Hey

Exam 2 Review

Bone = Connective Tissue

1) What are the 6 types of bones and what are their functions? (FLIPSS)

Flat: Protects organs [Ribs]
Long: Locomotion and structure [Femur]
Irregular: Protection of the CNS [Vertebral column]
Pneumatic: Makes the bones lighter while maintaing strength [found in birds]
Short: Range of motion for movement and shock absorption [tarsals]
Sesamoid: Protects tendons and ligaments [patella]

2) What are the bones in order from cranial to caudal of the axial skeleton?

Skull → Vertebral column → Sternum → Ribs

3) What are the bones in order from proximal to distal of the bones in the thoracic and pelvis limbs?

Thoracic: Scapula → Humerus → Ulna → Radius → Carpals → Metacarpals → Phalanges

Pelvic: Pelvis → Femur → (Patella) → Tibia (Fibula) → Tarsals → Metatarsals → Phalanges

4) What are the two types of ossification?

Endochondrial and Intramembranous

5) What are the functions of bones?

Structure
Protection
~~Production~~
Leverage
Storage

6) What do calcium salts and collagen fibers do for bones?

Makes the bones hard
Allows the bones to be flexible

7) What is the difference between spongy and compact bone?

Less dense, more hollow, and lighter (inside of bones)
Denser and heavier (outside of bones)

8) What are the four types of bone cells discussed, and what are their functions?

Osteocyte: Mature bone cells → derived from osteoblasts

Osteoblast: Comes from the osteoprogenitor → builds bone (secretes unmineralized bone (osteoid))

Osteoclast: Comes from monocytes → Breaks down and reabsorbs bone cells

Osteoprogenitor: Comes from Mesenchymal stem cell → MUST be differentiated

9) What are the two types of bone marrow and what does each type do?

Red
- Forms blood cells (Erythrocytes & Leukocytes)
  RBC WBC

White/Yellow
- Can return to red bone marrow
- Fat storage

10) Glycosaminoglycans modulate activity of osteogenesis and osteoclastic factors.

11) What are the two hormones affecting bone growth and when do they affect the animal's growth?

Growth Hormone (GH)
↳ Young animal's growth

Gonads
↳ Puberty aged animal's growth (influenced by hormones)
- Removal of gonads: negative feedback loop
- Intact gonads: positive feedback loop

12) What are the three major classes of joints, where are they found, how much do they move, and do they have a joint cavity?

1) Synarthroses (Fibrous): Axial skeleton; No movement; No joint cavity

2) Amphiarthroses (Cartilaginous): Axial skeleton; Slightly moveable; No joint cavity

3) Diarthroses (Synovial): Appendicular skeleton; Freely moveable; Yes joint cavity

13) What are the three types of immoveable joints and an example of each?

1) Suture: Skull plates
2) Gomphosis: Teeth into the mandible
3) Syndesmosis: Splint bone to canon bone (equines)

14) Why do joints need blood, lymph, and nerve supplies?

Blood: Nutrition and waste removal
↳ Maintain the cartilage

Lymph: Immune functions to keep joints healthy (free from infection)

Nerve: Pain & reflexes; locomotion & posture

15) What are the functions of the nervous system?

Regulation

Integration

Sensory Reception

Consciousness/Sentience

16) Explain the differences between the autonomic and somatic nervous systems.

Involuntary (Automatic)
- Can't be controlled
- Reflexes
- Smooth & Cardiac Muscle and glands

Voluntary
- Can be controlled
- Skeletal Muscle

17) The central nervous system is located medially (centrally) in the body and is composed of the brain and spinal cord. The brain is highly cellularized and protected by the maxilla. The spinal cord ends at L1 and is protected by the vertebral column.

18) What are the meninges of the brain, superficial to deep?

Dura Matter
Arachnoid
Pia Mater

19) What is the pia mater and what is important about it?

- Inner meninge layer
- Adheres to the brain and spinal cord
- Forms the blood/brain barrier

20) What is the difference between unmyelinated and myelinated nerve cells?

21) **True or False**: The nervous system does not tell the heart to beat.

Gray Matter, Slower, Sensory + Motor nuclei
↳ White Matter, few cell bodies, brainstem/brain + spinal cord

22) The Neuron is the functional unit of the nervous system.

23) What is the primary function of the neuron?

To conduct neural impulses
↳ Changes in electrical charge of the plasma membrane

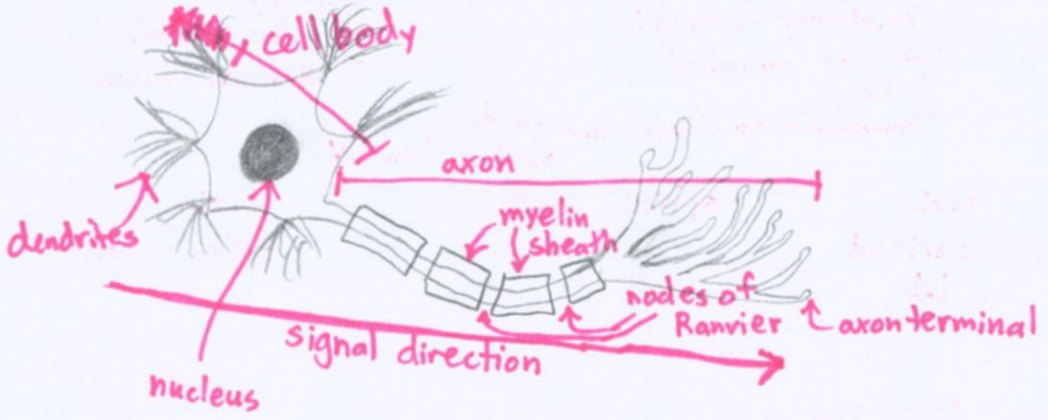
24) The cell body of a neuron is known as the biosynthetic center of the neuron.

25) What is the function of an axon and how does it work?

- Conduction of impulses within the neuron
- Generates and transmits nerve impulses AWAY from the cell body

★Axon "terminus" = Neurotransmitters

26) Draw a neuron. Then label the dendrite, axon, nodes of Ranvier, myelin sheath, axon terminal, cell body, and nucleus. Draw an arrow showing the signal direction.



27) What are the three types of neurons and what are their functions?

Motor: Carries impulses from the CNS to effector cells
Sensory: Carries impulses from sense receptors to the CNS
Relay: Connects Sensory and Motor Neurons

28) What are the types of effector cells?

- Glands
- Muscle tissues (skeletal, smooth, & cardiac)

29) The axon diameter and the degree of myelination of a neuron has what type of relationship to the speed that a neuron can transfer an impulse?

Direct (↑,↑)

30) Explain the differences between electrical synapses and chemical synapses.

Electrical
- Gap junctions
  - Channels connect neurons directly
- Smooth & cardiac muscle
- Immediate & large reactions
  - Whole organ

Chemical
- Neurotransmitters
  - Hormones float to the next neuron
- Skeletal Muscle
- Slower, More controlled movements
  - Voluntary
- Ca^{2+} & Acetyl CoA + choline

31) What are the functions of the muscular system?

① Contraction
② Locomotion
③ Support

32) What are the three types of muscle? What are the characteristics of each type of muscle?

Smooth
- Involuntary
- Electrical Synapses
- Single Nucleated
- Round or spindle shaped

Skeletal
- Voluntary
- Chemical Synapses
- Multi-Nucleated
- Striated
  - Myosin & Actin arrangement

Cardiac
- Involuntary
- Electrical Synapses
- Single Nucleated
- Striated
  - Intercalated Disks
- Heart tissue
- Smaller sized than skeletal

33) What are the sources of energy for muscle contraction?

★ATP
- Little stored
- ADP: abundant, but less available energy
  - ↳ Find a phosphate (ADP + P = ATP)

★ Creatine Phosphate
- Can donate its phosphate to ADP

★ Glycogen (stored glucose)

★ Fatty Acids

34) Explain the all or nothing principle (applies to both nervous (NS) and muscular (MS) systems).

The impulse (NS) or contraction (MS) either fully happens, or it won't happen. There is no partial contraction or excitement of nervous tissue.

35) What is the smallest ~~contractile~~ functional unit of the muscle?

Sarcomere

36) **True or False**: The nervous system does not tell the heart to beat.

37) What does the nervous system do to the heart?

Modifies the speed (rate) of contractions

38) What are the two proteins found in muscle tissue?

Actin & Myosin

39) Where is Calcium (Ca) stored in muscle tissue?

Sarcoplasmic Reticulum
- ↳ (Same as ER in other cells)

40) Where is glycogen stored?
- Liver
- Some in skeletal muscle

41) What is the nickname for the **sinoatrial node** (SA node)? And why is it important to the heart?
- "Pacemaker"
- Involuntary contraction is started by impulse from SA node

42) Where is visceral smooth muscle found?

Large sheets found in the walls of organs
- Stomach, intestines, uterus, urinary bladder

43) What types of contractions are caused by visceral smooth muscle? (Also include the two examples from class.)

→ Large, rhythmic waves of contraction

- Peristaltic contraction
- Parturition

*Whole organ

44) Multiunit smooth muscle involves small discrete groups of cells, this allows for fine movement. Within the body this is found in the eye, walls of blood vessels, and air passages of the lungs.

45) Put the following skeletal muscle terms in order of smallest to largest. (Sarcolemma, Muscle Fibers, Myofibrils, Muscle bundle, Myofilaments)

Myofilaments → Myofibrils → Muscle Fiber → Muscle Bundle

Sarcolemma (surround myofibrils)

are composed of bundles of actin & myosin