PSYCH 260-BBH 203 Exam 2

October 16, 2015

Answer the questions using the Scantron form.

Name: _____

1 Main

Please put in their proper order the steps that lead to synaptic communication between neurons. Begin with the presynaptic cell.

1. Step 1
   A. Voltage-gated Ca++ channels open.
   B. Action potential propagates down the axon to the axon terminal.
   C. Ca++ entry initiates exocytosis of neurotransmitter.
   D. Ligand-gated receptors bind neurotransmitter and activate channels in the postsynaptic cell.
   E. Neurotransmitter diffuses across the synaptic cleft.
2. Step 2
   A. Voltage-gated Ca++ channels open.
   B. Action potential propagates down the axon to the axon terminal.
   C. Ca++ initiates exocytosis of neurotransmitter.
   D. Ligand-gated receptors bind neurotransmitter and activate channels in the postsynaptic cell.
   E. Neurotransmitter diffuses across synaptic cleft.
3. Step 3
   A. Voltage-gated Ca++ channels open.
   B. Action potential propagates down the axon to the axon terminal.
   C. Ca++ initiates exocytosis of neurotransmitter.
   D. Ligand-gated receptors bind neurotransmitter and activate channels in the postsynaptic cell.
   E. Neurotransmitter diffuses across synaptic cleft.
4. Step 4
   A. Voltage-gated Ca++ channels open.
   B. Action potential propagates down the axon to the axon terminal.
   C. Ca++ initiates exocytosis of neurotransmitter.
   D. Ligand-gated receptors bind neurotransmitter and activate channels in the postsynaptic cell.
   E. Neurotransmitter diffuses across synaptic cleft.
5. Step 5
   A. Voltage-gated Ca++ channels open.
   B. Action potential propagates down the axon to the axon terminal.
   C. Ca++ initiates exocytosis of neurotransmitter.
   D. Ligand-gated receptors bind neurotransmitter and activate channels in the postsynaptic cell.
   E. Neurotransmitter diffuses across synaptic cleft.

Answer the following questions.

6. All of the following are components of the HPA axis, EXCEPT:
   A. Hippocampus.
   B. Pituitary.
   C. Adrenal gland.
   D. Hypothalamus.

7. During stage _____sleep, the deepest of the stages, brainwaves are _____.
   A. 1; high amplitude and synchronized.
   B. 4; high amplitude and synchronized.
   C. 1; low amplitude and desynchronized.
   D. 4; low amplitude and desynchronized.

8. This method of recording functional brain activity is commonly used to reveal the different stages of sleep.
   A. fMRI.
   B. PET.
   C. EEG.
   D. Cognition; emotion.

9. This nucleus of the hypothalamus receives visual input and thereby synchronizes the body's circadian rhythms to changes in the day/night cycle.
   A. preoptic.
   B. mammillary body.
   C. suprachiasmatic nucleus.
   D. anterior pituitary.

Match the hormone to its function.

10. Oxytocin
    A. stress response; increases blood glucose; anti-inflammatory effect.
    B. uterine contraction; milk release; bonding.
    C. regulates seasonal changes; sexual maturation.
    D. blood vessel constriction; antidiuretic hormone.

11. Vasopressin
    A. stress response; increases blood glucose; anti-inflammatory effect.
    B. uterine contraction; milk release; bonding.
    C. regulates seasonal changes; sexual maturation.
    D. blood vessel constriction; antidiuretic hormone.

12. Cortisol

    A. stress response; increases blood glucose; anti-inflammatory effect.

    B. uterine contraction; milk release; bonding.

    C. regulates seasonal changes; sexual maturation.

    D. blood vessel constriction; antidiuretic hormone.

13. Melatonin

    A. stress response; increases blood glucose; anti-inflammatory effect.

    B. uterine contraction; milk release; bonding.

    C. regulates seasonal changes, circadian rhythm; sexual maturation.

    D. blood vessel constriction; antidiuretic hormone.

Answer the following questions.

14. Botulinum toxin (botox) blocks the release of acetylcholine from presynaptic terminals. In large quantities, this can be _____because it _____.

    A. good; speeds the conduction of action potentials.

    B. bad; blocks communication to muscle fibers.

    C. good; accelerates K+ flow.

    D. bad; affects the size and number of presynaptic IPSPs.

15. The blood oxygen-level dependent (BOLD) response is measured by _____.

    A. Structural MRI.

    B. Positron Emission Tomography (PET).

    C. Magnetoencephalography.

    D. functional MRI.

16. Monoamine oxidase contributes to the _____of _____.

    A. Breakdown and inactivation; acetylcholine.

    B. Breakdown and inactivation; dopamine, norepinephrine, and epinephrine.

    C. Postsynaptic reuptake; serotonin.

    D. Increase in monoamine levels; GABA-releasing neurons.

17. Selective reuptake inhibitors like Prozac act on _____, _____the normal process of inactivation.

    A. synaptic vesicles; slowing.

    B. postsynaptic receptors; accelerating.

    C. presynaptic transporters; slowing.

    D. Na+/K+ pumps; accelerating.

18. The _____is one of the places in the adult mammalian brain where new neurons are produced.

    A. region surrounding the cerebral ventricles.

    B. thalamus.

    C. cerebellum.

    D. ventral spinal cord.

19. The meso-limbo-cortical projection from the _____in the midbrain releases the neurotransmitter _____. It is part of the brain's 'reward' circuit.

    A. ventral tegmental area; dopamine.

    B. raphe nucleus; NE.

    C. superior colliculus; glutamate.

    D. thalamus; GABA.

20. The 10th cranial (Xth) or vagus nerve connects to the _____branch of the autonomic nervous system. Its neurons tend to slow heart rate when stimulated.

    A. sympathetic.

    B. enteric.

    C. parasympathetic.

    D. somatic.

21. This glial cell type contributes to the 'pruning' of dendritic spines from unused synapses in the CNS.

    A. Pyramidal cells.

    B. microglia.

    C. Schwann cells.

    D. Stellate cells.

22. _____receptors contain their own ion channel; _____do not.

    A. ionotropic; metabotropic.

    B. metabotropic; ionotropic.

    C. GABA; glutamate.

    D. Dopamine; serotonin.

23. _____is the primary *excitatory* neurotransmitter in the CNS; _____is the primary neurotransmitter of *CNS output*.

    A. GABA; glutamate.

    B. glutamate; GABA.

    C. glutamate; acetylcholine.

    D. Acetylcholine; glutamate.

24. Hormonal action _____than neuronal action.

    A. is faster-acting.

    B. is more specific in its effects.

    C. is slower-acting.

    D. involves greater voluntary control.

25. Opening a channel permeable to Na+ in a neuron at its resting potential would have a/an _____effect.

    A. excitatory.

    B. inhibitory.

    C. modulatory.

    D. Ca++ activating.

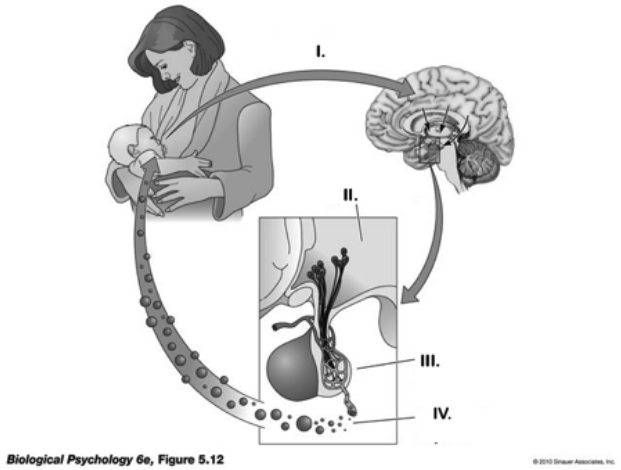
Match the endocrine structure with the function.

26. Hypothalamus
    A. Circadian (day/night) rhythms.
    B. Responds to adrenocoricotropic hormone (ACTH) by releasing cortisol.
    C. Releases NE and epinephrine.
    D. Controls hormone secretions into and by pituitary.

27. Pineal gland
    A. Circadian (day/night) rhythms.
    B. Responds to adrenocoricotropic hormone (ACTH) by releasing cortisol.
    C. Releases NE and epinephrine.
    D. Controls hormone secretions into and by pituitary.

28. Adrenal cortex
    A. Circadian (day/night) rhythms.
    B. Responds to adrenocoricotropic hormone (ACTH) by releasing cortisol.
    C. Releases NE and epinephrine.
    D. Controls hormone secretions into and by pituitary.

Match the Roman numeral in the figure below, to the processes and structures in the hormonal action cycle the figure depicts.



29. I

A. Posterior pituitary.
B. Nerve impulses to hypothalamus.
C. Release of oxytocin.
D. Hypothalamus.

30. II

A. Posterior pituitary.
B. Nerve impulses to hypothalamus.
C. Release of oxytocin.
D. Hypothalamus.

31. III

A. Posterior pituitary.
B. Nerve impulses to hypothalamus.
C. Release of oxytocin.
D. Hypothalamus.

32. IV

A. Posterior pituitary.
B. Nerve impulses to hypothalamus.
C. Release of oxytocin.
D. Hypothalamus.

33. Dopamine antagonists alleviate some of schizophrenia's positive symptoms – 'additions' to behavior. This _____the _____hypothesis of schizophrenia which posits that excessive dopamine causes psychotic symptoms.
    A. Supports; dopamine.
    B. Supports; amino acid.
    C. Undermines; dopamine.
    D. Undermines; monoamine.

34. Which of these is NOT true about REM sleep?
    A. There is muscular paralysis.
    B. EEG signals are desynchronized, similar to a wakeful state.
    C. It accounts for 80% of the time spent asleep in adults.
    D. It involves vivid dreams.

35. Which neurotransmitter is involved in sexual arousal, childbirth, and social bonding?
    A. Serotonin.
    B. Oxytocin.
    C. Epinephrine.
    D. Vasopressin.

36. Which of these is NOT one of features of the human brain that contributes to our greater processing capacity?
    A. Dense interconnections.
    B. High levels of myelination.
    C. Larger mass but fewer folds.
    D. Large cerebral cortex.

37. Synaptogenesis _____; myelination _____.
    A. Continues long after birth; also continues long after birth.
    B. Continues long after birth; stops before birth.
    C. Ends before birth; continues long after birth.
    D. Ends before birth; also ends before birth.

38. Complex, multicellular animal life arose on Earth about
    A. 10,000 years ago.
    B. 4.5 billion years ago.
    C. 500 million years ago.
    D. 110,000 years ago.

39. Across the animal kingdom, bigger animals generally have _____brains.
    A. bigger.
    B. smaller.
    C. smooother, less wrinkled.
    D. radially symmetric.

40. The human _____is/are disproportionately large in comparison to other primates.
    A. cerebellum.
    B. spinal cord.
    C. cerebral ventricles.
    D. cerebral cortex.

2 Bonus

41. The 'birth' of the nervous system occurs at about 18 days post-fertilization when _____begins.

    A. neurulation.

    B. synaptogenesis.

    C. myelination.

    D. neuronal migration.

    E. cortical folding.

42. During human brain development, the process of *apoptosis* describes:

    A. Expansive myelination in the CNS.

    B. Movement of newly development cells to their proper locations.

    C. Stem cells become specified types of cells.

    D. Pruning of neurons via cell death.

43. The longitudinal fissure divides the _____.

    A. left hemisphere from the right.

    B. temporal lobe from the frontal and parietal lobes.

    C. frontal lobe from the parietal lobes.

    D. corpus callosum from the anterior commissure.

44. Spina bifida results from _____.

    A. malformation of the brain.

    B. failure to myelinate peripheral neurons.

    C. failure of caudal neural tube closure.

    D. slow rates of neurogenesis.