181 Lab

Connective Tissues

Axial Skeleton

**Please Note:** Today’s lab deals with viewing several slides. Be sure to use appropriate microscope technique. Drop the stage to the lowest position before adding or removing a slide. Use the scanning power to locate and center an image before moving to a higher magnification. Use the course adjust knob ONLY with the scanning power, never with the low or high power lenses. Once you’ve upgraded to the low power (100X) or the high power (400X) be sure to use the fine adjust knob. If you have any questions regarding microscope usage, ask your TA.

Part 1: Connective Tissues

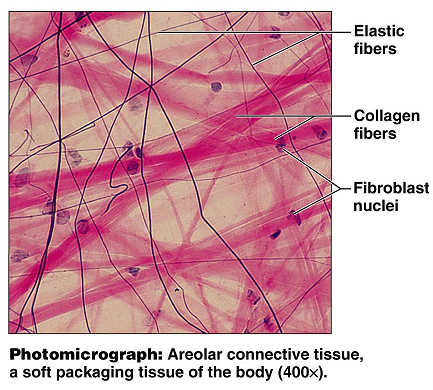
After viewing the slides, use your text book or lab manual to answer the questions

**Slide: Areolar Connective Tissue**

In your field of view, try to identify fibroblasts, macrophages, and mast cells. You may be able to identify some white blood cells as well.

Question: What is the function of areolar connective tissue?

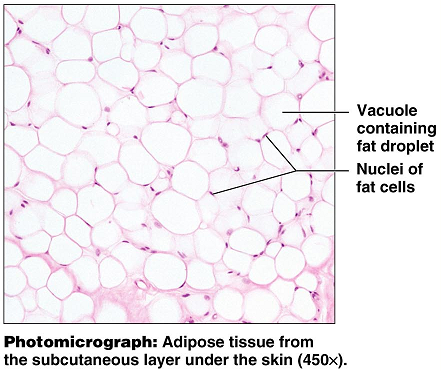
Question: Where can areolar connective tissue be found?





**Slide: Adipose Tissue**

In your field of view, you will find what appears to be empty cells. These spaces once housed the fat stores in the adipocytes. Try to identify the nuclei which are pushed off to the side.

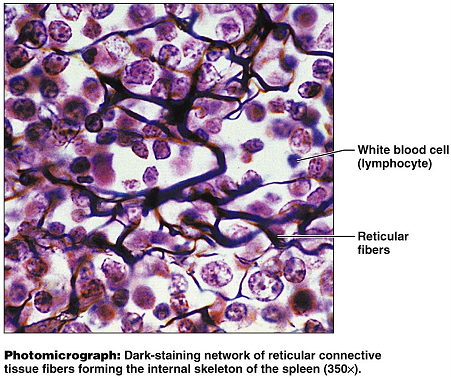


Question: What is the function of the adipose tissue?

Question: Where are some locations in which adipose tissue is found.

Question: within the adipocyte, what is the vacuole?

**Reticular Connective Tissue (no slide available)**



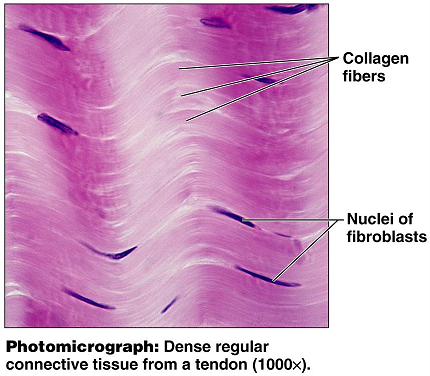
Reticular connective tissue contains a great deal of the reticular fibers. Observe the branched/networked nature of the fibers.

Question: Where is reticular connective tissue found?

Question: What is the function of reticular connective tissue?

**Dense Regular Connective Tissue**

This type of connective tissue can be seen in tendons. Notice how this tissue type is mostly fibers with few cells. The fibures are arranged in a regular pattern, giving a wavy appearance to the tissue. Also note that the image on the right is magnified 1000X. Your microscope will get you to 400X without oil immersion.



Question: Which fiber type is most prominent in this tissue type?

Question: Although cells are not abundant in this tissue, which cell is the most frequently found in this type?

Question: What is an aponeurosis?

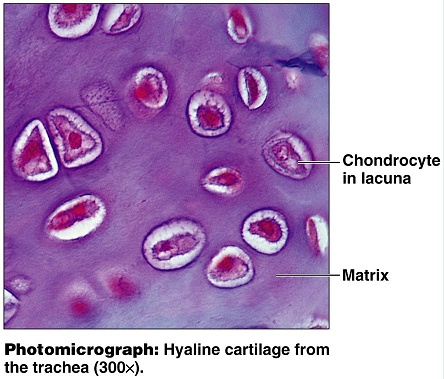
**Cartilage:**

Slides: Hyaline Cartilage, elastic cartilage, fibrocartilage

Hyaline Cartilage: Slide: Monkey Trachea or trachea

In this tissue type, the collagen fibers form a network that is not easily seen; it appears as an evenly colored background. What is noticeable is the lacunae which house the chondrocytes. When looking at the trachea slides, keep in mind that hyaline tissue may not be the only tissue type appearing on this slide. You’ll have to search for the hyaline characteristics.





Question: Where is hyaline cartilage found?

Question: Which type of bone formation begins with a hyaline “bone” that gets ossified?

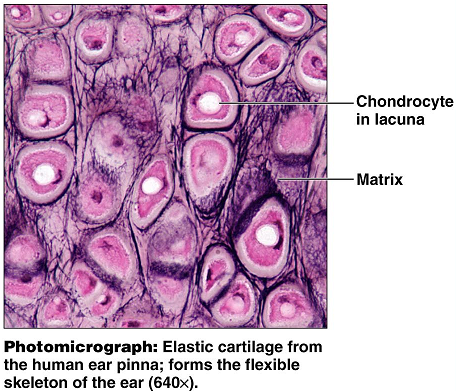
Question: In the term “chondrocyte”, what does “chondro” refer to?

**Cartilage: Elastic Cartilage**

Slide: Elastic cartilage or Epiglottis

Make a comparison of the hyaline cartilage to the elastic cartilage. Both have lacunae, but the lacunae in the elastic cartilage are more pronounced. Also, elastic cartilage has visible elastic fibers whereas the fibers in hyaline cartilage were much more subtle.





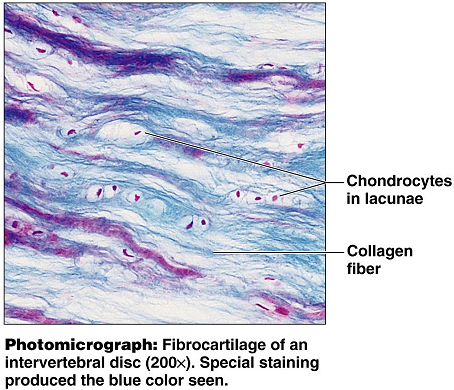
Question: In which locations can elastic cartilage be found?

Question: What is the advantage of having elastic fibers in the matrix? Which quality does this give the elastic cartilage?

**Cartilage: Fibrocartilage**

Fibrocartilage contains a large amount of the thick collagen fibers. Still present are the lacunae and the chondrocytes. Compare this cartilage to the hyaline and the elastic cartilages.

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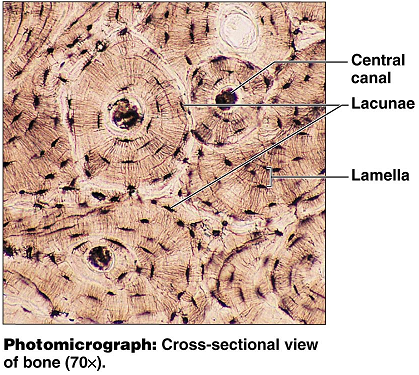


Question: Where is fibrocartilage found?

Question: what is the function of fibrocartilage?

Connective Tissue: Bone

Note that this connective tissue has a calcified matrix unlike the previously viewed tissues. Locate the central canal and lamella while viewing the osteon. Again, this tissue type contains lacunae, but rather than containing chondrocytes like the cartilage did, these contain osteocytes.



Question: What is the function of the central canal?

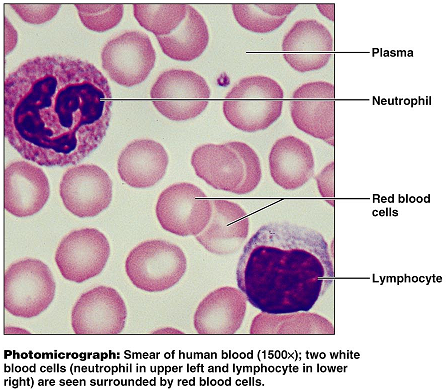
Question: What is the function of the canaliculi?

Question: What is an osteon?

**Connective Tissue: Blood**

Slide: Blood or Wright’s stain

Blood is a connective tissue used for transportation. The matrix is a fluid matrix (plasma) and the cells are the red and white blood cells.



Question: According to your lecture notes (or text book) What are the functions of connective tissues in general?

Given the four tissue types (Epithelia, Connective Tissue, Muscle, and Nervous), try to arrange them into their groups. (List the slides and tissues you’ve viewed this lab and last into their appropriate categories below.)

**Epithelia:**

Simple Stratified Other

**Connective Tissue:**

Connective Tissue Proper “Special” Connective Tissue

Muscle tissue and Nervous tissue will be viewed in later labs as we discuss those tissue types.

Note: Before moving onto the skeleton, make sure the microscopes are stored properly.

* Turn off the light
* Drop stage to lowest position
* Remove slide from stage. Make sure all slides are returned.
* Place the scanning lens in position
* Carefully return the microscopes to their cabinets
* Check and clean your work space

**Axial Skeleton**

The human skeleton is divided into two main regions: axial and appendicular. The axial skeleton contains the skull, vertebrae, ribs, and sternum. The appendicular skeleton contains the bones of the upper and lower extremeties, and the girdles that attach them to the axial skeleton.

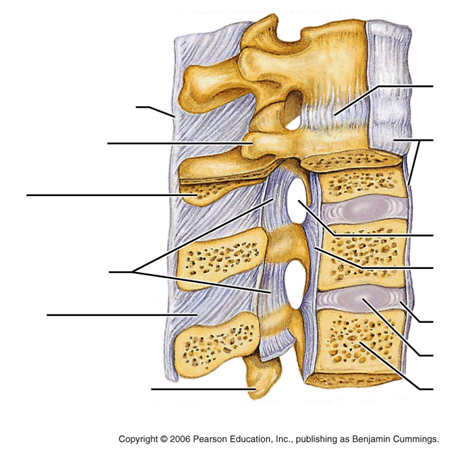
For the purposes of this lab, we will not be spending a great deal of time on the skull. Be aware, though, that the skull has two divisions to it. It contains the facial bones as well as the cranial bones.

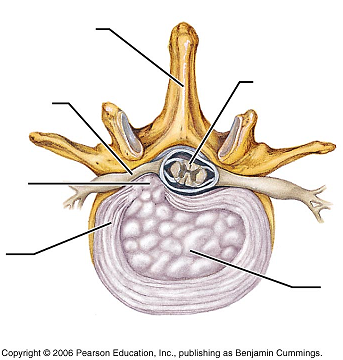
**Skull: Observe the bones of the skull.**

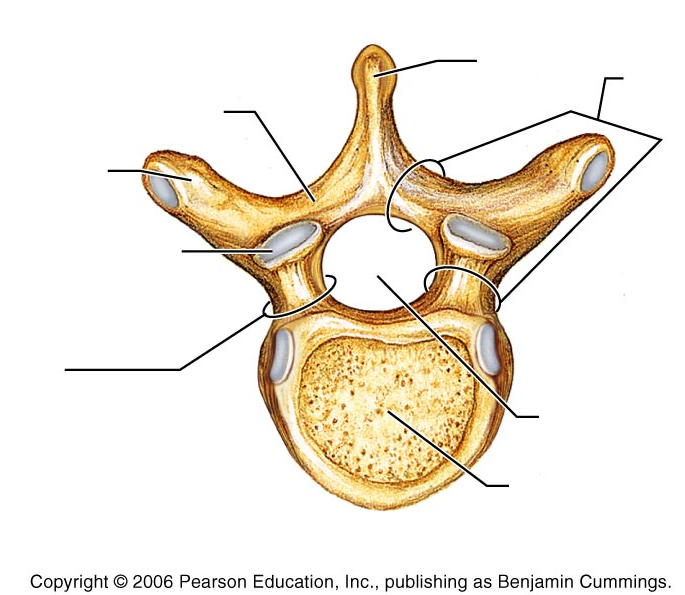
**Vertebral column**

On page 8 of your lab manual (axial skeleton), you will find descriptions of the vertebrae based on their locations. While each vertebrae has common features, those features can vary from region to region, allowing us to identify the level from which the vertebra came.

From your text book, label the following images:

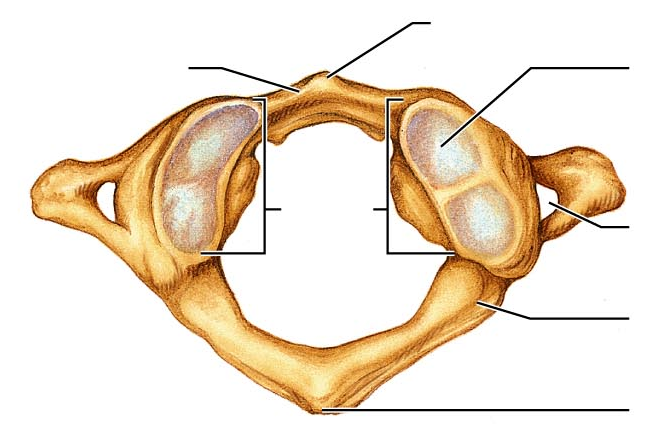






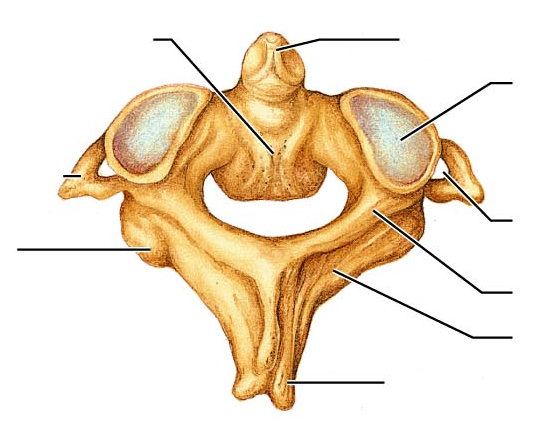
**Observe the first cervical vertebra**:  **C1**

This structure varies from the other vertebra in that it has a modified body. The shape of C1 allows rotation to take place with the skull, as well flexion and extension. Look at the smooth articular surfaces that form the joints with the occipital regions of the skull.



**Observe the second cervical vertebra: C2**

Notice on the superior aspect is a bony protrusion called the dens or odontoid process. This process articulates with C1 and allow us to have a great deal of rotation at this level. Find a C1 and a C2 vertebra and fit them together properly to observe how their articulation allows for this pivoting to take place.



**Observe the remaining cervical vertebrae**. Notice the presence of the transverse foramina, which allow the arteries to run through a protected environment on their way to the brain.

Compare the bodies of the cervical vertebra to those of the thoracic vertebrae and those of the lumbar vertebra.

What do you notice in terms of shape?

What do you notice in terms of size?

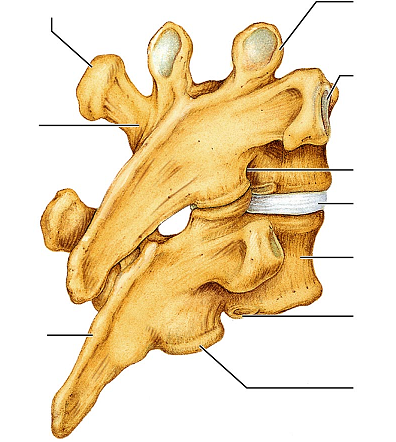
Compare the cervical, thoracic, and lumbar vertebrae.

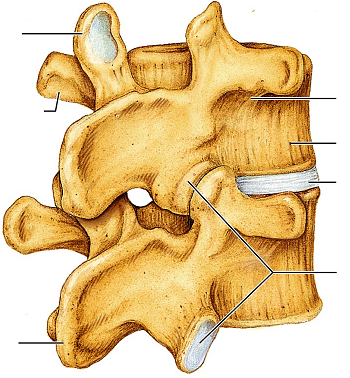
What do you notice about the spinous processes for each region? (indicate distinctions about shape, size, and orientation of the SP)

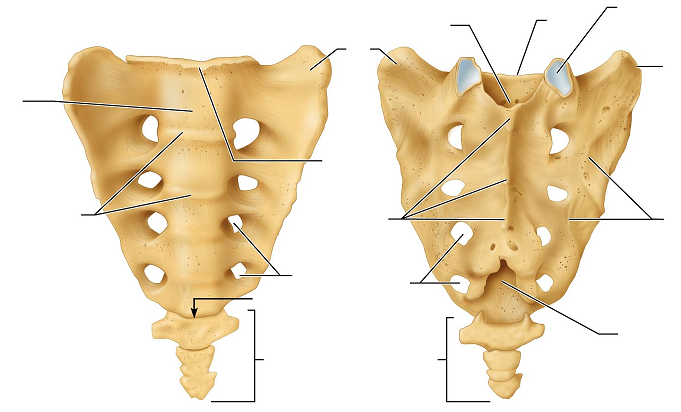
Compare the cervical, thoracic and lumbar vertebrae.

What do you notice with regards to the transverse processes for each region?

What feature do the thoracic vertebrae have to accommodate the ribs?



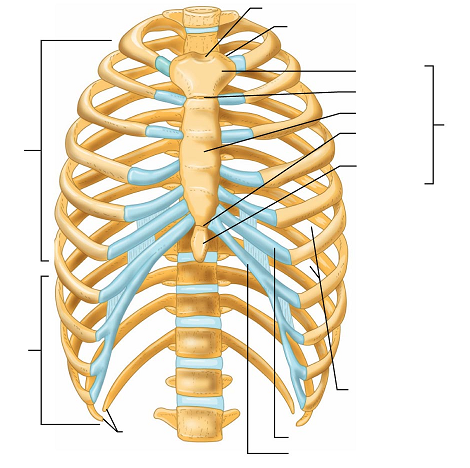


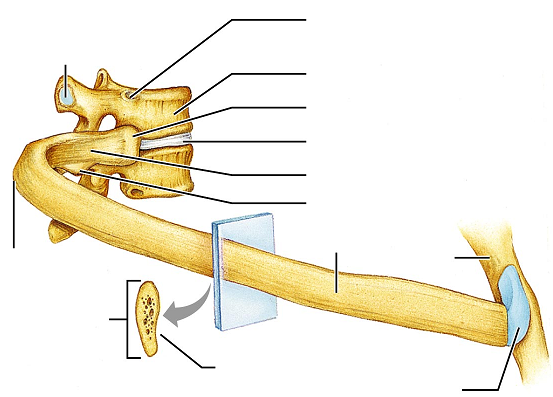


**Thoracic Cage:**

The thoracic cage is the protective environment that houses the delicate organs of the chest. It is composed of the sternum, the ribs, and the thoracic vertebrae, as well as the costal cartilage. As we breathe, our chest needs to be able to expand and contract. The articulations of the ribs at the vertebrae allow this to happen, as does the costal cartilage attachments to the sternum.

Observe the features of the thoracic cage and complete the labeling on the diagrams below.





Before leaving lab, be sure that you can find and identify each of the features on the axial skeleton bones that you were asked to label in the above images.