KARTA PRZEDMIOTU

I. Dane podstawowe

Nazwa przedmiotu	Molekularne podstawy sygnalizacji komórkowej
Nazwa przedmiotu w języku angielskim	Molecular basics of cell signalling
Kierunek studiów	Biotechnologia
Poziom studiów (I, II, jednolite magisterskie)	I
Forma studiów (stacjonarne, niestacjonarne)	stacjonarne
Dyscyplina	biotechnologia
Język wykładowy	Grupy w języku polskim – język polski Grupy w języku angielskim – język angielski

Koordynator przedmiotu/osoba odpowiedzialna	Prof. dr hab. Ryszard Szyszka

Forma zajęć *(katalog zamknięty ze słownika)*	Liczba godzin	semestr	Punkty ECTS
Wykład			12
konwersatorium			
Ćwiczenia			
Laboratorium			
Warsztaty			
Seminarium	60	V, VI	
proseminarium			
Lektorat			
Praktyki			
zajęcia terenowe			
pracownia dyplomowa			
translatorium			
wizyta studyjna			

Wymagania wstępne	Passed courses in biochemistry with enzymology, molecular biology

II. Cele kształcenia dla przedmiotu

The goal of the seminar is to acquaint students with basic terms regarding cell mechanisms towards internal and external signals and mechanisms for their transmission between cells and intracellular.

III. Efekty kształcenia dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
WIEDZA		
W_01	The student knows the functions of molecules in cellular signalling	K_W01
W_02	The student knows the influence of molecules in signalling on organism The students obtains knowledge concerning cellular signalling pathways and their influence on cellular processes	K_W02
W_03	The student has knowledge in the field of basic laboratory techniques and research tools used in biochemistry and molecular biology	K_W06
UMIEJĘTNOŚCI		
U_01	The student learns independently in a targeted manner in the field related to his topic of bachelor thesis biotechnology, updates his knowledge and skills, applies new research techniques and plans his professional development	K_U07
U_02	The student participates in the debate on biochemistry and molecular biology issues using scientific language	K_U08
U_03	The student prepares an oral presentation of a selected topic in English using specialized terminology	K_U09
U_04	The student prepares his bachelor thesis on a selected topic in English using scientific language	K_U10
U_05	The student correctly concludes on the basis of data from various sources	K_U11
U_06	The student uses scientific literature and other sources of information, including electronic ones, in English or another modern language	K_U12
U_07	The student uses knowledge in the field of legal protection of intellectual property	K_U13
KOMPETENCJE SPOŁECZNE		
K_01	The student is aware of the importance to update his knowledge, he is open-minded for using modern technologies	K_K01
K_02	The student possesses the ability to make decisions	K_K06
K_03	understands and appreciates the importance of intellectual honesty in own and other people's activities, understands the need to protect intellectual property	K_K07

IV. Opis przedmiotu/ treści programowe

Mechanisms of information transmission by cells:
– endocrine signalling through hormones excreted into the blood and further transferred
– paracrine signalling through signalling molecules present in the intercellular environment in narrow distances (e.g. histamine in inflammatory reactions, growth factors
– nervous signalling
– through electric impulses
– signalling on the basis of direct contact, dependent on transmission of molecules by adjacent cells

Signal molecules and their groups. Big hydrophilic protein molecules and their receptors localized in the cell membrane. Structure of cell receptors and their function: – ionotropic receptors (connected with ion channel) – after binding of neurotransmitters ion channels are open, e.g. Na^+, K^+, Ca^{2+}, Cl^-; – metabotropic receptors (connected to G proteins); – catalytic receptors – often interacts with protein kinases – their binding with signalling molecules activates a cascade of further kinase phosphorylation Second messenger molecules and their importancejne Protein kinases and phophates, classification and role in signalling cascades. Cytokines and their role. Effects of disorders in the transmission and receiving signals – disorders in metabolism, cancerogenesis, uncontrolled cell death (apoptosis), disorders in cell differentation during development

V. Metody realizacji i weryfikacji efektów kształcenia

Symbol efektu	Metody dydaktyczne *(lista wyboru)*	Metody weryfikacji *(lista wyboru)*	Sposoby dokumentacji *(lista wyboru)*
WIEDZA			
W_01	Conversational lecture	Paper, oral exam	BSc thesis, protocol
W_02			
W_03			
UMIEJĘTNOŚCI			
U_01	textual analysis, discussion	Paper	BSc thesis
U_02 U_03	discussion, textual analysis	Presentation paper	Presentation rating card BSc thesis
U_04 U_05	discussion, textual analysis	paper	BSc thesis
U_06 U_07	textual analysis, discussion	presenation Paper	Presentation rating card BSc thesis
KOMPETENCJE SPOŁECZNE			
K_01 K_02	discussion	Paper	BSc thesis

VI. Kryteria oceny, wagi

Failed – absent during classes, not prepared properly to the classes, show no activity at the classes, master thesis is not written.
Passed – present during classes, properly prepared to the classes, actively contributes to the classes, contributes to discussions, master thesis is written.

VII. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	60
Liczba godzin indywidualnej pracy studenta	240

VIII. Literatura

Literatura podstawowa
1. Voet, D., Voet J. (2004) Biochemistry, Wiley 2. Berg, J.M., Tymoczko, J.L., Gatto, G.J., Stryer, L. (2015) Biochemistry Eighth edition
Literatura uzupełniająca
1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter, P. (2002) Molecular biology of the cell. Garland Publisher. 2. Articles in scientific journals