



FACULTY OF PHARMACY MEDICAL UNIVERSITY OF SOFIA

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DEPARTMENT "PHARMACOLOGY, PHARMACOTHERAPY AND TOXICOLOGY"

SYLLABUS

in

Cellular and Molecular Pharmacology

INCLUDED IN THE CURRICULUM FOR "PHARMACY"
EDUCATIONAL DEGREE: "MASTER OF SCIENCE"
CREDITS (ECTS): 5

ANOTATION

The elective discipline "Cellular and molecular pharmacology" is aimed at introduction to the biochemical and molecular biological aspects of drug action. The features of the four receptor classes, enzymes, ion channels and transporters as drug targets and signal transduction mechanisms are discussed in detail. The course also reviews the regulation of cell proliferation and programmed cell death, the molecular features of malignant transformation and, respectively, possible targets for targeted antineoplastic therapy, the pharmacology of autacoids and gene therapy approaches.

System for control and evaluation of students: ongoing control - 1 colloquium and final exam after two semesters of training - written and oral.

Training in English language

SYLLABUS

1. Cell culture as a foundation of: modern biomedical research. Types of cell cultures and opportunities for their application in pharmacological studies.
2. Model cell systems for investigation of drug pharmacodynamics.
3. Molecular biology of receptors - receptor types, structure and function. Membrane receptors.
4. Cell death (necrosis, apoptosis and autophagy) - nature, physiological and pathological significance. Opportunities for pharmacological modulation.
5. Cellular signal transduction - physiologic and pathologic significance. Signaling cascades as targets for pharmacological modulation.

6. Enzymes as drug targets - kinase inhibitors, COX inhibitors, farnesyltransferase inhibitors, etc.
7. In vitro test systems for the study of drug action. Opportunities for determination of pharmacological profiles and drug safety.
8. Pharmacological agents for modulation of the ion transport across biological membranes.
9. Lipid mediators of inflammation and allergy and opportunities for pharmacological modulation.
10. Cellular senescence. Free-radical processes and antioxidants. Damage and repair of genomic DNA. Physiological and pathological significance of telomerases.
11. Molecular mechanisms of malignant transformation of cells. Opportunities for pharmacological control.
12. Epigenetic mechanisms of the regulation of cell growth and differentiation.
13. Stem Cells. Hematopoiesis - recombinant factors affecting hematopoiesis. Stem cell transplantation - Opportunities and Prospects. Therapeutic cloning - "pro-" and "anti-"
14. The molecular target as a basis for rational molecular design of targeted drug molecules.
15. Gene therapy – targets, viral and non-viral vectors, indications and ethical aspects.

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Prepared the program:

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(Prof. G. Momekov, Ph.D.)