



Master's program

Entrance examination topics

Biology

1. Origin of life on Earth. Organization of cells. Chemo- and photosynthesis, respiration.
2. DNA, gene, chromosomes, genome. Replication and cell division.
3. Genetics of prokaryotes. Mendel's laws, gene linkage, genetic maps. Transcription in pro- and eukaryotes.
4. Translation and the genetic code. The ribosome. Mutation and repair. Mutagens and carcinogens.
5. Regulation of gene expression in pro- and eukaryotes. Genetic engineering.
6. Cytoskeleton and cellular movements, intracellular transport. Structure and function of biological membranes.
7. Outline of the nervous system and its function in living organisms.
8. Cellular information uptake, processing, storing and response.
9. Characterization of the cell types found in nervous tissue, common and distinctive traits compared to the structure and function of other somatic cells.
10. The electrical activity of neurons, action potential, EPSP and IPSP.
11. Types of nerve fibers, conduction of nerve impulses in the central and peripheral nervous system.
12. Types and functions of glial cells.
13. Morphological and functional description of neuron-neuron interactions. Comparison of chemical and electric synapses.
14. Morphological and functional description of neuron-glia interactions. Role of glial cells in synaptic transmission.
15. Types of neurotransmitters, their synthesis, use and degradation, amines and peptide type neurotransmitters.
16. Non-synaptic interneuronal contacts and retrograde signal transmission.
17. Types and function of receptors. The structure and role of the muscle spindle.
18. Types and mechanisms of effectors, structure and role of the motor endplate.

Recommended literature:

Jocelyn E. Krebs, Elliott S. Goldstein, Stephen T. Kilpatrick: *Lewin's genes X*. Jones & Bartlett Learning, 2011.

Eric R. Kandel et al. (eds): *Principles of Neural Science*. Fifth edition, McGraw-Hill, 2013.