

DESCRIPTION OF THE COURSE OF STUDY

Course code	0912.7.LEK.B.C	
Name of the course in	Polish	Cytofizjologia
	English	Cytophysiology

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	medicine
1.2. Mode of study	full-time
1.3. Level of study	uniform Master's study
1.4. Profile of study*	General academic
1.5. Person/s preparing the course description	Dr Małgorzata Łysek-Gładysińska
1.6. Contact	malgorzata.lysek-gladysinska@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	English
2.2. Prerequisites*	

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	Lectures (Lec): 30h (including 5h e-learning), Classes (C): 20h (including 5h e-learning), Laboratories (L): 10h	
3.2. Place of classes	Courses in the teaching rooms of UJK	
3.3. Form of assessment	Exam:lecture Credit with grade: classes, laboratories	
3.4. Teaching methods	Lectures (including 5h e-learning): Informative lecture Classes (including 5h e-learning): multimedia presentation Laboratories: practical classes	
3.5. Bibliography	Required reading	1. Bruce Albert, Dennis Bray, Hopkin Karen, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter: Essential Cell Biology, 3rd edition 2. Nalini Chandar, Susan Viselli: Cell and Molecular Biology Lippincott's illustrated Review by Chandar, Viselli, 2010
	Further reading	1. Anthony L. Mescher: Junqueira's Basic Histology: Text and Atlas, last edition

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes)

Lectures

- C1. To familiarize students with modern knowledge about cell physiology.
- C2. To familiarize students with the most common causes and mechanisms of cell damage leading to carcinogenesis.
- C3. To make students aware that every disease process has its source in a specific cellular structures.
- C4. To highlight the importance of cytophysiology in relation to human diseases, diagnostics and therapeutic strategies.

(including e-learning)

- C1. To familiarize students with the functions of cytoplasmic matrix and cytoskeleton.
- C2. To familiarize students with the composition of ribosomes and the regulation of protein biosynthesis.

Classes

- C1. To familiarize students with functions of mitochondria, peroxisomes and cytoskeleton in the cell.
- C2. To familiarize students with cell damage and death.
- C3. To familiarize students with functions and applications of stem cells in medicine.

(including e-learning)

- C1. To draw students' attention to cellular movement and basics of contraction in striated and smooth muscle fibers.
- C2. To draw students' attention of excitation and conduction in the nervous system and higher nervous functions.
- C3. To familiarize students with selected cytoplasmic processes such as proteins targeting, intracellular proteins sorting and nucleocytoplasmic transport.

Laboratories

- C1. Acquiring laboratory skills in the homogenization and fractionation of cells and tissues.
- C2. Familiarization with the barrier properties of the cell membrane through practical tasks.
- C3 Observation of the eukaryotic cells cycle and analysis of post-radiotherapy damage.

4.2. Detailed syllabus (including form of classes)**Lectures**

1. Basic research methods of cell biology. Chemical components of cells. Basic cellular structures and their functional characteristics.
2. Structure and functions of biological membranes. Mechanisms of transport across membranes (diffusion, facilitated transport, active transport, ion transport with the participation of a sodium-potassium pump).
3. Organization and functions of the cell nucleus. Structure of nucleic acid, DNA replication and repair. Structural organization of chromatin. Expression of genetic information (transcription, translation).
4. The cell cycle and its regulatory mechanisms.
5. The role of enzymes in the regulation of cellular transformations. Cell energetics.
6. Apoptosis, autophagy and their significance for organismal function.
7. Cell aging and its consequences for organismal function.
8. Cell-to-cell communication, signal reception and transmission. Intracellular signaling cascades.
9. Mechanisms of cell development and differentiation.
10. Intercellular junctions. Basic components of the intercellular matrix.
11. Carcinogenesis – fundamental abnormalities in cancer cells. Characteristics of benign and malignant neoplasms.

(including e-learning)

1. Organization and functions of cytoplasm.
2. Cytoplasmic matrix and cytoskeleton. Intermediate filaments, microtubules, actin filaments.
3. Ribosomes. Characteristics and composition of ribosome subunits.
4. Regulation of protein biosynthesis. Inhibitors of protein biosynthesis.

Classes

1. Function and structure of mitochondria.
2. Lysosomes as centres of intracellular degradation. Functions of peroxisomes.
3. Pathomorphological changes in the cytoskeleton (poisons of the microtubular system, genetic diseases caused by defects in genes encoding cytoskeletal proteins). Drugs that act on the microtubular system.
4. Basics of oncogenesis. Cancer treatment.
5. Mechanisms of cell damage and cell death.
6. Functions and applications of stem cells in medicine

(including e-learning)

1. Phenomena of movement in cells. Fundamentals of contraction of striated and smooth muscle fibers.
2. Basic principles of excitation and conduction in the nervous system including higher nervous functions.
3. Selected cytoplasmic processes: protein targeting and sorting within the cell, protein import into specific organelles, and nucleocytoplasmic transport.

Laboratories

1. Homogenization and fractionation of cells and tissues. Organelles and their chemical determinants.
2. Structure of biological membranes and their barrier properties.
3. Life cycle of eukaryotic cells. Cell cycle disturbances after radiotherapy.

4.3.**4.3 Intended learning outcomes**

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	Knows the basic cellular structures and their functional specifications;	A.W2.
W02	Knows the structure of lipids and polysaccharides and their functions in the cellular and extracellular structures;	B.W9.
W03	Knows the protein primary, secondary, tertiary and quaternary structures as well as the post-translational and functional protein modifications and their significance;	B.W10.
W04	Knows the functions of nucleotides in the cell, RNA and DNA primary and secondary structure as well as chromatin structure;	B.W11.
W05	...Knows the ways of communication between cells as well as between the cell and the extracellular matrix and signal transduction pathways in the cell as well as examples of	B.W16.

	disorders in these processes leading to the development of tumors and other diseases;	
W06	Knows the processes such as: cell cycle, proliferation, differentiation and cell aging, apoptosis and necrosis, and their importance for the functioning of the body;	B.W17.
W07	Knows the functions and applications of stem cells in medicine;	B.W18.
W08	Knows the basic principles of stimulation and conduction in the nervous system and higher nervous functions, as well as physiology of striated and smooth muscles;	B.W19.
within the scope of ABILITIES:		
U01	Demonstrates the ability to plan and perform basic scientific research, interpret the results and draw conclusions;	B.U11.
within the scope of SOCIAL COMPETENCE:		
K01	Demonstrate the need to recognize his/her own limitations and self-evaluate educational deficiencies and needs;	K.S5.
K02	Uses reliable information sources;	K.S7.
K03	Formulate conclusions on the basis of own surveys and observations;	K.S8.
K04	Is aware of the need to introduce rules of social conduct and teamwork to the group of specialists, including specialists from other medical professions also in the multicultural and multinational environment;	K.S9.
K05	Formulates opinions concerning various aspects of professional activity;	K.S10.
K06	Is aware of accepting responsibility for one's decisions made during professional activities including own safety and safety of other people.	K.S11.

4.4. Methods of assessment of the intended learning outcomes																					
Teaching outcomes (code)	Method of assessment (+/-)																				
	Exam writ-ten			Test*			Project*			Effort in class*			Self-study*			Group work*			Others* e.g. standard-ized test used in e-learning		
	Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes		
	L	C	L	L	C	L	L	C	L	L	C	L	L	C	L	L	C	L	L	C	L
W01-W08	+					+													+	+	
U01	+				+	+															
K01-K06	+																				

*delete as appropriate

4.5. Criteria of assessment of the intended learning outcomes		
Form of classes	Grade	Criterion of assessment
Lecture (L) (including e-learning)	3	Receiving from 60% - 68% the total number of points available for the written exam
	3,5	Receiving from 69% - 76% the total number of points available for the written exam
	4	Receiving from 77% - 84% the total number of points available for the written exam
	4,5	Receiving from 85% - 92% the total number of points available for the written exam
	5	Receiving from 93% - 100% the total number of points available for the written exam
Classes (C) (including e-learning)	3	Receiving from 60% - 68% the total number of points obtained from final test
	3,5	Receiving from 69% - 76% the total number of points obtained from final test
	4	Receiving from 77% - 84% the total number of points obtained from final test
	4,5	Receiving from 85% - 92% the total number of points obtained from final test
	5	Receiving from 93% - 100% the total number of points obtained from final test
Laboratories (L) (including e-learning)	3	Receiving from 60% - 68% the total number of points obtained from final test
	3,5	Receiving from 69% - 76% the total number of points obtained from final test
	4	Receiving from 77% - 84% the total number of points obtained from final test
	4,5	Receiving from 85% - 92% the total number of points obtained from final test
	5	Receiving from 93% - 100% the total number of points obtained from final test

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload
	Full-time studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	60
Participation in lectures*	30
Participation in classes, seminars, laboratories*	30
Preparation in the exam/ final test*	
Others (please specify e.g. e-learning)*	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	60
Preparation for the lecture*	20
Preparation for the classes, seminars, laboratories*	40
Preparation for the exam/test*	
Gathering materials for the project/Internet query*	
Preparation of multimedia presentation	
Others *	
TOTAL NUMBER OF HOURS	120
ECTS credits for the course of study	5

**delete as appropriate*

Accepted for execution (date and legible signatures of the teachers running the course in the given academic year)

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