Anatomy Outreach Program

- Department of Anatomy and Office of Health Professions Education, Northeastern Ohio Universities Colleges of Medicine and Pharmacy
- American Association of Anatomists

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Anatomical Directions

Figure 1.10 Directional References
Sectional Anatomy

![Figure 1.11 Planes of Section](image)

<table>
<thead>
<tr>
<th>Orientation of Plane</th>
<th>Adjective</th>
<th>Directional Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perpendicular to long axis</td>
<td>Transverse or horizontal or cross-sectional</td>
<td>Transversely or horizontally</td>
<td>A transverse, or horizontal, section separates superior and inferior portions of the body; sections typically pass through head and trunk regions.</td>
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<tr>
<td>Parallel to long axis</td>
<td>Sagittal</td>
<td>Sagittally</td>
<td>A sagittal section separates right and left portions. You examine a sagittal section but you section sagittally.</td>
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<tr>
<td></td>
<td>Midsagittal</td>
<td></td>
<td>In a midsagittal section, the plane passes through the midline, dividing the body in half and separating right and left sides.</td>
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<tr>
<td></td>
<td>Parasagittal</td>
<td></td>
<td>A parasagittal section misses the midline, separating right and left portions of unequal size.</td>
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<tr>
<td></td>
<td>Frontal or coronal</td>
<td>Frontally or coronally</td>
<td>A frontal, or coronal, section separates anterior and posterior portions of the body; coronal usually refers to sections passing through the skull.</td>
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</tbody>
</table>
Plane of Section

A banana is oriented with the tip being superior (cranial), the stem being inferior (caudal), the concave surface being anterior (ventral) and the convex surface being posterior (dorsal).  

A. Draw the shape of a transverse section cut near the tip of the banana;  
B. Draw the shape of a transverse section cut at the midsection of the banana;  
C. Draw the shape of an oblique section cut near the middle of the banana;  
D. Draw the shape of a coronal section that passes through the superior and inferior portions of the banana, but not the middle;  
E. Draw a shape of coronal section that cuts through the middle of the banana, but not the tip or stem;  
F. Draw the shape of a mid-sagittal section of a banana.
A banana is oriented with the tip being superior (cranial), the stem being inferior (caudal), the concave surface being anterior (ventral) and the convex surface being posterior (dorsal). **A.** Draw the shape of a transverse section cut near the tip of the banana; **B.** Draw the shape of a transverse section cut at the midsection of the banana; **C.** Draw the shape of an oblique section cut near the middle of the banana; **D.** Draw the shape of a coronal section that passes through the superior and inferior portions of the banana, but not the middle; **E.** Draw a shape of coronal section that cuts through the middle of the banana, but not the tip or stem; **F.** Draw the shape of a mid-sagittal section of a banana and rotate it to the right or left.
Draw a 3-dimensional view of a single structure shown here in a 2-dimensional planar view
Preparation of Tissue for Microscopic Examination

1. Perfused and fixed 2. Embedded in paraffin or plastic 3. Sectioned using a microtome 4. Sections mounted on a glass slide, air-dried, stained and covered with another small glass slide.
3-Dimensions to 2-Dimensions
A seventy-year-old man shows up at the emergency room on Monday morning with a swollen left leg. The ER doctor asks him “How did this happen”? The man says that he had just returned on Saturday from a vacation in Europe. After a long transatlantic flight and a short nap, he decided to make himself some dinner. While he was preparing dinner, he developed a pain in his calf and his leg began to swell. After dinner, he lied down and elevated his leg, hoping that the swelling would subside by morning. However, when he awoke on Sunday, the swelling did not go down and the pain in his calf worsened. He tells the physician that his leg hurts more when he is standing than when he is lying down. What are the possible sources for his discomfort?
Mnemonic for Differential Diagnosis - VINDICATE (P)

Vascular
Inflammatory
Neoplastic,
Degenerative,
Intoxication
Congenital
Allergic/autoimmune
Traumatic
Endocrine
Psychological
<table>
<thead>
<tr>
<th>Head</th>
<th>Lungs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right atrium</td>
<td>Left atrium</td>
</tr>
<tr>
<td>Right ventricle</td>
<td>Left ventricle</td>
</tr>
<tr>
<td>Trunk and legs</td>
<td></td>
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</tbody>
</table>
Circulation of Blood

- Head
- Right atrium
- Left atrium
- Right ventricle
- Left ventricle
- Trunk and legs
- Lungs

Pulmonary
Systemic
Coronary
The wall of the left ventricle is thicker than the wall of the right ventricle. Why?
The three layers of the heart (from lumen to the outside) are the **endocardium**, **myocardium** and **epicardium**.

The **endocardium** consists of an single cell layer lining called the endothelium and connective tissue.

The middle layer is composed primarily of cardiac muscle fibers and is called the **myocardium**.

The outer layer or **epicardium** is composed of connective tissue rich in adipocytes (fat cells). Numerous blood vessels and cell bodies of autonomic neurons are found in the epicardium.
Tract of Purkinje fibers (lighter-stained fibers)

Endocardium

Myocardium

Ganglia

Epicardium is thicker than endocardium.
Tunica intima --- Endocardium
Tunica media --- Myocardium
Tunica adventitia --- Epicardium
Which vessels are arteries and which are veins?
Deep Vein Thrombosis (Blood Clot)

A blood clot in a leg vein may cause pain, warmth and tenderness in the affected area.
Deep Vein Thrombosis

Causes: (1) injury to vein (2) inactivity causing blood to pool in legs; (3) hypercoagulation

Danger is that the clot breaks loose and forms a pulmonary embolus

Rx is administration of the anti-coagulant Lovenox and placing the patient on warfarin sodium/coumadin (blood thinner).