

Biology 223 - HUMAN ANATOMY & PHYSIOLOGY I

LECTURE COURSE OBJECTIVES - SALADIN TEXT (Note there is considerable overlap with the material in the lab objectives)

CHAPTER 1 and ATLAS A: MAJOR THEMES OF ANATOMY & PHYSIOLOGY: ORIENTATION

1. Define anatomy and physiology. 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. 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 and describe the structure of the 3 different types of epithelial (serous) membranes of closed body cavities (pericardial, pleural and peritoneum).
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 metabolism.
9. Define homeostasis, explain its importance, and describe the relationship between homeostasis and disease.
10. Define positive and negative feedback mechanisms and describe their relationship to homeostasis.

CHAPTER 4: HISTOLOGY

1. Define the term "tissue". Identify or list four general types of tissues in the body and give the function of each.
2. State the body regions, structural characteristics and functions for each of the epithelial types listed below.

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

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

serous membranes
mucous membranes
synovial membranes
cutaneous membranes

4. Name and know the functions of the three structural elements of connective tissue.

5. State a body region or structure for each of the connective tissue types listed below.

loose connective tissue
areolar
adipose
reticular
dense regular connective tissue (fibrous connective)
dense irregular connective tissue
hyaline cartilage
elastic cartilage
fibrocartilage
bone (compact & spongy)
blood

6. Give an example of cell types commonly found in the various types of connective tissues and list a function for each cell type.

7. List and identify the three major types of muscle tissue. Give an example of where each is found.

8. Describe the characteristics and functions of nervous tissue (also see chapter 12, pp442-452).
9. Explain the structural and functional divisions of the nervous system (also see chapter 12, pp442-452).
10. Describe and identify the structural components of a neuron and give the function of each (also see chapter 12, pp442-452).
11. Understand the secretory processes of these glands:

Apocrine
Merocrine
Holocrine
Goblet cells

CHAPTER 7: BONE TISSUE

1. List and describe the major functions of bone.
2. I identify the different shapes of bones and give examples of each--long, short, irregular, and flat.
3. Compare the histology of compact and spongy bone.
4. Describe the process of long bone growth that occurs at the epiphyseal plate.
5. Explain hormonal control of bone deposition and resorption. What are normal blood calcium levels; what are the recommended levels of calcium in the diet?
6. Describe and the cause of the following bone disorders:

Osteoporosis
osteomalacia
dwarfism
gigantism
rickets
acromegaly
Paget's disease.

7. I identify and state the function of the Haversian system with its constituents:

Osteon
central (Haversian) canal

Lacunae
canaliculi
Perforating (Volkmann's) canals
Lamella
Osteon
Sharpey's fibers

8. I 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

9. Be able to describe and define the following:

osteocyte
osteoblast
osteoclast
hemopoietic tissue
fontanel
articulation
ligament

10. Know the various functions of the skeletal system.

11. Describe the two kinds of bone marrow, give the function of each and where each is found in the child and adult.

12. Describe intramembranous and intracartilaginous (endochondral) ossification.

13. I identify synarthroses, diarthroses, and amphiarthroses (see laboratory objectives).

14. I identify the three factors that stabilize joints.

15. Describe synovial fluid and the synovial joint.

16. Describe the structure and function of the bursa.

17. Be able to classify movable joints into the correct category according to the type of movement at the joint

CHAPTER 9: JOINTS

1. Classes of Joints

Synarthroses

amphiarthroses

diarthroses

2. Kinds of Joints

ball and socket

hinge

condyloid

pivot

saddle

gliding

3. Angular Movement

Flexion

extension

rotation

circumduction

pronation

supination

abduction

adduction

hyperextension

CHAPTER 6: INTEGUMENTARY SYSTEM

1. Explain the general functions of skin.
2. Describe the layers of the epidermis, the kinds of cells found in the epidermis, the specialized proteins of these cells and the function of those cells.
3. Describe the structure and function of the dermis.
4. Describe the accessory structures and glands associated with the skin and state the general functions of each.
5. Describe the following functions of skin:

Thermoregulation

protection

sensory

synthetic

mechanical

blood reservoir

excretion

6. Summarize the factors that determine skin color.
7. Know how burns are classified – 1st , 2nd and 3rd degree.
8. Explain the effect of serious burns. Describe how the rule of nines and degree of burn is used to determine the seriousness of the burn.
9. Know and be able to describe the three types of skin cancer. Know which one is the most dangerous.
10. Define the “ABCDE” rule of skin cancer.

CHAPTER 12: NERVOUS TISSUE

1. List the basic function(s) of the nervous system.
2. Explain the structural and functional divisions of the nervous system.

3. Describe and identify the structural components of a neuron and give the function of each

4. Describe and identify the following characteristics of neurons:

threshold

resting membrane potential (polarized state)

depolarized state

repolarization

refractory period

5. Describe substances which are acting as chemical transmitters at a synapse or neuron junction and explain the action of each one.

6. Describe or identify the following properties of a synapse:

facilitation

temporal summation

spatial summation

fatigue

inhibition

7. Describe the principle steps in the origin and conduction of a nerve impulse.

8. List the types of supporting cells of the nervous system and give the function of each.

9. Describe the function of myelin sheath and explain how it is formed in the PNS and CNS. What cell types actually form the myelin sheath in the PNS and CNS.

10. Classify neurons structurally and functionally.

11. Differentiate between a nerve and a tract. Differentiate between a nucleus and a ganglia.

12. Define the resting membrane potential and describe its electrochemical basis.

13. Compare and contrast graded and action potentials.

14. Explain how action potentials are generated and propagated along neurons.

15. Define absolute and relative refractory periods. What function does the absolute refractory period serve? The relative refractory period?

16. Define saltatory conduction and contrast it to conduction along unmyelinated fibers.
17. Define synapse.
18. Distinguish between electrical and chemical synapses both structurally and in their mechanisms of information transformation.
19. Describe in detail the structure and function of a chemical synapse.
20. Distinguish between excitatory and inhibitory postsynaptic potentials.
21. Describe how synaptic events are integrated and modified.
22. Describe common patterns of neuron organization and neuronal processing.

CHAPTERS 10 & 11: THE MUSCULAR SYSTEM & MUSCULAR TISSUE

1. State the primary and most immediate chemical source of energy for muscle contraction (pages 425-428. See also chapter 26, pages 1025-1032).
2. Describe the pathways that provide ATP for a contracting muscle fiber (pages 425-428. See also chapter 26, pages 1025-1032). In what order are these pathways activated?
3. Describe the production and subsequent fate of lactic acid in a fatigued muscle. Define oxygen debt and muscle fatigue. List possible causes of muscle fatigue. (pages 425-428. See also chapter 26, pages 1025-1032).
4. Compare the anatomy and physiology of skeletal, cardiac and smooth muscle in terms of the following characteristics.

striated/ non-striated

voluntary/ involuntary innervations

mechanism of contraction

proteins involved in contraction

size

location

role of calcium in contraction

channel types associated with an action potential

5. Know the three layers of connective tissue that surround muscle; what layer does the tendon connect to?

6. Describe and identify the following characteristics of neurons:

threshold

polarized state

depolarized state

repolarization

refractory period

7. Describe substances which are acting as chemical transmitters at a synapse or neuron junction and explain the action of each one.

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

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. Know the difference between the following:

receptor operated (chemically gated) channels

voltage operated (voltage gated) channels

stretch-activated channels

11. Know the intracellular and extracellular physiological concentrations of K^+ , Na^+ and Ca^{2+} . Know which way these ions flow through the above channel types.

12. Be able to predict whether a particular ion's flow results in depolarization, repolarization or hyperpolarization.

13. Locate and describe the microscopic structure and functional roles of the following parts of a muscle fiber.

muscle fiber

myofibrils

myofilaments

thin filaments

actin

G actin

F actin

tropomyosin

troponin - TnI, TnT, TnC

thick filaments

myosin

myosin tail

myosin head

sarcoplasmic reticulum

foot proteins

Ca^{2+} channels

Ca-ATPase

T tubules

terminal cisternae

triads

A band

I band

H zone

M line

Z line

fascicle

sarcomere

14. Know and understand the Sliding Filament Theory of Muscle Contraction.
15. Be able to draw and explain the basis of the length tension curve.
16. Explain how graded contractions of skeletal muscle are produced.
17. Define muscle twitch and describe the physiological events.
18. Describe the factors that influence the force, velocity, and duration of skeletal muscle contraction.
19. Name and describe types of skeletal muscle fibers (fast, slow and intermediate) and how their function relates to their energy producing pathways.
20. Compare and contrast the gross and microscopic anatomy of smooth muscle cells to skeletal muscle cells.
21. Compare and contrast the contractile mechanisms and the means of activation of skeletal and smooth muscles.

CHAPTER 13: THE SPINAL CORD, SPINAL NERVES AND SOMATIC REFLEXES

1. Define peripheral nervous system and list its components.
2. Describe the function of the descending and ascending tracts of the spinal cord.
3. Describe the anatomical relationship between the spinal cord, the vertebral column and the meningeal layers.
4. Label a spinal nerve and state the function of each of the following:

dorsal root
dorsal root ganglia
ventral root
5. Know and be able to define the three levels of neural integration of the somatosensory system.
6. Know and be able to define the three levels (motor hierarchy) that control neural integration of the motor system.
7. Distinguish between sensory, motor and mixed nerves.

8. Define ganglion and indicate the general location of ganglia in the body.
9. Define nerve and describe the general structure of a nerve.
10. Explain how a nerve regenerates. Under what circumstances would regeneration occur? Under what circumstances would regeneration not occur?
11. What are the five components of a reflex arc?
12. Describe the events of a stretch reflex.
13. How does a muscle spindle react to muscle stretch? To muscle contraction?
14. Describe these reflexes:
 - Golgi (Deep) tendon
 - Flexor
 - Crossed Extensor
 - Plantar
 - Abdominal
15. List the five types of sensory receptors in the body.
16. Define sensation and explain what is meant by sensory adaptation.
14. Name the 5 subdivisions of the spinal nerves and state the number of nerves within each.
17. Describe the levels of the motor control hierarchy.
18. Define ataxia and explain how and why it occurs.

CHAPTER 14: BRAIN & CRANIAL NERVES

1. Describe the embryonic tissue layers from which the central nervous system differentiates.
2. Name the major regions of the brain and know their functions.
3. Define the term ventricle and indicate the location of the ventricles of the brain.
4. Know the major lobes, fissures, and functional areas of the cerebral cortex.

5. Differentiate between commissures, association, and projection fibers.
6. State the general function of the basal nuclei.
7. Know the location of the diencephalon and name the subdivisions.
8. Know the three major regions of the brain stem and give the function of each.
9. Describe the structure and function of the cerebellum.
10. Know the location and function of the limbic system and the reticular formation.
11. Describe how meninges, cerebrospinal fluid, and the blood-brain barrier protect the CNS.
12. Describe the formation of cerebrospinal fluid and follow its circulation.
13. Briefly describe the pathology of the following degenerative brain disorders: Alzheimer's disease, Parkinson's disease and Huntington's disease.
14. Name the arteries which supply blood to the brain and state how venous blood is drained from the brain (see chapter 20).
15. Name and be able to describe the two major types of sleep.
16. Define EEG and be able to identify and functionally distinguish alpha, beta, theta, and delta waves.
17. Compare and contrast sleep patterns of infants, middle aged and older adults.
18. What are the effects of sleep deprivation?
19. Compare and contrast:

Consciousness
Syncope
Coma
Brain Death
20. Explain the function of the cerebellum and basal nuclei in somatic sensory and motor integration.
21. Number (using Roman numerals) & name each of the cranial nerves.

Note for memory objectives see also chapter 12 (pages 472-475)

29. Name the stages of memory.

30. Name four factors that help information move from short term to long term memory?

31. What are the two categories or types of memory?

32. What areas of the brain are involved in memory?

33. How are calcium & NMDA receptors involved in memory?

CHAPTER 15: THE AUTONOMIC NERVOUS SYSTEM

1. Compare the somatic and autonomic nervous systems relative to effectors, efferent pathways, and neurotransmitters released.

2. Compare and contrast the general functions of the parasympathetic and sympathetic divisions.

3. Give examples of the antagonistic effects of the sympathetic and parasympathetic division of the autonomic nervous system.

4. Give the sympathetic response for each of the following body parts.

iris of the eye

lungs

kidneys

sweat glands

heart

liver

intestine

adrenal glands

urinary bladder

blood vessels

5. Describe how the hypothalamus controls and integrates the autonomic nervous system.

6. Define cholinergic and adrenergic fibers.

7. What are the two types of cholinergic receptors?

8. What are the two major classes of adrenergic receptors?
9. Describe the body's physiologic response to stress.
10. What is meant by referred pain? What causes referred pain?

CHAPTER 16: SENSE ORGANS

1. List the anatomical parts of the eye and explain the function of each.
2. Explain how light is refracted by the eye.
3. Trace the pathway of light through the eye to the retina, and explain how light is focused for distant and close vision.
4. Describe the physics of light.
5. What are the roles of the visual pigments.
6. Describe the role of vitamin A in vision.
7. Describe in detail the events involved in the stimulation of photoreceptors by light, and the eventual generation of generation of an action potential in the ganglion cells.
7. Compare and contrast the the behavior of the photoreceptors in the light and the dark.
8. Compare and contrast the roles of rods and cones in vision.
9. Trace the visual pathway to the optic cortex, and briefly describe the process of visual processing.
10. Describe the structure and general function of the outer, middle, and inner ears.
11. Describe the sound conduction pathway to the fluids of the inner ear, and follow the auditory pathway from the Organ of Corti to the temporal cortex.
12. Describe the physics of sound energy and explain how it is converted to an action potential by the ear.
13. Explain how one is able to differentiate pitch and intensity of sound.
14. Distinguish between static and dynamic equilibrium, and explain how a sense of balance is maintained.

15. Identify the receptors for touch, pressure, thermoreception, pain, stretch, and chemoreception.

16. List the five basic taste groups.

17. Describe the process and the steps in taste transduction - i.e. the steps of how the chemical signal is transduced into a signal which is received by the brain.

18. Describe the seven primary odors.

19. Describe the process and the steps in smell transduction - i.e. the steps of how the chemical signal is transduced into a signal which is received by the brain.

Biology 223 - ANATOMY & PHYSIOLOGY I

LABORATORY COURSE OBJECTIVES - SALADIN TEXT (Note there is considerable overlap with the material in the lecture objectives)

For lab safety see handout given first day of lab.

BODY ARCHITECTURE & ORGAN SYSTEMS

Use your textbook, lab manual and the Anatomy Coloring Book as references.

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

Superior
cranial
inferior
caudal
anterior
ventral
proximal
posterior
dorsal
medial
lateral
distal
superficial
deep

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 body cavities, 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

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 3 serous membranes.

9. Describe structures of the axial and appendicular areas of the body.

THE MICROSCOPE

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

Ocular eyepieces

Objective lenses

Scanning lens (X4 objective lens)

Stage

Arm

Base

Iris diaphragm

Condenser
Substage light
Fine focus adjustment knob
Coarse focus adjustment knob

2. Know the procedure for examining a specimen slide using the 40X objective.

3. Be able to define:

Real image
Virtual image
Total magnification
Resolving power
Field

4. 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?

TISSUES

Use your textbook, lab manual and the Anatomy Coloring Book as references.

1. Be able to identify under a microscope and describe the appearance of each of the following types of epithelium. Be able to make labeled drawings of all these membranes and list an example of where they would be found with their function:

simple squamous
stratified squamous
simple cuboidal
stratified cuboidal
transitional
simple columnar
pseudostratified columnar
ciliated pseudostratified columnar
stratified columnar
ciliated columnar

2. Be able to identify under a microscope and describe the appearance of each of the following types of connective tissue. Be able to make labeled drawings of all these tissues and list an example of where they would be found with their function:

loose connective tissue

dense regular connective tissue (white fibrous connective)

dense irregular connective tissue

hyaline cartilage

elastic cartilage

fibrocartilage

adipose tissue

areolar tissue

reticular connective

bone (compact and spongy)

blood

3. Be able to identify the three major types of muscle tissue using a microscope (skeletal, cardiac and smooth).

4. Be able to identify nervous tissue presented in lab using a microscope.

5. Explain the structural and functional divisions of the nervous system.

6. Using models, slides & diagrams describe and identify the following structural components of a neuron and give the function of each:

Cell body with nucleus

Dendrites

Axon

Axon Hillock

Synapses (also known as axonal terminals)

Myelin sheath

Nodes of Ranvier

7. List the types of supporting cells of the nervous system and give the function of each.

8. Describe the function of myelin sheath and explain how it is formed in the PNS and CNS. What cell types actually form the myelin sheath in the PNS and CNS.

9. Be able to draw simple labeled diagrams of ALL OF THE ABOVE TISSUES & list in the body examples of where they may be found.

SKELETAL SYSTEM

Use your textbook, lab manual and the Anatomy Coloring Book as references.

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

sulcus

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

KNOW THE FOLLOWING PARTS OF THE AXIAL SKELETON

Skull:

frontal (including the zygomatic process of the frontal)

parietal

temporal

external auditory (acoustic) meatus

mastoid process

zygomatic process of the temporal

mandibular fossa

styloid process

zygomatic

temporal process of the zygomatic

frontal process of the zygomatic

maxilla

inferior nasal concha

nasal

occipital

occipital condyles

sphenoid

sella turcica

greater and lesser wings

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

KNOW THE FOLLOWING 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

KNOW THE FOLLOWING SINUSES

frontal
maxillary
sphenoid
ethmoid

KNOW THE FOLLOWING SUTURES

squamous
coronal
lambdoidal
occipitomastoid
sagittal

KNOW THE FOLLOWING PARTS OF THE STERNUM

Manubrium
body
xiphoid process
jugular notch

KNOW THE FOLLOWING PARTS OF THE VERTEBRAL COLUMN

Atlas
axis
dens (=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

RIBS

true
false
floating
head
neck
tubercle
angle
shaft

KNOW THE FOLLOWING PARTS OF THE APPENDICULAR SKELETON

Shoulder girdle:

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

trapezium

trapezoid

capitates

hamate

scaphoid

lunate

triquetral

pisiform

metacarpals

phalanges (proximal, middle & distal)

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
anterior inferior iliac spine
ischial spine
posterior superior iliac spine
posterior inferior iliac spine
greater sciatic notch
ischial tuberosity
lesser sciatic notch

Thigh

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

INTEGUMENTARY SYSTEM

Use your textbook, lab manual and the Anatomy Coloring Book as references.

1. Be able to identify the following structures of the skin on slides, models and diagrams.

Stratum corneum
Stratum lucidum
Stratum granulosum
Stratum spinosum
Stratum basale
Papillary layer
Reticular layer
Epidermis
Dermis
Hypodermis
Eccrine sweat gland
Adipose tissue
Root hair plexus
Pacinian corpuscle
Hair follicle
Hair root

Sebaceous (oil) gland
Apocrine glands
Arrector pili muscle
Meissner's corpuscle
Dermal papillae
Free nerve endings
Sensory nerve fiber
Dermal blood vessels - both arteriols and venules

THE NERVOUS SYSTEM

CNS - be able to identify the following structures on charts, models, slides, cadavers, and specimens.

Use your textbook, lab manual and the Anatomy Coloring Book as references.

Be able to identify the following parts of a neuron:

nucleus
endoneurium
node of ranvier
cell body
axon hillock
axon
myelin sheath
neurofibrils
synapse
synaptic vesicles
motor end plate
neurotransmitter receptors

Be able to identify, and know the function, of the following parts of the nervous system from histology tissue slides and pictures:

brain cortex
anterior pituitary
posterior pituitary
hypothalamus

pineal

adrenal glands

CENTRAL NERVOUS SYSTEM - be able to identify the following structures on charts, models, slides, cadavers, and specimens.

For The Brain:

corpus callosum

gyrus

sulcus

corpora quadrigemina

superior colliculi

inferior colliculi

pineal body

olfactory bulbs

hypothalamus

optic chiasma

mammillary body

septum pellucidum

fornix

cortex

gray matter

white matter

cerebrum

frontal lobe

parietal lobe

occipital lobe

temporal lobe

insula

cerebellum

arbor vitae

pons

medulla oblongata

pyramids and pyramidal tracts

choroid plexus

dura mater

falx cerebri

tentorium cerebelli
falx cerebelli
arachnoid membrane
pia mater
lateral ventricles
third ventricle
fourth ventricle
foramen of Monro
cerebral aqueduct
thalamus
intermediate mass
Central sulcus (also known as the fissure of Rolando)
Precentral gyrus
Postcentral gyrus
lateral sulcus (also known as the Sylvian fissure or lateral fissure)
longitudinal fissure
left and right cerebral hemispheres
transverse fissure
cerebellar peduncle
pituitary gland
vermis
cerebellum
cerebrum
medullated (myelinated) nerve
motor nerve (motor neuron)
peripheral nerve
spinal cord
Nissl bodies

For The Spinal Cord:

central canal
conus medullaris
cauda equina
anterior/posterior median fissure
subdural space

subarachnoid space
epidural space
pia mater
dura mater
arachnoid membrane
white matter
gray matter
dorsal horn
ventral horn
lateral horn
dorsal root
ventral root
dorsal root ganglia
spinal nerve
sympathetic chain ganglia

For The Neuron:

nucleus
endoneurium
node of ranvier
cell body
axon hillock
axon
myelin
Schwann cells
Purkinje cells
Pyramidal cells
neurofibril

Note: For the following blood vessels see chapter 20

Circle of Willis
vertebral artery
basilar artery
internal carotid artery
posterior/anterior/middle cerebral arteries
posterior/anterior communicating arteries
superior sagittal sinus

inferior sagittal sinus
great cerebral vein
straight sinus
occipital sinus
transverse sinus
sigmoid sinus
superior ophthalmic vein
cavernous sinus
superior petrosal sinus
inferior petrosal sinus
internal jugular vein

PNS - be able to identify the following structures on charts, models, slides, cadavers, and specimens.

1. For each of the 12 pairs of cranial nerves, list its name, number, type, and its function.

2. Define plexus. Name the major plexuses listed below, their sites of origin, and the major nerves arising from each.

cervical plexus

brachial plexus

lumbar plexus

sacral plexus

3. Name the 5 subdivisions of the spinal nerves and state the number of nerves within each.

4. Know the five components of a reflex arc. Know the following reflexes.

abdominal

achilles

corneal

crossed extensor

patellar

plantar

Golgi tendon

5. Be able to identify (with both name and Roman numeral) and know the function of the following cranial nerves

olfactory (CN I)

optic (CN II)

oculomotor (CN III)

trochlear (CN IV)

trigeminal (CN V)

abducens (CN VI)

facial (CN VII)

vestibulocochlear (CN VIII)

glossopharyngeal (CN IX)

vagus (CN X)

accessory (CN XI)

hypoglossal (CN XII)

6. For The Spinal Nerves:

cervical plexus

brachial plexus

lumbar plexus

sacral plexus

cervical nerves

thoracic nerves

lumbar nerves

sacral nerves

phrenic nerve

musculocutaneous nerve

median nerve

ulnar nerve

radial nerve

axillary nerve

femoral nerve

obturator nerve

sciatic nerve

MUSCULATURE SYSTEM

Use your textbook, lab manual, tissue slides and the Anatomy Coloring Book as references.

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

LEG

iliopsoas

gluteus maximus

gluteus medius

gluteus minimus

tensor fascia latae

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 (fibularis longus)

peroneus brevis (fibularis brevis)

extensor digitorum longus

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

TRUNK

diaphragm

external obliques

internal obliques

rectus abdominis

external intercostals

internal intercostals

latissimus dorsi

lumbodorsal fascia

pectoralis major

pectoralis minor

transversus abdominis

linea alba

serratus anterior

trapezius

teres major

teres minor

levator scapulae

rhomboideus major

rhomboideus minor

erector spinae

Semispinalis
quadratus lumborum
subscapularis
infraspinatus

HEAD & NECK

frontalis
orbicularis oculi
orbicularis oris
buccinators
masseter
temporalis
platysma
splenius capitis
scalene
sternocleidomastoid
occipitalis

KNOW THE FOLLOWING STRUCTURES

epimysium
tendon
aponeurosis
perimysium
endomysium
sarcolemma
endoplasmic reticulum
synaptic vesicles
synaptic cleft
motor end plate
junctional folds (invaginations) of motor end plate
neurotransmitter
acetylcholine
acetylcholinesterase
receptor operated channels
voltage operated channels
muscle fiber
myofibrils

myofilaments
thin filaments
actin
G actin
F actin
tropomyosin
troponin - TnI , TnT , TnC
thick filaments
myosin
myosin tail
myosin head
foot proteins
Ca²⁺ channels
Ca-ATPase
T tubules
terminal cisternae
triads
A band
I band
H zone
M line
Z line
fascicle
sarcomere

SPECIAL SENSE ORGANS - be able to identify the following structures on charts, models, slides, cadavers, and specimens.

For Visual reception:

optic nerve
macula lutea
fovea centralis
sclera
choroid (part of the vascular layer)
retina
pigmented layer
photoreceptors (sensory neurons) - rods & cones with outer and inner segments

bipolar cells (neurons)
ganglionic cells (neurons)
suspensory ligaments
vitreous humor
aqueous humor
conjunctiva
optic disc
pupil
cornea
anterior chamber
posterior chamber
anterior cavity (segment)
posterior cavity (segment)
lacrimal apparatus
lacrimal gland
lacrimal ducts
lacrimal canal
lacrimal sac
lacrimal punctum
nasolacrimal duct
extrinsic muscles
superior rectus
inferior rectus
medial rectus
lateral rectus
superior oblique
inferior oblique
ciliary body
iris
sphincter pupillae
dilator pupillae
medial canthus
lateral canthus
lens
corneal epithelium
Canal of Schlemm

For Auditory Reception:

external auditory meatus

auricle

tympanic membrane

pharyngotympanic tube (also known as the Eustachian canal or auditory tube)

malleus

incus

stapes

cochlea

cochlear duct

semicircular canal

round window

oval window

basilar membrane

tectorial membrane

crista ampullaris

vestibular membrane

scala vestibuli

scala tympani

cochlear nerve

vestibule

vestibular nerve

sacculle

utricle

vestibulocochlear nerve

organ of Corti

ampulla

inner hair cells

outer hair cells

perilymph

endolymph

maculae (utricle and sacculle)

crista ampullaris

cupula (gelatinous mass)

otolithic membrane

otoliths

stereocilia embeded in otolithic membrane

For Taste Reception:

papillae - filiform, fungiform, circumvallate

supporting cells

gustatory cells

gustatory hairs

taste bud

taste pore

basal cells

For Olfactory Reception:

olfactory epithelium

olfactory receptor cells

supporting cells

basal cells

olfactory cilia

mitral cell

Special Senses - be able to identify cross-sections of the following tissues on slides, photographs and specimens.

eye

retina

cornea

cochlea

crista ampullaris

olfactory epithelium

Meissner's corpuscles

Pacinian corpuscles