

Anatomy and Physiology Tissue Review

OVERVIEW

Histology practicals can be rough, especially when access to slides is limited to the lab period. This resource provides an opportunity to learn or review the structure and functions of various tissue types as they examine specimens using the BioNetwork virtual microscope.

LEARNING OBJECTIVES

In this activity you will use the microscope to investigate different types of tissues found in the human body. Some of the structures will relate directly to the function of the tissues. In other cases, the combination of tissues is the key to how things function. For example, the trachea includes pseudostratified columnar epithelium, hyaline cartilage, and smooth muscle. The combination of these tissues allows us to take oxygen deep into our lungs at the same time preventing dust, pollen, and viruses from getting too far into the respiratory system.

For lecture and lab, you will need to know the description, function, and location of EACH type of tissue!!!

PROCEDURE

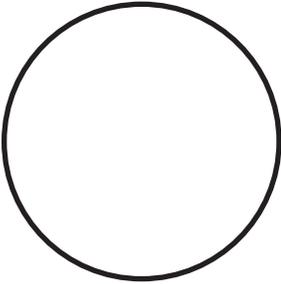
Follow instructions from the **A&P Microscopy Lab** to find the **Human** slides in the **Slide Catalog**. View each slide listed up to the 10X, or 40X objective as needed. It may also be helpful to use the information and photos in an A&P textbook as a resource to help identify the tissues listed below.

Hint: You may have to drag the slide around to get a good view of the tissue.

Describe what you see in the charts on the following pages: think about how each is different and how the cells are arranged. In addition, add a sketch for each. Finally, answer the questions at the end of the document.

PART A: Epithelial tissue

For each example, sketch what you see and describe your observation.

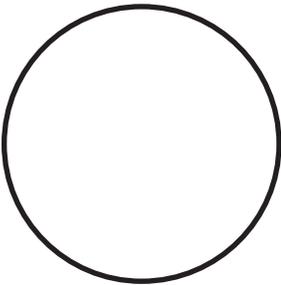


Simple Squamous

Purpose: Single layer of flat cells allows molecules to diffuse through easily.

Location: Glomeruli of kidneys, Air sacs of lungs, Lines heart and vessels (blood and lymph)

Describe:

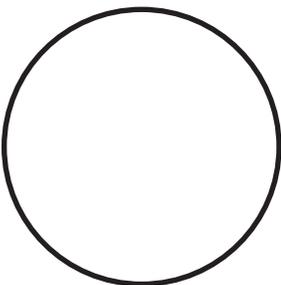


Simple Cuboidal

Purpose: Cube cells in a single layer that function in secretion and absorption

Location: Kidney tubules, Ducts in small glands, and Surface of ovaries

Describe:



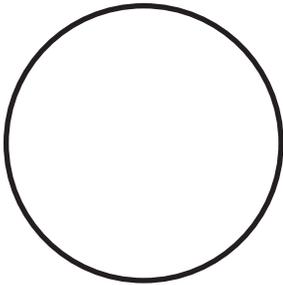
Simple Columnar*

**Look for goblet cells*

Purpose: Tall cells forming columns that function in absorption and secretion of enzymes, mucus, etc. May have cilia.

Location: Lining of digestive tract, Lines small bronchi, uterine tubes, and regions of the uterus (ciliated form)

Describe:



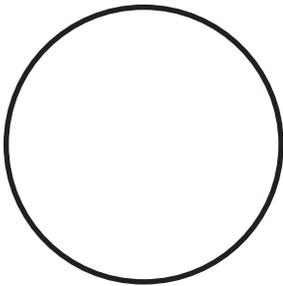
Pseudostratified Columnar

*Look for goblet cells and cilia

Purpose: Elongated cells of different heights, nuclei at different levels, have cilia – secretion (particularly secretes mucus), uses cilia to move mucus

Location: Upper respiratory tract and trachea, Lines male sperm ducts and ducts of large glands (non-ciliated type)

Describe:

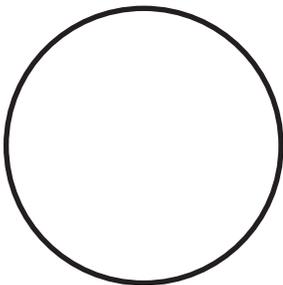


Stratified Squamous

Purpose: Several cell layers: flattened cells at top and more cube-shaped cells towards the bottom. Used for protection. SKIN

Location: Linings of esophagus, mouth, and vagina

Describe:



Transitional

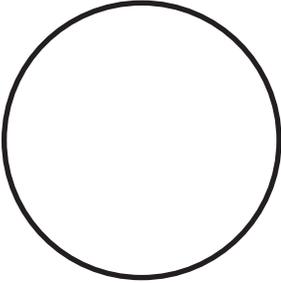
Purpose: Several layers with cube shaped and tall cells, cells at surface are dome shaped or flat. Stretchy tissue used in urinary system.

Location: Lines ureters, bladder, and urethra

Describe:

PART B: Connective tissues

For each example, sketch what you see and describe your observation.

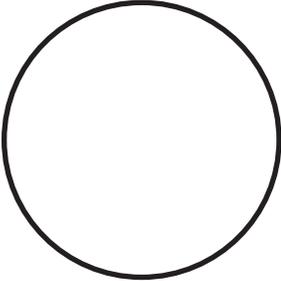


Areolar (Loose)

Purpose: Gel-like matrix with fibers (collagen, fibroblasts, and elastic fibers).
Wraps around and provides cushioning to organs

Location: Under epithelia, around organs, and surrounds capillaries

Description:

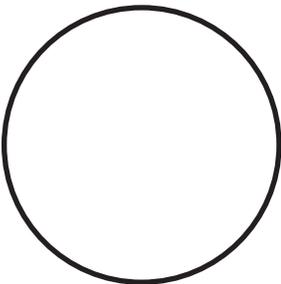


Adipose (Loose)

Purpose: Gel-like matrix with sparse cells (adipocytes). Stores fuel, provides insulation to body, protects organs

Location: Under skin, around kidneys, eyes, and in breasts

Description:

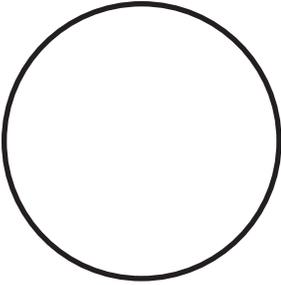


Reticular (Loose)

Purpose: Network of reticular fibers that form a soft internal skeleton

Location: Lymphoid organs

Description:

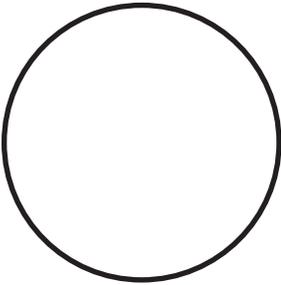


Dense Regular

Purpose: Collagen fibers in parallel rows, fibroblasts. Withstands pressure of pulling in one direction.

Location: Tendons. Most ligaments, and aponeuroses

Description:



Elastic (Dense)

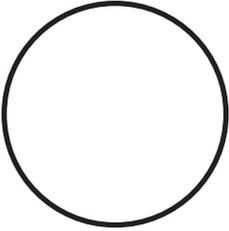
Purpose: Dense tissue with mainly elastic fibers. Brings tissue back after stretching: blood pulse through arteries, recoil of lungs

Location: Walls of large arteries, ligaments of the backbone, and walls of bronchial tubes

Description:

Part C: Cartilage

For each example, sketch what you see and describe your observation.

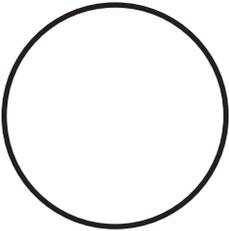


Hyaline Cartilage

Purpose: Firm matrix with collagen fibers (chondrocytes in lacunae).
Support and reinforcement.

Location: Ends of long bones in joints, Cartilage of ribs, Cartilage of nose, trachea,
and larynx, and Skelton of embryo

Description:

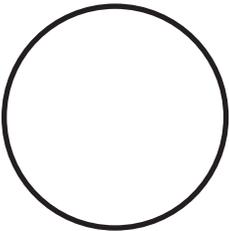


Elastic Cartilage

Purpose: More elastic fibers than hyaline. Maintains shape but allows for flexibility

Location: Auricle of ear, Epiglottis

Description:



Fibrocartilage

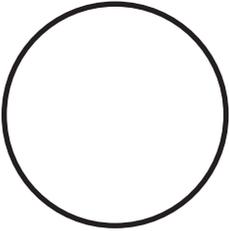
Purpose: Predominantly thick collagen fibers, matrix less firm than hyaline

Location: Discs between vertebrae, Discs of knee joint

Description:

Part D: Bone

For each example, sketch what you see and describe your observation.



Compact Bone (Osseous Tissue)

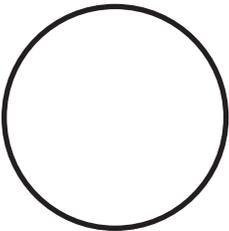
Purpose: Hard calcium matrix with osteocytes in lacunae. Support and protection

Location: Bones

Description:

Part E: Blood

For each example, sketch what you see and describe your observation.



Cells*

**Look for RBCs and a WBC (stained purple)*

Purpose: Cells in plasma (fluid matrix), Erythrocytes (Red blood cells)- carries Oxygen,
Leukocytes (WBCs) - defends against pathogens

Location: Within blood vessels

Description:

QUESTIONS

- 1) What are tissues and what are the four main types of tissue?
- 2) Know functions and basic structures of each type of tissue.
- 3) What are the classes and characteristics of epithelia?
- 4) What is the difference between an endocrine and exocrine gland?
- 5) Name the types of exocrine glands based on structure and mode of secretion.
- 6) What are the four classifications of connective tissue and their overall functions?
 - a) What structural differences did you notice?
- 7) Fluid Connective Tissues (blood vs. lymph; erythrocytes vs. leukocytes)
- 8) Differences between cartilage and bone, and specialized structures of each.
- 9) What are the two cell types found in nervous tissue? Know cell parts of a neuron.
- 10) What are the three types of muscle tissue and the defining characteristics of each?
- 11) What is a major difference between skeletal and smooth muscle?
- 12) What is the structural component that is unique to cardiac muscle?