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FACULTY OF MEDICINE

Approved:

Dean:

(Prof. Dr. Yoto Yotov, DSc)



SYLLABUS

IN

Molecular biology in medicine

Specialty	MEDICINE
Educational - qualification degree	master
Organizational form of education	full-time
Auditorial activity (Lectures/Seminars)	30 (20/10)
Extra-auditorial activity	30
ECTS- credits	2
Discipline type	Elective
Semester/s of education	Third, Fourth, Fifth, Sixth
Semester of examination	Third, Fourth, Fifth, Sixth
Developer(s) of the Syllabus:	Prof. Diana Ivanova, PhD, DSc
	Assoc. Prof. Chavdar Bachvarov
	Assist. Prof. Deyana Vankova, PhD

Varna, 2024

ANNOTATION

Aims of the course	<p>"Molecular Biology in Medicine" is an elective course for the medical students at Medical University – Varna. Molecular biology science is of great importance for understanding of health and diseases states and for disease treatment. It is the basis for the progress in biochemistry, genetics, biotechnologies and pharmacology and is of special significance for nutrigenomics and pharmacogenomics development, as well as for the scientific and practical progress of personalized nutrition and medicine. One of the main objectives of the lecture course is to introduce students in the molecular biology methods applied in nutrigenomics and pharmacogenomics. The role of molecular biology in medicine will also be demonstrated by elucidating the relationship between gene variations and the individual reactivity and sensibility to changing environment, nutritional habits and drug interventions.</p> <p>The lecture course aims to acquire the students with the base and modern techniques and approaches in the field of medicine, and especially nutrition and pharmacogenomics. The lectures will provide students additional knowledge in the field of macromolecule biochemistry and molecular methods application in medical practice for diagnostics, screening, prognosis and treatment. In addition, students will be introduced in the application of the modern molecular biology methods and techniques in the medical scientific research.</p> <p>Students will build competencies for planning and implementation of scientific researches. Students will acquire knowledge and practical skills for basic molecular biological methods and analyses, will have the opportunity to present and discuss their own results of experimental work. Special attention in the "Molecular Biology in Medicine" course is devoted to the processing, systematization and presentation of the results of experimental work. Students interested in the discipline will have the opportunity to present their results at a student conference.</p>
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Outcomes for students at the end of the course:	
Competence group	1. Medical Knowledge about established and evolving biomedical, clinical, and cognate (eg, epidemio-logical and social-behavioral) sciences and the application of this knowledge to patient care.
Knowledge	<ul style="list-style-type: none"> ▪ the mechanisms of regulation of gene expression in normal and pathological conditions; ▪ new molecular-biological therapies applied to oncological and infectious diseases; ▪ novelties in the field of nutrigenomics and pharmacogenomics
Skills	<ul style="list-style-type: none"> ▪ orientation in the basic models of functioning of living matter at the molecular-biological level. ▪ identification of problematic topics in science and to propose strategies and approaches for their resolution. ете колкото редове е нужно/
Competence group	2. Practice-Based Learning and Improvement that involves investigation and evaluation of their own patient care, appraisal, and assimilation of scientific evidence, and improvements in patient care.

Knowledge	<ul style="list-style-type: none"> gene expression studying methods and methods for various diseases models in molecular biology; new non-protein biomarkers with potential in diagnosis and assessment of the various diseases progression.
Skills	<ul style="list-style-type: none"> to interpret the results of research; to develop critical thinking and the ability to evaluate new biomarkers and therapeutic approaches.
Competence group	3. Interpersonal and Communication Skills that result in effective information exchange and teaming with patients, their families, and other health professionals.
Knowledge	<ul style="list-style-type: none"> selection of scientific literature on a given topic; planning and implementation of scientific research; methods of analysis of obtained scientific results.
Skills	<ul style="list-style-type: none"> presentation in graphical and tabular form of the obtained scientific results; scientific discussion of received scientific results; for public presentation and promotion of scientific results.
Competence group	4. Professionalism , as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
Knowledge	<ul style="list-style-type: none"> ethical norms when conducting scientific research related to the study of biological material; ethical problems of the of gene therapy application.
Skills	<ul style="list-style-type: none"> to assess possible ethical problems in the use of molecular genetic technologies in clinical practice.
Competence group	5. Systems-Based Practice , as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.
Knowledge	<ul style="list-style-type: none"> new experimental or successful molecular biological therapies introduced into practice in different countries.
Skills	<ul style="list-style-type: none"> to apply an interdisciplinary approach to solving current problems in clinical practice.

Key competencies for lifelong learning¹, that the discipline develops:

Literacy competence Literacy is the ability to identify, understand, express, create, and interpret concepts, feelings, facts and opinions in both oral and written forms, using visual, sound/audio and digital materials across disciplines and contexts. It implies the ability to communicate and connect effectively with others, in an appropriate and creative way.	X
Multilingual competence This competence defines the ability to use different languages appropriately and effectively for communication. It broadly shares the main skill dimensions of literacy: it is based on the ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form (listening, speaking, reading and writing) in an appropriate range of societal and cultural contexts according to one's wants or needs.	X

¹ As defined in 2018 r. by the European Union Council ([https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32018H0604\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32018H0604(01)&from=EN))

<p>Mathematical competence and competence in science, technology, engineering</p> <p>A. Mathematical competence is the ability to develop and apply mathematical thinking and insight in order to solve a range of problems in everyday situations. Building on a sound mastery of numeracy, the emphasis is on process and activity, as well as knowledge. Mathematical competence involves, to different degrees, the ability and willingness to use mathematical modes of thought and presentation (formulas, models, constructs, graphs, charts).</p> <p>B. Competence in science refers to the ability and willingness to explain the natural world by making use of the body of knowledge and methodology employed, including observation and experimentation, in order to identify questions and to draw evidence-based conclusions. Competences in technology and engineering are applications of that knowledge and methodology in response to perceived human wants or needs. Competence in science, technology and engineering involves an understanding of the changes caused by human activity and responsibility as an individual citizen.</p>	X
<p>Digital competence</p> <p>Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.</p>	X
<p>Personal, social and learning to learn competence</p> <p>Personal, social and learning to learn competence is the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career. It includes the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional well-being, to maintain physical and mental health, and to be able to lead a health-conscious, future-oriented life, empathize and manage conflict in an inclusive and supportive context.</p>	X
<p>Citizenship competence</p> <p>the ability to act as responsible citizens and to fully participate in civic and social life, based on an understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability.</p>	X
<p>Entrepreneurship competence</p> <p>Entrepreneurship competence refers to the capacity to act upon opportunities and ideas, and to transform them into values for others. It is founded upon creativity, critical thinking and problem solving, taking initiative and perseverance and the ability to work collaboratively in order to plan and manage projects that are of cultural, social or financial value.</p>	X
<p>Cultural awareness and expression competence</p> <p>Competence in cultural awareness and expression involves having an understanding of and respect for how ideas and meaning are creatively expressed and communicated in different cultures and through a range of arts and other cultural forms. It involves being engaged in understanding, developing and expressing one's own ideas and sense of place or role in society in a variety of ways and contexts.</p>	

<p>Methods of education</p> <ul style="list-style-type: none"> ▪ lectures ▪ practical and laboratory exercises ▪ practical and creative problem solving, ▪ discussions, ▪ work with scientific literature, ▪ work with databases, ▪ analyses and presentations.

<p>Links with other courses from the curriculum of the specialty</p> <ul style="list-style-type: none"> ▪ Builds upon knowledge acquired in/Depends on: <ul style="list-style-type: none"> ○ Biology, Cell Biology, Organic Chemistry, Biochemistry, Physiology ▪ Other related disciplines: Biochemistry, Pathobiochemistry, Genetics, Microbiology, Virology
