

Kazan (Volga region) Federal University, Kazan, Russia
Institute of Fundamental Medicine and Biology

Master's program
NEUROBIOLOGY

Neuroscience is one of the most exciting and fastest growing research fields. Examining the development and function of nervous systems does not only hold the key to better understand the interaction of animals and human beings with their environments, but will also allow us to develop therapeutic strategies for the treatment of neurological, behavioral and psychiatric disorders. Neurobiology Master's degree programs aims at training highly qualified specialists in the field of neuroscience and psychophysiology, owning modern knowledge and methods of experimental physiology and neurophysiology, functional diagnostics, skills to work with a variety of laboratory animals, mathematical and statistical analysis of data. During education students acquire knowledge about the structure and functions of the regulatory systems of the body, including nervous, endocrine and immune systems, as well as the cellular and molecular mechanisms of interaction of these systems, the basic laws of human higher mental functions related to his cognitive activity and the role of genetic and environmental factors in their formation during ontogenesis and phylogenetic evolution of living organisms

The aim of the program: training of the specialists, possessing both broad theoretical knowledge in the field of neuroscience and experimental skills in this field, able to carry out research at the molecular, cellular, systemic levels of organization of living systems.

Objectives of the program:

- 1) to study of the latest developments in the field of neurobiology and computer modeling of physiological systems; the study of molecular and system mechanisms underlying the activity of the nervous system
- 2) training of professional knowledge of modern methods of investigation of the nervous system - from cell and system to computational and cognitive approaches.
- 3) the implementation of a student research project
- 4) the practice of scientific communications with the international scientific community

Experimental basis:

During training, students study methods of recording and analysis of bioelectrical activity in the brain of humans and animals, methods for recording and analysis of evoked potentials, methods for evaluating the functional state of the body at rest and in different types of activities, methods of analysis and processing of experimental data.

Experimental basis for the implementation of research projects of the program is Laboratory of Neurobiology, which was organized at the Department of Human and Animal Physiology, has the status of an international laboratory associated with the Mediterranean Institute of Neurobiology, Marseilles, France. The laboratory is equipped to the highest international standards and allows students to carry out research at the level of ion channels, neuronal networks and cognitive functions. Electrophysiological studies can be fulfilled both in cell cultures, brain slices (in vitro), and the whole brain of an animal (in vivo). For extracellular recording the activity of the cerebral cortex unique multi-channel silicon electrodes are used, allowed for simultaneous recording and analyzing the work of ensembles of neurons, optical recording methods, including optogenetics for study cortical activity will be developed in the laboratory in the nearest time.

In the laboratory leading scientists, recognized worldwide are working. One of the main research directions of the laboratory is devoted to the study of brain development in ontogeny,

headed by Dr. R.N.Khazipov, the head of research group in INSERM, France. Other areas of researches are included the neurobiology of pain – Prof. RA Giniatullin (Head. Neurobiology Laboratory of the University of Eastern Finland, Kuopio), mechanisms of synaptic plasticity - Dr. A.Rozov (Prof. of the University of Heidelberg, Germany). Students are given the opportunity of internships in foreign laboratories.

Training Modules:

1. Molecular and cellular neurobiology (ion channels, synapses, the basics of excitability, neurochemistry, neuroimmunology);
2. System neurophysiology
3. Cognitive neuroscience (mechanisms attention, perception, decision making, memory, motivation, language, emotion)
4. The ontogeny of the nervous system (the study of brain development and the role of early activity in the formation of neural networks in the pre- and postnatal human and rat)
5. Computational neuroscience and modeling

Teaching staff

Implementation of master program in Neurobiology is provided by highly qualified teaching staff with basic education, corresponding to the profile of the discipline and systematically engaged in research, methodological and clinical practical activities

About 40% of the employees have been trained in the world's leading research laboratories in France (Paris, Marseille), Great Britain, Finland, Austria, Germany, and are currently engaged in an intensive educational and research work.

Cooperation with European universities for master's program "Neurobiology":

1. The National Institute for Health and Medical Research (INSERM), France
2. University of Helsinki, Finland
3. The University of Eastern Finland, Kupio
4. University of Salzburg Austria
5. Heidelberg University, Germany
6. Giessen University, Germany

Masters who have completed training in Neurobiology program continue their research activities in a Ph.D. program.

Applying for a Masters in Pharmacology Program (Admissions)

Normative period of implementation of the basic educational training program for Master in Neurobiology degree is 2 years.

Admission to the Masters program is based on competitive selection procedure. It is carried out in a form of examination in general biology with subsequent interview at the Department of Human and Animals Physiology.

The Admissions Committee, formed by the representatives of the Medicine-Biology Faculty and the Institute of Chemistry, carries out competitive selection procedure. Competition ensures admission to the Masters Program of the most capable students, prepared for their further development.

To enroll into the competitive selection procedure the applicants should submit the following documents:

- A personal application form with statement indicating the area of training and the chosen masters program;
- The original or a copy of the state document about higher education (bachelors or specialist level), with the corresponding annex; or another recognized in the Russian Federation document confirming holding a graduate degree of higher education (state bachelor's diploma, or specialist, or master's diploma);
- A copy of the identity document.

List of additional documents:

- The diplomas, certificates of continuing professional development;
- Diplomas of winners and/or laureates of research projects, design work and student competitions at various levels;
- Scientific work of the applicant in electronic or/and paper form (published or handwritten);
- Documents, confirming awards: scholarships from ministries, agencies, funds, etc.
- In addition, applicants can provide a letter of recommendation from her/his supervisor (recognised expert in the field, lecturer of high school).

Head of the master's program in Neurobiology
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