

Tissues/Histology and microscopy (labs 1.2 and 1.1)

Background information on Tissues and Microscopy

The background information for understanding this exercise is in lab 1.2 (tissues) and lab 1.1 (microscopy). You should read labs 1.2 and 1.1 for background material and answer the lab report questions in the lab report sections of those labs.

a) Microscopy

When viewing any slide under the microscope, use the following procedure. The microscope parts are listed in **bold** type. If you are not sure where any microscope part is, refer to figure 1.1 in your lab manual.

1) **Before** you plug in, turn on, or look into the microscope, do all of the following steps:

a) Turn the rheostat (a dial on the arm of the microscope) as low as possible by turning the rheostat dial toward you. *This step is important because the light bulb can burn out if the rheostat starts on high.*

b) Turn the lens turret until the **4X objective lens** clicks into place, pointing straight down at the **stage** (the flat platform).

c) Turn the **course focus knob** (the largest dial on the side of the microscope) to move the stage upward toward the lens as far as possible.

2) Turning on the microscope light.

a) Plug in the microscope and turn on the power. The power switch is on the arm, just below the rheostat. The switch symbols are “I” for on and “O” for off.

b) Turn the rheostat to maximum power by turning the rheostat dial away from you. The light should now be on as bright as possible.

3) Start viewing the slide using the 4X objective lens.

a) Put the slide into the **slide carrier** (the metal clip on the stage). The slide carrier opens up and the glass slide clips into it. Do not wedge the slide under the slide carrier. This can damage the microscope.

b) Use the two **mechanical stage knobs** (two knobs pointing downward, next to the stage) to adjust the slide position so that the specimen is in the “spotlight” coming up through the stage.

c) Now look into the **eyepieces**. If the light is uncomfortably bright, use the **iris diaphragm lever** on the **condenser** to make it dimmer.

d) While looking into the eyepiece, turn the course focus knob slowly until the specimen comes into sharp focus. This should take less than a quarter turn of the course focus knob.

Once you have the image in sharp focus, use the two mechanical stage knobs to view different regions of the specimen.

4) Increasing the magnification using the 10X and 40X objective lenses.

When you wish to view a region of the specimen at higher magnification, use the following procedure to switch to the 10X and 40X objective lenses. Note that we will not use the 100X objective lens in this class (it requires special viewing oil to focus the image).

a) Move the region you wish to view to the exact center of the field of view (using the mechanical stage knobs).

b) Turn the lens turret to the next higher objective lens. *Do not move the focus knob.*

c) View the slide at the new higher magnification. You will have to fine tune the focus and adjust the brightness.

If you are using the 40X objective, focus only with the fine focus knob. Using the course focus knob can crash the 40X lens into the slide.

b) Tissues (Histology)

The background information for understanding this exercise is in lab 1.2. Follow the procedure listed below but read lab 1.2 for background material and answer the lab report questions in the lab report section of that lab. Also, compare what you see in the microscope to the corresponding photos and sketches in exercise 1.2 of the lab manual. If what you see under the microscope does not look like the tissue as shown in the lab manual, **ask your instructor for help.**

View the tissues listed below. **Sketch each tissue at 400X and label the listed structures.**

1) Epithelial tissues

a) Stratified squamous epithelial

Structures: Label the stratified squamous epithelial cells. Although you may not be able to see it, label the basement membrane in your sketch.

- b) Pseudostratified columnar epithelial, with cilia
Structures: Label the Pseudostratified columnar epithelial cells. Label their cilia also. Although you may not be able to see it, label the basement membrane in your sketch.
- c) Simple cuboidal epithelial (from kidney)
Structures: Label the simple cuboidal epithelial cells. Although you may not be able to see it, label the basement membrane in your sketch.

2) Muscle tissue

- a) Smooth muscle (from uterus)
Structures: Label the smooth muscle cells in your sketch.
- b) Skeletal muscle
Structures: Label the skeletal muscle cells in your sketch. Also label striations and multiple nuclei in the muscle cells.
- c) Cardiac muscle
Structures: Label the cardiac muscle cells in your sketch. Also label their striations and intercalated discs.

3) Nervous tissue

- a) Nervous
Structures: Label neurons (with dendrites, axons, cell body) and neuroglia cells.

4) Connective tissue

- a) Loose connective tissue
Structures: Label collagen fibers and fibroblast cells. The loose connective tissue on this slide is the tissue that borders the epithelial layer.
- b) Irregular dense connective tissue
Structures: Label collagen fibers and fibroblast cells. Note that the slide for this tissue is the same slide that contains loose connective tissue. The irregular dense connective tissue is deeper down, beneath the loose connective tissue, which itself is beneath the epithelial tissue.
- c) Regular Dense connective tissue
Structures: Label collagen fibers and fibroblast cells.

d) Bone

Structures: Label osteons, and their parts: Osteocytes in lacuna, central canal, canaliculi, lamella, and extracellular matrix.

e) Cartilage

Structures: Label chondrocytes in lacuna, and chondrin extracellular matrix.

f) Adipose

Structures: Label adipocytes and their nuclei, and the fat droplet (the white glob of triglyceride) inside each cell.

g) Blood

Structures: Label RBCs, WBCs, platelets, and plasma.

5) Self test slides. The following slides are optional self test slides. You are not required to view them or sketch them. But if you have time and would like to test your ability to identify tissues, try to identify the tissues on each of these slides.

a) Self test slide A

Try to identify tissues A, B, and C.

b) Self test slide B

Try to identify tissues A and B.

c) Self test slide C

Try to identify tissues A, B, and C.

d) Self test slide D

Try to identify tissues A, B, and C.