The Histology Practical Examination will consist of fifteen tissue samples on microscopes set up at stations throughout the lab. In addition, some "rest" stations will be included so that you will have ample time to review your answers. You will be given 90 seconds at each station, and there will be time at the end of the Practical Exam to go over and re-check stations that you might be unsure of. Please Note: You will not be able to adjust the COARSE adjustment of the microscope. If necessary, you will be allowed to adjust the FINE adjustment.

You are encouraged to take detailed notes of the structures of each cell type and it is strongly recommended that you plan on staying after school at least one day to review the material in addition to the time we spend in class. The following guide is meant to aid in your study of the material. It is not meant to replace your textbook or replace viewing slides in lab for preparation. If you have any questions, please see me!

**Histology Practical Review Sheet** (Outlines the Tissue types you must know)

**Epithelial Tissue**

**Simple Squamous Epithelium**

This is an "overhead" view of *squamous epithelium*. It is a single layer of flat cells with centrally located nuclei. In addition, you may see *stratified* (layered) *squamous epithelium*, but the cells still appear flattened at the top layer.

From: [Cell & Developmental Biology Online](#)
**Stratified Squamous Epithelium**

This is an cross-sectional view of *stratified squamous epithelium*. Note the cells still appear flattened at the top layer.

From: [The JayDoc HistoWeb](#)

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**Cuboidal Epithelium**

As its name implies this cell type resembles a cube and also has a centrally located nucleus. You may see cuboidal cells arranged in layers, which would be more correctly identified as *stratified cuboidal epithelium*.

From: [Cell & Developmental Biology Online](#)

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**Columnar Epithelium**

*Columnar epithelium* appears cylindrical and may or may not be **ciliated**. If tiny hair-like projections are present, the cell is ciliated. If they are not present, the cell is nonciliated. These cells may also be found in one single layer (*Simple columnar epithelium*) or in several layers (*Stratified columnar epithelium*). To further confuse the situation, there is also *pseudostratified columnar epithelium*.
**Psuedostratified Columnar Epithelium**

*Psuedostratified Columnar Epithelium* gives the appearance of consisting of several layers. Even though not all of the cells reach the surface, all attached to the basement membrane. This indicates the cells are not truly stratified. The cells in this picture would be correctly identified as *pseudostratified ciliated columnar epithelium*.

From: [University of New England College of Osteopathic Medicine Histology Homepage](https://www.une.edu/medicine/histology/)

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**Connective Tissue**

**Bone**

Compact Bone tissue is easily recognizable because of its unique structure. It consists of osteocytes (bone cells) sitting in cavities called *lacunae*. The concentric rings resemble the interior of a tree trunk.

From: [Red Deer College Connective Tissue Homepage](https://www.rdcollege.ca/connectivetissue/)

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**Elastic Cartilage**

Elastic cartilage consists of chondrocytes within a threadlike network of elastic fibers located within the matrix. Notice the elastic fibers between the cartilaginous cells.

From: Molecular Expressions

**Hyaline Cartilage**

Hyaline cartilage is both the weakest and most abundant cartilage found in the human body. The tissue contains many chondrocytes and has bluish ground substance dispersed in between. Fine collagen fibers might not be apparent, but they are there.

From: Biology Learning Center

**Dense Fibrous Connective Tissue (Two types you should know)**

**Dense Regular**

Dense Regular Connective Tissue is connective tissue arranged in parallel rows to provide additional strength. The collagen fibers are arranged here in a "wave-like" fashion.

From: Ohio State University's Anatomy & Physiology Homepage
Dense Irregular Connective Tissue

Dense Irregular Connective Tissue lives up to its name: it consists of randomly arranged collagen fibers with very few fibroblasts to provide strength for structures.

From: Loyola University Medical Education Network (LUMEN)

Elastic Connective Tissue

Elastic connective tissue consists of elastic fibers that freely branch to one another. Fibroblasts are scattered in between.

From: General Histology

Areolar Connective Tissue

Areolar connective tissue has many cell types dispersed throughout. It consists of collagen, elastic, and reticular fibers, along with several cell types, embedded in a semifluid ground substance.

From: Niagara County Community College
**Reticular Connective Tissue**

Reticular connective tissue consists of reticular fibers and reticular cells interlaced to form a loose network that helps give structure to organs and muscle cells. Notice the black reticular fibers located between reticular cells.

From: University of Delaware's Mammalian Histology Homepage

**Adipose Tissue**

Adipocytes (fat cells) appears almost like cork cells under the microscope. The cell consists of a large triglyceride deposit, with the cytoplasm and nucleus of the cell pushed out to the periphery of the cell.

From: Deltagen's Homepage

**Blood**

Blood is possibly the easiest tissue type given its color and typical cell shape. Erythrocytes (red blood cells) are abundant with leukocytes (white blood cells) randomly dispersed in between. Small platelets are also present, though in far fewer numbers than red blood cells.

From: Red Deer College Connective Tissue Homepage
**Nervous Tissue**

Nervous tissue consists of neurons and neuroglia. The neuron is the larger cell in this picture while the neuroglia are the many "dots" scattered throughout. Note the presence of the nucleus in the cell body of the neuron. The neuron also has a single axon and many dendrites extending from the cell body.

From: [Cell and Developmental Biology Online](https://www.cellanddevelopmentalbiologyonline.com)

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**Muscle Tissue**

*Skeletal Muscle Tissue*

Skeletal muscle can be identified because of its alternating bands of light and dark segments (*striations*), a feature that is unique to skeletal and cardiac muscle. Unlike cardiac muscle, skeletal muscle lacks intercalated discs. Instead, skeletal muscle consists of long, cylindrical, fibers with peripherally located nuclei.

From: [Niagara County Community College](https://www.niagaracountycoll.edu)
**Cardiac Muscle Tissue**

Like skeletal muscle, cardiac muscle is striated. Unlike skeletal muscle, cardiac muscle also has **intercalated discs**, which both strengthens the tissue and provides a route for electrical stimulation impulses to travel throughout the heart.

From: **Niagara County Community College**

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**Smooth Muscle Tissue**

Smooth muscle is the only muscle type that is not striated. Fibers are long and spindle-shaped, with one central nucleus per cell (fiber).

From: **Niagara County Community College**

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**Other Resources on the Internet**

- [Kent State University's Histology Site](#)
- [Loyola University Medical Education Network (LUMEN)](#)