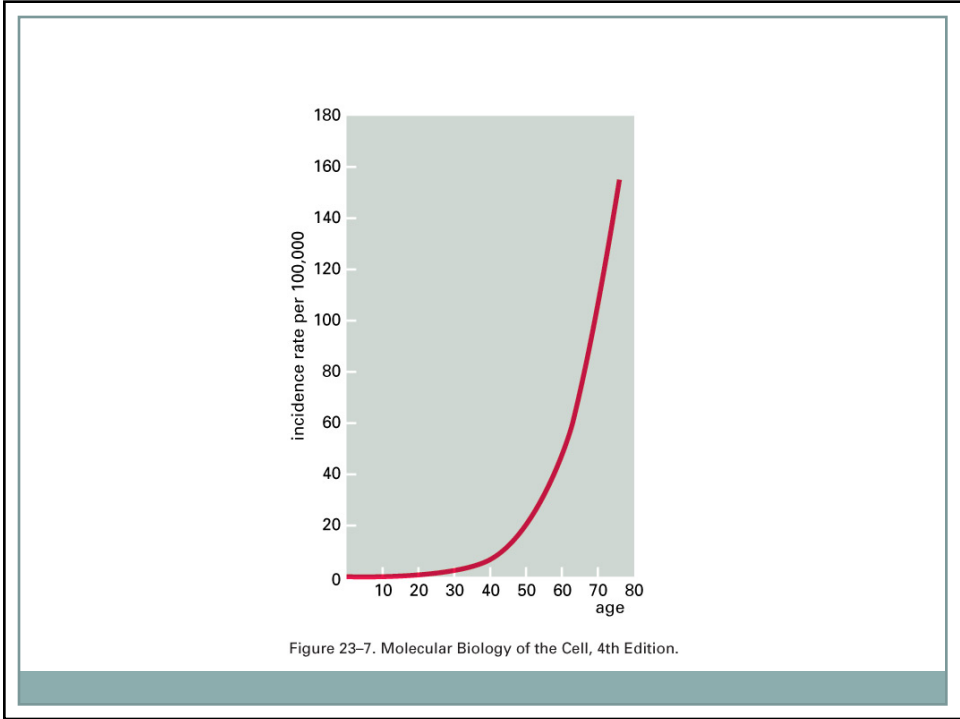




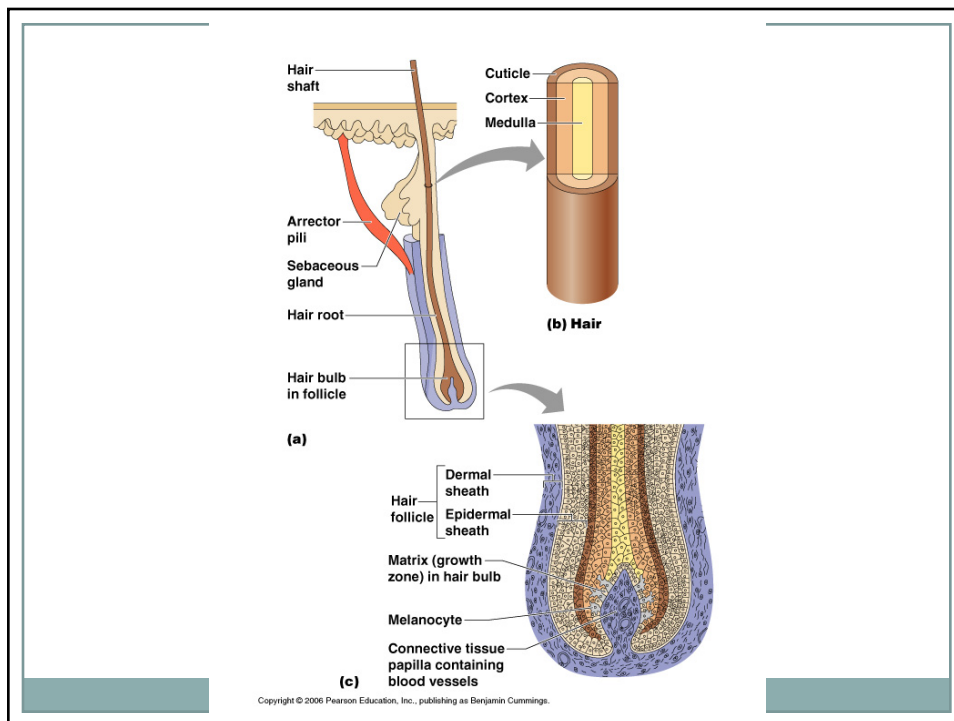
| Tissue | % Body Weight | % Water | Quarts of Water (Liters) |
|----------|---------------|---------|--------------------------|
| Muscle | 41.7 | 75.6 | 23.35 (22.1) |
| Skin | 18 | 72 | 9.58 (9.07) |
| Blood | 8 | 83 | 4.91 (4.65) |
| Skeletal | 15.9 | 22 | 2.59 (2.45) |
| Brain | 2 | 74.8 | 1.12 (1.05) |
| Liver | 2.3 | 68.3 | 1.16 (1.1) |

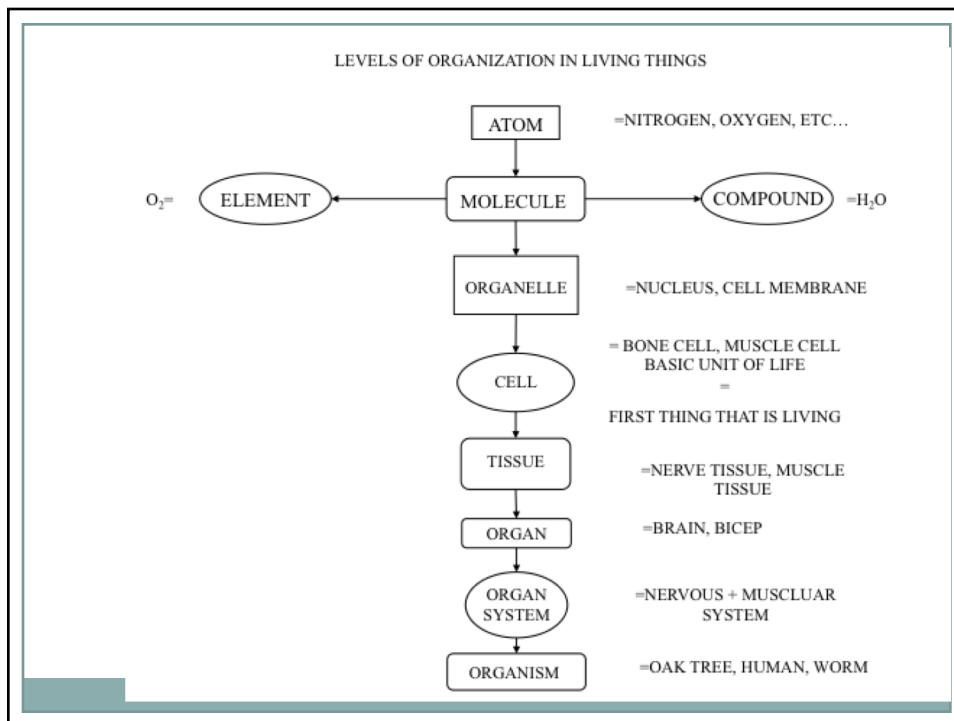
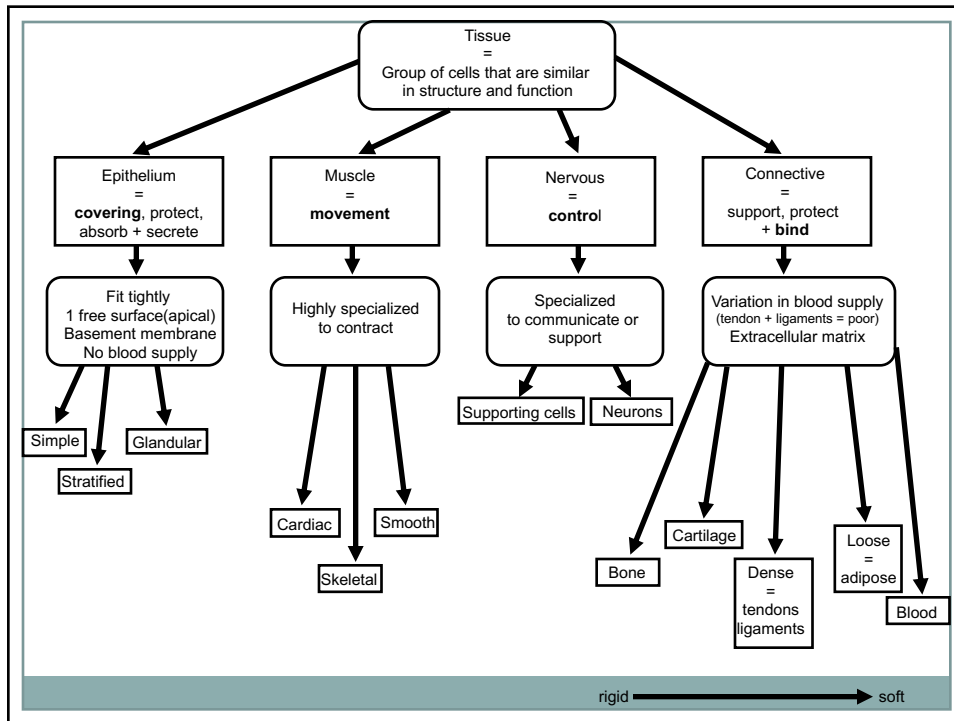
| Cell Type | Average Lifespan |
|--------------------------------|------------------|
| Blood cells: Red blood cells | 120 days |
| Blood cells: Lymphocytes | Over 1 year |
| Blood cells: Other white cells | 10 hours |
| Blood cells: Platelets | 10 days |
| Bone cells | 25–30 years |
| Brain cells* | Lifetime |
| Colon cells | 3–4 days |
| Liver cells | 500 days |
| Skin cells | 19–34 days |
| Spermatozoa | 2–3 days |
| Stomach cells | 2 days |





| Cell Type | Average Lifespan |
|--------------------------------|------------------|
| Blood cells: Red blood cells | 120 days |
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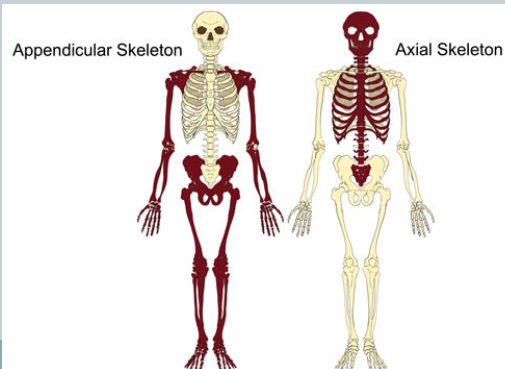


Organization of the Human Body

REGIONS, DIRECTIONS, PLANES

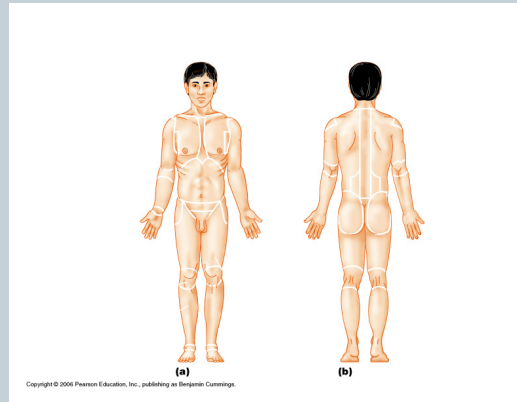
Axial Skeleton vs. Appendicular Skeleton

- We have one skeleton that is divided into two major regions.
 - Axial Skeleton
 - ✦ Skull, Vertebrae, Ribs, Sternum
 - Appendicular Skeleton
 - ✦ Limbs and girdles



Anatomical Position

- **B**ody erect
- **F**eet slightly apart
- **P**alms facing forward
- **T**humbs point away from body



Supine vs. Prone

Supine

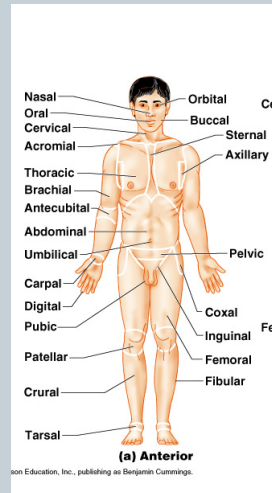


Prone



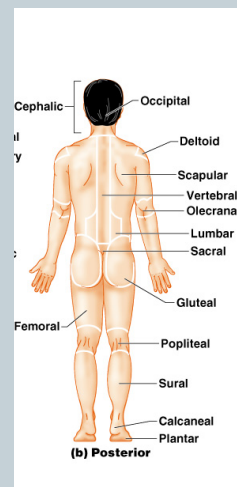
Anterior

- Anterior (ventral)= toward or at the front of the body; in front of

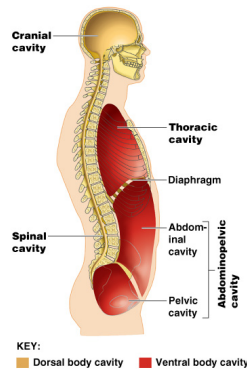


Posterior

- Posterior (dorsal) = toward or at the back of the body; behind



Posterior (dorsal) vs. Anterior (ventral)



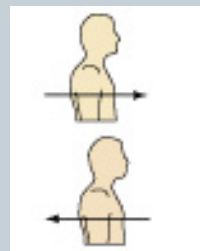
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Anterior (ventral) vs. Posterior (dorsal)

- **Examples**

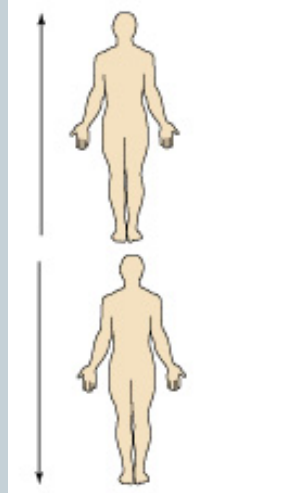
- The breastbone is anterior to the spine

- The heart is posterior to the breastbone



Superior vs. Inferior

- **Superior (cranial or cephalad)**
 - Toward the head end or upper part of a structure of the body above
 - × Example
 - The forehead is superior to the nose
- **Inferior (caudal)**
 - Away from the head end or toward the lower part of a structure or the body; below
 - × Example
 - The navel is inferior to the breastbone

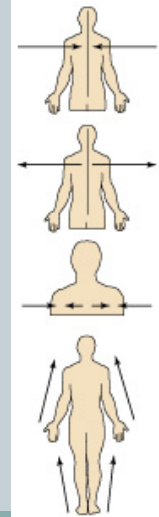


Quick Note

- **Caudal (quite literally) means toward the tail.**
 - This is only synonymous with *inferior* only to the inferior end of the spine.
- **Ventral and anterior only mean the same thing in humans.**
 - Ventral in four legged animals refers to the “belly” of an animal – therefore it takes on the meaning of being the inferior surface.
- **Dorsal and posterior only mean the same thing in humans.**
 - Dorsal in four legged animals refers to the animals back, this taking on the meaning of being the superior surface.

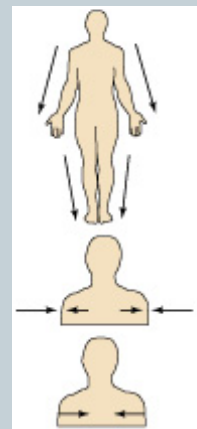
Orientation and Directional Terms

- **Medial**
 - Toward or at the midline of the body; on the inner side of.
 - ✦ Example: The heart is medial to the arm.
- **Lateral**
 - Away from the midline of the body; on the outer side of
 - ✦ Example: The arms are lateral to the chest
- **Intermediate**
 - Between a more medial and a more lateral structure.
 - ✦ Example The armpit is intermediate between the breastbone and shoulder.
- **Proximal**
 - Close to the origin of the body part or the attachment of a limb to the body trunk.
 - ✦ Example: The elbow is proximal to the wrist (meaning that the elbow is closer to the shoulder or attachment point of the arm than the wrist is)



Orientation and Directional Terms

- **Distal**
 - Farther from the origin of a body part or the point of attachment of a limb to the body trunk.
 - ✦ Example: The knee is distal to the thigh
- **Superficial (external)**
 - Toward or at the body surface
 - ✦ Example: The skin is superficial to the skeleton
- **Deep**
 - Away from the body surface; more internal
 - ✦ Example: The lungs are deep to the rib cage

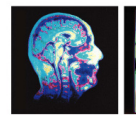


Planes

Sagittal



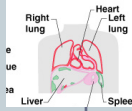
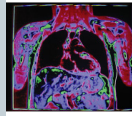
(a) Midsagittal (median) plane



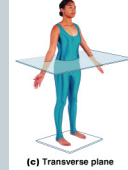
Frontal



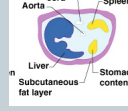
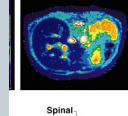
(b) Frontal (coronal) plane



Transverse



(c) Transverse plane



Planes

- Sagittal – cuts the body vertically and runs from front to back. A sagittal plane that is perfectly midline is a median plane
- Frontal – cuts the body vertically and runs from right to left
- Transverse – cuts the body horizontally
- Quick Note:
 - Sagittal, frontal, and transverse planes do not necessarily have to be in the middle. You can cut the body into several sagittal planes, frontal planes, and transverse planes

Planes

