

**NEURO UNIT 2**  
**EXPLAINED ANSWERS TO PRACTICE QUESTIONS**

**TABLE OF CONTENTS**

Plasticity.....2  
Thalamus.....2  
Cerebral Cortex.....6  
Higher Cortical Function.....9

## Plasticity

1. Which of the following statements is **FALSE**?

A. TRUE

B. TRUE

**C. FALSE** the critical period of visual development involves the first six years of life, although the first two or three years are most critical.

D. TRUE

E. TRUE

2. Which of the following statements is **FALSE**?

**A. FALSE** during the critical period, the visual system is very vulnerable to the effects of abnormal sensory input

B. TRUE

C. TRUE

D. TRUE

E. TRUE

3. Which of the following statements is **FALSE**?

A. TRUE

B. TRUE

**C. FALSE**

D. TRUE

E. TRUE

## Thalamus

1. The diencephalon is divided into symmetrical halves by the:

A. FALSE the fourth ventricle is in the brain stem

B. FALSE the hypothalamic sulcus divides the thalamus from the underlying hypothalamus

C. FALSE will you ever forget the dube?

**D. TRUE**

E. FALSE

2. The lateral surface of the diencephalon is bounded by the:

A. FALSE the third ventricle is a medial border of the thalamus

B. FALSE

**C. TRUE** this is a very important spatial relationship.

D. FALSE this fiber bundle is inside the thalamus and separates it into medial and lateral nuclear masses

E. FALSE foramen of Lushkae (there are two of them) are laterally placed openings connecting the fourth ventricle with the subarachnoid space. They are very close to CN IX and usually have some choroids plexus floating in them.

3. Which of the following statements is **FALSE** concerning thalamic syndrome:
- A. TRUE
  - B. TRUE
  - C. TRUE
  - D. FALSE** the thresholds for somatic sensory stimuli are usually *lowered* on the *opposite* side of the body as the lesion.
  - E. TRUE this is important!
4. The largest nucleus within the intralaminar group is:
- A. TRUE**
  - B. FALSE pulvilar=lateral nuclear group
  - C. FALSE lateral dorsal=lateral nuclear group
  - D. FALSE mediodorsal=medial nucleargroup
  - E. FALSE ventral nuclear group
5. The mediodorsal (dorsomedial) nucleus projects to the \_\_\_\_ lobe.
- A. TRUE**
  - B. FALSE
  - C. FALSE
  - D. FALSE
  - E. FALSE who wrote this?
6. Which of the following nuclei is (are) recognized in the ventral nuclear group of the thalamus?
- A. TRUE divided into VPM and VPL
  - B. TRUE cerebellar and basal ganglia inputs
  - C. TRUE cerebellar and basal ganglia inputs
  - D. TRUE retinal input, six layers (each monocular)
  - E. TRUE**
7. Which of the following nuclei relay(s) somatosensory information?
- A. TRUE** ML, ALS (Remember from the first unit, VPL for the body and VPM for the head?)
  - B. FALSE auditory via brachium of IC
  - C. FALSE limbic system
  - D. FALSE LGB=retinal
  - E. FALSE VA=cerebellar and basal ganglia motor-related informationB
8. Which of the following thalamic nuclei is (are) thought to have a predominantly motor function?
- A. FALSE somatosensory; ML and ALS
  - B. FALSE ALS
  - C. TRUE** basal ganglia and cerebellum
  - D. FALSE many diffuse
  - E. FALSE many diffuse

9. The lateral nuclear group of the thalamus includes the:
- A. **TRUE** along with lateral dorsal and lateral posterior nuclei
  - B. FALSE centromedian=intralaminar
  - C. FALSE anterior =anterior nuclear group
  - D. FALSE mediodorsal=medial nuclear group
  - E. FALSE ventral lateral=ventral nuclear group
10. Which of the following nuclei of the thalamus are sensory relay nuclei?
- A. TRUE TTT, STT
  - B. TRUE auditory
  - C. TRUE retinal
  - D. TRUE ML, ALS
  - E. **TRUE** see A, B, C, and D
11. Which of the following nuclei receive nociceptive (painful) anterolateral input?
- A. TRUE this is not a highly publicized projection like that the ALS and TTT to VPL and VPM, but there are collaterals of these pathways that reach MD
  - B. TRUE this is another poorly publicized projection of the ALS and TTT
  - C. TRUE highly publicized!!!!
  - D. FALSE pulvinar receives input from many diverse areas way beyond clinical importance
  - E. **TRUE** see A, B, and C
12. Which of the following statements is true regarding the shaded structure?
- Shaded structure=pulvinar.**
- A. TRUE wide areas of association (not primary anything!) cortex
  - B. TRUE not associated with any primary sensory or motor pathways
  - C. FALSE LGB, PT, and suprachiasmatic (see Hypothalamus) receive input from the optic nerve
  - D. FALSE
  - E. **TRUE** see A and B
13. Which of the following statements is true regarding the shaded structure?
- The shaded area is the pineal.**
- A. TRUE
  - B. TRUE can see on MRIs and hopefully is on the midline
  - C. TRUE pretty picky! Classic NB!
  - D. TRUE bilateral pressure on SCs= Parinaud =paralysis of upward gaze
  - E. **TRUE** see A, B, C, and D
14. Which of the following statements is true regarding the shaded structure?
- The shaded structure is the very popular LGB!**
- A. FALSE too far caudal to have an effect. Circuitry is intact
  - B. **TRUE** cells in each layer are monocular; structure as a whole=binocular
  - C. FALSE they project to area 17 via the retrolenticular limb of the internal capsule
  - D. FALSE bitemporal hemianopsia is due to a lesion at the optic chiasm which injures crossing fibers from nasal retinas
  - E. FALSE receives input from temporal retina of *ipsilateral* eye

15. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the less popular MGB!**

- A. TRUE CN VIII • cochlear nuclei • IC • MGB
- B. TRUE
- C. FALSE primary auditory cortex=41, 42 of Brodmann
- D. TRUE this is the primary auditory cortex; part of the superior temporal gyrus
- E. **TRUE** see A, B, and D

16. Which of the following statements is true regarding the shaded structure? **The shaded structure is the VPM.**

- A. TRUE taste
- B. TRUE pain and temp. and 2 pt etc
- C. TRUE a.k.a. postcentral gyrus
- D. TRUE important point. Has to get there somehow so jumps right into this two way bundle
- E. **TRUE** love those E's!

17. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the VPL**

- A. TRUE cells of origin in contra. dorsal horn
- B. TRUE cells of origin in contra. nucleus gracilis and nucleus cuneatus
- C. TRUE
- D. TRUE
- E **TRUE**

18. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the VPL (again!)**

- A. FALSE STT=VPM
- B. FALSE TTT=VPM
- C. TRUE
- D. TRUE
- E. **TRUE** see C and D

19. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the VPM.**

- A. FALSE ALS=VPL
- B. FALSE ML=VPL
- C. TRUE
- D. TRUE
- E. **TRUE** see C and D

20. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the VA/VL (not really full blown!)**

- A. TRUE from dentate and interpositus
- B. TRUE from the internal segment via ansa lenticularis and lenticular fasciculus
- C. TRUE not well emphasized! This is not the DA part of the substantia nigra (pars compacta)
- D. TRUE
- E. **TRUE** see A, B, C, and D

21. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the anterior nucleus of the thalamus.**

- A. TRUE MTT runs between mamm. bodies and ant. nuc.
- B. TRUE
- C. TRUE remember, the MTT is a bi-directional/two way street
- D. FALSE
- E. **TRUE** see A, B, and C

22. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the mediodorsal nucleus.**

- A. TRUE
- B. TRUE but not directly from the olfactory nerve
- C. TRUE from ALS and TTT
- D. TRUE frontal lobes=emotion. "Hurts but doesn't bother me."
- E. **TRUE**

23. Which of the following statements is true regarding the shaded structure?

**The shaded structure is the centromedian nucleus.**

- A. TRUE not very well publicized!
- B. TRUE not very well publicized!
- C. TRUE not very well publicized!
- D. TRUE wow!
- E. **TRUE** not again!

## Cerebral Cortex

1. The main afferent projection to the primary somatic sensory cortex is from:

- A. **TRUE** VP consists of VPL and VPM
- B. FALSE projects to prefrontal cortex
- C. FALSE projects to motor cortex and striatum
- D. FALSE projects to parietal, temporal, and occipital association cortex
- E. FALSE projects to cingulate gyrus/cortex

2. The visual cortex is supplied primarily by which artery?

- A. **TRUE** (classic National Boards question)
- B. FALSE supplies lenticular nucleus, striatum, and dorsal part of posterior limb of the internal capsule
- C. FALSE supplies medial wall of hemisphere; leg region of motor and somatosensory cortex
- D. FALSE supplies ventral part of posterior limb internal capsule and lenticular nucleus
- E. FALSE branch of posterior cerebral and supplies the thalamus (thalamic syndrome)

3. The part of motor cortex that controls muscles of the foot is primarily supplied by which artery?

- A. **TRUE** classic NB
- B. FALSE supplies lateral hemisphere
- C. FALSE supplies visual cortex, hippocampus, and branches supply thalamus
- D. FALSE supplies ventral part of posterior limb internal capsule and lenticular nucleus
- E. FALSE Unless your foot's in your mouth the dorsalis pedis is nowhere near your thalamus

4. Which of the following statements concerning the internal capsule is incorrect?
- A. **FALSE** they run in the posterior limb of int. capsule; corticopontine, thalamocortical and corticothalamic run in the anterior limb; blood supply of the ant. limb=medial striates
  - B. TRUE classic NB
  - C. TRUE anterior choroidal=ventral part post. Limb; middle cerebral/lateral striate=dorsal part
  - D. TRUE
  - E. TRUE
5. Which area(s) is/are found in the frontal lobe?
- A. TRUE in front (rostral) of central sulcus, and therefore in the frontal lobe
  - B. FALSE lies in occipital lobe
  - C. TRUE lies on inferior frontal gyrus
  - D. FALSE lies caudal to central sulcus in parietal lobe
  - E. **TRUE** see A and C
6. Which area(s) of Brodmann is/are not sensory cortex?
- A. TRUE 17 is visual cortex
  - B. TRUE 3 is part of somatosensory cortex
  - C. TRUE 42 is part of primary auditory cortex (along with 41)
  - D. **FALSE** 44 is part of Broca's (along with 45)—an association cortex
  - E. TRUE 2 is part of somatosensory cortex
7. Which of the following Brodmann's areas is incorrectly paired with its function or lobe?
- A. TRUE 6 lies rostral to central sulcus; is premotor cortex (SMA and PM1)
  - B. TRUE 17 is in the occipital lobe and deals with vision
  - C. TRUE lesion of 22 leads to fluent aphasia; blood supply=middle cerebral
  - D. TRUE 41 and 42=primary auditory cortex=transverse temporal gyri of Heschl=superior temporal gyrus; blood supply=middle cerebral artery
  - E. **FALSE** caudal to central sulcus=part of somatosensory cortex on postcentral gyrus
8. The cerebral cortex projects directly to:
- A. TRUE corticothalamic; travel in anterior and posterior limbs of internal capsule
  - B. TRUE corticospinals travel in the posterior limb of internal capsule
  - C. TRUE corticocortical via corpus callosum
  - D. TRUE corticobulbars
  - E. **TRUE**
9. Blockage of cerebral veins is just as likely to result in deficits as blockage of cerebral arteries.  
**FALSE** Anastomoses between veins is so extensive that blocking does not lead to infarction.
10. The entire medial part of the temporal lobe is supplied by the anterior cerebral artery.  
**FALSE** The medial part of the temporal lobe is supplied by the posterior cerebral and middle cerebral arteries.

11. Much of the visual cortex is supplied by the posterior cerebral artery.

**TRUE** “Much” is in the eye of the beholder, but the posterior cerebral supplies a lot of the visual cortex.

12. Blockage of the middle cerebral artery produces little cortical damage because of the presence of the Circle of Willis.

**FALSE** Such a blockage is devastating because it is distal to the Circle of Willis—remember the vertebral and internal carotid arteries that contribute to the famous anastomosis?

13. Broca’s speech area is supplied by the middle cerebral artery.

**TRUE** Areas 44 and 45 on the inferior frontal gyrus are supplied by the middle cerebral artery.

14. Deficits from damage to the internal capsule are typically minor because it is so small.

**FALSE** Deficits are huge because lots of important fibers are traveling in a small, compact area.

15. Complete section of the corpus callosum leads to severe bilateral sensory and motor deficits.

**FALSE** The sensory information still reaches each side of cortex and the motor cortical areas still are intact.

16. Striate and lenticulostriate are alternate names for the same arteries.

**TRUE**

17. The superior longitudinal fasciculus, inferior longitudinal fasciculus, uncinate fasciculus, and cingulum are all association fiber bundles within the cerebral hemispheres.

**TRUE** association bundles connect cortical areas on the same side.

18. Broca’s speech area corresponds to Brodmann’s areas 44 and 45.

**TRUE** Areas 44 and 45 on the inferior frontal gyrus are supplied by the middle cerebral artery. A lesion here leads to non-fluent aphasia.

19. Primary auditory cortex corresponds to Brodmann’s areas 41 and 42.

**TRUE** Areas 41 and 42/primary auditory cortex/transverse temporal gyri of Heschl/superior temporal gyrus (all synonyms) are supplied by the middle cerebral artery.

20. A lesion of the left posterior limb of the internal capsule would result in a left hemiplegia.

**FALSE** A lesion of the left posterior limb of the internal capsule leads to *right* hemiplegia.

21. Brodmann’s numbers are based on the effects of lesions to the cerebral cortex.

**FALSE** They are based on organization of cells/layers of cortex or “cytoarchitecture.”

22. The patient’s communication problem is called:

A. **FALSE** she could understand questions

**B. TRUE** She was unable to speak=Broca’s aphasia=motor aphasia=non-fluent aphasia

C. **FALSE** Wernicke’s =fluent aphasia=receptive aphasia

D. **FALSE** dysarthria is poor articulation. She could not speak!

E. **FALSE** fluent aphasia=talk like crazy but does not make sense



23. This type of deficit is most often associated with a lesion of the:

A. FALSE this would be where part of Wernicke's area is. The lesion involves Broca's area and the adjacent motor cortex

**B. TRUE** Broca's is on the inferior frontal gyrus of the left frontal lobe

C. FALSE are you thinking Wernicke's again?

D. FALSE such a lesion could give some dysarthria/poor articulation

E. FALSE aphasias *DO NOT* result from capsule lesions. For aphasias to occur the lesion has to be in either Broca's or Wernicke's. You *can* get the hemiplegia and dysarthria from capsule lesion but, not aphasias.

## Higher Cortical Function

1. A patient with very halting speech but preserved comprehension likely has what problem?

A. FALSE agnosia=is a general term for a loss of ability to *recognize* objects, people, sounds, shapes, or smells; that is, the inability to attach appropriate meaning to objective sense-data. It usually is used when the primary sense organ or associated pathways are not impaired

B. FALSE dyslexia is a brain-based type of learning disability that specifically impairs a person's ability to read

**C. TRUE** halting speech=non-fluent aphasia/Broca's aphasia

D. FALSE prosopagnosia (also known as facial agnosia or face blindness) is difficulty or inability to recognize faces

E. FALSE paraphasias are included under Wernicke's, where comprehension is fine

2. A patient is brought to you who is having difficulty performing activities of daily living, such as grooming, dressing and eating. The patient does not have serious motor dysfunction, but does have some difficulties with verbal expression and comprehension. Which of the following is the most likely lesion site?

A. FALSE the thing that should come to mind is the tape of the patient using his toothbrush to eat his mashed potatoes. He is having difficulty performing activities of daily living, such as grooming, dressing and eating! The man in the tape has an ideational apraxia (wrong tool!) and such apraxias result from lesions of the left temporal parietal junction. You also know that Wernicke's lies in the same general region in the left hemisphere and this would account for some difficulties with verbal expression and comprehension.

B. FALSE see A

C. FALSE see A

**D. TRUE** see A

E. FALSE a lesion of GP would not result in cortical/cognitive deficits like this.

3. A patient who misuses a coin for a key when opening a door may have what condition?

A. FALSE visual form agnosia is the inability to visually recognize objects. However, the patient can use stereognosia to tell if the key is a key or a coin

**B. TRUE** ideational apraxia=wrong tool!

C. FALSE

D. FALSE duh!

E. FALSE

4. Which type of aphasia has minimal impairment of speech but significant impairment of writing?
- A. FALSE the key here is “minimal impairment of speech,” which would not be true for Broca’s. There are problems in writing following lesions of Broca’s area.
  - B. FALSE ideomotor apraxia does not result in speech disturbances.
  - C. TRUE** the key here is that in such a case speech is easily articulated/fluent and thus “minimal impairment of speech” is true.
  - D. FALSE ideomotor apraxia does not result in speech disturbances
  - E. FALSE see C
5. You are interviewing a patient, who had a stroke several years ago, and her husband. The husband reports that recently at a family party his wife denied he was present even though he was standing nearby. She has no visual deficits and fairly well preserved intelligence. What condition may she have?
- A. FALSE does not include deficit=“wife denied he was present even though he was standing nearby.”
  - B. FALSE does not include deficit=“wife denied he was present even though he was standing nearby.”
  - C. FALSE does not include deficit=“wife denied he was present even though he was standing nearby.”
  - D. FALSE does not include deficit=“wife denied he was present even though he was standing nearby.”
  - E. TRUE** prosopagnosia (also known as facial agnosia or face blindness) is difficulty or inability to recognize faces—even his wife’s!!!!
6. Which of the following statements is **TRUE** regarding conduction aphasia? You can answer this only after reading the cases that follow (Case Histories XII-XVII)
- A. FALSE the speech is fluent in a conduction aphasia
  - B. FALSE lesion is in the arcuate fasciculus—connects Wernicke’s and Broca’s
  - C. TRUE** Wernicke’s is alive and kicking!
  - D. FALSE Classic NB THEY CAN’T REPEAT
  - E. FALSE see C