University of Gdańsk

Subject card

Subject name and code	Neurobiology of development and aging, PG_00154577						
Field of study	Medical Biology						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2026/2027			
Education level	Bachelor's studies		Subject group	Obligatory subject group in the field of study Optional subject group 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	1.0			
Learning profile	academic		Assessment form	credit			
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Jan Kaczor				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	The objective of this course is to familiarize students with the maturation process of the central nervous system, methods of pediatric assessment, and the most common CNS disorders in childhood and old age. The course will cover developmental anomalies, dementia syndromes, and neurodegenerative diseases. It will also introduce theories of aging, the role of mitochondria, oxidative stress, and its impact on neurodegenerative diseases.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLMEDL3_W10] understands and describes the physicochemical and biological basis of health sciences	Understands the physicochemical and biological foundations of CNS aging processes, including mitochondrial function and the mechanisms of oxidative stress in the development of neurodegenerative diseases	[SW4] test/exam - oral or written
	[BIOLMEDL3_K01] understands the need for lifelong learning and to update his/her knowledge of medical biology and related disciplines	Understands the need to update knowledge in the fields of neurobiology, aging processes, and the mechanisms and risk factors associated with the development of neurodegenerative diseases	[SK4] test/exam - oral or written [SK8] observation of student's independent or team work
	[BIOLMEDL3_U15] learns independently, in a focused manner	Can independently expand and update knowledge concerning CNS development and aging, using scientific literature and other reliable sources of information	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[BIOLMEDL3_U07] is able to identify problems corresponding to the needs of an individual and a social group and to undertake basic diagnostic, preventive and educational activities appropriate to the profession of medical biologist	Can identify problems associated with disorders of CNS development and aging, and determine the importance of diagnostic, preventive, and educational impact in relation to neurodegenerative diseases	[SU4] test/exam - oral or written
	[BIOLMEDL3_W16] explains the theoretical basis of experimental methods and lists the most important techniques of biological sciences that can be applied to medical biology and diagnostics	It explains the theoretical foundations of methods for studying the development and functioning of the CNS and describes selected diagnostic methods used in the assessment of neurodevelopmental disorders and neurodegenerative diseases	[SW4] test/exam - oral or written
	[BIOLMEDL3_W11] posiada zaawansowaną wiedzę dotyczącą metod oceny stanu zdrowia oraz objawów i przyczyn wybranych zaburzeń i zmian chorobowych oraz zna podstawy zdrowego trybu życia, potrafi je uzasadnić i promować	Has knowledge of methods for assessing CNS function and recognizes the symptoms and explains the causes of, selected neurodevelopmental disorders and neurodegenerative diseases, taking into account their underlying mechanisms and risk factors	[SW4] test/exam - oral or written
	[BIOLMEDL3_K09] is ready to work with honesty and integrity in his scientific and professional work	Is ready to use knowledge concerning the development, aging, and diseases of the CNS in a reliable and responsible manner.	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[BIOLMEDL3_W06] describes, explains and compares systemic control mechanisms in animal and human organisms (including onto- and phylogenetic points of view) and the neurobiological and genetic basis of different disorders	It describes and explains the processes of maturation and aging of the CNS, characterizes the most common neurodevelopmental disorders and neurodegenerative diseases, and explains the role of mitochondria and oxidative stress in their pathogenesis	[SW4] test/exam - oral or written
	[BIOLMEDL3_K04] is able to form opinions about individuals and social groups in a professional context	Can formulate opinions on issues related to CNS development and aging, as well as neurodegenerative diseases, in individuals and social groups in the context of professional practice	[SK1] oral statement/conversation/ discussion
	[BIOLMEDL3_W03] knows the structure of the animal or human organism, the processes and functional relationships at the cellular, tissue, organ and organismal levels, and explains their relationship to behavior and adaptation of the organism to changing environmental conditions	Understands the physicochemical and biological foundations of CNS aging processes, including mitochondrial function and the mechanisms of oxidative stress in the development of neurodegenerative diseases	[SW4] test/exam - oral or written

Subject contents	General information on the maturation of the central nervous system. Basic methods of pediatric assessment and common CNS disorders in early life (prematurity, hypoxic-ischemic pathology), congenital and perinatal brain injuries: developmental anomalies, cerebral palsy. Basic symptoms and neurological syndromes in old age: stroke, dementia syndromes, neurodegenerative diseases, headaches, and back pain. Discussion of selected aging theories including reactive oxygen and nitrogen species - free radical theory of aging, the role of mitochondria. Aging of the body, oxidative stress, and the development of neurodegenerative diseases. The impact of diet and physical activity on slowing down the aging process and the development of neurodegenerative diseases. The importance of neurophysiological and neuroimaging studies in evaluating the central and peripheral nervous systems. The significance of biochemical and molecular biology research on the functions of nerve and glial cells, including the phenomena occurring in them and the mechanisms of information transmission.
Prerequisites and co-requisites	Courses in Human Functional Anatomy, Animal and Human Physiology, Functional Neuroanatomy, Neurophysiology Basic knowledge of neuroanatomy, neurohistology, and neurophysiology.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Attendance and activity on lectures	90.0%	0.0%
Exam essestment	51.0%	100.0%

Recommended reading	Basic literature	
	Supplementary literature	Teaching materials provided as part of the lectures.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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