

Level: bachelor			
Course title: Biochemistry of antioxidant systems (IB-607)			
Status: elective			
ECTS: 6			
Requirements: none			
Learning objectives To introduce students to the latest scientific knowledge about the biochemical and physiological roles of reactive species in human organism, oxidative stress development and development of chronic diseases.			
Learning outcomes Students are expected to identify and describe reactive species in the cell, how they are produced and their roles in the development of chronic diseases. Student should be able to explain mechanisms of antioxidant defence and experimental methods for their characterisation.			
Syllabus <i>Theoretical instruction</i> The phenomenon of oxygen toxicity in aerobic organisms. Activation of oxygen and formation of reactive species: superoxide anion radical, hydroxyl radical, singlet oxygen, organic peroxides peroxy- and alkoxy- radicals, carboxyl radical, nitrogen oxides, thiyl radicals, etc. Cellular sources of reactive species. Physiological significance of reactive species. Oxidative stress. Mechanisms of free radical toxicity: lipid peroxidation, oxidative damage of proteins, nucleic acids and carbohydrates. Antioxidant mechanisms of cells: antioxidant enzymes and non-enzymatic cellular antioxidants. Exogenous antioxidants. Experimental methods for determination of reactive species level and characterisation of antioxidant systems. Pathological changes in the cell and the organism as a result of oxidative stress. Reactive species and chronic diseases. <i>Practical instruction</i> Determination of chosen sample potential to neutralize DPPH [•] , superoxide anion radical and hydroxyl radical. FRAP and AEAC assays.			
Weekly teaching load			Other: /
Lectures: 2	Exercises: 3	Other forms of teaching: /	Student research: /