

## **Chapter 2: Neuropsychology of Memory**

1. What does it mean to say that memory is an emergent property of the nervous system?
  - a) Memory is inherent in the neurons.
  - b) Memory is a quality that exists apart from neural structure.
  - c) The nervous system has emerged to create memory.
  - d) Memory is a quality that emerges out of how the nervous system is structured. \*
2. What is a way to describe the relationship between memory and the nervous system?
  - a) emergent \*
  - b) intrinsic
  - c) necessary
  - d) opportunistic
3. In the nervous system, information comes in through the \_\_\_\_\_ and goes out through the \_\_\_\_\_.
  - a) dendrites; axon \*
  - b) nucleus; dendrites
  - c) axon; nodes of Ranvier
  - d) terminal buttons; myelin sheath
4. Neurotransmitters used for neural communication are stored where in a neuron?
  - a) cell body
  - b) mitochondria
  - c) RNA
  - d) terminal buttons \*
5. Neural communication can be facilitated in some neurons by the inclusion of a(n) \_\_\_\_\_.
  - a) axon
  - b) myelin sheath \*
  - c) neurotransmitter-absorbing membrane
  - d) dendrite structure
6. Neurons encode and communicate information by \_\_\_\_\_.
  - a) variations in the size of the action potential
  - b) the pattern of neural activation and inhibition \*
  - c) re-synthesizing various neurotransmitters
  - d) long-term potentiation
7. Which part of a neuron is more specialized for collecting neural impulses?
  - a) synapse
  - b) axon
  - c) neurotransmitters
  - d) dendrite \*

8. What is the electrical charge of a neuron during an action potential?
- a) -70 mV
  - b) 100 mV
  - c) 40 mV \*
  - d) 7 kW
9. How wide is a synapse?
- a) 100–200 angstroms \*
  - b) 5–10 angstroms
  - c) 5–10 millimeters
  - d) 1–2 millimeters
10. Which of the following neurotransmitters is important for memory?
- a) serotonin
  - b) acetylcholine \*
  - c) lukaisian
  - d) Phrygian
11. Glutamate is important for \_\_\_\_\_.
- a) the suppression of acetylcholine
  - b) forgetting
  - c) the formation of new synapses \*
  - d) the reversal of processes damaged by LTP
12. Which of the following is an important inhibitory neurotransmitter?
- a) glutamate
  - b) noepinephrine
  - c) acetylchioline
  - d) GABA \*
13. What is norepinephrine important for?
- a) memory consolidation \*
  - b) forgetting
  - c) visual imagery
  - d) retrieval interference
14. The role of LTP in learning is at the \_\_\_\_\_.
- a) neural level \*
  - b) level of brain structures
  - c) level of working memory
  - d) stimulus-response level
15. How long is long-term potentiation?
- a) several neurons long
  - b) several weeks \*
  - c) about 10 cm
  - d) several months

16. What is the process of making memories more permanent in the nervous system called?
- a) learning
  - b) consolidation \*
  - c) encoding
  - d) permutating
17. What is the process of weakening memories in the nervous system called?
- a) repolarization
  - b) disconnecting
  - c) synaptic-resetting process
  - d) long-term depression \*
18. What neural process is thought to be related to memory consolidation?
- a) action potentials
  - b) neurotransmitter release
  - c) long-term potentiation \*
  - d) recoding
19. What part of a neuron is altered during learning?
- a) dendrite \*
  - b) axon
  - c) neurotransmitters
  - d) soma
20. The process by which hippocampal neurons fire with greater ease due to being used several times is called \_\_\_\_\_.
- a) long-term potentiation \*
  - b) neurotransmitters
  - c) event-related potentials
  - d) the HERA model
21. Memory consolidation is aided by \_\_\_\_\_.
- a) electrical impulses
  - b) sleep \*
  - c) apnea
  - d) alcohol
22. Which of the following neurological structures has been of particular interest to learning and memory researchers?
- a) spinal cord
  - b) spleen
  - c) hippocampus \*
  - d) dendritic neurons

23. A neural structure important for processing emotional aspects of memories is the \_\_\_\_\_.
- a) amygdala \*
  - b) hippocampus
  - c) temporal lobe
  - d) frontal lobe
24. The amygdala \_\_\_\_\_.
- a) is used in storing conscious memories
  - b) is one of the lobes of the neocortex
  - c) is key to emotional aspects of memory \*
  - d) is known to lead to amnesia when damaged
25. Which of the following is NOT a subcortical structure that is heavily involved in memory?
- a) basal ganglia
  - b) diencephalon
  - c) cerebellum
  - d) medulla oblongata \*
26. During the encoding process, the hippocampus stores information about \_\_\_\_\_.
- a) subconscious events stored in long-term memory
  - b) episode-specific events in the present \*
  - c) discriminatory processes
  - d) visual imagery in the sensory registers
27. Which brain structure is important for unconscious motor learning?
- a) hippocampus
  - b) basal ganglia \*
  - c) hypothalamus
  - d) amygdala
28. A neural structure important for controlling the flow of memory processing is the \_\_\_\_\_.
- a) amygdala
  - b) hippocampus
  - c) temporal lobe
  - d) frontal lobe \*
29. The lobe of the cortex most involved in memory storage is the \_\_\_\_\_.
- a) occipital
  - b) parietal
  - c) temporal \*
  - d) frontal
30. The lobe of the cortex most involved in controlling and coordinating memory processes is the \_\_\_\_\_.
- a) occipital lobe

- b) parietal lobe
- c) temporal lobe
- d) frontal lobe \*

31. People who dissociate may have problems with source monitoring due to damage in the \_\_\_\_\_.

- a) frontal lobes \*
- b) occipital lobes
- c) parietal lobes
- d) temporal lobes

32. Which of the following neuroimaging methods has good temporal resolution, but relatively poor spatial resolution?

- a) ERP \*
- b) CT
- c) PET
- d) fMRI

33. Which of the following scanning techniques has good spatial AND temporal resolution?

- a) functional magnetic resonance imaging (fMRI) \*
- b) positron emission tomography (PET)
- c) computer-assisted tomography (CT)
- d) event-related potentials (ERP)

34. CT scans can be used to help understand the \_\_\_\_\_ of a given person's brain.

- a) structure \*
- b) function
- c) activation
- d) hemispheric dominance

35. Which of the following can be used to assess the structure of a living brain?

- a) EEG & PET
- b) CT & PET
- c) MRI & EEG
- d) CT & MRI \*

36. How did Penfield test for memories in living brains?

- a) by observing EEG scans
- b) by injecting radioactive isotopes into patients
- c) by electrically stimulating people's brains \*
- d) by removing various portions of the cortex and assessing the effects

37. How did Penfield think that memory operated in the brain?

- a) as a network
- b) like a videocamera \*
- c) by using complex schemas
- d) by using long-term potentiation

38. What is the best way to describe Penfield's findings in his research recovering memories using electrical stimulation of the cortex?
- a) All memories are stored accurately; one just needs the appropriate means of recovering them.
  - b) Memories are stored as an electrical field in the brain.
  - c) The best memories to access are the older ones that have consolidated.
  - d) Penfield was wrong in his conclusions about memory. \*
39. What is the name of the neurological technique of tracking the neural impulses of an individual neuron?
- a) single-cell recording \*
  - b) ERP recordings
  - c) oxygen<sup>13</sup> scanning
  - d) network unit monitoring
40. Which neuroimaging method looks at the over level of power in various frequency bands to assess memory?
- a) single-cell recording
  - b) ERP recordings
  - c) magnetoencephalography (MEG)
  - d) event-related desynchronization (ERD) \*
41. Which neurological method can produce temporary lesions in otherwise normal people?
- a) transcranial magnetic stimulation (TMS) \*
  - b) ERP recordings
  - c) magnetoencephalography (MEG)
  - d) event-related desynchronization (ERD)
42. The neuroimaging method of magnetoencephalography (MEG) does what?
- a) broadly measures cortical blood flow activity
  - b) narrowly measures cortical blood flow activity in a specific region
  - c) broadly measures cortical electrical activity \*
  - d) narrowly measures cortical electrical activity in a specific region
43. What aspect of physiological processing is being measured in a PET scan?
- a) nitrogen processing
  - b) blood flow \*
  - c) neural firing
  - d) structural processes
44. What is cerebral blood flow thought to be associated with in memory?
- a) neurological diseases
  - b) arousal level
  - c) degree of mental processing \*
  - d) oxygen levels in the lungs

45. What is being tracked in a PET scan?
- a) oxygen-15 isotope \*
  - b) white blood cells
  - c) neurotransmitters
  - d) electrical spikes
46. What type of scan looks for the presence of oxygen atoms in the brain using a large magnet to track blood flow?
- a) MRI
  - b) PET
  - c) ERP
  - d) fMRI \*
47. Which of the following has the best spatial resolution?
- a) event-related desynchronization (ERD)
  - b) magnetic resonance imaging (MRI) \*
  - c) positron emissions tomography (PET)
  - d) computer-assisted tomography (CAT/CT)
48. What is a serious limitation of neuroimaging methods in general?
- a) They do not provide accurate data.
  - b) They do not tell the researcher what a person is thinking. \*
  - c) They are susceptible to individual differences.
  - d) There are no limitations.
49. The primary disadvantage to studies of neuropsychological processes using brain lesions is that \_\_\_\_\_.
- a) special populations of individuals with brain damage do not exist
  - b) aging does not affect changes in memory, so lesions would not help in studies of change over time
  - c) there are not enough trained surgeons to create adequate lesions
  - d) often trauma to the brain is not clean, and lesions affect multiple brain components \*
50. Which of the following methods allows one to study how damage to different brain areas affects memory processing? (It should also be a method less influenced by idiosyncratic deviations.)
- a) case studies
  - b) single-cell recordings
  - c) connectionist modeling
  - d) developmental studies \*

51. Which of the following is a special population that can be looked at to assess the effects of brain damage on memory?
- a) surgery patients
  - b) gunshot wounded individuals
  - c) Korsakoff patients \*
  - d) organ transplant recipients
52. The most important point of the success of the HERA model is that \_\_\_\_\_.
- a) the brain is used in memory processing
  - b) cognitive psychology is better than behaviorism
  - c) the episodic-semantic distinction is psychologically/neurologically meaningful \*
  - d) the absence of direct exposure to stimuli can result in strong memory traces
53. According to the HERA model, semantic memory retrieval involves \_\_\_\_\_.
- a) the frontal lobes acting in unison
  - b) the left frontal lobe \*
  - c) the right frontal lobe
  - d) either the left or right front lobe, depending on the memory's age

### **Short Answers**

1. Long-term potentiation involves what processes?
2. What are the primary structural components of a neuron, and what function do they serve?
3. What are some of the subcortical structures that are important to memory?
4. How are the different cortical lobes involved in memory processing?
5. What are some neuroimaging techniques that can tell a researcher about the structure of a person's brain?
6. What neuroimaging techniques involve the electrical component of neural transmission?
7. Which neuroimaging techniques track cerebral blood flow to measure mental processing?
8. What is the basic idea behind the HERA model?