

### Introductory Concepts

homeostasis and negative feedback

body cavities

directional terminology

basic information on the following: mitosis, meiosis, DNA, protein synthesis

### Skeletal System

Know the names of the bones that we studied!

### Muscular System

#### Structure

Characteristics and functions of skeletal muscle

Composition of the sarcomere: A-band, I-band, H-zone, Z-line, M-line

Myofilaments: actin, myosin

- actin: troponin, tropomyosin, thin
- myosin: heads, ATP, thick

#### Membrane Potentials

Resting membrane potential: Charge difference

How is an action potential generated?

- presynaptic terminal, neurotransmitter, synaptic cleft, postsynaptic terminal
- sodium channels open.....

How is an action potential propagated?

- sarcolemma, sarcoplasmic reticulum, T-tubules
- calcium

What is repolarization? How/why does repolarization occur?

## **Theory for Muscular Contraction**

### Sliding Filament Theory

- relaxed vs. contracted (sarcomere differences)

What is Rigor mortis and why does it occur?

What is the All-or-None Principle?

What are the phases of muscular contraction? (graph)

- Lag
- Contraction
- Relaxation Phase

What is a muscle twitch? Tetanus?

What does Recruitment mean? Relate to motor units and increasing ones strength.

## **Energy Needs**

When are the following energy sources used for energy?

- ATP
- creatine phosphate
- aerobic
- anaerobic respiration

What is oxygen debt? What are symptoms of a person who is experiencing oxygen debt?  
Why does it occur?

Compare muscular fatigue and psychological fatigue.

## **Muscle Contractions**

isometric -

eccentric -

concentric -

isotonic -

## **Muscle Fibers**

slow twitch -

fast twitch -

## **General Muscle Anatomy**

synergists, antagonists, prime mover, origin, insertion

Be able to identify the major muscles discussed in class.

## **Nervous System**

What are the components of the CNS?

What are the major functions of the nervous system?

What is the pathway of a reflex arc? Why are reflexes important?

What are the major parts of a neuron?

What neuroglia cells produce myelin in the PNS? CNS?

## **Action Potentials**

What is the role of myelin?

How are action potentials propagated? (saltatory conduction)

What happens during depolarization? Specifically with calcium.

## **Brainstem**

What are the parts of the brainstem? Roles of each?

What part of the brainstem do nerve pathways cross-over?

Where is the reticular formation found? What does it control?

## **Diencephalon**

What does the diencephalon consist of?

What structure acts as the relay station to the cerebral cortex for ascending pathways?

Which structure contains the pineal body, which is involved in puberty and long-term cycles?

Which structure is highly involved in maintaining homeostasis, as well as is responsible for inappropriate emotional responses (like eating when depressed)?

## **Cerebrum**

What are the folds called on surface of cerebrum? What is the purpose of them?

What are the four lobes of the cerebrum?

What lobe is involved in processing visual information?

What lobe is mostly responsible for hearing, memory, smell, and making sense of language?

What lobe contains the motor cortex, is involved in the judgement/the decision making process, and also with behavior and moods such as motivation and aggression?

### **Memory**

What is the difference between the types of memory?

How is information transferred to long-term memory?

### **Hemispheres**

What is the difference between the left and right hemispheres?

What is the largest connection between the hemispheres, composed of nerve bundles, called?

### **Cerebellum**

Explain the cerebellum's role as a comparator! (how we learn new motor skills)

### **Nerves**

Know what the cranial nerves (1-12) in general innervate.

Know the following spinal nerves: Phrenic, Femoral, Ischiadic (sciatic), Radial

### **Learning**

What happens or can happen (with neurons) when you learn?

### **Be able to map a scenario; for example:**

How would you be able to identify an object in your hand, if you were not able to see it?

Afferent neuron → Dorsal Horn → Spinal Cord → Medulla oblongata (crossing-over) → Pons → Midbrain → Thalamus → Primary somatic sensory cortex → Association Area (object is recognized) → Sensory Speech: Wernicke's Area (object is named) → Motor Speech: Broca's Area (spoken word initiated) → Premotor Area → Primary Motor Cortex → Muscles activated necessary to say word

## **Circulatory System**

In what cavity is the heart located?

How does blood flow through the heart?

What is the function of the coronary arteries? Where are they located?

What are the four valves of the heart? Atria and ventricles?

What are the characteristics of cardiac muscle?

Be able to interpret an EKG!

- P wave -
- QRS -
- T wave -

What is cardiac output? What are some factors that effect cardiac output? (exercise, body temperature, stress, anger, ext). Relate to stroke volume and heart rate → formula

Differentiate parasympathetic and sympathetic stimulation in order to maintain homeostasis.

- blood pressure
- CO<sub>2</sub> levels

What are the intrinsic and extrinsic regulatory mechanisms of the heart?

What are the factors that effect heart rate? (exercise, nor/epinephrine, parasympathetic vs. sympathetic stimulation)

What is Starling's law of the heart?

How are action potentials conducted throughout the heart?

What is the cardiac cycle? Could you explain it using a flow chart?

What happens to the heart when calcium channels are blocked? Plateau phase?