University of Gdańsk

Subject card

Subject name and code	Multicellular organisms - Human body organisation and physiology Foundation (M04_B2), PG_00196930		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	academic	Assessment form	exam
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Adam Iwanicki	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	68.0	0.0	0.0	0.0	0.0	68
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	68	5.0	27.0	100

Subject objectives	The subject provides detailed knowledge about the principles of cell organization into higher-order structures in the human body, biological processes related to cell functioning and the mechanisms of differentiation and specialization of human cells, tissues and organs in connection with their functions. The student will learn about human embryonic development and the proper features of the morphological structure and functioning of tissues, organs and human body systems. Advanced techniques and research tools used in this field of science will be presented.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHL3_W07] The graduate has advanced knowledge of the rules of operation and the possibilities of using research techniques and tools used in biotechnology.	The student knows advanced techniques and research tools used in researching cellular processes, imaging the morphological structure of tissues and organs, culturing mammalian cells and their genetic modifications.	[SW4] test/exam - oral or written
	[BIOTECHL3_W04] The graduate has an advanced level of knowledge on the structure and functions of the human body in terms of anatomy, histology and physiology and understands their importance for medicine and medical biotechnology.	The student has knowledge about human embryonic development, as well as the proper features of the morphological structure and functioning of tissues and individual organs and systems of the human body, which is important from the point of view of medicine.	[SW4] test/exam - oral or written
	[BIOTECHL3_W02] The graduate knows and understands at an advanced level selected processes at the cell, tissue, and organism level, important from the biological point of view	The student knows the principles of cell organization into higher-order structures in the human body, biological processes related to cell functioning and the mechanisms of differentiation and specialization of human cells, tissues and organs in connection with their functions.	[SW4] test/exam - oral or written
	[BIOTECHL3_W09] The graduate possesses structured and advanced knowledge of the terminology and concepts used in biological and medical sciences and related disciplines.	The student knows and is able to skillfully apply the concepts and terminology used in cell biology and used to describe the structure of cells, tissues and organs, their functioning and interactions.	[SW4] test/exam - oral or written

Subject contents	**F1. Mechanisms of differentiation and specialization of human cells/tissues/organs in connection with their functions:** - Principles of organizing cells into higher-level structures (introductory lecture). - Principles of the hierarchy of human structure (cells, cell connections, extracellular matrix, tissues, organs, body). - Cellular processes of division/proliferation, cell cycle and their regulation, types and structure of intercellular connections, differentiation and cell specialization, mechanisms of aging and cell death, transmembrane transport, intracellular transport. - Mechanisms of embryogenesis and morphogenesis of animal tissues and organs, reproductive cells and gametogenesis, stem cells, reprogramming somatic cells, cell replacement therapies. **F2. Types of human cells, tissues and organs overview:** - Microscopic techniques. - Epithelial tissue. - Connective tissue. - Skeletal connective tissue. Ossification. - Muscle tissue. - Nervous tissue. - Peripheral blood. Marrow blood. - Lymphatic system. **F3. Elements of human immunology at the cell and organism level:** - Evolution of the immune system. - Self-non-self recognition as the basis of the immune system, PAMPs, DAMPs, PRRs. - Mechanisms of non-specific immunity. - Mechanisms of specific immunity: B and T lymphocytes, histocompatibility complex, cytokines. **F4. The structure of the human body, including:** - Skeletal system. - Peripheral nervous system. - Circulatory system.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
F1: test	51.0%	60.0%
Comprehensive integrating exam	50.0%	40.0%

Recommended reading	Basic literature	Literature sources provided in the lecture materials. Anatomy teaching materials placed on the MUG's electronic educational platform Histologia, W. Sawicki, PZWL, 2012 Atlas histologiczny pod red. A. Myśliwskiego, OPERON, 2002 Gołąb J. i wsp. Immunologia, 2007, PWN, Warszawa Alberts i wsp. Podstawy biologii komórki. PWN 2009 lub nowsze wydanie Moore Keith L., Persaud T.V.N., Torchia Mark G. Embriologia i wady wrodzone. Elsevier Urban & Partner 2013. S. F. Gilbert. Developmental Biology Ed 7 or newer (online access).

	Supplementary literature	Immunologia (wyd. 2006) pod redakcją I.M. Roitt, Atlas histologii, Sobotta i Hammersen, Urban & Partner, 2002 Postępy biochemii, kwartalnik Postępy biologii komórki, kwartalnik Rosenberger CM, Finlay BB, Nat. Rev. Mol. Cell. Biol. 2003, 4:385-396 Gruenberg J, van der Goot FG, Nat. Rev. Mol. Cell. Biol. 2006, 7:495-504 Turk BE, Biochem J. 2007, 402:405-417 Haraga A, Ohlson MB, Miller SI, Nat. Rev. Microbiol. 2008, 6:53-66 Cornelis GR, Nat. Mol. Cell. Biol. 2002, 3:742-752 Hamon M, Biere H, Cossart P, Nat. Rev. Microbiol. 2006, 4:423-434 Baldari CT, Lanzavecchia A, Telford JL, TRENDS Immunol. 2005, 26:199-207 Mueller P, Pieters J, Immunobiol. 2006, 211:549-556 Abramovitch RB, Anderson JC, Martin GB, Nat. Rev. Mol. Cell. Biol. 2006, 7:601-611 World Health Organization.Laboratory biosafety manual. 3rd ed. (2004). Z. Grodziński. Embriologia dla studentów biologii. PWN 1970. J. Poulos. The limited application of stem cells in medicine: a review. Stem Cell Ressearch and Therapy (2018):9:1 Trounson A., McDonald C.. Stem Cell Therapies in Clinical Trials: Progress and Challenges. Cell Stem Cell 17 (2015). J.Z. Kubiak, M.A. Ciemerych. Od Gurdona do Yamanaki, czyli krótka historia reprogramowania komórek. Postępy Biochemii 59 (2) (2013). K. Filimonow, M. Krupa, A. Suwińska. Pierwsze decyzje rozwojowe różnicowanie komórek w przedimplantacyjnym zarodku myszy. Postępy biochemii 59 (2) (2013).
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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