LITHUANIAN UNIVERSITY OF HEALTH SCIENCES

International **Summer School** Practice

Investigation of the molecular mechanisms underlying brain cell responses to inflammatory stimuli

Inflammatory processes in the central nervous system (CNS) play an important role in maintaining brain homeostasis and protecting neural tissue from harmful stimuli. However, dysregulation of inflammatory responses may contribute to the development and progression of various nervous system disorders, including neurodegenerative, neurological and various diseases associated with neuroinflammatory processes.

Microglial cells play a key role in these processes by responding to changes in their environment and regulating inflammatory responses, while interactions between neurons and glial cells also contribute to the maintenance of brain homeostasis. Prolonged or excessive microglial activation may impair normal neural tissue function and contribute to the development of pathological processes. Therefore, investigating brain cell responses to inflammatory stimuli and the underlying molecular and cellular mechanisms is important for improving our understanding of the pathogenesis of various nervous system disorders and identifying potential therapeutic targets.

This scientific internship (research) will focus on investigating the molecular mechanisms underlying brain cell responses to inflammatory stimuli. The studies will assess neuronal and/or microglial cell viability, changes in cell number, functional and morphological alterations, and inflammatory responses, as well as explore potential mechanisms for the pharmacological modulation of these processes. Microglial metabolic changes and their association with inflammatory responses may also be investigated. Experimental studies will be conducted using primary brain cell cultures, including mixed neuron–glia cultures and/or pure microglial cultures. Fluorescence microscopy will be used as one of the principal research methods to visualize and assess cellular morphological changes and selected biological markers.