

QUIZ: BASIC ELECTROPHYSIOLOGY PART 1

Please record your answers on the answer sheet.

1. Select the correct sequence of impulse travel through the specialized conduction system:
 - a. SA node-- AV junction to bundle of His--bundle branches-- Purkinje fibers
 - b. SA node-- right atrium--left atrium (via the CS and Bachman's Bundle) -- AV junction-- bundle of His-- Purkinje fibers-- bundle branches
 - c. Bachman's Bundle-- AV junction-- SA node-- bundle branches

2. The following is an accessory AV connection:
 - a. Slow AV nodal pathway
 - b. Bachmann's Bundle
 - c. Ligament of Marshall
 - d. Mahaim Fiber

3. Automaticity is
 - a. the ability of an impulse to travel through the conduction system
 - b. the ability of the heart muscle to respond to an electrical impulse with pumping action.
 - c. the ability of cells to initiate electrical impulses spontaneously
 - d. the ability of a cell to respond to an electrical impulse

4. Excitability is
 - a. the ability of an impulse to travel through the conduction system
 - b. the ability of the heart muscle to respond to an electrical impulse with pumping action.
 - c. the ability of cells to initiate electrical impulses spontaneously
 - d. the ability of a cell to respond to an electrical impulse

5. Conductivity is
 - a. the ability of an impulse to travel through the conduction system
 - b. the ability of the heart muscle to respond to an electrical impulse with pumping action.
 - c. the ability of cells to initiate electrical impulses spontaneously
 - d. the ability of a cell to respond to an electrical impulse

6. Contractility is
 - a. the ability of an impulse to travel through the conduction system
 - b. the ability of the heart muscle to respond to an electrical impulse with pumping action.
 - c. the ability of cells to initiate electrical impulses spontaneously
 - d. the ability of a cell to respond to an electrical impulse

7. Repolarization is
 - a. the phase when sodium ions enter the cell
 - b. the period of time when contraction is occurring
 - c. the phase of electrical recovery in the cell
 - d. the phase when the cells are responding to an electrical impulse

8. The absolute refractory period is
 - a. the time during which an impulse may be able to reengage the ventricular cells and initiate an impulse
 - b. the interval of time when the cells cannot be stimulated by another impulse
 - c. the phase when sodium ions enter the cell

9. Phase 2 of the action potential is
 - a. the phase of rapid depolarization
 - b. the phase when calcium enters the cell
 - c. the period when the sodium-potassium pump assists in restoring the resting cell state

10. Phase 4 of a ventricular muscle action potential is
 - a. the phase of rapid depolarization
 - b. the phase when calcium enters the cell
 - c. the phase during which the resting membrane potential can be measured
 - d. the period when the sodium-potassium pump assists in restoring the resting cell state.

11. Phase 0 of the action potential is
 - a. the phase of rapid depolarization
 - b. the phase when calcium enters the cell
 - c. the period when the sodium-potassium pump assists in restoring the resting cell state

12. Potassium passes across the cell membrane
 - a. during phase 2 and 3 of the cardiac action potential
 - b. during phase 0 of the action potential
 - c. together with calcium
 - d. attached to chloride

13. The inherent rate for the AV junction area is
 - a. 60-100 bpm
 - b. 40-60 bpm
 - c. 10-40 bpm

14. The inherent rate for the sinus node is
 - a. 60-100 bpm
 - b. 40-60 bpm
 - c. 10-40 bpm

15. For reentry to occur there must be
- an area of 2-way block
 - a congenital anomaly and an electrolyte abnormality
 - an area of slow conduction and an area of one-way block
16. Abnormal automaticity is present when
- a one-way block occurs and an impulse travels in a circular fashion
 - cells within a portion of the conduction system initiate an impulse in a faster than normal fashion
 - the patient exhibits echo beats
17. The SA node
- is located between the SVC and the RA appendage
 - a globular shape
 - is called the pacemaker of the heart
 - innervated with sympathetic fibers only
 - can support an arrhythmia called reentry
- 1, 2, and 3
 - 1, 3, and 4
 - 1, 3, and 5
 - 2, 4, and 5
 - all of the above
18. The two primary routes of conduction between the right and left atria are
- the crista terminalis and the coronary sinus
 - the slow pathway and the tricuspid annulus
 - the foramen ovale and Bachmann's bundle
 - Bachman's bundle and the coronary sinus
19. The AV junction is composed of
- the compact AV node, the slow AV nodal pathway, and the fast AV nodal pathway
 - The compact AV node, the fast AV nodal pathway, and the bundle of His
 - the fast AV nodal pathway, the bundle of His, and the Purkinje fibers
20. The bundle of His divides into
- the posteroinferior division of the left bundle branch
 - the anterosuperior division of the left bundle branch
 - the right bundle branch
 - all of the above
21. A blockage of one of the divisions of the left bundle branch is called
- a hemiblock
 - altered automaticity
 - reentry

d. AV block

22. Accessory AV connections

- a. are also known as bypass tracts
- b. are connections between the atria and ventricles
- c. may alter the QRS width on the ECG
- d. all of the above
- e. none of the above

23. Rapidly conducting AV pathways

- 1. are associated with WPW syndrome
 - 2. usually conduct retrogradely and antegradely
 - 3. are only found on the right side of the heart
 - 4. are found on the right and left sides
 - 5. are Mahaim pathways
 - 6. are the pathways of PJRT
 - 7. conduct only retrogradely
 - 8. conduct only antegradely
- a. 1, 2, and 4
 - b. 3, 6, and 8
 - c. 1, 4, and 7
 - d. 3, 5, and 8

24. Mahaim fibers

- 1. usually conduct retrogradely and antegradely
 - 2. are only found on the right side of the heart
 - 3. are found on the right and left sides
 - 4. are the pathways of PJRT
 - 5. conduct only retrogradely
 - 6. conduct only antegradely
 - 7. are slowly conducting pathways
 - 8. are rapidly conducting pathways
- a. 1, 2, and 4
 - b. 2, 6, and 7
 - c. 1, 4, and 7
 - d. 3, 5, and 8

25. PJRT pathways

1. usually conduct retrogradely and antegradely
 2. are only found on the right side of the heart
 3. are found on the right and left sides
 4. are the pathways of Mahaim
 5. conduct only retrogradely
 6. conduct only antegradely
 7. are slowly conducting pathways
 8. are rapidly conducting pathways
- a. 1, 2, and 4
 - b. 2, 6, and 7
 - c. 1, 4, and 7
 - d. 2, 5, and 7

26. The classic findings of WPW on the sinus rhythm 12 lead EKG include

1. long PR interval
 2. short PR interval
 3. wide QRS
 4. narrow QRS
 5. delta wave
 - 6 Osborne wave
- a. 1, 4, and 5
 - b. 2, 4, and 6
 - c. 2, 3, and 6
 - d. 2, 3, and 5

27. The level of threshold potential determines

- a. how easily an impulse is able to excite a cell
- b. the level of magnesium required to successfully cause depolarization
- c. the type of antiarrhythmic drug required to suppress ventricular rhythms
- d. how many phases are present in an action potential for repolarization to occur

28. The resting membrane potential (RMP) of a cell exists because of

- a. the reentry potential of the SA node
- b. the charge difference between the cell's inside and outside.
- c. the electrical difference between the slow and fast pathways
- d. equal electrical charge inside and outside the cell

29. Phase 0 of the action potential
1. is the upstroke of the action potential
 2. represents cell depolarization
 3. represents the stimulus which serves to excite the adjacent cell
 4. is the cellular basis for all of the intracardiac (extracellular) electrograms recorded during an EP study
 5. is the event causing tissue activation or depolarization
 6. is the cellular basis for the QRS complex on the surface EKG
- a. 1, 3, 5, and 6
 - b. 2, 3, 4, and 6
 - c. 1, 2, 3, and 4
 - d. all of the above
30. During phase 1 of the action potential
- a. potassium exits the cell via the transient outward current $i_{K to}$
 - b. the action of the slow inward calcium current occurs
 - c. sodium enters the cell
 - d. potassium enters the cell
31. Phase 3 corresponds to the ___ wave of the EKG
- a. P
 - b. Q
 - c. T
 - d. U
32. The two mechanisms for slow rhythm problems are
- a. reentry and failure of impulse formation
 - b. altered automaticity and failure of impulse propagation
 - c. failure of impulse formation and impulse propagation
 - d. reentry and triggered activity
33. The following are examples of locations of anatomic reentry
1. bundle branches
 2. tricuspid annulus
 3. AV node
 4. accessory pathways
- a. 1 and 2
 - b. 1, 2, and 3
 - c. 2, 3, and 4
 - d. all of the above

34. Factors that are responsible for early afterdepolarizations include
- a. QT prolonging drugs
 - b. low potassium
 - c. magnesium
 - d. digitalis toxicity
 - e. a and b
 - f. c and d