UCL Université catholique de Louvain

LBIR1321

2014-2015

Biochemistry II : metabolic pathways and their regulation

3.0 credits	30.0 h + 15.0 h	1q

Teacher(s) :	Ghislain Michel (coordinator) ; Larondelle Yvan ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus
Prerequisites :	Course of structural biochemistry and basic knowledge of organic chemistry
Main themes :	-Metabolism is a linked series of chemical reactions within living organisms. These enzyme-catalysed reactions allow the cells to break down fuel molecules to produce energy (catabolism). The energy is then used to build up cell's components (anabolism). - The course describes the types of chemical reactions, the role of enzymes and cofactors and their organisation into metabolic pathways. - The course explains the transformation of foodstuffs into simple oxidized products and energy using basic concept of thermodynamics and bioenergetics. - The course gives several examples of the variability of metabolism between different organs or organisms and the regulatory role of hormones.
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) 1.1 ; 1.3 3.2 ; 3.3, 3.6, 3.7 ; 3.8 6.5 b. Formulation spécifique pour cette activité des AA du programme (maximum 10) At the end of this course, students will be able to explain how the set of chemical and energy transformations within the cells allow growth and fitness to their environment. They will be also able to resolve case-oriented problems in physiology and biotechnology. These learning outcomes will be developed through: - Learning of the chemical reactions constitutive of the main metabolic pathways - Comparison of the metabolism activity between organs and model organisms -Integration of metabolic pathways according to determined physiological conditions - Understanding of the regulatory mechanisms induced by changes in external or internal milieux -Working out a set of metabolic reactions to produce a defined compound - Measurement of metabolic activity by using adequate methods and equipment *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	The written examination consists of a series of questions that require concise or detailed answers and problems solving ability. The performance developed during the laboratory training sessions are evaluated independently, via the laboratory report.
Teaching methods :	Lectures will be given in a classroom. They consist of ex cathedra speeches and solved problems. The laboratory sessions aim at developing a scientific reasoning behaviour and improving classroom communication skills. Students are given a detailed evaluation of their performance. The learning of basic concepts and vocabulary in English is stimulated.
Content :	Bioenergetics basic concepts; transport across biological membranes, glycolysis and fermentation, phosphogluconate pathway, gluconeogenesis, degradation and synthesis of glycogen, Krebs cycle, glyoxylate cycle, respiratory chain and oxidative phosphorylation, lipid b-oxidation and synthesis, urea cycle, amino acid degradation and synthesis, metabolism of nitrogen compounds Students are trained to measure the metabolic activity of a model organism through laboratory sessions.
Bibliography :	Syllabus, slides shown in classroom and laboratory notes will be available via icampus. This course is based on the reference book 'Lehninger Principles of Biochemistry' (ed Freeman). However the purchase of this book is not required.
Cycle and year of study :	> Bachelor in Bioengineering > Master [120] in Biomedical Engineering > Master [120] in Chemical and Materials Engineering
Faculty or entity in charge:	AGRO