

# Biology 358 — Neuroanatomy

## First Exam

---

Please **print your name clearly** on the back of the last page of this exam. Please read the instructions preceding each section carefully.

---

**Section 1: Diagram labeling.** The following pages are unlabeled diagrams of either spinal cord or some portion of the brain. Utilizing the blue marker supplied to you, label the following structures on the diagram. **Outline the area in the diagram where the structure would be found, and then extend a line from the diagram out to the white margin. (You need to do this on one side only).** In the white margin label the outlined segment with the number found to the left of the structures listed below. **However, if the structure is not found on the segment** put the number in the margin of the segment and mark the structure **NFOS** (not found on segment). *If you take the exam apart you must put the pictures back in the order in which you found them, as it makes grading much, much easier and faster.* (2 points each)

### HBS-1

1. The neurons of these tracts are more independent of the cerebral cortex than the neurons of other tracts. Functionally they are related to the position and movements of the head and indirectly provide position information about the body.
2. This tract is not somatotopically arranged, remains almost entirely ipsilaterally, and arises from the nuclei reticularis pontis caudalis.
3. This tract arises from the nucleus reticularis gigantocellularis.
4. Fibers of this tract arise in the superior colliculus, are mostly contralateral, and terminate primarily in the cervical cord.
5. This tract influences motor movements primarily through the interplay with the cerebellum and motor cortex and not through the fibers within the spinal cord.

### HBS-4

6. Tract that carries information about pain, temperature and crude touch from the left side of the body.
7. Tract that carries unconscious proprioception from both sides of the body.
8. Fibers of motor tract that arises from primary motor cortex, premotor cortex and somesthetic cortex and extends only to the upper thoracic levels
9. Somas of SON of the tract that that provides conscious proprioception from anatomical structures superior to T6

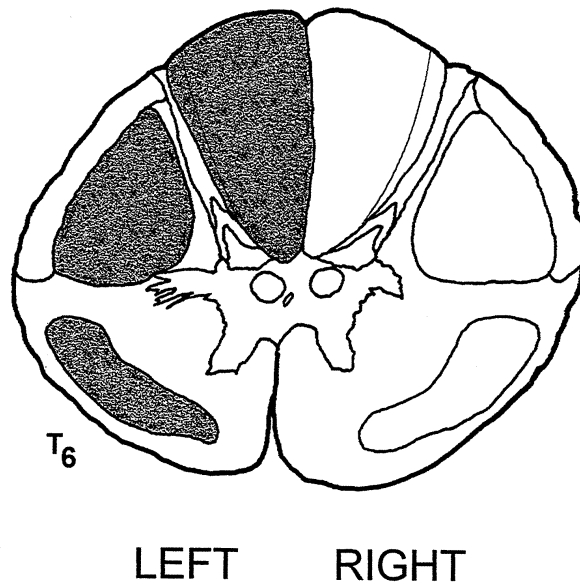
### **HBS-7**

10. Giant Cell Reticular Nucleus (also termed gigantocellular reticular nucleus)
11. Neurons of SON carrying conscious proprioception only from anatomical structures superior to T6.
12. Rubrospinal tract
13. Small Cell Reticular Nucleus (also termed parvicellular reticular nucleus)

## Section 2: Multiple-Choice Think Questions

The questions below are based on the cross sections embedded within the question. Choose the most appropriate letter and place it in the space provided below. Then, in the space indicated, give a short answer giving the proper sound anatomical logic for the correct answer.

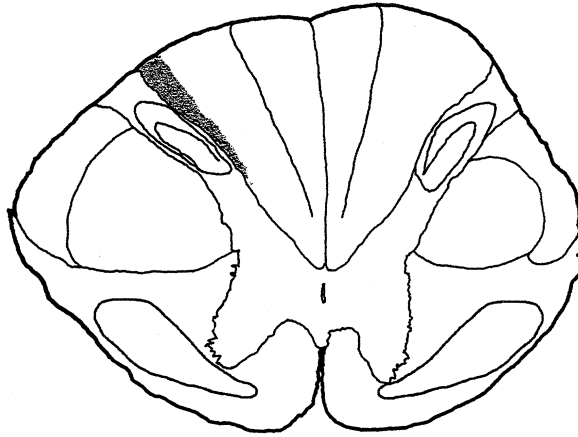
- \_\_\_\_\_ 14. Which statement is true regarding the neurological deficit(s) that would be present following a lesion in the shaded areas below. Note: There might be deficits that are not included in the responses. There is only one correct answer.



- a. Paralysis on the right side of the body
- b. Positive Babinski sign
- c. Deficit in pain from the ipsilateral big toe
- d. Flaccid paralysis of the left arm and leg
- e. Flaccid paralysis of the ipsilateral foot

14b. Anatomical rationale? (2 points)

- \_\_\_\_\_ 15. Which statement is true regarding the neurological deficit(s) that would be present following a lesion in the shaded area below? There might be deficits that are not included in the choices below. There is only one correct answer

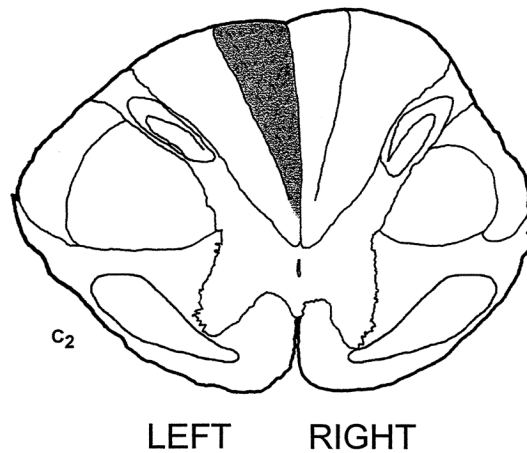


LEFT      RIGHT

- a. Deficit in two-point discrimination from the contralateral index finger
- b. Deficit in two-point discrimination from the ipsilateral index finger
- c. Deficit in vibration sense from the contralateral big toe
- d. Deficit in conscious proprioception from the contralateral index finger
- e. Deficit in two-point discrimination from the ipsilateral big toe

15b. Anatomical rationale? (2 points)

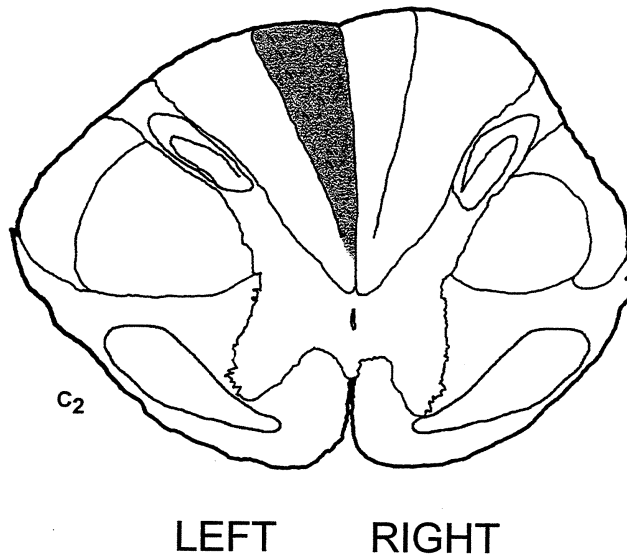
- \_\_\_\_\_ 16. Which statement is true regarding the neurological deficit(s) that would be present following a lesion in the shaded area below? There might be deficits that are not included in the choices below. There is only one correct answer



- Deficit in two-point discrimination from the contralateral index finger
- Deficit in two-point discrimination from the ipsilateral index finger
- Deficit in vibration sense from the contralateral big toe
- Deficit in conscious proprioception from the contralateral index finger
- Deficit in two-point discrimination from the ipsilateral big toe

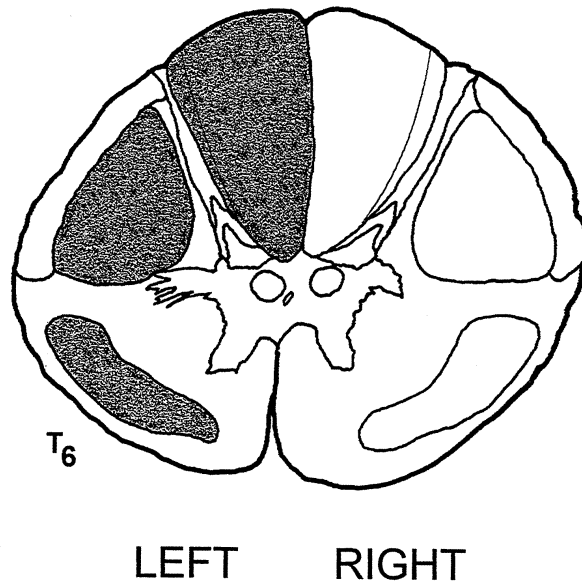
16b. Anatomical rationale? (2 points)

- \_\_\_\_\_ 17a. Which statement below is true regarding the shaded area in the spinal cord cross section? (Note: there is only one correct answer) (2 points)



- a. The pathway terminates in the ipsilateral nucleus cuneatus
  - b. The pathway arises from cells in the contralateral dorsal horn
  - c. The pathway arises from cells in the ipsilateral dorsal root ganglion T6 and above
  - d. The pathway arises from cells in the ipsilateral dorsal root ganglion T7 and below
- 17b. Anatomical rationale? (2 points)

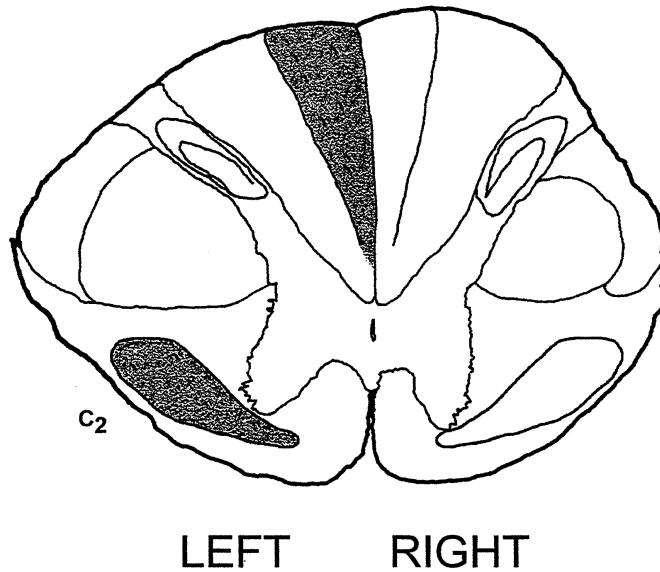
\_\_\_\_\_ 18. Which statement is true regarding the shaded areas below? There is only one correct answer.



- a. The pathway arises from the ipsilateral motor cortex
- b. The pathway terminates on cells in the ipsilateral side of the spinal cord
- c. The pathway terminates in the contralateral VPL
- d. The pathway arises from cells in the ipsilateral dorsal column of Clarke.
- e. Two of the above

18b. Anatomical rationale? (2 points)

- \_\_\_\_\_ 19. A patient is admitted that has deficits in the shaded areas below. Which of the following statements is true? There might be deficits that are not included in the choices below. There is only one correct answer.



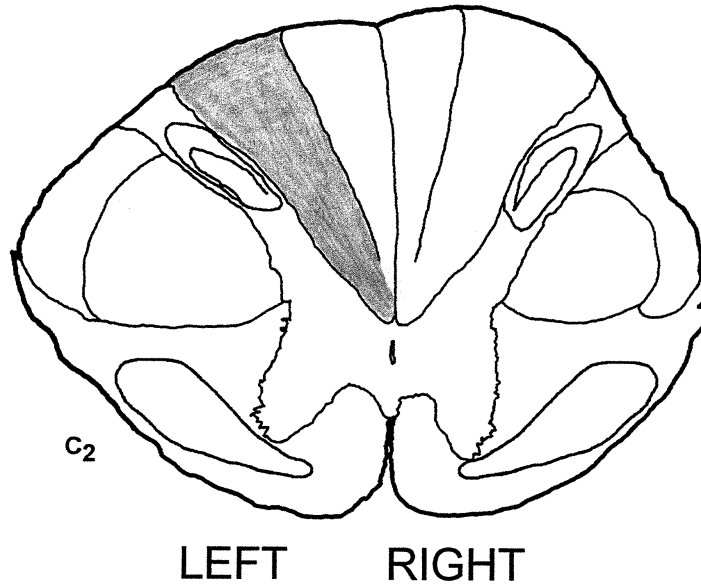
- a. The patient has a deficit in conscious proprioception and pain perception of the ipsilateral big toe.
  - b. The patient has a deficit in conscious proprioception and pain perception in the contralateral big toe.
  - c. The patient has a deficit in conscious proprioception of the ipsilateral big toe and pain perception in the contralateral big toe.
  - d. The patient has a deficit in conscious proprioception of the contralateral big toe and pain perception in the ipsilateral big toe.
  - e. The patient has a deficit in conscious proprioception of the ipsilateral big toe and unconscious proprioception on both sides of the body.
- 19b. Anatomical rationale? (2 points)



### Section 3: Essay questions

Answer the following questions on the following blank pages. **Please answer question #20 on page 10 and question #21 on page 11.**

- 20a. A patient has a lesion in his/her spinal cord as indicated below. Indicate any and all deficits that the patient would have (10 points)
- 20b. Give a detailed anatomical description of the tract(s) involved in the lesion below. (15 points)



- 21a. A patient has lesions as indicated below. Indicate any and all deficits that the patient would have. (10 points)
- 21b. Give a detailed anatomical description of why the patient would have all of the deficits resulting from the lesions indicated below. (20 points)

