

9.01 Midterm Examination

NAME _____

October 27, 2003

- 1) Karl Wernicke, in the 1870s, formulated a model of the brain mechanisms for language processes. What are the two major brain areas involved (name them or give the major function), and how are these two connected? (4 points)

- 2) The molecules kinesin and dynein are involved in what important neuronal activity? (2 points)

- 3) What did Otto Loewi discover? Answer in a very few words. (You don't have to describe the experiments that he literally dreamed up.) (2 points)

- 4) Define "ligand-gated ion channel" and give an example. (4 points)

- 5) What is neurohormone release and where does it occur? (2 points)

- 6) The 'tweenbrain (diencephalon) contains four major subdivisions. Name two of them. (2 points)

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- 12) At the junction of hindbrain and spinal cord, there are two major decussations. Define “decussation” and name or describe **one** of these major decussations. (3 points)
- 13) What neurons are located in the “lateral horn”, and describe the longitudinal level of the CNS where it can be found. (4 points)
- 14) Give one example of a parasympathetic nervous system ganglion. (Name it or describe its location.) What neurotransmitter do these neurons release at their axon terminals? (3 points)
- 15) Think of midbrain neurons that project to the spinal cord. Answer the following question for **one** such neuron: In what structure is it located, and what function is it involved in? (4 points)
- 16) What types of neurons develop in the embryonic basal plate of the neural tube at spinal levels? Name two types. (2 points)

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- 17) Name a major structure that develops from cells of the rhombic lip in the embryonic central nervous system. Where is the rhombic lip found? (3 points)
- 18) Name two types of migration of post-mitotic neurons. (2 points)
- 19) From what embryonic cells do the dorsal root ganglia, sympathetic ganglia, and parasympathetic ganglia arise? (2 points)
- 20) Answer **either A or B**: **A)** The cross section (coronal or frontal section) of the midbrain of the rat (or mouse or hamster) differs greatly from that of the squirrel (or tree shrew). What is the major difference? **B)** What is a major differences between the rat and human brains, other than size/weight? (2 points)
- 21) The _____ forebrain bundle runs through the lateral hypothalamus. It contains axons coming from the _____ system structures of the endbrain. (2 points)
- 22) Netrin-1: What cells secrete this molecule, and what function of netrin-1 has been found? (4 points)
- 23) Why is an innervated muscle fiber needed within the muscle spindle, a sensory organ? (3 points)

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- 24) Describe reciprocal inhibition during a withdrawal reflex. (3 points)
- 25) Describe a spinal module of limb movement control, as discovered by Bizzi and collaborators. (4 points)
- 26) Describe post-tetanic potentiation. (4 points)
- 27) Some monkeys in the experiment by Lawrence and Kuypers had complete section of the pyramidal tract plus lesions of lateral hindbrain pathways. These monkeys showed a paralysis in one test and lack of paralysis of the same parts of the body in another test. Describe these two tests and how the movements differ. (6 points)
- 28) How does multiple sclerosis cause severe impairments of sensory and motor function, and other functions as well? Answer by briefly describing the pathology – what goes wrong? (3 points)

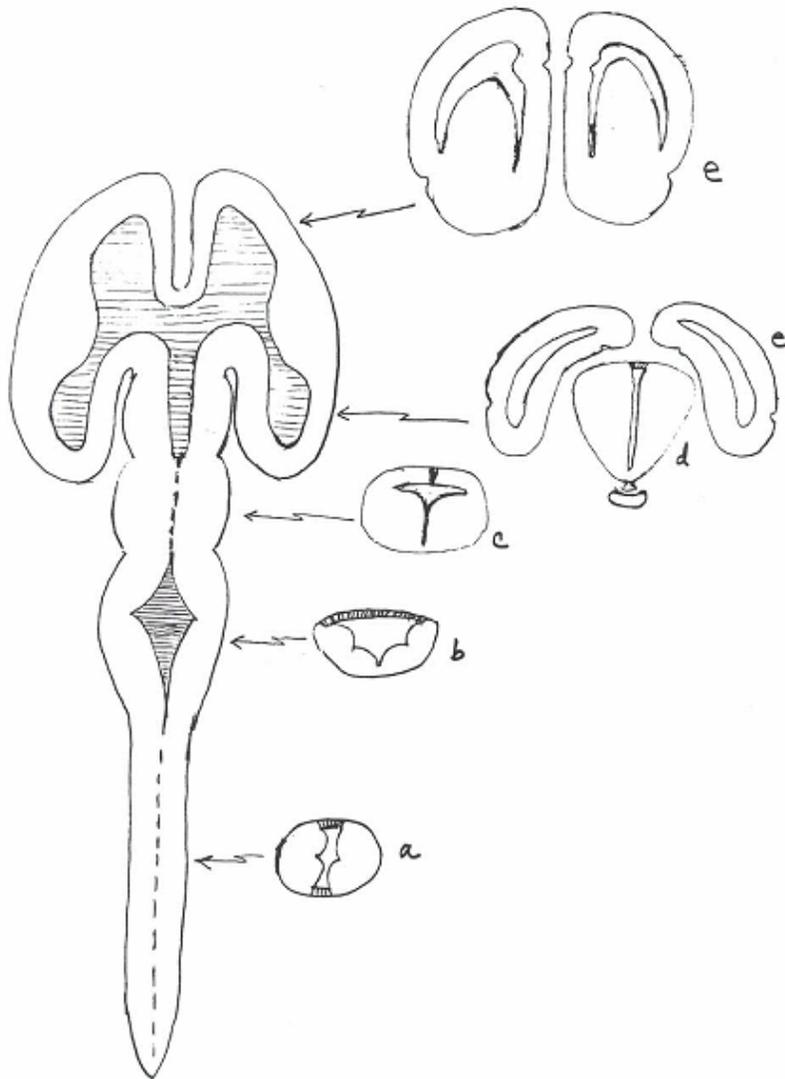
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29) Name or describe one example of anatomical plasticity in the CNS not due to learning. What causes it and what changes? (4 points)

30) In the figure below, identify by name each of the five levels of the embryonic CNS. You may use the English or the Latin or Greek names. Then, identify three parts at level “e” or “d”. Indicate clearly the part you are identifying, and give the name. (8 points)



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DISCARDS:

What is the Bell-Magendie law (the discovery by both Charles Bell and Francoise Magendie in the early part of the 19th century)? Exactly where does it apply? (2 points)

What are two major types of chemical attractants that can act on growing axons? (4 points) X

Where is the pituitary and what is the major difference between its two divisions? (4 points)

The catfish has a 7th cranial nerve with a distribution that differs markedly from that of the 7th cranial nerve in mammals. To what major part of the CNS does this nerve connect? After answering this, answer one of the following two questions: What is the anatomical difference in the nerve's distribution? What is the function that led to the difference? (4 points)

Describe one cell in the neolemniscus: the dorsal column – medial lemniscus pathway. Include the location of the cell body and of its axonal terminations. (3 points)

Describe filopodia (one location, their structural appearance, an action). (5 points)

What is innervated by alpha motor neurons and by gamma motor neurons? (3 points)

Using what you know about visual system plasticity, explain why a patch periodically placed over the healthy eye of a child with one “weak” eye is a good idea. Why should this be done as early as possible? (5 points)

Describe a genetic disorder that impairs the functioning of the nervous system. (4 points)

1st DRAFT 135 points