



Mechanisms of organ formation and congenital malformations development Mechanizmy rozwoju narządów i powstawania wad wrodzonych

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
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 the effect of learning in accordance with standards of learning	Effects in the field of: <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 29th of September 2023)</i>
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Knowledge – Graduate* knows and understands:

A.W1.	structure of the human body in the topographical approach (upper and lower limb, chest, abdomen, pelvis, back, neck, head) and the functional approach (skeletal system, muscular system, urinary system, reproductive system, nervous system and sensory system, integumentary system); appropriate Polish and English anatomical, histological and embryological terminology
A.W3.	micro-architecture of tissues, extracellular matrix and organs
A.W4.	the stages of development of the human embryo, the structure and function of the membranes and placenta, the stages of development of the various organs and the effects of harmful factors on embryonic and foetal development (teratogenic)
C.W1.	the normal human karyotype and the different types of sex determination
C.W7.	genetic determinants of congenital malformations and selected rare diseases and the possibility of their prevention
E.W6.	basic fetal diagnosis and therapy

Skills– Graduate* is able to:

B.U8.	use medical databases and correctly interpret the information they contain to solve problems in basic and clinical sciences
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* In appendix to the Regulation of Minister of Science and Higher education from 29th of September 2023, „graduate”, not student is mentioned.

5. ADDITIONAL EFFECTS OF LEARNING

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

K1	
K2	

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.W3.; A.W4.; C.W1.; B.U8.; K.1
S2	Principles and mechanisms of morphogenesis and dysmorphogenesis. Prenatal diagnosis.	A.W1.; A.W3.; A.W4.; C.W1.; C.W7.; E.W6.;B.U8.; K.1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
S6	Brain vesicle development. Selected birth defects of the central and peripheral nervous system. Development of sense organs - eye and ear.	A.W1.; A.W3.; A.W4.; C.W7.; B.U8.; SC1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
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.W3.; A.W4.; C.W7.; B.U8.; SC1
S10	Development of the urogenital system. Molecular regulation of the urinary system formation: 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.W3.; A.W4.; C.W1.; C.W7.; B.U8.; SC1

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.W3.; A.W4.; C.W1.; C.W7.; E.W6.; B.U8.; K.1	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 of the block/semester/year should be allotted for students to fill out the Survey of Evaluation of Classes and Academic Teachers