

International School of Medicine / Medicine (English)

2023 - 2024 Academic Year

From Molecule to Cell

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
From Molecule to Cell	02. Committee	Fall Semester	94+24	0	8
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Committee				
Course Coordinator	Assist.Prof. Kıvanç KÖK				
Name of Lecturer(s)	Assist.Prof. Kıvanç KÖK				
Assistant(s)					
Aim	The aim of this committee is to introduce biologically important molecules acting in the structure and function of the cell and the chemical reactions taking place in the cell for the survival of the cell. It also aims to provide understanding the important biochemical molecules (such as DNA, RNA, ATP, cAMP, proteins, peptides, amino acids, major hormones etc.) and their functions in living systems and comprehend biochemical transformations of these important molecules.				
Course Content	This course contains; Medical Biology and Genetics: Basic structure and functions of proteins, Genetic material of the cell, DNA, chromosomes and genome, DNA replication, repair and recombination, Transfer of genetic information from DNA to protein, Control mechanisms of gene expression and cellular genetic switches, Advanced molecular techniques, Molecular fundamental biology and clinical applications of techniques, Physiology: An overview of physiology, including definitions and applications. Functions of the cell membrane, Transport of substances across the cell membrane, Cell volume regulation, Mechanics of the cell, Principles of Scientific Research and Access to Information: Definition and principles of scientific research, Types and stages of scientific research, Definition of scientific publication, Types of scientific publication, Access to electronic data sources, Scientific data analysis, Biophysics: Physics and its branches, physical quantities, SI unit system and general equations, Introduction to biophysics, definition of biophysics, differences and common points between physics and biophysics, Organic Chemistry: Alkyl halides, nucleophilic substitution reactions, organic compounds containing CO and CS, Acidity-basicity, carboxylic acids, organic compounds containing C=O, organic compounds containing N, Aromatic compounds, Biomolecules: carbohydrates, lipids, Biomolecules: amino acids, peptides, Biomolecules: proteins and enzymes, enzyme kinetics, Biochemistry: the molecular meaning of life.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
Learns the chemical reactions occurring in living organisms and the properties of organic compounds.			12, 14, 17, 9	A, D	
Learn about structural molecular cell biology, medical biology, and genetic concepts, as well as molecular mechanisms of cellular functioning, which will serve as the foundation for clinical studies.			14, 16, 9	A	
It provides a general understanding of physiological mechanisms, structure-function relationships in the cell membrane, and basic principles of cell mechanics.			14, 16, 9	A	
Learns about scientific research, its general principles and methods, and how to access scientific information.			10, 12, 13, 14, 19, 23, 9	A	
Learns the fundamental concepts and methods of biophysics.			14, 16, 9	A	
Can describe the chemical reactions in the cell at the molecular level and explain the changes that occur in these reactions in pathological conditions.			12, 17, 9	A, D	
Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 13: Case Study Method, 14: Self Study Method, 16: Question - Answer Technique, 17: Experimental Technique, 19: Brainstorming Technique, 23: Concept Map Technique, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, D: Oral Exam				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Medical Biology and Genetics: Basic structure and functions of proteins, Genetic material of the cell, DNA, chromosomes and genome, DNA replication, repair and recombination, Transfer of genetic information from DNA to protein, Control mechanisms of gene expression and cellular genetic switches, Advanced molecular techniques, Molecular fundamental biology and clinical applications of techniques				
2	Physiology: An overview of physiology, including definitions and applications. Functions of the cell membrane, Transport of substances across the cell membrane, Cell volume regulation, Mechanics of the cell				
3	Principles of Scientific Research and Access to Information: Definition and principles of scientific research, Types and stages of scientific research, Definition of scientific publication, Types of scientific publication, Access to electronic data sources, Scientific data analysis				
4	Biophysics: Physics and its branches, physical quantities, SI unit system and general equations, Introduction to biophysics, definition of biophysics, differences and common points between physics and biophysics				
5	Organic Chemistry: Alkyl halides, nucleophilic substitution reactions, organic compounds containing CO and CS, Acidity-basicity, carboxylic acids, organic compounds containing C=O, organic compounds containing N, Aromatic compounds, Biomolecules: carbohydrates, lipids, Biomolecules: amino acids, peptides, Biomolecules: proteins and enzymes, enzyme kinetics				
6	Biochemistry: the molecular meaning of life				
Evaluation Methods		Weight(%)			
Midterm Exam		60			
General Exam		40			

Resources

1. Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter "Essential Cell Biology" Fourth Edition, Garland Science Publishers, USA, 2013 2. Nesrin Emekli, Temel ve Uygulamalı Biyokimya 3. Guyton, Tibbi Fizyoloji 4. Zeynel Dinler, Bilimsel Araştırma ve E- Kaynaklar 5. Roland Glaser, Biophysics 6. Paula Y. Bruice. Organic Chemistry 7. ed., Pearson, 2013. ISBN: 10-0-321-69768-5 Course presentations and notes