PSYCH 260H Exam 2

October 17, 2016

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. Bergman's rule about the relationship between body mass and latitude suggests that animals get _____as average temperatures get colder.
   A. longer
   B. smaller.
   C. larger.
   D. faster.

7. The _____of the _____control the nervous system's responses to changes in temperature.
   A. medial geniculate nucleus; thalamus
   B. inferior colliculus; tegmentum
   C. postganglionic area; spinal cord
   D. preoptic area and lateral regions; hypothalamus

8. All of the following are components of the SAM axis, *except*:
   A. Midbrain.
   B. Sympathetic nervous system.
   C. Adrenal medulla.
   D. Hypothalamus.

Match the hormone to its function.

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

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

11. Melatonin
    A. stress response; increases in 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.

12. 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.

13. _____is a kind of _____brain imaging method used to study axon fiber (white matter) tracts.

    A. Structural MRI; structural.

    B. Positron Emission Tomography (PET); functional.

    C. Magnetoencephalography; functional.

    D. diffusion tensor imaging (DTI); structural.

14. The enzyme AChE 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.

15. This neurotransmitter is released by motor neurons onto skeletal muscle.

    A. GABA

    B. Serotonin

    C. Acetylcholine

    D. Glutamate

16. 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.

17. 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.

18. 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.

19. 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.

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

    A. ionotropic; metabotropic.

    B. metabotropic; ionotropic.

    C. GABA; glutamate.

    D. Dopamine; serotonin.

21. _____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.

22. 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.

23. 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.

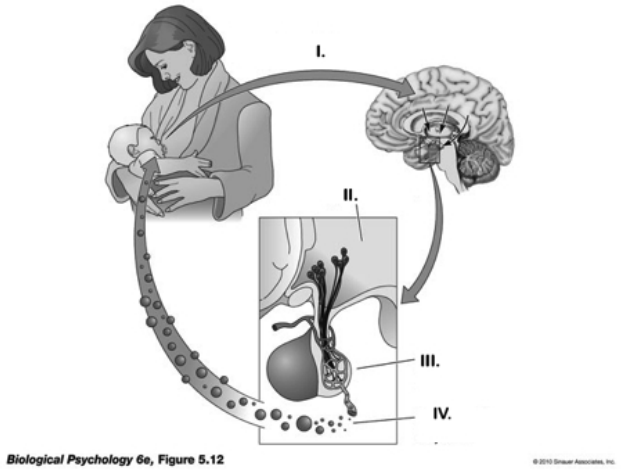
Match the endocrine structure with the function.

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

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

26. Adrenal cortex
    A. Circadian 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.



27. I

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

28. II

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

29. III

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

30. IV

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

Answer the following questions.

31. Both Parkinson's Disease and schizophrenia have been linked to disturbances in _____neurotransmitter systems.

    A. dopamine.

    B. GABA.

    C. acetylcholine.

    D. serotonin.

32. All of the following are biologically driven "periods" of animal physiology *except*.

    A. once a week.

    B. 90-110 min.

    C. daily.

    D. yearly.

33. The _____plays a role in entraining the release of the hormone _____to patterns in the day/night cycle.

    A. hippocampus; adrenaline.

    B. suprachiasmatic nucleus; melatonin.

    C. preoptic area; ACTH.

    D. amygdala; glutamate.

34. _____sleep is characterized by large amplitude, low frequency EEG patterns and the absence of vivid dream experiences.

    A. slow-wave (Stage 3/4).

    B. REM.

    C. Stage 1.

    D. Stage 2.

35. One reason young infants might have such erratic sleep patterns is that

    A. most new parents don't keep regular day/night schedules.

    B. it takes time for retinal neurons to establish effective connections with the SCN.

    C. they spend most of their in slow-wave sleep.

    D. the infant hypothalamus doesn't release melatonin like an adult.

36. During REM sleep, most motor neurons are _____– except for those controlling the _____.

    A. inhibited; eyes.

    B. inhibited; limbs.

    C. excited; eyes.

    D. excited; digestive tract.

37. In which group of animals is monogamy common?

    A. primates.

    B. mammals.

    C. birds.

38. Human sexuality differs from most other animals in all of the following ways *except*.
    A. Have sex outside of estrous.
    B. Fewer outward signs of estrous.
    C. Smaller testes, ejaculate volumes, and sperm counts.
    D. Have sex frequently.

39. Gap junctions support _____between cells.
    A. direct electrical coupling
    B. chemical communication
    C. slow communication
    D. hormonal signaling

40. The release of glutamate onto an AMPA receptor on a neuron's dendrite produces an _____.
    A. inhibitory postsynaptic potential (IPSP)
    B. electrochemical postsynaptic potential (EPSP)
    C. excitatory postsynaptic potential (EPSP)
    D. inwardly-driven postsynaptic potential (IPSP)

Turn to the next page to complete the bonus questions.

2 Bonus

41. True or False. There are many obvious structural differences between female and male brains.
    A. True.
    B. False.

42. Histamine is one of the _____group of neurotransmitters. It is released by the _____.
    A. monoamine; hippocampus.
    B. amino acid; midbrain.
    C. monoamine; hypothalamus.
    D. peptide; amygdala.

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. Corticotropin Releasing Hormone (CRH) is released by the _____into the _____.
    A. hippocampus; amygdala.
    B. adrenal cortex; blood stream.
    C. hypothalamus; anterior pituitary.
    D. medulla oblongata; adrenal medulla.