



KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
UNIVERSITAS BRAWIJAYA
FAKULTAS KEDOKTERAN
PROGRAM MAGISTER ILMU BIOMEDIK

Jalan Veteran, Malang 65145, Jawa Timur – Indonesia
 Telp. (62)(341) 569117; 567192 Pes. 134, 135 – Fax. (62)(341) 564755
 E-mail: sekr.fk@ub.ac.id Website: <http://biomedical.fk.ub.ac.id>

Teaching Plan

Course Title : Cell Molecular Biology
Course Code : MAB6103
Credits : 2
Course Coordinator : Edwin Widodo, S.Si., M.Sc.
 (Phone: 082234608052, email: edwin@ub.ac.id)

Course Description

This course was designed with overall goal is to introduce students to the important concepts and principles of cell molecular biology. Topics previously covered in earlier chemistry and biology courses will be expanded and placed in the context of the living organism. The key objective is to understand and apply concepts rather than merely memorize information. Subject areas covered include: the chemical and physical structures-functions of cell organelles; the self-assembly and dynamic structure of cytoskeletal filaments; molecular motors, the cytoskeleton and cell behavior; microtubule organization and dynamics; kinesin- and dynein-powered movements; signaling pathways that control gene activity; integration of signals and gene control; the cell cycle and cell growth control; cell cycle control system in mammalian cells; protein of the cells; and proteosomes and proteins.

Course Learning Outcomes

On successful completion of this course students will (be):		Bloom's Taxonomy
CLO1	Demonstrate a comprehensive understanding of the chemical and physical structures-functions of cell organelles (biomembranes, cytoplasm, ribosome, reticulum endoplasm, mitochondria, Golgi complex, lysosomes, centrosomes, vacuoles, nucleus/nucleolus, chromosomes and genes, chloroplasts; matrix extracellular and integrating cells into tissues) and the self-assembly and dynamic structure of cytoskeletal filaments, especially how cells regulate their cytoskeletal filaments (actin filament, microtubule, and intermediate filaments)	Level 2. Understanding
CLO2	Demonstrate a comprehensive understanding of the basic concepts of molecular motors, the cytoskeleton & cell behavior, microtubule organization and dynamics, kinesin- and dynein-powered movements, including molecular motors related cytoskeleton that leads cell movements, microtubule organization, Microtubule Associated Proteins (MAPs), microtubule dynamics and macromolecule powered movements inside the cell	Level 2. Understanding
CLO3	Demonstrate a comprehensive understanding of signaling pathways and cell cycle control system, including signaling pathways that control gene activity (JAK-STAT pathway; activation of Ras; MAP kinase pathways), integration of signals and gene control, the cell cycle and cell growth control for regulating mitotic-events and cell-cycle control system in mammalian cells	Level 2. Understanding
CLO4	Demonstrate a comprehensive understanding of protein of the cells, proteosomes and proteins, including protein targeting and protein sorting, protein processing and quality control in the endoplasmic reticulum, the importance of proteosomes – protein study for cell as the importance of genome-gene study	Level 2. Understanding
CLO5	Able to interpret the scientific paper relating to the understanding of the roles of cell function and cell system and communicate it through oral presentation.	Level 3. Applying
CLO6	Demonstrate self-directed learning and ethical standards for the intellectual activities.	Level 3. Applying

Links between CLO and PLO

	PLO1.1	PLO1.2	PLO2.1	PLO2.2	PLO2.3	PLO3.1	PLO3.2	PLO3.3	PLO3.4	PLO4
CLO1	√									
CLO2	√									
CLO3		√								
CLO4		√								
CLO5	√	√	√			√	√			√
CLO6							√			√



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Topic and Schedule

Week	Topics	Competences	Lecturers
1.	Signaling Pathways that Control Gene Activity	Able to explain JAK-STAT pathway; activation of Ras; MAP kinase pathways	SW
2.	Integration of Signals and Gene Control	Able to explain gene controlling for signal integration	SW
3.	Cell Cycle and Cell-Growth Control	Able to explain the molecular mechanisms for regulating mitotic-events	SW
4.	Molecular motors, the cytoskeleton & cell behavior	Able to explain molecular motors related cytoskeleton that leads cell movements	SP
5.	Microtubule organization and dynamics	Able to explain microtubule organization, Microtubule Associated Proteins (MAPs) and Microtubule dynamics;	SP
6.	Kinesin- and dynein-powered movements	Able to explain macromolecule powered movements inside the cell	SP
7.	Journal reading and oral presentation 1	Able to interpret the scientific paper relating to the understanding of the roles of cell function and cell system, then able to communicate effectively and succinctly through oral presentation	SP
8.	Mid-Term Examination		TEAM (SW+SP)
9.	The chemical and physical structures-functions of cell organelles	Able to explain biomembranes, cytoplasm, ribosome, reticulum endoplasm, mitochondria, Golgi complex, lysosomes, centrosomes, vacuoles, nucleus/nucleolus, chromosomes and genes, chloroplasts; matrix extracellular and integrating cells into tissues	SBS
10.	The self-assembly and dynamic structure of cytoskeletal filaments	Able to explain how cells regulate their cytoskeletal filaments (actin filament, microtubule & intermediate filaments)	SBS
11.	Cell-cycle control system in mammalian cells	Able to explain regulation and inhibition of cell cycling, and apoptosis mechanism	EW
12.	Proteosomes and protein	Able to explain the importance of proteosomes – protein study for cell as the importance of genome-gene study	EW
13.	Protein of the cell	Able to explain protein targeting and protein sorting	WI
14.	Protein of the cell	Able to explain protein processing and quality control in the endoplasmic reticulum	WI
15.	Journal reading and oral presentation 2	Able to interpret the scientific paper relating to the understanding of the roles of cell function and cell system, then able to communicate effectively and succinctly through oral presentation	EW
16.	Final Examination		TEAM (SBS+WI + EW)

Lecturers:

EW : Edwin Widodo, S.Si., M.Sc. (082234608052)*
 SBS : Sutiman Bambang S, Prof., SU., DSc. (08123306857)
 SP : Sofy Permana, Drs., MSc., DSc. (085259106803)
 SW : Sri Widyarti, Dr. Dra., MSi. (081333743333)
 WI : Widodo, S.Si., M.Si., Ph.D.Med.Sc. (081230017307)

Teaching and Learning Strategy

Core material will be delivered through lectures and/or online delivery systems, completed with an oral presentation of scientific journal reading.



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Assessment Methods

Type	Weighting	CLO Assessed	Description
Journal reading and oral presentation	20%	1/2/3/4, 5, 6	Students are assigned a scientific paper to review and describe as an oral presentation. The assessment will comprise a 1000 word executive summary (in English) of research paper or review from scientific journals; this assessment includes a 15 minutes presentation (in English) on the highlights of the journal followed by 10 minutes of discussion. Executive summary and presentation slides should be submitted via email 1 week after the oral presentation.
Written exam (mid)	40%	1, 2, 6	The examination will be exam on theoretical aspects of cell molecular biology.
Written exam (final)	40%	3, 4, 6	

Learning Sources

Essential reading/resources	<ol style="list-style-type: none">1. Molecular Biology of the Cell, 6th Edition, by Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts and Peter Walter. Publisher: Garland Science.2. Molecular Cell Biology, 7th Edition, by Harvey Lodish, Arnold Beck, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon and Matthew P. Scott. Publisher: W. H. Freeman
Further reading/resources	Scientific Journals (Cell, Nature, Nature Cell Biology, The New England Journal of Medicine).

Course Coordinator,

Edwin Widodo, S.Si., M.Sc.