

Human Structure and Function I

COURSE OBJECTIVES / STUDY GUIDE

Fall Term
2006

MATERIAL TO BE COVERED ON LECTURE TESTS

LECTURE TEST #1

I. CHAPTER 1: INTRODUCTION TO THE HUMAN BODY

1. Define anatomy, physiology, and pathophysiology. Explain how they are related and the subdivisions of each.
2. Name the levels of structural organization in the human body and explain their relationships.
3. Know the major body cavities and their subdivisions. Understand the location of and organs contained in the major body cavities (open and closed) covered in lecture.
4. Be able to name and locate the six serous membranes of closed body cavities.
5. Be able to describe the anatomical position.
6. List and describe the major requirements of life.
7. List and describe the major functions or characteristics of life.
8. Define homeostasis, explain its importance, and describe the relationship between homeostasis and disease. Give an example of a homeostatic mechanism.
9. Define positive and negative feedback mechanisms and describe their relationship to homeostasis.
10. List the eleven major organ systems of the body and know the general function of each.
11. Know the anatomical landmarks noted in your textbook. Know the planes of the body, the four quadrants and the nine regions of the abdominopelvis and the organs contained in these regions.

II. CHAPTER 2: THE CHEMISTRY OF LIFE

1. Define matter. Know what elements and atoms are. Know what electrons, protons and neutrons are and where they are located on an atom.
2. Be able to define and use atomic number, atomic weight, molecular weight, dalton and mole.
3. Know the three main types of chemical bonds and how they are formed. Know the significance of each of the bond types in macromolecules. Understand the significance of polar and nonpolar covalent bonds.
4. Know what an ion, cation, and anion are and their significance to biological systems.
5. Know what typically occurs in a chemical reaction, and be able to identify the reactants and products. Understand equilibrium and concentration.
6. Understand what an enzyme does and state the significance of enzymes in biological systems.
7. Be able to differentiate acids and bases and their relative pH values. Understand what happens when an acid is added to an unbuffered solution and what happens when a base is added to an unbuffered solution. Understand what happens when an acid is added to a buffered solution and what happens when a base is added to a buffered solution. State the normal pH range of body fluids.
8. Know the four major types of macromolecules, their basic structure, common functions and name a few representatives of each type.
9. Differentiate between polar and non-polar compounds and relate these to water solubility. Explain the importance of water to the function of the body. Know where water is found in the body.

III. CHAPTER 3: CELL STRUCTURES AND THEIR FUNCTIONS

1. Describe the following cell structures and organelles and know their functions

nucleus

nucleolus

nuclear membrane

chromosomes

genes

endoplasmic reticulum

ribosomes

golgi apparatus

lysosomes

peroxisomes

mitochondria

chloroplasts

cytoplasm

cytosol

cytoskeleton

microfilaments

intermediate filaments

microtubules

molecular motors

2. Understand the composition and function of the cell membrane. Be able to identify and give the function of the following structures associated with the cell membrane. Name five functions that the following proteins might have in the cell membrane.

flagella

cilia

microvilli

membrane proteins

anchoring proteins

recognition proteins

enzymes

receptor proteins

carrier or transport proteins

channels

glycocalyx

3. Understand membrane permeability. What do freely permeable, selectively permeable and impermeable mean?

4. Understand the following transport processes and how the cell membrane regulates the composition of the cytoplasm

diffusion

define diffusion:

what is a concentration gradient?

how does the concentration gradient affect diffusion?

how does distance affect diffusion?

how does molecular size affect diffusion?

how does temperature affect diffusion?

how does electrical charge/ electrical forces affect diffusion?

how does the cell membrane affect diffusion?

facilitated diffusion

osmosis?

what is osmotic pressure?

what is isotonic?

what is hypotonic?

what is hypertonic?

filtration

carrier-mediated transport

is facilitated diffusion a carrier-mediated process?

what is active transport?

what does the Na,K-ATPase do?

what is a membrane (transmembrane) potential?

how is a membrane potential measured?

what is secondary active transport?

vesicular transport

what is endocytosis

what is receptor-mediated endocytosis

what is pinocytosis

what is phagocytosis

what is exocytosis

5. Define isotonic, hypotonic, and hypertonic solutions and explain their effects on water movement in and out of the cell.
6. Describe the stages of the cell cycle. Detail the events of mitosis and meiosis. What is the significance of mitosis? Of meiosis? What are centrosomes and centrioles?
7. Be able to describe the replication of DNA.
8. Be able to explain transcription and translation.

9. Describe the functions of the rough endoplasmic reticulum and Golgi apparatus in post-translational modifications of secretory proteins.
10. Understand what a genetic disease is and give some examples. How can genes cause disease?
11. Define homologous chromosomes, autosomes, sex chromosomes and genes.
12. Define alleles, genotype, phenotype, homozygous, and heterozygous. Discuss the difference between dominant and recessive traits. What are Punnett Squares and how are they used?

LECTURE EXAM #2:

I. CHAPTER 4: TISSUES, GLANDS AND MEMBRANES

1. Know the germinal layers of the embryo. Identify and list the four general types of tissues in the body and describe their structural and functional differences.
2. State the body region(s), structural characteristic(s) and function(s) for each of the epithelial types listed below. How is location of an epithelial tissue related to its function?

simple squamous
 simple cuboidal
 simple columnar
 pseudostratified columnar

stratified squamous
 stratified cuboidal
 stratified columnar
 transitional

3. State body regions, structures and functions for each of the following membrane types:

serous membranes
 pleural
 pericardial
 peritoneal
 mucous membranes

what is the function of mucus?
synovial membranes
cutaneous membranes

4. Name the three structural elements of connective tissue and state their functions
5. State a body region or structure for each of the connective tissue types listed below.

connective tissue proper
 loose connective tissue
 areolar
 adipose
 reticular

 dense connective tissue (fibrous connective)
 dense regular
 elastic
 dense irregular

cartilage
 hyaline cartilage
 elastic cartilage
 fibrocartilage

bone
 compact
 spongy

blood

8. List and identify the three major types of muscle tissue. Give an example of where each is found and define their anatomical differences.
9. Describe the characteristics and function of nervous tissue.

II. CHAPTER 6: SKELETAL SYSTEM: BONES AND JOINTS

1. List and describe the major functions of the skeleton.
2. Identify these classification shapes of bones and give examples of each

long
short
irregular
flat

3. Compare the histology of compact and spongy bone.
4. Describe how the embryonic skeleton is made or replaced by bone via
intramembranous ossification
endochondral ossification
5. Describe the process of long bone growth that occurs at the epiphyseal plate.
6. Explain hormonal control of bone deposition and resorption. What are normal blood calcium levels; what are the recommended levels of calcium in the diet?
7. List the nutrients necessary for bone growth.
8. What affect do gravitational forces and exercise have on bone?
9. Describe and know the cause of the following bone disorders:
osteoporosis
osteomalacia
dwarfism
gigantism
rickets
10. Identify and state the function of the Haversian system with its constituents:
Central (Haversian) canal
lacunae
canaliculi
Perforating (Volkmann's) canals
Lamella
Osteon
Sharpey's fibers

11. Identify a sagittal section of a bone including the following structures:
- periosteum
 - compact bone
 - spongy or cancellous bone
 - diaphysis
 - epiphysis
 - epiphyseal plate
 - hyaline cartilage
 - medullary cavity
12. Define:
- osteocyte
 - osteoblast
 - osteoclast
 - hemopoietic tissue
 - fontanel
 - articulation
 - ligament
13. Describe two kinds of bone marrow, give the function of each and where each is found in the child and adult.
14. Locate and identify the primary and secondary curves of the spine.
15. Describe sesamoid bones and locate examples of each
16. Identify the following types of joints and give examples of each
- fibrous
 - cartilaginous
 - synovial
 - synarthroses
 - diarthroses
 - amphiarthroses, give an example and location of each.
17. Be able to classify movable joints into the correct category according to the type of movement at the joint.

18. Understand these joint disorders:

osteoarthritis
rheumatoid arthritis
hemophilic arthritis
Lyme disease
gout

III. CHAPTER 7: MUSCULAR SYSTEM

1. Describe the organization of skeletal muscle at the gross level. Know the difference between antagonistic and synergistic muscle.
2. Know the three layers of connective tissue that surround muscle; what layer connects to the tendon?
3. Locate and describe the microscopic structure and functional roles of the following parts of a skeletal muscle fiber.

muscle fiber
myofibrils
myofilaments
 thin filaments
 actin
 G actin
 F actin
 tropomyosin
 troponin
 thick filaments
 myosin
 myosin tail
 myosin head

sarcoplasmic reticulum
 foot proteins
 Ca²⁺ channels
 Ca-ATPase
T tubules
terminal cisternae
triads
A band

I band
H zone
M line
Z line
fascicle
sarcomere

4. State the primary and most immediate chemical source of energy for muscle contraction.
5. What pathways provide ATP for a contracting muscle fiber? In what order are these pathways activated?
6. Describe the production and subsequent fate of lactic acid in a fatigued muscle. Define oxygen debt and muscle fatigue. What is the role of hemoglobin and myoglobin?
7. Compare the anatomy and physiology of skeletal, cardiac and smooth muscle in terms of the following characteristics.

striated/ non-striated
voluntary/ involuntary innervation

mechanism of contraction

proteins involved in contraction

actin
myosin
tropomyosin
troponin

size

location

role of calcium in contraction

channel types associated with action potential

8. Know the location and function of the following components of the neuromuscular junction:

nerve axon
synaptic vesicles
synaptic cleft
motor end plate
junctional folds (invaginations) of motor end plate
neurotransmitter
acetylcholine

acetylcholinesterase
receptor operated channels
voltage operated channels

9. Be able to define:

resting membrane potential
depolarization
repolarization
hyperpolarization
10. How are the terms in #9 above related to ion channels and ion movements?
11. Know and understand the Sliding Filament Theory of Muscle Contraction.

LECTURE EXAM #3:

I. CHAPTER 11: BLOOD

1. Identify and state the function of the components of blood including

formed elements of the blood
buffy coat
plasma
2. List the components of plasma and serum and state the function of each. What are some of the functions of proteins found in plasma?
3. Know the volume of blood in men and women. Know what a hematocrit is, how it is obtained and, how it is calculated.
4. Describe the characteristics/functions of the following as they relate to RBC production:

size of RBC
shape of RBC
hemoglobin characteristics
breakdown products of hemoglobin
hematopoiesis
erythropoiesis
erythropoietin
location of erythropoietin production

ultimate stimulus for erythropoietin production
negative feedback mechanism of erythropoietin production
vitamin B₁₂
folic acid
intrinsic factor
iron
amino acids.

5. Describe the chemical events of clot formation

hemostasis vs homeostasis
three steps of hemostasis
 vascular spasm
 platelet plug formation
 coagulation
 intrinsic vs extrinsic pathways
 common pathway (know steps)

6. List the classes, structural characteristics, and function of leukocytes:

neutrophils
lymphocytes
 T lymphocytes
 B lymphocytes
monocytes
eosinophils
basophils

7. Describe the structure and function of platelets; know definition/ significance of

megakaryocytes
thrombopoietin
thrombocytopenia
prothrombin time

8. Differentiate between a thrombus and an embolus as to their formation and location in the body.

9. Understand balance between clot formation and inhibition; know the significance, definition or function of:

fibrinolysis
tissue plasminogen activator
conversion of plasminogen → plasmin

10. Describe the ABO and Rh blood groups. Explain the basis of transfusion reactions. Include:
- antigens of A, B, AB, and O types
 - antibodies of A, B, AB, and O types
 - universal donors
 - universal recipients
 - erythroblastosis fetalis
11. Define:
- diapedesis
 - colony stimulating factor
 - leukemia
 - leucopenia
12. Know the causes of these blood disorders:
- hemophilia A
 - hemophilia B
 - anemias
 - acute hemorrhagic
 - chronic hemorrhagic
 - aplastic
 - nutritional
 - pernicious
 - thalassemia
 - sickle cell anemia
 - polycythemia
 - bone marrow cancer
 - blood doping
 - secondary polycythemia

II. CHAPTER 12: THE HEART

1. Be able to describe the following about the heart:
- size
 - location
 - valves
 - great vessels
 - blood vessels leading to and from heart and the lungs
 - blood vessels leading to and from the heart and the body
2. Name the membranes covering and lining the heart.

3. Know these functions of the valves of the heart.
 - when and why the valves open and close
 - what keeps certain valves from being forced to open backwards
 - what a heart murmur is
4. Trace the route of blood moving through the heart, starting with the superior and inferior vena cava and exiting through the aortic arch. List all valves, chambers, and vessels involved in correct sequence.
5. Describe the operation of the cardiac conduction system by identifying system parts and locations and the proper action sequence for one normal cardiac cycle. Also be able to identify the
 - normal pacemaker area of the heart
 - pacemaker area during junctional rhythm
 - reasons for heart block
 - role of gap junctions
6. Draw a diagram of the normal electrocardiogram. Name the individual waves and indicate what each represents in terms of **electrical** and **mechanical** activity of the heart. How are the activities of the cardiac conduction system reflected in the electrocardiogram?
7. Define and know the equation that relates:
 - Cardiac output
 - Stroke volume
 - Heart Rate
8. Define and know these factors and how they affect Stroke Volume:
 - End diastolic volume (how does EDV affect sarcomere length?)
 - venous return (how does this affect EDV?)
 - End systolic volume (how is this affected by EDV and afterload?)
 - Heart Rate (how does this affect EDV?)
 - Heart Contractility (what does this cause?)
 - Afterload (how is this related to ESV?)
 - Preload (how is this related to EDV?)
 - Starling's Law of the Heart
9. Explain the role of the autonomic (sympathetic and parasympathetic) nervous system on heart rate and contractility.

10. Know the general role of extracellular potassium and calcium concentrations in regulating heart function.

11. Know the definitions of these clinical descriptions of heart function.

- Fibrillation
- Defibrillation
- Tachycardia
- Bradycardia
- Coronary or Heart Attack
- Angina
- Systole
- Diastole
- Congestive Heart Failure
 - Dilated myopathy
 - Pulmonary congestion

12. Know the long term effect that increased blood pressure (afterload) has on the heart.

13. What is calcium induced calcium release (CICR)?

14. What are the differences in oxygen content between arterial blood in the systemic circulation and arterial blood in the pulmonary circulation?

III. CHAPTER 13: BLOOD VESSELS AND CIRCULATION

1. Know

- the three layers of arteries and veins and their functions
- how the layers differ between arteries and veins
- what the lumen is
- what the vaso vasorum is
- what endothelial cells are and what they secrete
- types of arteries
 - elastic
 - muscular
 - arterioles
 - terminal

- metarterioles
- thoroughfare
- capillaries
 - continuous
 - fenestrated
 - sinusoidal
 - true
 - precapillary sphincter
- postcapillary venules
- veins
 - venous valves
 - venous sinuses
- anastomoses
 - venous
 - arterial
 - arteriovenous

2. Define, know normal ranges for and how to calculate (when appropriate) these terms

- systolic pressure
- diastolic pressure
- pulse
- sphygmomanometer
- sounds of Korotkoff
- pulse pressure
- mean arterial pressure
- hypotension
 - orthostatic hypotension
- hypertension
 - primary or essential hypertension
 - secondary hypertension
 - chronic hypertension
- compare (which is higher/lower?)
 - blood pressure of aorta
 - blood pressure of capillaries (why so low)
 - blood pressure of veins

3. Know and be able to use the equation relating Blood Pressure, Blood Flow , and Resistance.

4. Know the neural controls of short term blood pressure regulation, including:

Chemoreceptor reflex
Baroreceptor reflex
Higher brain centers

5. Know these mechanisms of long term regulation of blood pressure.

aldosterone
antidiuretic hormone (ADH)
the relationship between $[Na]_{\text{plasma}}$, $[H_2O]_{\text{plasma}}$, BV, and BP.

6. Know how these hormones affect the heart.

antidiuretic hormone (ADH)
 know how alcohol effects this mechanism
epinephrine
norepinephrine
endothelium derived relaxing factor (EDFR, Nitric Oxide)
endothelium derived constricting factor (EDCF, endothelin)

7. Name three medical problems caused by hypertension.

8. Know how blood flow to skeletal muscle, brain, skin, lungs, kidney and heart changes with exercise.

9. Define circulatory shock and explain the homeostatic mechanisms that compensate for it. Know these types of shock:

hypovolumic shock
vascular shock
cardiogenic shock
orthostatic shock

10. Describe the typical capillary bed and explain how blood hydrostatic pressure and blood osmotic pressure affect the movement of fluid and nutrients in and out of the capillary bed.

11. Describe the relationships between edema and each of the following:

blood hydrostatic pressure

capillary permeability
lymphatic drainage
blood osmotic pressure
interstitial osmotic pressure

LECTURE EXAM #4

I. CHAPTER 14: THE LYMPHATIC SYSTEM AND IMMUNITY

1. Know these components of lymphatic system.

minivalves
lacteals
chyle
layers of lymphatic vessels
 tunica intima
 tunica media
 tunica adventicia
lymphoid tissue types
 diffuse
 follicles
 germinal centers
lymphoid cell types
 T lymphocytes
 B lymphocytes
 macrophages
 dendritic cells
 reticular cells

2. What are the similarities between between lymphatic vessels and veins?
3. Know how lymph is formed, how it circulates and where it returns to the systemic blood circulation. Know how much lymph is formed per day.
4. Describe the function and location of the thymus, spleen, tonsils, Peyer's patches and Mucosa Associated Lymphatic Tissue (MALT). Also know

where T and B cells mature
the significance of the blood-thymus barrier
what immunocompetency is, when it occurs

the function of crypts
which tonsil is most often infected

5. Describe the mechanisms that control the movement of lymph.

II. CHAPTER 16: THE DIGESTIVE SYSTEM

1. State the general functions of the digestive system. Know the major divisions and organs that make up those divisions. Know the specific functions of those organs.
2. Identify the following accessory structures of the digestive system. Know their functions and secretions, if applicable.

Hard and soft palate
Tongue
Salivary glands
Liver
Pancreas

3. Know the difference between deciduous and permanent teeth in terms of
number
age of eruption
classification of teeth
4. Know the external and internal structure of a general tooth.
5. Describe the structure and function of the pharynx and esophagus.
6. Describe the four layers of tissue that make up the esophagus, stomach, small intestine, large intestine and rectum. Where does absorption occur? Where are the circular and longitudinal muscles located? Where are the lacteals and why are they important?
7. Understand the processes of digestion, including:
ingestion
mastication
propulsion
 deglutition
 peristalsis
 mass movements

mixing
 segmental contraction
secretion
 mucus
 water
 enzymes
 chyme
mechanical digestion
chemical digestion
 where are carbohydrates digested?
 where are lipids digested?
 where are proteins digested?
absorption
 how does absorption differ in different regions of the GI tract?
elimination
 defecation

8. What is the function of the normal flora of the colon?

III. CHAPTER 17: NUTRITION, METABOLISM, AND BODY TEMPERATURE REGULATION

1. Differentiate between metabolism, anabolism and catabolism. What are kilocalories? Calories?
2. Describe what happens in synthesis reactions and decomposition reactions.
3. What are the possible roles of enzymes in metabolism?
4. Describe the following processes of carbohydrate metabolism and know their metabolic roles.

Respiration
Glycolysis
Krebs Cycle (Citric Acid Cycle) and Oxidative Phosphorylation
Gluconeogenesis
Glycogenolysis

5. Know what the products of cell respiration are and how the body disposes of them. What are the roles of O₂ and CO₂ in cell respiration?
6. Describe the following processes of lipid metabolism and know their metabolic roles.

Ketogenesis

What are ketone bodies

Why are ketone bodies important?

Lipogenesis

Beta-oxidation

7. Describe the following processes of protein metabolism and know their metabolic roles.

Transamination

deamination

8. What is the basal metabolic rate? What events affect it?
9. What is the normal range for body temperature? How does the body generate heat. What role does the hypothalamus play in body temperature?

IV. CHAPTER 10: THE ENDOCRINE SYSTEM

1. Distinguish between an endocrine gland and an exocrine gland.
2. Explain the characteristics and functions of the endocrine system. What are the differences as to how the endocrine system and the nervous system control body functions?
3. Define the term hormone. What are the different chemical classifications of hormones? What is a prostaglandin?
4. What are the three ways hormone release can be stimulated? What are tropic hormones? What are target cells? How do protein hormones stimulate a cell? How do steroid hormones stimulate a cell?
5. Know these endocrine organs and the hormones they secrete.

Pituitary (hypophysis) gland

Pineal gland

Thyroid gland
Parathyroid gland
Adrenal gland
Heart
Kidney
Digestive organs
Pancreas
Testes
Ovaries
Thymus
Placenta

6. Understand the following mechanisms hormones use to cause changes in their target cells to achieve their desired results.

Changes in membrane permeability
Changes in protein synthesis
Changes in enzyme synthesis
Changes in secretion
Mitosis

7. Explain how negative feedback works and what its role is in controlling hormone secretion. Give an example of a hormone controlled by negative feedback.

8. Explain how positive feedback works and what its role is in controlling hormone secretion. Give an example of a hormone controlled by positive feedback.

9. Describe the structural and functional relationships between the hypothalamus and the pituitary gland. What is the hypothalamic-hypophyseal tract? What is the hypophyseal portal system?

10. Identify the hormones produced by the anterior pituitary gland and state their functions and mode of control.

11. Identify the hormones of the posterior pituitary gland and state their functions and mode of control. Why is the hypothalamus considered a neuroendocrine gland?
12. What is the function of thyroid hormone?
13. Understand the relationships between
calcitonin and parathyroid hormone
insulin and glucagon
14. Describe the clinical symptoms of Type I Diabetes Mellitus and explain how the disease causes these symptoms. What are the two types of diabetes mellitus and how do they differ? What causes these two different types of diabetes mellitus?
15. Describe how the following conditions are related to specific hormones:
Gigantism
Grave's Disease
Cretinism
Hypersecretion of prolactin

MATERIAL TO BE COVERED ON LAB EXAMS

LAB PRACTICAL EXAM #1:

I. BODY ARCHITECTURE

1. Define and identify with respect to a model or diagram the following directional terms:

superior
cranial
inferior
caudal
anterior
ventral
ipsilateral
contralateral
pectoral
inguinal
proximal
posterior
dorsal
medial
lateral
distal
superficial
deep
brachial
antecubital
peroneal
acromial
buccal
popliteal

Quiz #1: ↓

2. Define and identify with respect to a model or diagram the following body planes:

coronal or frontal
sagittal
transverse or horizontal
midsagittal

3. Be able to describe the anatomical position.

4. Identify and describe the organs of and structural limits of the following regions and cavities with respect to a model, diagram or the cadaver:

right and left hypochondriac regions
right and left lumbar regions
right and left iliac regions
epigastric region
hypogastric region
umbilical region
ventral cavity
spinal cavity
abdominal cavity
dorsal cavity
cranial cavity
thoracic cavity
pelvic cavity
pericardial cavity
pleural cavity
peritoneal cavity

Quiz #1: ↑

5. Use the terms listed in objective 1, 2, and 3 above to describe the region in which a given body structure is found. Describe the relative position of any two given body structures with respect to each other.
6. List the 11 organ systems of the body, briefly explain their function, and list major organs found in each.
7. Describe the anatomical position.
8. Name the serous membranes.
9. Describe structures of the axial and appendicular areas of the body.

II. **MICROSCOPE**

Quiz #2: ↓

1. Be able to identify and know the function of these parts of the microscope

Ocular
Objective
Stage
Arm
Base
Iris diaphragm
Condenser

Substage light
Fine adjustment knob
Coarse adjustment knob
Nose piece

2. Know the procedure for examining a specimen slide using the 40X objective. Be able to focus on a slide and find the desired structure.
3. Understand the relationship between the power of the objective to the magnification of the specimen examined. When switching to a higher power, do you see more or less of the specimen?

III. CELL STRUCTURE

1. Be able to identify the following cell structures on pictures and diagrams

Nucleus
Endoplasmic reticulum
 Smooth endoplasmic reticulum
 Rough endoplasmic reticulum
Golgi apparatus
Lysosomes
Vesicles
Cell membrane
Nucleoplasm
Nucleolus
Cytoplasm
Ribosome
Mitochondrion
Vacuole
Microtubule
Microfilament
Chromosomes
Peroxisomes
Cytoskeleton
Flagella
Cilia
Centrioles
Centrosomes

2. Be able to identify a cell using the microscope. Quiz #2: ↑

IV. TISSUES

Quiz #3: ↓

1. Be able to identify pictures in histology atlas of each of the following types of epithelium:

- simple squamous
- stratified squamous
- simple cuboidal
- stratified cuboidal
- transitional
- simple columnar
- pseudostratified columnar
- stratified columnar

2. Be able to identify slides of the following types of connective tissue using a microscope.

- loose connective tissue
 - areolar
 - adipose
- dense connective tissue
 - dense regular connective tissue (white fibrous connective)
 - dense irregular connective tissue
- cartilage
 - hyaline cartilage
 - fibrocartilage
 - elastic cartilage
- bone (compact)
- blood

Quiz #3: ↑

3. Be able to identify slides of the three major types of muscle tissue using a microscope.
4. Be able to identify nervous tissue presented in lab using a microscope.

LAB PRACTICAL EXAM #2:

I. SKELETAL SYSTEM

1. From diagrams, models, slides, and articulated/disarticulated skeletons be able to identify the following structures:

Descriptive Terms

head
condyle
crest
spine
tubercle
tuberosity
foramen
sinus
meatus
trochanter
fossa
fissure
ramus
epicondyle

Classes of Joints

synarthroses
amphiarthroses
diarthroses

Kinds of Joints

ball and socket
hinge
condyloid
pivot
saddle
gliding

Angular Movements

flexion
extension
rotation
circumduction
pronation
supination
abduction

adduction
hyperextension

AXIAL SKELETON

Skull

Quiz #4: ↓

frontal
parietal
temporal
 external auditory meatus
 mastoid process
 zygomatic process
 mandibular fossa
 styloid process
zygomatic
 temporal process
 frontal process
maxilla
inferior nasal concha
nasal
occipital
 occipital condyles
sphenoid
 sella turcica
ethmoid
 cribriform plate
 crista galli
 perpendicular plate
 middle nasal concha
palatine bone
mandible
 body
 coronoid process
 mandibular condyle (condyloid process)
 ramus
lacrima bone
vomer
hyoid bone
temporomandibular joint

Sternum

manubrium
body

xiphoid process
jugular notch

Vertebral Column

atlas
axis
odontoid process
cervical vertebrae
thoracic vertebrae
lumbar vertebrae
sacrum
coccyx
intervertebral disc
body of vertebrae
pedicle
lamina
spinous process
transverse process
vertebral foramen
intervertebral foramen
transverse foramen
nucleus pulposus
superior articular surface
inferior articular surface

Quiz #4: ↑

Ribs

true
false
floating
head
neck
tubercle
angle
shaft

Foramen of the skull

optic canal
foramen rotundum
foramen ovale
foramen spinosum
jugular foramen
carotid canal

foramen lacerum
foramen magnum
mental foramen
supraorbital foramen
infraorbital foramen
superior orbital fissure
inferior orbital fissure
hypoglossal canal
stylomastoid foramen
greater palatine foramen

Sinuses

frontal
maxillary
sphenoid
ethmoid

Sutures

squamous
coronal
lambdoidal
occipitomastoid
sagittal

APPENDICULAR SKELETON

Shoulder girdle

Quiz #5: ↓

clavicle
 acromial end
 sternal end
scapula
 spine
 glenoid cavity
 coracoid process
 acromion
 borders (lateral, medial, superior)
 supraspinous fossa
 infraspinous fossa

Upper Arm

humerus
 head

- greater tubercle
- lesser tubercle
- olecranon fossa
- coronoid fossa
- radial fossa
- capitulum
- trochlea
- medial epicondyle
- lateral epicondyle

Forearm

ulna

- olecranon process
- trochlear notch
- coronoid process
- styloid process
- head

radius

- styloid process
- head
- neck
- radial tuberosity

Wrist and hand

carpals—"Sally left the party to take Cathy home"

- scaphoid
- lunate
- triquetral
- pisiform
- trapezium
- trapezoid
- capitate
- hamate

metacarpals

phalanges

Quiz #5: ↑

Bones of the pelvis

os coxae

- ilium
- ischium
- pubis

acetabulum

pubic symphysis

obturator foramen
crest of ilium
false pelvis (greater pelvis)
true pelvis (lesser pelvis)
anterior superior iliac spine
ischial spine
posterior superior iliac spine
posterior inferior iliac spine
greater sciatic notch
ischial tuberosity
lesser sciatic notch

Thigh

Quiz #6: ↓

femur

head
neck
greater trochanter
lesser trochanter
linea aspera
lateral condyle
medial condyle
medial epicondyle
lateral epicondyle

Lower leg

tibia

lateral condyle
medial condyle
medial malleolus
tibial tuberosity

fibula

lateral malleolus
head

Foot

tarsals

talus
calcaneus
navicular
medial cuneiform
intermediate cuneiform

lateral cuneiform
cuboid
metatarsals
phalanges

Structures associated with the knee joint

patella
lateral meniscus
medial meniscus
synovial cavity
anterior cruciate ligament
posterior cruciate ligament
fibular (lateral) collateral ligament
tibial (medial) collateral ligament

Quiz #6: ↑

II. BLOOD

Use Chapter 18 (textbook) and Exercise 29 (Lab Manual) as references.

1. Know how to
Type ABO blood types.
Type blood for Rh factor.
Make and calculate a hematocrit.
2. Know the approximate percentages of a normal hematocrit.
3. Be able to identify the 5 types of leukocytes.
4. Know what a complete blood count is.
5. Know the definition of anemias, polycythemias, leukocytosis, leukopenia.
6. Know a natural anticoagulant.
7. Know what and how different physiological conditions change RBC count.
8. Know the normal blood volume.

9. Know the functions of the formed elements of blood.

II. HEART

Quiz #7: ↓

1. From diagrams, models, slides, and the cadaver be able to identify the following structures:

Heart Structures

fibrous pericardium
myocardium
endocardium
tricuspid valve
bicuspid valve
right atrium
left atrium
right ventricle
left ventricle
pulmonary artery
pulmonary veins
chordae tendineae
papillary muscle
aorta
pulmonary semilunar valve
aortic semilunar valve
superior vena cava
inferior vena cava
coronary arteries

Quiz #7: ↑

III. MUSCULATURE SYSTEM

(Note class will select muscles to include!)

1. From diagrams, models, slides and the cadaver, be able to identify the following structures:

Trunk
diaphragm
external oblique
internal oblique
rectus abdominis

Quiz #8: ↓

external intercostalis
internal intercostalis
latissimus dorsi
lumbodorsal fascia
pectoralis major
pectoralis minor
transversus abdominis
linea alba
serratus anterior
trapezius
teres major
teres minor
levator scapulae
rhomboideus
erector spinae
semispinalis
quadratus lumborum
subscapularis
infraspinatus

Head and Neck

frontalis
orbicularis oculi
orbicularis oris
buccinator
masseter
temporalis
platysma
splenius capitis
scalenes
sternocleidomastoid
occipitalis

Arm

deltoid
biceps brachii
triceps brachii
brachialis
pronator teres
brachioradialis
coracobrachialis
flexor carpi radialis
palmaris longus
flexor carpi ulnaris
extensor carpi radialis longus

extensor carpi radialis brevis
extensor carpi ulnaris
extensor digitorum

Leg

iliopsoas
gluteus maximus
gluteus medius
gluteus minimus
tensor fascia lata
pectineus
gastrocnemius
soleus
achilles tendon
sartorius
rectus femoris
quadriceps femoris
vastus lateralis
vastus medius
vastus intermedius
adductor longus
adductor magnus
adductor brevis
gracilis
biceps femoris
semimembranosus
semitendinosus
tibialis anterior
tibialis posterior
plantaris
peroneus longus
extensor digitorum longus

Muscle Structures

epimysium
tendon
aponeurosis
perimysium
endomysium
sarcolemma

Quiz #8: ↑

FINAL LAB PRACTICAL:

I. BLOOD VESSELS

Quiz #9: ↓

1. What is the center of a blood vessel called?
2. What are the structural differences between arteries and veins?
4. Trace the path of blood through pulmonary circulation.
5. Trace the path of blood through hepatic circulation.
6. Be able to identify on the cadaver, models or diagrams the following arteries and veins.

Arteries

aorta
arch of the aorta
axillary
basilar
brachial
celiac
common carotid (left and right)
common iliac
Circle of Willis
external carotid
external iliac
femoral
inferior mesenteric
right brachiocephalic
internal iliac
left coronary
popliteal
pulmonary
radial
renal

right coronary
testicular/ovarian
splenic
subclavian
suprarenal
superior mesenteric
ulnar
ovarian
vertebral
internal carotid
posterior tibial
anterior tibial
hepatic

Veins

anterior tibial
posterior tibial
peroneal
axillary
azygous
basilic
brachial
right brachiocephalic
cephalic
common iliac
coronary sinus
external iliac
external jugular
femoral
great saphenous
hepatic
inferior mesenteric
inferior vena cava
internal iliac
left brachiocephalic
median cubital
popliteal
portal
pulmonary
splenic
right and left subclavian
superior mesenteric
superior sagittal sinus
superior vena cava
radial

ulnar
spermatic
ovarian
hemiazygous

Quiz #9: ↑

II. LYMPHATIC SYSTEM

Quiz #10: ↓

1. Know the location of the following lymphatic structures

lymph nodes
spleen
tonsils
 palatine
 lingual
 pharyngeal
 tubal
Peyer's patches
mucosa-associated lymphatic tissue (MALT)
lacteals

2. Know the following parts of the lymphatic system

lymphatic capillaries
 minivalves
lymphatic collecting vessels
lymphatic trunks
 lumbar
 bronchomediastinal
 intestinal
 subclavian
 jugular
lymphatic collecting ducts
 right lymphatic ducts
 thoracic duct
 cisterna chyli
right and left subclavian vein
internal jugular vein
cervical lymph nodes
axillary lymph nodes
Inguinal lymph nodes

3. Know the following structures of the lymph node.

afferent lymph vessels
efferent lymph vessels

germinal center
cortex
medulla
capsule

4. Know how lymph circulates, where it returns to the cardiovascular system.
5. Know the components of lymph.

III. DIGESTIVE LAB

oral cavity

teeth

crown
neck
root
enamel
dentin
pulp cavity
pulp
gingiva
cementum
periodontal ligament

tongue

salivary glands

parotid
sublingual
submandibular

palate

hard
soft
uvula

pharynx

tonsils

palatine
pharyngeal
lingual

esophagus

stomach

cardiac sphincter
fundus
body
pylorus
pyloric sphincter

small intestine

- duodenum
- jejunum
- ileum
- large intestine
 - taenia coli
 - haustra
 - ileocecal valve
 - cecum
 - ascending colon
 - transverse colon
 - descending colon
 - sigmoid colon
 - rectum
 - anus
 - appendix
- liver
- gallbladder
- hepatic duct
- cystic duct
- common bile duct
- spleen
- pancreas
- pancreatic duct
- sphincter of Oddi
- ampulla of Vater
- peritoneum
 - visceral
 - parietal
 - greater omentum
 - lesser omentum
 - falciform ligament
 - mesocolon
- portal vein
- hepatic artery
- superior and inferior mesenteric artery
- hepatic vein

IV. ENDOCRINE SYSTEM

1. Identify all of the endocrine glands on charts, models, slides, cadavers, and specimens (refer to list associated with #2 below).
2. Identify histological preparations of the following endocrine glands:

pancreas
 islets of Langerhans
 acinar cells
pituitary
 posterior
 anterior
adrenal
 capsule
 zona glomerulosa
 zona fasciculata
 zona reticularis
 medulla
thyroid
 follicle cells
 colloid
 parafollicular cells
hypothalamus
 parathyroid
thymus
ovary
testis
pineal

Quiz #10: ↑