Neurodegenerative diseases will pose an increasing burden on society. Most of them are incurable, and despite extensive work and many efforts, no effective treatment can be proposed to a vast majority of patients. According to World Health Organization (WHO), neurodegenerative diseases are the cause of about 10% deaths worldwide. Neurodegenerative diseases are defined as disorders resulting from the gradual and progressive loss of neural cells. Such a decrease in number and activity of neurons leads to severe dysfunctions in the nervous system, usually affecting biological functions of the whole organism. In many neurodegenerative diseases, including Huntington's disease, the pathological processes depend on formation of protein aggregates. Despite many years of studies, no cure is available for these diseases apart from symptomatic treatment which can only weakly alleviate major destructive effects of neurodegeneration. Recent studies have suggested that enhanced degradation of pathological proteins might be the most effective way to treat these diseases. Studies performed in the team led by the principal investigator (PI) of this project demonstrated stimulation of lysosomal biogenesis by genistein (4',5,7 trihydroxyisoflavone). Moreover, in very recent experiments, the same team has demonstrated that genistein induces autophagy and corrects phenotypes of cellular model of Huntington's disease. Thus, in this project, molecular mechanisms of genistein-mediated autophagy activation, as well as cellular and physiological effects of this process, will be studied in Huntington's disease as a model of neurodegenerative diseases (due to well-understood etiology), as specific way(s) of its action has/have not been determined yet. In fact, understanding molecular mechanisms of this process may provide a possibility to develop an effective therapy for neurodegenerative diseases in the future. However, to make such a scenario real, determination of molecular mechanisms leading to effects caused by genistein is necessary. Therefore, studies planned in this project may be a breakthrough in understanding biological mechanisms of protection of cells and organisms against neurodegeneration and other pathological processes.