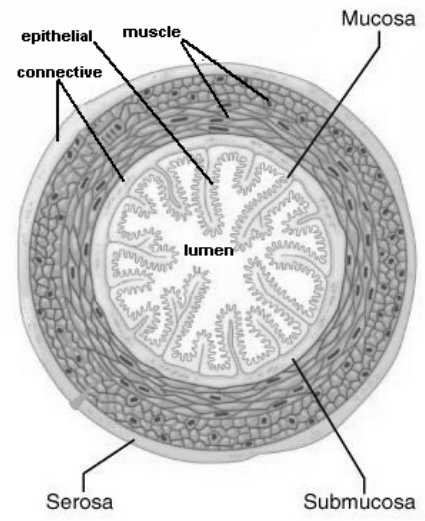


Tissues: Collections of cells.

There are >200 types of cells, can be grouped into 4 basic tissue types:



1. Epithelial: Protect, line, absorptive surface, secreting surface, diffusion surface.

- Sheets of cells. Cells are connected to each other. REMEMBER...they are found in linings!
- thin tissues, usually 1-2 or 3 cells thick, occasionally thicker (epidermis of skin ~ 20 cells thick)
  - \* Protection = thicker, absorptive + secretion = thinner, diffusion surfaces = only 1 layer thick.
- 3 main cell types; tissue type is named for the cell type.
  - \* squamous (flat), cuboidal, columnar
  - \* also, student is responsible for 1 "special" type: pseudostratified
- Also, all can be simple (1 layer thick) or stratified (> 1 layer thick)

Simple squamosal(diffusion)	Simple cuboidal (glands, secretion)	Simple columnar (absorption)
Stratified Squamosal (protection)	Stratified cuboidal (glands, secretion)	Pseudostratified columnar (absorption, cilia + goblet cells)

2. Connective: Connects, protects, attaches, nutrient/waste storage & removal, transport. All are cells dispersed in a matrix. The tissues differ more in the composition of the matrix (what kind of protein, and the presence of salts, etc. such as calcium phosphates in bone)

NOTE: there are several cell types, but they are all very similar. Also, all of the cells can be "blasts" (active) or "cytes" (dormant). Most of the tissues use fibroblasts.

Fibro = basic type

Adipo = fat

Chondro = cartilage

Osteo = bone

Hemo or Hemato = blood

- 2 main categories, with several subcategories.

#### A. Loose

- mostly water. Nutrient storage/waste disposal/transport

- 3 kinds:

i. Areolar. Fibroblasts with some other cells (mast cells, immunity). "Nutrient pool", because it is a watery tissue surrounding other tissues/organs, serving as a nutrient source & waste dump. Edema.

ii. Adipose. Fat storage. Adipocytes.

iii. Blood. Hematocytes (WBCs, RBCs and platelets).

#### B. Dense

- harder, more protein in the matrix. Extreme case: collagen + Ca<sup>++</sup> salts (osseous tissue). Connection, protection.

i. Dense regular (many different names: white, fibrous, collagenous)

ii. Dense irregular

iii. Cartilage - 3 types. All have chondrocytes in lacunae. Simplest is "Hyaline Cartilage".

iv. Bone - see "Bone Tissue" lab for details + characteristics. 2 types:

a. Compact

b. Spongy (cancellous)

Student is only responsible for identifying Compact bone tissue under the microscope.

3. Muscle. Cells are called "fibers". All contain myofilaments made of contractile proteins (striations made of actin & myosin). 3 types (NOTE: 2 of the 3 are "striated"):

- i. Skeletal (striated) - obvious striations
  - ii. Cardiac - heart only. Also contains obvious striations, but includes intercalated disks.
  - iii. Smooth - involved in peristalsis
- Student only has to identify Cardiac and Skeletal under the microscope.

4. Nervous. Cells are neurons + glial cells ("helper" cells).

Process to go through when looking at a slide (or..."*how to do process of elimination*"):

1. Is it nervous?
  - A. yes: your done!
  - B. No: go to step 2.
2. Is it muscle?
  - A. Yes: what kind is it? Is it striated? Does it have intercalated disks?
  - B. No: go to step 3.
3. Is it epithelial (thin sheet next to a lumen) or connective(dispersed cells in a matrix)?
  - A. If epithelial: go to step 4.
  - B. If connective, go to step 7
4. Are the cells flat (squamous)?
  - A. yes: your done! Just check if they are simple or stratified.
  - B. No: go to step 5.
5. Are they a cluster of square-ish cells in a "donut" shape (cuboidal).
  - A. yes: your done! Just check if they are simple or stratified.
  - B. No: go to step 6.
6. Are they long, with obvious goblet cells?
  - A. yes: your done! Just double check to see if they are simple or pseudostratified with cilia.
  - B. No: you are mistaken about something. Start at the beginning.
7. You have decided that it is connective. If this is incorrect, start over. If it is connective, is it loose or dense?
  - A. Loose: Go to step 8.
  - B. Dense: go to step 12.
8. NOTE: steps 8 through 10 can all be done at the same time. Does the tissue look like honeycombs?
  - A. yes: your done! It is adipose!
  - B. No: go to step 8.
9. Is it areolar?
  - A. yes: your done!
  - B. No: go to step 10.
10. Is it blood?
  - A. yes: your done!
  - B. No: something's wrong. If you think it is loose connective, it has to be areolar, adipose or blood. Start over at the beginning.
12. If you are here, you have decided that it is a dense connective type. If not, start over. Is it bone?
  - A. yes: your done!
  - B. No: go to step 13.
13. Does it have lacunae?
  - A. yes: it is a cartilage. You are done!.
  - B. No: go to step 14.
14. It is either dense regular or dense irregular.
  - A. Yes: Just decide which it is!
  - B. If you decide No: start at beginning.