

PSYCH 260 Exam 2

March 2, 2017

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. True or False. There are many obvious structural differences between female and male brains.
- A. True.
 - B. False.**
7. Influx of _____ion into the presynaptic terminal triggers the release of neurotransmitter by means of _____.
- A. Na⁺; ion transportation.
 - B. Cl⁻; inhibitory postsynaptic potential enhancement.
 - C. Ca⁺⁺; exocytosis.**
 - D. K⁺; Na⁺/K⁺ pump activity.
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 lateral 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.
19. This small 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 adrenocorticotropic hormone (ACTH) by releasing cortisol.
- C. Releases NE and epinephrine.
- D. Controls hormone secretions into and by pituitary.**

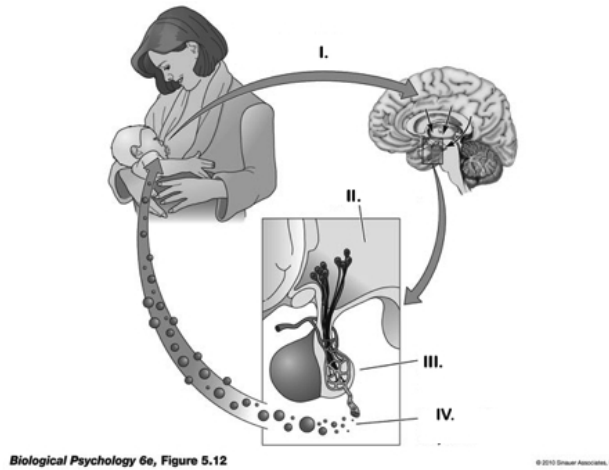
25. Pineal gland

- A. Circadian rhythms.**
- B. Responds to adrenocorticotropic 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 adrenocorticotropic 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. preoptic area; ACTH.
 - C. **suprachiasmatic nucleus; melatonin.**
 - 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. **it takes time for retinal neurons to establish effective connections with the SCN.**
 - B. most new parents don't keep regular day/night schedules.
 - 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; limbs.
 - B. excited; eyes.
 - C. **inhibited; eyes.**
 - D. excited; digestive tract.
37. In which group of animals is monogamy common?
- A. primates.
 - B. **birds.**
 - C. mammals.
 - D. reptiles.

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. inwardly-driven postsynaptic potential (IPSP)
 - D. excitatory postsynaptic potential (EPSP)**

Turn to the next page to complete the bonus questions.

2 Bonus

41. The hippocampus is located deep within which lobe of the cerebral cortex?
- A. **Temporal.**
 - B. Frontal.
 - C. Parietal.
 - D. Occipital.
42. Histamine is one of the _____ group of neurotransmitters. It is released by the _____.
- A. monoamine; hippocampus.
 - B. **monoamine; hypothalamus.**
 - C. amino acid; midbrain.
 - D. peptide; amygdala.
43. The 10th cranial (Xth) or vagus nerve connects to the _____ branch of the autonomic nervous system. Its neurons tend to slow heart rate and activate digestion when stimulated.
- A. **parasympathetic.**
 - B. sympathetic.
 - C. enteric.
 - D. somatic.
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.