
COURSE: Biochemical and Metabolic Processes

ACADEMIC YEAR: I

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Dr. Rocco Rossano Ph.D

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website:

phone: **+39 0971 205507**mobile (optional):

Language: **Italian**

ECTS: **8** (6 lessons and
tutorials/ 2 practice)n. of hours: **72** (48 lessons
and tutorials/ 24 practice)Campus: **Potenza**
Dept./School: **Dept. of Sciences**
Program: **Biotechnology for
Medical, Pharmaceutical and
Veterinary Diagnostics.**Semester: **II**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course aims to provide students with the scientific knowledge on the metabolism of the brain tissue and some molecular mechanisms related to the metabolism of proteins and other nitrogen compounds, the cell detoxification, the signaling, the nerve impulse propagation, transport across membranes, the action of hormones, fat-soluble vitamins and plasma lipoproteins. In addition, great emphasis is given to the importance of diet on human health, and the role of natural antioxidants and polyunsaturated fatty acids. Finally, students acquire knowledge about the extraction of proteins from different biological matrix and their identification by MALDI-ToF mass spectrometry.

PRE-REQUIREMENTS

To the students are required a satisfactory knowledge of different concepts of general biochemistry already acquired. In particular, on the principal molecular components of the cell and related biochemical processes.

SYLLABUS

The nervous tissue, brain metabolism, the blood-brain barrier, the importance of oxygen and glucose in the cerebral metabolism. The mechanism of transmission of nerve impulse. The synthesis and inactivation of neurotransmitters. Transmembrane transport. Metabolism of purine and pyrimidine nucleotides. Heme metabolism. Mechanism of action of the fat soluble vitamins. Hormones and signal transduction. Second messengers. Ion channels. Nature of hormones, hormone receptors, mechanism of action. Hormonal regulation of glucose and lipid metabolism. Hyperlipidemia, atherosclerosis, diabetes, hypo- and hyperthyroidism. The plasma lipoproteins, lipoprotein receptors. Cellular detoxification. ROS and oxidative stress. Functional aspect of the diet. Natural antioxidants and polyunsaturated fatty acids (PUFAs), features, functions and metabolism. Proteases. Protein degradation, the ubiquitin-proteasome system, lysosomal proteolysis, selective proteolysis, proteolysis dependent on caspases. Proteomics in the study of protein expression profiles and their post-translational modifications.

Laboratory: Proteins extraction and determination. MALDI-ToF mass spectra acquisition. Protein identification *via* Peptide Mass Fingerprinting.

TEACHING METHODS**Lectures and laboratory activities**

EVALUATION METHODS**Oral examination. Evaluation: score on 30 points**

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

1. Nelson e Cox: *I Principi di Biochimica di Lehninger*, Ed. Zanichelli, Bologna.
 2. Campbell e Farrell: *Biochimica*, Ed. EdiSES, Napoli.
 3. **Material provided by the teacher.**
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INTERACTION WITH STUDENTS

Office hours (3rd floor-3ANord building): Monday from 12.00 to 13.00; Wednesday from 9:00 to 11:00 and Friday from 9:00 to 11:00. In addition, the teacher is available at all times for a contact with the students through e-mail.

EXAMINATION SESSIONS (FORECAST)¹

February 3, 2017

March 10, 2017

May 26, 2017

June 23 2017

July 24, 2017

September 11, 2017

October 9, 2017

December 18, 2017

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.