



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	BIOTECHNOLOGIES FOR INDUSTRIES AND SCIENTIFIC RESEARCH		
SUBJECT	APPLIED BIOCHEMISTRY		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50596-Discipline biologiche		
CODE	01548		
SCIENTIFIC SECTOR(S)	BIO/10		
HEAD PROFESSOR(S)	GHERSI GIULIO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	102		
COURSE ACTIVITY (Hrs)	48		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	GHERSI GIULIO Tuesday 14:00 15:30 Dipartimento STEBICEF, Viale delle Scienze ed.16 - 90128 PalermoSTUDIO		

DOCENTE: Prof. GIULIO GHERSI

PREREQUISITES	Knowledge of Biochemistry and Cell Biology
LEARNING OUTCOMES	<p>Knowledge and ability 'to understand Understanding and knowledge of the target protein to the various mechanisms of the individual cells or secretion, as well as, of the main changes posttraduzionali of proteins and their signaling effect. In addition, the role of adhesion molecules and the proteolytic enzymes in guiding the cell, and movement around, the synthesis and validation processes of molecules with biological function produced by recombinant techniques. Capacity 'to apply knowledge and understanding Knowing how to deal with the experimental study of a problem of Cellular Biochemistry Making judgments The student must 'be able to determine which is the best beaten to synthesize molecules with specific function and what are the approaches to be able to cross the functionality. Enable 'communication The student must 'have properties' of language and ability' description of the cellular processes that see involved a particular protein and / or protein family. Capacity 'Learning For a correct learning the student must 'have bases more' consolidated biochemistry of proteins, as well as organic chemistry, mathematics and biophysics.</p>
ASSESSMENT METHODS	<p>The learning is assessed through an interview. In this oral examination the students must answer to at least three questions on the topics of the course, and they have to show an adequate knowledge, acquisition of interpretative skills, capacity of connecting and processing the arguments, as well as a relevant presentation capacity. The final grade will be expressed in thirtieth and will be judged insufficient when the student will demonstrate: difficulty to focus on the proposed topics, a shallow knowledge of the arguments and extreme limited exposure ability. As the degree of details of the proven knowledge increase will proportionally increase the positivity of the grade. The maximum score is obtained in case of excellent mastery and critical-interpretative jurisdiction of the subject content of the course and a good exposition proved by the use of proper scientific terminology.</p> <p>Evaluation:</p> <ul style="list-style-type: none">- Excellent: 30 - 30 cum laude <p>Outcome: excellent knowledge of the topics, excellent language properties, good analytical ability, the student can apply knowledge for solve the proposed problems</p> <ul style="list-style-type: none">- Very good: 26-29 <p>Outcome: good knowledge of the topics, full ownership of language, good analytical ability, the student can apply knowledge for solve the proposed problems</p> <p>Good: 24-25</p> <p>Outcome: good knowledge of the topics, good language properties, limited ability to independently apply knowledge to solve the problems proposed</p> <p>Satisfactory: 21-23</p> <p>Outcome: the candidate does not have complete mastery of the main topics but neither possesses the knowledge, satisfactory language properties, low ability to independently apply the acquired knowledge for the resolution of problems</p> <p>Sufficient: 18-20</p> <p>Outcome: basic knowledge of the main topics and the technical language, little or no ability to autonomously apply the acquired knowledge insufficient.</p> <p>Outcome: the candidate does not have an acceptable knowledge of the topics treated during the course.</p>
EDUCATIONAL OBJECTIVES	<p>The purpose of the course is to let the student the basic knowledge about the transport mechanisms in cell different districts and outside to the cell. Also it aims to give basic knowledge about the application of cellular biotechnology in industry. In particular in the field of cell and regenerative medicine, in "Drug Delivery" as well as in the production and selection of monoclonal advance and not least about the productive principles of optimization of synthesis in the fermenter.</p>
TEACHING METHODS	The didactic activities will be performed in frontal lessons. And seminar activities.
SUGGESTED BIBLIOGRAPHY	<p>Alberts B., Bray D., Lewis J., Raff M., Roberts K. and Watson J. Biologia Molecolare della Cellula; Ed. Garland, 3° ed or later. Isbn: 9788808151391</p> <p>Alberts B., Bray D., Lewis J., Raff M., Roberts K. and Watson J. Molecular Biology of the cell; Ed. Garland, 3° ed or later. ISBN-10: 0-8153-4072-9</p> <p>Per approfondimenti: Articoli scientifici recenti, selezionati dal docente.</p>

SYLLABUS

Hrs	Frontal teaching
48	<p>6 hours - Membranes and compartmentalization of the cells. The transport of macromolecules between the cytoplasm and nucleus. The formation of the Nuclear Pore Complex. The role of the small GTPase Ran The transport of biological macromolecules from the cytoplasm to the mitochondria and the peroxisomes Chloroplast</p> <p>6 hours - Transfer of proteins in the endoplasmic reticulum. The insertion of proteins in biological membranes of Quality Control 'in the pattern endoplasmic - Role of carbohydrates in the "folding" and in determining the destination of glycoproteins positions of glycosylation: The glycosylation in the immune response. The use of RE as a deposit for the engineered proteins that are to be secreted</p> <p>6 hours - The vesicular traffic. of the membrane deformation mechanisms) The Golgi vesicular trafficking and RE-Golgi and vice versa; RE-cell membrane; RE-lysosomes. Endocytosis and exocytosis. molecular motors. Cytoskeleton and cell behavior</p> <p>6 hours - Cell-cell adhesion molecules and their regulatory functions. Molecules of cell-matrix adhesion and their regulatory functions. - 6 hours - Proteolytic enzymes secreted and localized on plasma membrane, their role in the remodeling of the ECM and the motility / invasiveness' processes</p> <p>6 hours - Synthesis of molecules involved in interactions and degradation of ECM and their characterization using molecular / biochemical selection techniques</p> <p>6 hours - Functionalized nanoparticles in the transport and release of drugs, as well as in cell recognition.</p> <p>6 hours - Generation of "Scaffold" supplementary / replacement of a different nature. Summary pre-industrial / industrial application of biomolecule of interest.</p>