Physiology

Test bank

First three lectures

Done by: Abdallah Abu Sarhan.

Corrected by: Abdallah Abu Sarhan.

1. **The major cation inside the cell is :**
   a. **Na**
   b. **Ca**
   c. **K**
   d. **PO4**
2. **The major cation outside the cell is :**
   a. **Na**
   b. **K**
   c. **Ca**
   d. **ATP**
3. **The major anion inside the cell is :**
   a. **Cl**
   b. **Proteins**
   c. **ATP**
   d. **b+c**
4. **the major anion outside the cell is :**
   a. **PO4**
   b. **Amino acid**
   c. **Cl**
   d. **All of the above**
5. **All of the following contribute to the resting state of action potential except:**
   a. **High concentration of Na outside the cell**
   b. **More Na channel in plasma membrane than K channel**
   c. **The selective permeability of plasma membrane doesn't allow for protein and ATP to leave the cell**
   d. **Electrogenic nature of the Na / K ATPases**

6. **Myocytes produce electrical signal depending of which type of channels :**
   a. **Mechanical gated channels**
   b. **Ligand gated channels**
   c. **Voltage gated channels**
   d. **All of the above**
7. **what is the difference between graded potential and action potential :**
   a. **Graded potential allow communication over short distances while action potential over long distances**
   b. **Graded potential arise mainly at trigger zone**
   c. **Action potential is slower than graded potential**
   d. **Action potential allow summation**
8. **Which of the following can strongly activate the Na /K pumps :**
   a. **High Cl outside the cell**
   b. **Low proteins inside the cell**
   c. **High phosphate outside the cell**
   d. **High Na inside the cell**
9. **Local anesthetics are drugs that block pain and other somatic sensation by :**
   a. **Block the opening of K voltage gated channel**
   b. **Accelerate the opening of Na voltage gated channel**
   c. **Block the opening of Na voltage gated channel**
   d. **Accelerate the opening of Ca voltage gated channel**

10. **All of the following are the difference between graded and action potential except:**
    a. **Action potential is decremental**
    b. **Action potential has a refractory period while graded potential not**
    c. **Summation can occur in graded potential**
    d. **Mechanical and ligand gated channels are present in graded potential**

Answers :

1. **C**
2. **A**
3. **D**
4. **C**
5. **B**
6. **D**
7. **A**
8. **D**
9. **C**
10. **A**

11. What is the neurotransmitter in the NMJ :

a. Acetyl choline
b. Dopamine
c. Adrenaline
d. Noradrenaline

12. Why we need a lot of mitochondria in the terminal part of the neuron :

a. Synthesis of excitatory neurotransmitters (Ach)
b. Need for electrogenic Na / K pumps
c. Requires for exocytosis of the Ach vesicles
d. All of the above

13. Which channel in the presynaptic membrane opens when the action potential reach the terminal part of the axon:

a. Na voltage gated channel
b. K voltage gated channel
c. Cl voltage gated channel
d. Ca voltage gated channel

14. Which of the following facilitate exocytosis of the Ach vesicles :

a. flow of the Na ions inside the cell
b. flow of the Ca ions inside the cell
c. flow of the K ions outside the cell
d. flow of the Ca ions outside the cell

15. which of the following sentence is wrong about receptor in the post synaptic membrane in the NMJ :

a. it's a ligand gated channels
b. composed of 5 subunits
c. required 2 Ach molecules to open
d. in adults, the gamma subunit substitutes for an epsilon subunit in this receptor complex

16. one of the following is true regarding botulinum toxin :
    a. block the acetylcholine gated channels
    b. block the synthesis of acetylcholine
    c. block the release of the acetylcholine from the presynaptic neuron
    d. block the Ca voltage gated channel
17. regarding myasthenia gravis :
    a. is an untreatable disease and we use drug to minimize the symptoms
    b. caused by excessive release of acetylcholine
    c. there is an increase of the AchRs and Ca voltage gated channels
    d. it's an autoimmune disease that affect the neuromuscular junction
18. which sentence is wrong about muscle structure :
    a. composed of repeated sarcomere
    b. 98% of fiber is innervated by multiple nerve ending
    c. The major structure is actin and myosin protein
    d. The sarcoplasmic reticulum storage high amount of Ca
19. The action potential reaches all muscles fiber due to presence of :
    a. Z line
    b. M line
    c. T tubules
    d. Titin
20. Which of the following receptor sense the action potential when it reached the T tubules :
    a. Ryanodine receptor
    b. Ca release channels
    c. Dihydropyridine receptor

d. None of the following

21. Regarding troponin which one is true :
    a. Composed of four subunit
    b. Troponin I has strong affinity to actin
    c. Troponin T has strong affinity to titin
    d. Troponin C has strong affinity to chloride ions

22. Following the structure of the actin filament which one is wrong :
    a. Composed of actin, tropomyosin and troponin
    b. Actin backbone composed of triple stranded F-actin helix
    c. In resting state, the tropomyosin wrap on the top of active site of actin
    d. The strand of F-actin helix composed of polymerized G-actin molecules

Answers :

11. A
12. D
13. D
14. B
15. D
16. C
17. D
18. B
19. C
20. C
21. B
22. B

23. Following the contraction cycle which one is wrong:

a. **The contraction of muscle requires Ca**
b. **The myosin head need ATP to detachment from the actin**
c. **The myosin head tilt the actin filament away from the arm of the cross bridge**
d. **Before contraction ATP attach to the myosin head to become oriented and energized**

24. One of the following process require energy in the muscle fiber:

a. **Release of the Ca ions from the sarcoplasmic reticulum**
b. **Pulling the actin filament toward the M line by myosin head**
c. **Require for entering of Na to the cell**
d. **Uncovering the myosin binding site in the actin filament**

25. The first source of energy that reconstitute the ATP is :

a. **Oxidative phosphorylation**
b. **Aerobic glycolysis**
c. **Anaerobic glycolysis**
d. **Phosphocreatine**

26. What is the importance of glycolysis:

a. **The rate of ATP formation 2.5 times rapid than classic ATP formation**
b. **Can't occur in the absence of oxygen**
c. **Lasting for long duration around 1 hour**
d. **Happen in the mitochondria**

27. All of the following are features of slow fibers except:

a. **Slow fiber is smaller than fast fiber**
b. **Contain numerous numbers of mitochondria**
c. **Have an extensive sarcoplasmic reticulum than fast fibers**
d. **Posses high number of myoglobin, an iron-containing protein,**

28. which of the following is characteristics of fast fibers:

a. **contain less blood supply compared with slow fibers**
b. **depending on the oxidative phosphorylation as source of energy**
c. **have low rate of ATP hydrolysis**
d. **have high resistant to fatigue**

29. what is the difference between red and white fibers:

a. **red fibers have slow contraction velocity than white fibers**
b. **white fibers have an extensive sarcoplasmic reticulum compared with red fibers**
c. **red fibers have less glycogen store than white fibers**
d. **all of the above**

30. regarding type 1 and type 2 fibers which one is wrong:

a. **type 1 fibers contain larger amount of iron-containing proteins than type 2 fibers**
b. **type 2 fibers depend on glycolysis as source of energy**
c. **type 2 fibers contain large amount of glycolytic enzyme**
d. **All of the following are true**

Answers:

23. C
24. B
25. D
26. A
27. C
28. A
29. D
30. D