ILIA STATE UNIVERSITY

Two main divisions focused on Neuroscience are:

- **INSTITUTE OF CHEMICAL BIOLOGY**
- **TENGIZ ONIANI LABORATORY OF SLEEP-WAKEFULNESS STUDY**

***INSTITUTE OF CHEMICAL BIOLOGY AT ILIA STATE UN*IVERSITY is a teaching and research institution. The scientists are representatives of different fields of Neuroscience: Physiology, Biochemistry, Molecular Physiology, Morphology.**

The Institute has a *Graduate Program in Molecular Sciences (Molecular Biosciences, Biopharmacy, and Food Science) and Doctoral Programs in Biochemistry, Molecular Biology and Cellular Neuroscience*. The last program is the joint educational project with Ivane Beritashvili Center of Experimental Biomedicine and one of the first PhD programs funded by Shota Rustaveli National Science Foundation.

The Institute is currently developing the following research programs:

- *Biologically Active Compounds and Cell Regulation.*
This research aims to excrete biologically active substances with plant or animal origin, in order to identify the mechanisms of their action and the impact on cell regulatory systems. One of the directions is the elucidation of the roles of different regulatory macromolecules in the development of endocrine and inflammatory diseases and the ways of correction of these diseases using plant polyphenolic compounds spread in Georgia.

- *Cellular and Molecular Fundamentals of Memory*
The research addresses specific manifestation of synaptic plasticity - Memory and Visual Imprinting in Chickens. In particular, the scientists elucidate gene expression during memory formation, epigenetic changes during formation of recognition memory and its storage, micro-RNA changes in the memory recognition processes, and protein spectrum changes during the formation of recognition memory. .

- *Cellular and molecular mechanisms of epilepsy and epileptogenesis. The identification of prevention methods of epileptogenesis.* Scientists elucidate: (i) The changes in gene expression during the process of epileptogenesis with the use of micro aray technology and the effects of treatment with inositols on this process; (ii) The changes in the process of epileptogenesis in micro-RNM spectrum and the effects of chronic treatment by inositols;(iii) Post-translation modifications of histons, that determine epigenetic changes as well as inositole effects; (iv) The changes in methylation of genes during epileptogenesis and the effects of inositols on these changes; (v) The changes in albumen spectrum during eptogenesis and after inositol treatment, (vi) The ultrastructure and three-dimensional architecture of "epileptic" neuron using electron microscopy and atomic force microscopy.

The integrative approach unites molecular biological, electro physiological and high-informtive morphological methods. Such combined approach provides the opportunity to generate qualitatively important results.

- ***Behavioral and structural aspects of various pathological and physiological states of the central nervous system.*** **Using various approaches of modern histology, electron microscopy and atomic force microscopy, as well as behavioral tests, scientists investigate the effects of chronic use of inhalants, chronic white noise, aging and propionic acid (rodent propionic acid model of autism) on the structure of limbic, extrapyramidal and neocortical regions of the brain.**

The Institute often organizes international and national conferences, symposiums, workshops, and other scientific meetings

- ***TENGIZ ONIANI LABORATORY OF SLEEP-WAKEFULNESS STUDY***

Tengiz Oniani, academician of Georgian National Academy of Science, famous Geeorgian neuroscientist, during years conducted Sleep-Wakefulness studies in Georgia. *Tengiz Oniani Laboratory of Sleep-Wakefulness at Ilia State University* was created by well-known experts – former students of Academician Oniani.

Scientists of the Laboratory perform both, fundamental and clinical studies. Main scientific directions of the Laboratory are:

- **Neurophysiological, neuroethological and neuropsychological mechanisms of Sleep-Wakefulness Cycle;**

- **Motivational and emotional reactions and interconnections between neurobiological mechanisms of Sleep-Wakefulness phases;**
- **Modeling of different psychonervous pathologies in animals, in order to find the avenues for correction of disorders.**

The Laboratory offers Master's and PhD' Degree Programs in Neuroscience. Undergraduate, Graduate and doctoral students are involved in the research conducted in the Laboratory.

The scientists of the Laboratory are involved in various international programs and projects; systematically organize international scientific events and schools for young scientists.

The Center contributes to the fundamental theoretical knowledge of the neurobiological mechanisms of Sleep-Wakefulness Cycle.