EXAMINATION FOR THE COURSE:
NEVR3001 – Basic Neuroscience

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Examination date: 12 October 2012
Examination time: 9 am. – 1 pm.
ECTS-credits: 7.5

Supporting materials: Dictionary
Standardized language dictionaries (e.g. Norwegian-English/English-Norwegian) can be used, but NOT specialty dictionaries such as medical dictionaries. The dictionaries will be inspected by the invigilator before the start of the examination.

Language of examination: English
Number of pages: 5 (including front page).

Examination results will be made available on Studentweb within the end of:
2 November 2012.
EXAMINATION NEVR3001 "BASIC NEUROSCIENCE"
October 12th, 2012. 9 am – 1 pm

Permitted abbreviations:

CNS
DNA
RNA
ATP
CSF
SNARE
Vertebral levels
AMPA, NMDA receptors

There are 25 short questions and 6 long questions

You must answer ALL short questions (25% total marks)

You must answer FIVE long questions (75% total marks)
Short questions

1. Which nucleotide bases pair together in RNA?
2. What is the name given to proteins that cut DNA at specific sites?
3. Describe briefly the difference between transcription and translation.
4. What method would you use to extensively amplify a part of a DNA chain?
5. How would you define a peptide mass fingerprint?
6. How are axonal branches termed?
7. What is the name of the structures (not the name of the cells) in the brain that produce cerebrospinal fluid (CSF)?
8. Where in the brain are these CSF-producing structures located?
9. How would you describe a molecular motor?
10. Name two organellar sites where calcium is stored in neurones.
11. Give two typical differences between dendritic and axonal microtubules.
12. Which blood vessels supply most of the blood to the Circle of Willis?
13. Which neurotransmitter has the amino acid tryptophan as its precursor?
14. What is the main function of tau protein?
15. Give two features in which electrical synapses differ from chemical synapses.
17. Give two main functions of glutamine particularly important for the brain.
18. Give the characteristics necessary to induce long term potentiation.
19. During development, the neural tube forms as an invagination of a specialized portion of the ectoderm called the neuroectoderm. Which structure in the developing embryo is essential for the induction and organization of this process?
20. The neural tube differentiates into 4 different sub-regions called plates. Two of them are called the roof plate and the floor plate. What are the names of the other two plates?
21. During development the neuroectoderm gives rise to the neural crest. Name two components of the nervous system that originate from the neural crest.

22. Which cranial nerve carries sensory information from the inner ear to the brain?

23. Inhibitory neurons in the cortex cerebri derive from a specific source in the developing brain. Name or describe this origin.

24. Excitatory neurons in the cortex cerebri derive from a specific source in the developing brain. Name or describe this origin.

25. Where in the cortex of the hemisphere do we find the primary representation of somatosensory information? Describe or make a drawing.
LONG QUESTIONS

1. Explain where a neuropeptide neurotransmitter is synthesized, and how it is transported for release at presynaptic membranes (you do not need to explain the release processes).

2. Describe briefly some of the metabolism and functions of acetylcholine in the nervous system.

3. Describe the formation and propagation of an action potential in a myelinated nerve fiber. Why is this more efficient/faster than conduction through unmyelinated nerves? Illustrate your answer with one or more drawings.

4. Describe some of the changes at glutamatergic synapses during ischemia.

5. The parasympathetic and sympathetic nervous system are considered to be coupled in an agonistic/antagonistic manner. A good example to illustrate this is the control of bladder function. Describe the sympathetic and parasympathetic efferent and afferent pathways involved in this control, including the pathways controlling the balance between the two systems.

6. The autonomic nervous system was originally described within the context of the motor (efferent) component of the nervous system. More recently sensory components have been described as well. Describe the major afferent routes and relevant brain stem and forebrain structures that are considered to be essential components of the sensory autonomic system, and the relay to the motor component.