

Answer sheet
PHARMACY HISTOLOGY (ANATOMY 115)
MIDTERM EXAMINATION
WINTER, 2007

1. Which of the following would you need to distinguish smooth from skeletal muscle, or stratified epithelium from cuboidal epithelium: (**circle correct answer: 1 point**)

- a. chemical dyes
- b. microtome
- c. formalin
- d. microscope
- e. none of the above
- f. **all of the above**

2. (2 points)

Identify the structures indicated by the arrows and name one function of that structure

- a. **Name of structure: Microtubules**
- b. **One function: Intracellular transport; mitotic spindle formation; cilia and flagella formation**

3. (5 points)

A. Identify the following components of the structure above:

- a. In the red box – **lipids**
- b. In the green circle – **proteins**
- c. In the blue triangle – **carbohydrates**

B Name two functions of this entire structure

- a. **Transport**
- b. **Communication**
- c. **Adhesion**

4. During the contraction of a striated muscle fiber, the thin filaments of **actin** slide over the thick filaments of **myosin** and the **Z** bands become closer together. (2 points)

5. (3 points)

In this electron micrograph, what is the large structure (indicated by the arrowheads) that fills most of the image? **the nucleus**

Identify the dense structure indicated by “A”: **nucleolus**

Name one function of this structure: **Synthesis of ribosomal RNA; ribosomal; assembly**

6. (4 points)

Match a function of items in the right hand column with cartilage or bone cell or tissue types in the left hand column.

- | | |
|--|---|
| <p>C Hyaline cartilage</p> <p>E Osteoclasts</p> <p>A. Fibrocartilage</p> <p>B. Osteoblasts</p> | <p>A. High tensile strength; found in intervertebral discs</p> <p>B. Secrete organic components of the bony matrix</p> <p>C. Fetal precursor for endochondrial bone formation</p> <p>D. High content of elastic fibers; present in external auditory canal</p> <p>E. Secrete acid proteases used in resorption of bone</p> |
|--|---|

7. (6 points)

For each of the three general components of connective tissue (**A: fibers; B: ground substance; C: cells**), name a specific example and briefly (five words or less) describe how it contributes to the defense of the body. Be specific.

Specific example of connective tissue component	Contribution to defense of the body
A. (fibers): collagen	physical barrier to penetration of foreign organisms
B. (ground substance) GAGs, proteoglycans	physical barrier to penetration of foreign organisms
C. (cells) plasma cells macrophages	produce antibodies remove foreign particles

8. (7 points)

The two cell types illustrated above (arrows in left panel, arrowheads in right panel) both contribute to the same function in connective tissue.

a. Name the cell types illustrated

Left: adipocytes

Right: fibroblasts

b. Name the common function they perform in connective tissue:

Support and packing of organs

c. For each, briefly explain (in ten words or less) how they contribute to this function.

Left: Adipose cells - store fat to provide cushion

Right: Fibroblasts - produce fibers and ground substance.

9. You are walking on a beautiful beach and step on some coral; name the **blood component** that accomplishes each of the following specific tasks in response to this wound. (6 points)

	Blood component	Feature (enter letter from list below)
a) Kill bacteria that entered the wound	Neutrophil	B
b) Help stop the bleeding	Platelets	F
c) Digest cellular debris	Macrophages	D

and select one appropriate descriptive **feature** for that blood component from the list below:

- A) granules contain histaminase
- B) nucleus has 2-5 lobes
- C) contains hemoglobin
- D) derived from monocytes
- E) granules contain histamine
- F) derived from megakaryocyte

10. (5 points)

a. Which panel (left or right) illustrates the cell type that is responsible for killing parasites? **LEFT**

b. Name the cell type. **eosinophil**

c. Briefly describe the characteristic feature(s) that tell you what cell type this is.

Bilobed nucleus; Presence of eosinophilic granules

d. Name the other cell type and give its function

Cell type: Lymphocyte

Function: **immunological defense**

11. What is the name and function of the circled structure below? What type of filaments are involved in this structure? (3 pts)

Name: **Desmosome**

Type of Filaments: **Intermediate filaments; cadherins, cytokeratin; vimentin; desmin**

Function: **Intercellular adhesion; structural support of epithelium**

12. (2 points)

What is the name and function of the junctions stained in red?

Name: **Tight junctions; zonulae occludens**

Function: **Close off intercellular space; barrier function of epithelium, prevents flow of extracellular material into intercellular space**

13. What type of epithelium is the one shown below? (1 point)

Cuboidal

14. What are the structures in panel A? What are the structures in panel B? (4 points)

A. **Cilia**

B. **Microvilli**

Give one example of a region of the body where each structure would be found?

A. **Respiratory system; oviduct**

B. **Absorptive cells of intestine, kidney**

15. Name the three different types of capillaries and one distinguishing structural feature (6 points)

TYPE	Structural feature
A. Continuous	Continuous basal lamina; pinocytotic vesicles
B. Fenestrated	Continuous basal lamina; gaps in endothelial cell membranes
C. Sinusoidal	Discontinuous basal lamina; multiple fenestrations permit passage of large molecules

16. (5 points)

Above are figures (**Left and Right**) of two different types of arteries.

a) Name both types of these arteries.

Left: Muscular artery

Right: Elastic artery

b) What are their functions?

Left: Smooth muscle contraction controls flow of blood to organs

Right: Stabilize blood flow between systole and diastole

c) What is the main structural difference between these two types of arteries?

Structure of tunica media; contains abundant smooth muscle in muscular arteries; abundant elastic fibers arranged into laminae in elastic arteries

17. (4 points)

a. What type of muscle is this? Be specific

Striated skeletal muscle (“skeletal” description essential)

b. What contractile proteins are found in the “A” band?

Myosin; actin

c. What structures are located at the arrows? Which contractile protein inserts into them?

Structure **Z band**

Protein: **Actin**

18. It is essential that the depolarization of cardiac muscle cells spreads rapidly between the cells so that the myocardium can act as a synchronous unit. How does the depolarization spread from one cell to another? (2 points)

Positively charged sodium ions pass from one cell to another through GAP JUNCTIONS, thus carrying depolarizing current throughout the myocardium.