BIO 370: Brain and Behavior

Midterm Quiz

April 22, 2002
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Figure 1

1. Choose the brain region in Figure 1 most likely to be affected in Alzheimer’s Disease.

A. Region “A”
B. Region “B”
C. Region “C”
D. Region “D”
E. Region “E”
2. Which commonly used imaging modality would be most useful to identify pathology in region E of figure 1?
   A. CT scan
   B. MRI scan
   C. X-ray
   D. PET scan
   E. Region E cannot be visualized using any imaging modality

3. Which region of figure 1 is most likely to contain the characteristic lesions of multiple sclerosis?
   A. Region A
   B. Region B
   C. Region C
   D. Region D
   E. Region E

4. A 67-year old patient with tremor at rest and a short, shuffling gait is most likely to have atrophy in which region of figure 1?
   A. Region A
   B. Region B
   C. Region C
   D. Region D
   E. Region E

5. The main outflow pathway of Region D in figure 1 is the:
   A. Fornix
   B. Mammillothalamic tract
   C. Corpus callosum
   D. Arcuate fasciculus
   E. Cingulum bundle

6. True or false, Region D is more likely to exhibit damage after prolonged alcohol use than after a severe hypoxic event.
   A. True
   B. False
7. Name the imaging modality shown in figure 2:

A. CT scan  
B. T-1 weighted MRI  
C. T-2 weighted MRI  
D. PET scan  
E. None of the above

8. Which materials appear bright using the imaging modality of the type shown in figure 2?

A. Bone, old blood, air, water, white matter  
B. Bone, old blood, contrast, metal, calcium  
C. Bone, acute blood, contrast, metal, calcium  
D. Bone, air, and any foreign body  
E. None of the above are correct

9. The bright areas in the ventricles shown in figure 2 most likely represent:

A. Bone  
B. Acute blood  
C. Old blood  
D. Air  
E. Cerebrospinal fluid
10. Based on the appearance of this image, the patient shown in figure 2 has likely been staying in which position?

A. Standing up  
B. Lying on his back  
C. Lying on his stomach  
D. Hanging upside down from his feet  
E. huh? (note, do NOT choose answer 'E')

11. The tract connecting the anterior cingulate gyrus with the hippocampus is the:

A. fornix  
B. mammillothalamic tract  
C. thalamocortical projections  
D. stria terminalis  
E. cingulum bundle

12. An individual who is incapable of recognizing fear in other individuals may have suffered damaged to which brain region?

A. amygdala 
B. hippocampus 
C. cingulate gyrus 
D. mammillary bodies 
E. striatum

13. Damage to the structure described in the previous question can also lead to which of the following disorders?

A. Wernicke-Korsakoff syndrome  
B. Kluver-Bucy syndrome  
C. Panic disorder  
D. Parkinson's disease  
E. Toxoplasmosis

14. Choose the correct pathway for a typical fronto-subcortical circuit:

A. Frontal cortex → thalamus → striatum → amygdala → frontal cortex  
B. Frontal cortex → striatum → Globus pall. → Thalamus → frontal cortex  
C. Frontal cortex → striatum → cingulate gyrus → frontal cortex  
D. Hippocampus → mammillary bodies → thalamus → hippocampus  
E. None of the above are correct
15. Dementia of the frontal lobe is commonly characterized by all of the following EXCEPT:

- A. Anterior atrophy
- B. Deficits in executive functions
- C. Deficits in inhibitory functions
- D. Early episodic memory deficits
- E. Early changes in personality

16. Patients with lesions localized to the dorsolateral circuit are most likely to present with:

- A. Episodic memory deficits
- B. Depression
- C. Disinhibition and confabulation
- D. Obsessions and compulsions
- E. Perseveration and difficulty integrating sensory information

17. A man with a history of alcohol abuse and malnutrition is noted for his inappropriate behavior. Which of the following characteristics would you NOT likely see in this individual?

- A. Intrusions
- B. Confabulation
- C. Disinhibition
- D. Intact anterograde memory
- E. Evidence of thiamine deficiency

18. Common side effects of many psychotropic drugs include dry mouth, constipation, and blurred vision. These effects are mediated by blocking the effects of which neurotransmitter?

- A. Acetylcholine
- B. Dopamine
- C. GABA
- D. Norepinephrine
- E. Serotonin
19. Acetylcholinesterase inhibitors have been found to be most useful in the treatment of which disorder?

A. Alzheimer’s disease  
B. Parkinson’s disease  
C. Schizophrenia  
D. Seizures  
E. Sexual dysfunction  

20. All the following neurotransmitters are metabolized by MAO EXCEPT:

A. Acetylcholine  
B. Catecholamines  
C. Dopamine  
D. Norepinephrine  
E. Serotonin  

21. Which of the following is true about GABA?

A. It is the major excitatory neurotransmitter in the spinal cord  
B. Its actions are mediated via G-protein coupled receptors  
C. It is synthesized from glycine  
D. It mediates the opening of chloride channels  
E. Its main cell bodies are localized mainly in the brainstem  

22. Which of these structures demonstrate increased perfusion in patients with OCD?

A. orbital frontal cortex  
B. anterior cingulate gyrus  
C. caudate nucleus  
D. A & B  
E. A, B, and C  

23. An example of an obsession is:

A. Excessive hand-washing  
B. Ritualized showering  
C. Recurring thoughts of hurting oneself or others  
D. Repeated checking to see if the oven is on  
E. Repeated rescheduling of lecture time (1:15PM?, 1:30? 1:22? 1:20!!!!)
24. Which of the following is NOT TRUE regarding OCD:

A. There is a familial tendency towards OCD.
B. The most useful class of drugs for OCD are the tricyclic antidepressants.
C. OCD is associated with increased perfusion of the orbitofrontal cortex.
D. OCD usually presents in males in their teens/twenties.
E. People with OCD realize that their actions are “senseless.”

25. If you are able to recall a fact for this quiz because you remember reading it last night, you are using your:

A. working memory (aka short-term memory)
B. episodic memory
C. procedural memory

26. The part of the brain most used for encoding the memory described above is:

A. cerebral cortex
B. caudate nucleus
C. hippocampus
D. thalamus
E. globus pallidus

27. In temporally-graded retrograde amnesia, it is more difficult to retrieve older memories than more recent ones.

A. True
B. False

28. A 68 year old male patient comes to your office presenting with evidence of severe anterograde amnesia. Additionally, your exam and interview reveal that his ability to name objects is impaired, but he has no difficulty in performing every day tasks such as bathing, tying shoes, etc. The likely diagnosis is:

A. Medial temporal lobe damage due to stroke
B. Frontal lobe amnesia
C. Alzheimer’s disease
D. Huntington’s disease
E. None of the above
29. What drug is known to increase levels of prolactin by inhibiting dopamine in the hypothalamic-pituitary axis?
   A. Atropine
   B. Benzodiazapine
   C. Clonidine
   D. Clozapine
   E. Haloperidol

30. Ingestion of L-tryptophan increases levels of which substance in the brain?
   A. Acetylcholine
   B. Dopamine
   C. GABA
   D. Glutamine
   E. Serotonin
Questions 31-33: A 57 year old man presents with abrupt onset of left-sided hemiparesis and left-sided visual complaints. Figure 3 shows two neuroimaging scans. The scan on the left was taken within hours of symptom onset, while the scan on the right is from three days later.

31. The best description of the defect seen in figure 3 is:
   A. Diffuse cerebral atrophy
   B. Epidural hematoma
   C. Large region of hypodensity in right hemisphere
   D. Large region of hyperdensity in right hemisphere
   E. Large region of hyperdensity in left hemisphere

32. The most likely diagnosis for this patient is:
   A. Acute infarct- anterior cerebral artery territory
   B. Acute infarct- middle cerebral artery territory
   C. Acute infarct- posterior cerebral artery territory
   D. Old infarct- likely acquired years ago
   E. Blunt trauma to head

33. Disadvantages of the imaging modality shown in figure 3 include:
   A. Poor gray-white differentiation
   B. Patients with implanted metal are ineligible for this type of imaging
   C. Poor visualization of the posterior fossa
   D. A and B only
   E. A and C only