Nervous Lecture Test Questions – Set 2

Summer 2005

1. The role of chloride in a resting membrane potential:
   a. creates resting potential
   b. indirectly causes repolarization
   c. stabilization of sodium
   d. it has none, since it is balanced (i.e. equally distributed)
   e. unknown

2. The fact that a neuron membrane is polarized (resting) means that:
   a. the outside is more negative and the inside is more positive
   b. the outside is more positive and the inside more negative
   c. one end is negatively charged and the other end positively charged
   d. it is electrically neutral
   e. none of the above

3. Rapid inward potassium ion diffusion produces:
   a. hyperpolarization
   b. depolarization
   c. repolarization
   d. facilitation
   e. none of the above, since this can not occur--its concentration gradient is in the other direction

4. A neuron membrane that is more negative inside and more positive outside would have which type of polarity:
   a. resting
   b. depolarization
   c. EPSP
   d. action potential
   e. none of the above, since such a situation would be impossible

5. Rapid inward sodium diffusion produces:
   a. hyperpolarization
   b. repolarization
   c. resting potential
   d. reverberation
   e. none of the above

6. Neuron membrane depolarization is caused by which net change:
   a. sodium diffusing inwardly
   b. potassium diffusing inwardly at a rate below resting
   c. potassium diffusing outwardly at a rate above resting
   d. chloride diffusing outwardly
   e. sodium actively transported (pumped) outwardly

7. A neuron membrane that is more negative outside and more positive inside would have which type of polarity:
   a. resting
   b. hyperpolarization
   c. depolarization
   d. somatic
   e. none of the above, since such a situation would be impossible

8. An above threshold depolarization will produce:
   a. inhibition
   b. no response
   c. hyperpolarization
   d. a super-normal action potential which will result in an impulse of greater strength
   e. an action potential of no greater strength than one produced by less depolarization

9. Neuron membrane repolarization is ultimately caused by which net change:
   a. sodium diffusing inwardly
   b. potassium diffusing outwardly at a rate above resting, through gated channels
   c. potassium diffusing inwardly at a rate below resting, through ungated channels
   d. chloride diffusing outwardly
   e. sodium actively transported (pumped) outwardly

10. Rapid outward sodium ion diffusion produces:
   a. hyperpolarization
   b. repolarization
   c. resting polarization
   d. a conditioned reflex
   e. none of the above, since this is not normal

11. A neuron membrane potential of +20mV would indicate:
   a. depolarization, but no action potential
   b. hyperpolarization
   c. action potential
   d. facilitation
   e. repolarization

12. A graphic recording of a neuron's depolarization, action potential and repolarization cycle is:
   a. reflex arc
   b. reverberation
   c. afterdischarge
   d. decussation
   e. spike

13. What is occurring during the refractory period:
   a. depolarization
   b. resting potential
   c. action potential
   d. hyperpolarization
   e. repolarization

14. A nervous impulse is:
   a. a spike
   b. successive series of action potentials
   c. repolarization
   d. a resting potential
   e. an action potential

15. When an impulse is conducted along a neuron:
    a. it decreases in intensity as it goes along
    b. it brings about a permanent change in the neuronal membrane potential
    c. it successively reverses the resting potential to an action potential, spreading out over more of the membrane
    d. it increases in velocity
    e. there is only one depolarization, at the original site of stimulation

16. A successively propagated series of action potentials is:
    a. EPSP
    a. IPSP
    c. nervous impulse
    d. tract
    e. none of the above

17. Conduction of the nervous impulse:
    a. is due to an altered permeability of the neuron membrane to calcium and phosphorus
    b. is more rapid in medullated (myelinated) fibers than in unmedullated fibers
    c. always occurs, no matter what the level of stimulation
    d. cannot occur without myelin
    e. none of the above

18. The function of myelin:
    a. enhancing repolarization
    b. shock-absorption
    c. reception
    d. permits regeneration of damaged neurons
    e. increases impulse conduction speed

19. The maximum number of impulses which any neuron can carry per second:
    a. one
    b. 100
    c. 10
    d. 5000
    e. 1000

20. Neuron fatigue is caused by:
    a. hyperpolarization
    b. endorphins
    c. refractory period
    d. insufficient extracellular sodium
    e. excess intracellular chloride

21. The role of potassium in a resting membrane potential:
    a. stabilization, since its distribution is balanced
    b. prevents sodium from diffusing
    c. creates it due to its leaking outwardly
    d. makes the cell's interior more positively charged
    e. it has none

22. A neuron potential of –100mV would indicate:
    a. hyperpolarization
    b. sub-threshold depolarization
    c. threshold depolarization
    d. action potential
    e. repolarization

23. Insufficient extracellular sodium to cause depolarization is:
    a. impossible, since there is an unlimited supply
    b. fatigue
    c. refractory period
    d. hyperpolarization
    e. overcome by more chloride moving out of the cell

24. If a particular type of ion is relatively moving through a membrane in one direction in greater numbers than in the opposite direction, this is:
    a. due to its concentration gradient, which produces no effects of any consequence
    b. a spike
    c. an unequal distribution, which creates a membrane potential
    d. an equal distribution, which creates no membrane upset
    e. another way of defining a nervous impulse

25. The role of sodium in a resting membrane potential:
    a. none, since its distribution is equally balanced
    b. creates it due to leaking outwardly
    c. creates it due to leaking inwardly
    d. prevents potassium from diffusing outwardly
    e. makes the cell's interior more positively charged

26. A spike is:
    a. the result of increasing chloride membrane permeability
    b. the indirect prevention of activity on a post-synaptic membrane, by previous inhibition of the EPSP's by other cells
    c. only evident in medullated neurons
    d. only evident in non-medullated neurons
    e. graphic recording of a neuron's threshold depolarization, action potential and repolarization

27. Depolarization is initiated by:
    a. unknown phenomena
    b. action potential
    c. chloride ions
    d. a stimulus which causes opening of sodium diffusion channel gates
    e. none of the above

28. The role of sodium in repolarization:
    a. increased outward diffusion
    b. decreased outward diffusion
    c. increased inward diffusion
    d. decreased inward diffusion
    e. it has no role in this membrane potential

29. The ions involved in membrane potentials travel by means of:
    a. differential variables, coupled with static and unvarying absolutes
    b. active transport exclusively
    c. diffusion exclusively
    d. proteins termed diffusion channels and active transport pumps
    e. none of the above

30. A neuron membrane potential of –50mV would indicate:
    a. hyperpolarization
    b. sub-threshold depolarization
    c. action potential
    d. above-threshold depolarization
    e. nervous impulse conduction

31. An extra amount of depolarization, up to about +20mV, automatically generated when a neuronal membrane is depolarized to threshold:
    a. hyperpolarization
    b. action potential
    c. nervous impulse
    d. sub-threshold
    e. supra-threshold

32. Which of the following is responsible for stabilizing a neuronal membrane for proper sodium balance:
    a. negative intracellular ions
    b. calcium
    c. potassium
    d. chloride
    e. myelin

33. When there is a resting potential, chloride ions are prevented from becoming unbalanced, despite the concentration gradient, due to:
    a. repulsion by the neuron's interior positivity
    b. repulsion by the neuron's interior negativity
    c. being combined with sodium ions to form a neutral compound
    d. active transport inwardly
    e. unknown force(s)

34. Resting potential is measured as a negative voltage because:
    a. it is traditionally measured relative to the inside of the cell and positively charged ions are undergoing a net outward movement
    b. sodium ions have a positive charge
    c. chloride ions have a negative charge
    d. potassium ions have a negative charge
    e. any imbalance in ion distribution between the inside and outside of a cell will produce this electrical effect

35. Which of the following membrane potentials would indicate a sub-threshold depolarization:
    a. –70 mV
    b. –100 mV
    c. 0 mV
    d. –60 mV

e. +25 mV

36. For repolarization the first necessary change is:
a. chloride actively transported inwardly
b. potassium diffusion gates to close back to a resting level
c. sodium diffusion gates to close back to a resting level
d. sodium diffusion gates to open back to a resting level
e. clean socks

37. The approximate time for the depolarization events to occur:
a. one second
b. 0.9 millisecond
c. 0.2 millisecond
d. 0.5 second
e. 500 milliseconds

38. A neuron potential of –80mV would indicate:
a. action potential
b. supra-threshold depolarization
c. sub-threshold depolarization
d. hyperpolarization
e. fatigue

39. Impulse conduction speed would be the fastest under which condition:
a. no myelin
b. no myelin and closely spaced nodes
c. myelin and closely spaced nodes
d. myelin and widely spaced nodes
e. oligodendroglial sheathing

40. Which ion is involved in causing three different membrane potentials--resting, repolarization and hyperpolarization:
a. magnesium
b. potassium
c. sodium
d. chloride
e. calcium

41. If a particular type of ion is relatively moving through a cell membrane in one direction at the same rate as it is moving in the opposite direction, this is:
a. impossible
b. an equal distribution, which creates no membrane potential
c. a spike
d. an unequal distribution, which creates a membrane potential
e. another way of describing a nervous impulse

42. During an action potential a new threshold stimulus will produce no effect – this is termed:
a. inhibition
b. refractory period
c. summation
d. all-or-none law
e. specificity paradox

43. A resting potential is caused by which net ionic imbalance:

a. outward potassium leakage
b. inward potassium leakage
c. active transport of sodium outwardly
d. active transport of sodium inwardly
e. inward leakage of chloride

44. A stimulus causes diffusion gates to open for sodium, which rapidly diffuses inwardly – this membrane potential is:
a. resting
b. action potential
c. repolarization
d. hyperpolarization
e. depolarization

45. If a neuron membrane is depolarized to threshold, what will next occur:
a. immediate repolarization
b. hyperpolarization
c. action potential
d. nervous impulse
e. potassium gates close

46. What is a diffusion channel:
a. cell membrane lipid
b. cell membrane protein
c. Golgi secretion vesicle
d. spine shaped projection
e. <u>any</u> of the above, depending on the substance which is handled

47. Which ion is more concentrated in the <u>cytoplasm</u> than in the ECF:
a. chloride
b. sodium
c. potassium
d. calcium
e. <u>none</u> of the above

48. Which of the following membrane potentials would indicate a <u>sub-threshold</u> depolarization:
a. –70 mV
b. –90 mV
c. +20 mV
d. –40 mV
e. –50 mV

49. Depolarizations and impulses are inhibited and balanced by:
a. action potential
b. spikes
c. net ionic diffusion of proteins out of a neuron
d. repolarization
e. hyperpolarization

50. If a particular ion is diffusing through a cell membrane, while being actively transported at the same rate in the opposite direction, what situation would result:
    a. depolarization
    b. resting potential
    c. hyperpolariztion
    d. action potential
    e. no membrane potential

51. A diffusion channel that permits a continual high rate of leakage of its particular ion is termed:
    a. gated
    b. ungated
    c. pump
    d. refractory
    e. tetanized

52. A diffusion channel which variably restricts the passage of its particular ion is termed:
    a. pump
    b. ungated
    c. gated
    d. refractory
    e. reverberatory

53. What is an active transport pump:
    a. cell membrane lipid
    b. Golgi secretion vesicle
    c. cell membrane protein
    d. spine shaped projection from a cell
    e. any of the above, depending on the substance which is handled

54. Which of the following potentials is below resting:
    a. depolarization
    b. hyperpolarization
    c. repolarization
    d. threshold
    e. action potential

55. A membrane potential of –50mV would be termed:
    a. threshold depolarization
    b. sub-threshold depolarization
    c. action potential
    d. resting potential
    e. hyperpolarization

56. Which of the following is not a membrane potential:
    a. refractory period
    b. depolarization
    c. repolarization
    d. resting potential
    e. hyperpolarization

57. Which of the following is a membrane potential:
    a. depolarization
    b. hyperpolarization
    c. repolarization
    d. resting potential
    e. all of the above

58. During a resting potential, the negatively charged cytoplasm is caused by:
    a. chloride ions
    b. sodium ions
    c. hydroxide ions
    d. the movement of calcium ions from the endoplasmic reticulum, in response to the net loss of potassium ions to the extracellular fluid
    e. ionized proteins no longer being neutralized by potassium ions

59. Hyperpolarization is needed for what reason:
    a. cause secretion
    b. produce over stimulation
    c. permit faster repolarization
    d. prevent excessive excitation and unwanted impulses
    e. continual depolarization

60. A neuron membrane which is more negative outside and more positive inside would be depolarized.

61. A neuron membrane which is more negative outside and more positive inside would be resting.

62. A neuron membrane which is more negative outside and more positive inside would be hyperpolarized.

63. Different neurons have the same thresholds.

64. Different neurons can have different thresholds.

65. Medullated (myelinated) neurons conduct impulses the fastest.

66. Medullated (myelinated) neurons conduct impulses the slowest.

67. The maximum impulse frequency is five per second.

68. The maximum impulse frequency is 1000 per second.

69. The maximum impulse frequency is 100 per second.

70. A sodium pump is responsible for maintaining this ion's resting concentration.

71. A resting potential is typically about –25mV.

72. A resting potential is typically about –150mV.

73. A resting potential is typically about –70mV.

74. A resting potential is typically about 0mV.

75. A resting potential is typically about +20mV.

76. A resting potential is typically about –70 to –90mV.

77. Nervous impulses obey an all-or-none law.

78. In the resting condition sodium and chloride ions have concentration gradients but they are balanced by equal diffusion and active transport.

79. In the resting condition potassium ions have a concentration gradient, but they are balanced by equal diffusion and active transport through the neuronal membrane.

80. Rapid inward sodium diffusion produces repolarization.

81. In the resting condition sodium ions have a concentration gradient, but they are balanced by equal diffusion and active transport.

82. Rapid inward chloride diffusion produces repolarization.

83. A concentration gradient is not the same as an unequal ionic distribution.

84. Over any one neuron, a nervous impulse travels over its entire membrane in all directions.

85. A membrane potential that is going from +20mV to –70mV would be termed depolarization.

86. A membrane potential that is going from +20mV to –70mV would be termed repolarization.

87. The velocity of a nervous impulse would be greater over a longer axon.

88. A membrane potential of –100mV would indicate a resting condition.

89. A diffusion channel which will permit variable transport of its particular ion is termed ungated.
90. An equal ionic distribution is the same as a concentration equilibrium.

91. Net inward sodium diffusion produces hyperpolarization.

92. In effect, hyperpolarization decreases the amount of depolarization required to reach threshold.

93. Membrane irritability is based on ionic changes called potentials.

94. Potassium has both gated and ungated diffusion channels.

95. A membrane potential of –20 mV would be called hyperpolarization.