



48SJO-CYTOPHY
ECTS: 3.00
CYCLE: 2023Z

Course syllabus - part A Cytophysiology

SUBJECT MATTER CONTENT

CLASSES

Histology and its methods. Light and electron microscopy. Optical and digital microscopic imaging techniques. Immunohistochemistry. Protruding from the apical surfaces of epithelial cells. Cytoskeleton. Cell junctions. Adhesion molecules. Basement membrane. Extracellular matrix. Vesicular transport: endocytosis, phagocytosis, transcytosis and exocytosis. Cell nucleus, chromatin and nucleolus. Ribosomes and rough endoplasmic reticulum., translation. Golgi apparatus, protein modification and secretion. Regulation of intracellular protein turnover. Cell secretion and its regulation. Protein degradation: proteasomes and lysosomes. Cytoplasmic inclusions. Peroxisomes. Reactive oxygen species. Mitochondria. Changes in the energy level of the cell. Apoptosis and necrosis. Cell differentiation. Terminally differentiated cells. Inflammatory response cells: B lymphocyte, T lymphocyte, phagocytes, mast cells. Cytophysiology and development of the local inflammatory response, diapedesis. Macrophage-fibroblast interaction

LECTURE

Structure and dynamics of biological membranes. Transmembrane transport and its mechanisms. Multidrug resistance. Cell nucleus. Chromatin structure and epigenetics. Regulation of gene expression. Mechanisms of mitosis and meiosis. Nondisjunction. The cell cycle and its control mechanisms. Cyclins, cyclin-dependent kinases, cell cycle checkpoints. Protooncogenes and tumor suppressor genes. Cell growth and differentiation. Intercellular communication. Membrane and intracellular receptors. Signal transduction pathways. Stem cells. Bone marrow transplantation. Aspects of undifferentiated cell therapy. Regenerative medicine.

TEACHING OBJECTIVE

The main objective of the course is to provide students with knowledge about the morphology and functions of normal human cells as well as dysfunctions of basic molecular mechanisms. Knowledge in the field of cytophysiology is the basis for continuing teaching in the field of preclinical sciences: physiology, pathophysiology and pathomorphology. An important part of teaching are practical tasks in which students recognize and describe cells and structures within cells or extracellular matrix on a microscopic images.

**DESCRIPTION OF THE LEARNING OUTCOMES OF THE COURSE
IN RELATION TO THE DESCRIPTION OF THE
CHARACTERISTICS OF THE SECOND LEVEL LEARNING
OUTCOMES FOR QUALIFICATIONS AT LEVELS 6-8 OF THE
POLISH QUALIFICATION FRAMEWORK IN RELATION TO THE
SCIENTIFIC DISCIPLINES AND THE EFFECTS FOR FIELDS OF
STUDY:**

Legal acts specifying learning outcomes:
3112022

Disciplines: medical sciences

Status of the

course: Obligatory

Group of courses: A -

przedmioty podstawowe

Code: ISCED 0912

Field of study: Medicine

Scope of

education: Medicine

Profile of education:

General academic

Form of studies: full-time

Level of studies: uniform

master's studies

Year/semester: /1

Types of classes: Classes,
Lecture

Number of hours in

semester: Classes: 30.00,

Lecture: 10.00

Language of

instruction: English

Introductory subject: NA

Prerequisites: Basic

knowledge of cell biology

**Name of the organisational
unit conducting the**

course: Katedra Histologii i

Embriologii Człowieka

Person responsible for the

realization of the course: dr

Jacek Kieżun, dr hab. n. med.

Janusz Godlewski, prof. UWM,

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Kmieć

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Additional remarks: Classes

in small groups (up to 11

persons).

Symbols for outcomes related to the discipline:

M/NMA_P7S_WG+++

Symbols for outcomes related to the field of study:

B.U13.+ , A.U1.+ , A.U2.+ , A.W4.+ , A.W3.+ , A.W5.+ , K.2.+ , B.U10.+ , A.W2.+ , K.1.+ , A.W1.+

LEARNING OUTCOMES:

Knowledge:

W1 - In terms of knowledge, the graduate knows and understands anatomic, histological, and embryological nomenclature in the Polish and English languages

W2 - In terms of knowledge, the graduate knows and understands: the basic cell structures and their functional specialisations

W3 - In terms of knowledge, the graduate knows and understands the microarchitecture of tissues, extracellular matrix, and organs

W4 - In terms of knowledge, the graduate knows and understands the stages in the development of the human embryo, the composition and functions of the foetal membranes and the placenta, the stages in the development of individual organs, and the impact of harmful factors on the development of the embryo and foetus (teratogenic)

W5 - In terms of knowledge, the graduate knows and understands the methods of intercellular communication and of the communication between the cell and the extracellular matrix, and the signal transduction pathways in cells, plus examples of disturbances in the processes leading to the growth of neoplasms and other diseases

Skills:

U1 - In terms of skills, the graduate can operate an optical microscope, including the use of immersion

U2 - In terms of skills, the graduate can: recognise the histological structures corresponding to organs, tissues, cells, and cell structures in the images of the optical or electronic microscope, describe and interpret their structure and the relationships between their composition and function

U3 - In terms of skills, the graduate can use databases, including those available on the Internet, and find the necessary information with the available tools

U4 - In terms of skills, the graduate can plan and perform simple scientific studies, interpret its results, and draw conclusions

Social competence:

K1 - In terms of social skills, the graduate is prepared to perceive and recognise own limitations, and assess his/her deficits and educational needs

K2 - In terms of social skills, the graduate is prepared to use objective sources of information

TEACHING FORMS AND METHODS:

Classes(W1;W2;W3;W4;W5;U1;U2;U3;U4;K1;K2;):Classes

(W1;W2;W3;W4;W5;W6;U1;U2;U3;K1;K2;): Multimedia presentations (PowerPoint presentations) preceding the practical part. Microscopic analysis of histological slides. The teaching process is supported by tablets and remote education systems based on MS Teams platform (lectures, communication), Moodle (teaching materials, practical tasks, practical tests and colloquia) and CaseCenter (virtual digital microscopy). Students identify histological structures on slides using light microscopy and/or using virtual digital microscopy.

Lecture(W1;W2;W3;W4;W5;U4;K1;K2;):Lecture

(W1;W2;W3;W5;U2;U3;K1;K2;):Multimedia presentation (PowerPoint presentation) using remote learning platforms (MOODLE, MS TEAMS).

FORM AND CONDITIONS OF VERIFYING LEARNING OUTCOMES:

Classes (Written test) - A short test on a given topic is carried out at the beginning of the classes (5 open questions, included 2 open questions on the presented diagrams/figures, 8 minutes, 1 point each for a correct answer). (W1;W2;W3;W4;W5;K1;K2;); -

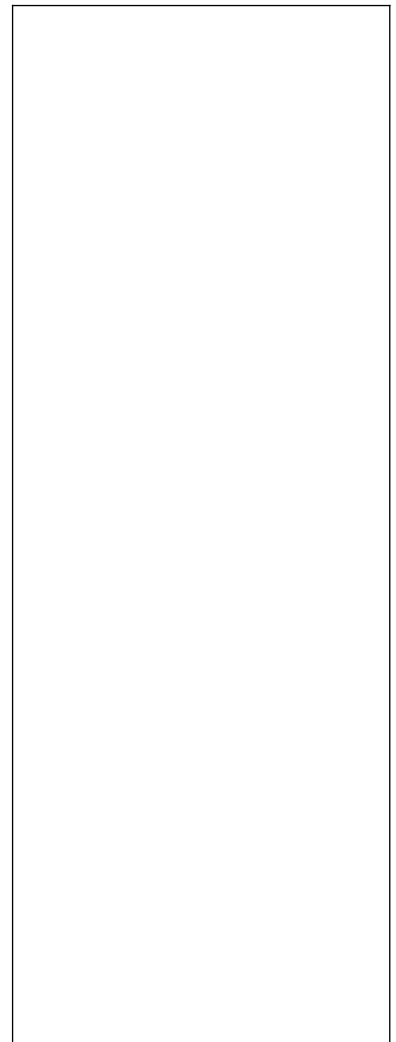
Classes (Presentation) - In the case of classes using a microscope the student shall perform a practical tasks in which students recognize and describe cells and structures within cells or extracellular matrix on a microscopic images or/and electronograms. The practical task is graded on a scale from 0 to 4 (4 points for a faultless task). W1, W2, U1, U2, K1, K2 -

Lecture (Colloquium test) - After all lectures and classes theoretical colloquium is organized (60 questions: 40 test questions - one-choice test, 8 short answer questions and 12 open questions on the 6 presented diagrams/figures; 1 point each for a correct answer, 80 minutes). A. To pass the Course, two requirements must be met simultaneously: 1) a minimum of 60% of the points obtained for the classes (short tests + practical tasks) and 2) a minimum of 60% of the points obtained for theoretical colloquium. For students who have not fulfilled the requirements of the regulations at the end of a given semester, revision theoretical colloquium (additional retake credit) is organized. The pass mark is 60% of the correct answers. -

BASIC LITERATURE:

1. A.L. Mescher, *JUNQUEIRA'S Basic Histology, Text Atlas*, Wyd. Edra and Urban, R. 2020, s. 15e
2. Chandar, Viselli, *Cell and Molecular Biology*, Wyd. Lippincott Illustrated Reviews, R. 2018, s. 2nd ed

SUPPLEMENTARY LITERATURE:



Detailed description of ECTS credits awarded - part B

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CYTOPHY
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Cytophysiology

The number of ECTS credits awarded consists of:

1. Contact hours with the academic teacher:

- participation in: Classes	30.0 h
- participation in: Lecture	10.0 h
- consultation	2.0
	Total: 42.0 h.

2. Independent work of a student:

Preparing for classes based on textbooks and providing materials.	30.00 h
Perform practical tasks.	3.00 h

Total: 33.0 h

contact hours + independent work of a student Total: 75.0 h

1 ECTS credit = 25-30 h of an average student's work, number of ECTS credit = 75.0 h : 25.0 h/ECTS = 3.00 ECTS on average: 3.0 ECTS

- including the number of ECTS credits for contact hours with the direct participation of an academic teacher: 0,00 ECTS points,

- including the number of ECTS credits for hours of independent work of a student: