



Mechanisms of organ formation and congenital malformations development

Mechanizmy rozwoju narządów i powstawania wad

1. IMPRINT	
Academic Year	2026/2027
Department	Faculty of Medicine
Field of study	Medicine
Main scientific discipline	Medical sciences
Study Profile	General academic
Level of studies	Uniform MSc
Form of studies	Full time studies
Type of module / course	Obligatory (elective course)
Form of verification of learning outcomes	Credit
Educational Unit / Educational Units	Department of Histology and Embryology Center for Biostructure Research 02-004 Warsaw, Chałubińskiego 5 Str.(Anatomicum bldg.) Web site: http://histologia.wum.edu.pl Department office is open for students on working days. Business hours 9: 30 - 14: 00, phone 22 629-5282.
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2. BASIC INFORMATION				
Year and semester of studies	I-V year, summer and winter semester		Number of ECTS credits	2.00
FORMS OF CLASSES		Number of hours	ECTS credits calculation	
Contacting hours with academic teacher				
Lecture (L)				
Seminar (S)		30	1.20	
Classes (C)				
e-learning (e-L)				
Practical classes (PC)				
Work placement (WP)				
Unassisted student's work				
Preparation for classes and completions		20	0.80	

3. COURSE OBJECTIVES	
O1	The aim of the course is to provide knowledge about the development of the human body. The scope of the subject complements the knowledge of general embryology and presents in details: - the principles and mechanisms of morphogenesis and dysmorphogenesis, - the methods used for prenatal diagnosis and treatment of fetus in utero as well as the main factors causing birth defects, - the mechanisms of molecular regulation of organ development the disturbances of molecular mechanisms leading to selected, most common, congenital malformations
O2	This is the background for further understanding the basis of birth defects in patients encountered by students at many clinics

4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING

Code and number of effect of learning in accordance with standards of learning	Effects in time <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>
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Knowledge – Graduate* knows and understands:

A.W1	A.W1 Student should know anatomical histological and embryological nomenclature in Polish and English
A.W2	A.W2 Student knows the structure of the human body in the topographic approach
A.W6	A.W6 Student should know developmental stages of human embryo, composition and function of fetal membranes and placenta, as well as developmental stages of systems and organs
B.W22	B.W22 Student should know physiology and regulation of reproductive functions of women and men

Skills– Graduate* is able to:

A.U5	A.U5 Student should be able to use anatomical, histological and embryological nomenclature in oral and written expression.
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* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

5. ADDITIONAL EFFECTS OF LEARNING

Number of effect of learning	Effects of learning in time
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Knowledge – Graduate knows and understands:

K1	perceiving and recognizing own limitations and self-assessment of deficits and educational needs
K2	readiness to use objective sources of information

Skills– Graduate is able to:

S1	
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Social Competencies – Graduate is ready for:

SC1	The student is aware of his own limitations and the ability to constantly learn
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6. CLASSES

Form of class	Class contents	Effects of Learning
S1	Fertilization, implantation, development of the trilaminar embryonic disc. Immunology of pregnancy.	A.W1; A.W2; A.W6; A.U5

S2	Principles and mechanisms of morphogenesis and dysmorphogenesis. Prenatal diagnosis.	A.W1; A.W1; A.W6; A.U5
S3	Development of the musculoskeletal system and of the skin and its derivatives. Mechanisms of molecular regulation of the somites differentiation and segmentation as well as bones and muscles formation. Development of the skull, vertebrae, the vertebral column, sternum, ribs and skeletal muscles. Molecular control of the development of the skin and its derivatives. Selected congenital malformations of the musculoskeletal system and anomalies of the skin and its derivatives.	A.W1; A.W2; A.W6; A.U5
S4	Development of the head and neck. Differentiation of the pharyngeal apparatus: pharyngeal arches, clefts, and pouches. The molecular control of face, nasal and oral cavities, tongue, thyroid gland and salivary glands formation. Congenital anomalies in the head and neck region.	A.W1; A.W2; A.W6; A.U5
S5	The main processes involved in the formation of the nervous system. Neural tube differentiation and development of the spinal cord. Formation of the peripheral nervous system.	A.W1; A.W2; A.W6; A.U5
S6	Brain vesicle development. Selected birth defects of the central and peripheral nervous system. Development of sense organs - eye and ear.	A.W1; A.W2; A.W6; A.U5
S7	Body cavities and the respiratory system development. Differentiation of the conductive and respiratory portions of the respiratory system. Formation of lungs and respiratory tree. Development of the body cavities and serous membranes: pericardial, peritoneal and pleural cavities, diaphragm, mesenteries. Congenital malformations of the respiratory system. Developmental anomalies of the body cavities.	A.W1; A.W2; A.W6; A.U5
S8	Development of the cardiovascular system. Signalling and mechanisms controlling formation of the heart tube and further differentiation of the heart. Formation of the vasculature: arterial and venous systems. Fetal circulation and circulatory changes at birth. Development of the lymphatic system. Birth defects of the heart and vessels.	A.W1; A.W2; A.W6; A.U5
S9	Formation of the gastrointestinal system. Body folding. Signalling processes involved in the regionalization of primitive gut and its further development. Differentiation of foregut: formation of esophagus, stomach, liver, gallbladder, pancreas and spleen. Formation of the midgut (intestinal loop, cytodifferentiation of epithelium, outer intestinal wall and its innervation) and the hindgut. Selected congenital abnormalities of the gastrointestinal system.	A.W1; A.W2; A.W6; A.U5
S10	Development of the urogenital system. Molecular regulation of the urinary system formation: pronephros, mesonephros, metanephros. Formation of ureters, urinary bladder, urethra and prostate gland. Development of the genital system: molecular mechanisms and signalling controlling male and female gonads as well as genital ducts and external genitalia formation. Selected birth defects of the urinary and genital systems.	A.W1; A.W2; A.W6; B.W22; A.U5

7. LITERATURE

Obligatory

1. Sadler T.W. "Langman's medical embryology", last edition

Supplementary

1. Schoenwolf G.C., Bleyl S.B., Brauer P.R., Francis-West P.H. "Larsen's human embryology", 2015, fifth edition, Elsevier Churchill Livingstone

2. Moore K.L., Persaud T.V.N., Torchia M.G. "The developing human: Clinically oriented embryology", 2016, tenth edition, Elsevier

8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
A.W1; A.W2; A.W6; B.W22; A.U5	Description of a selected development disorder.	credit from the teacher

9. ADDITIONAL INFORMATION

The seminars will be held on Wednesday, in the Anatomicum building on T. Chałubińskiego Street – the time will be given later.

Regulations:

1. Attendance at classes is obligatory.
2. Absence in two classes is allowed, regardless of the reason for absence.
3. Absence of 3 seminars results in failure to pass the subject.

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ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.