



The Goodman
Faculty of Life Sciences
Bar-Ilan University

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Ultrastructure of the Cell 80548

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Academic year: 2022-2023 Semester: 1st Hours/credits: 3 hours lecture / 1.5 credits

Mandatory

Prerequisites: course 80-103

Year in program & how often given, if relevant: 3rd year undergraduate course given once a year

Course Overview – Short abstract: Selected topics on structure-function research in relation to human disease.

Learning outcomes – short descriptions: The course aims to provide understanding in cell biology and the molecular mechanisms regulating its functions. Special emphasis will be on understanding the relationship between organelle structure and function, communication between organelles, and how impairments of the molecular mechanisms lead to disease and organelle malfunction.

Assessment: Coursework and Grade structure: Numerical grade. 100% - final exam. Bonus up to 10 points - in class quizzes and exercises. Students must get 60 or more in the final exam in order to pass the course.

Week-by-Week content, assignments and reading

Lesson #	Subject	Reading and content
1	Protein folding and degradation (Chaperon, Lysosome, proteasome)	Molecular biology of the cell Fifth Edition p.387-396 ,397-400-voluntary. Scientific papers.
2	ER, protein targeting and processing, Translocon, post translational modifications, trans-membranal proteins.	Molecular biology of the cell Fifth Edition P.723-745. Scientific papers.

3	Transfer from ER to Golgi, Degradation of unfolded proteins, ERAD, ER stress, Unfolded Protein Response (UPR)	Molecular biology of the cell Fifth Edition p.739-742, 766-779 Scientific papers.
4	ER stress, Unfolded Protein Response (UPR) – apoptosis. Peroxisome structure and function.	Molecular biology of the cell Fifth Edition p.721-723 Scientific papers.
5	Cystic Fibrosis- protein degradation disease.	Scientific papers.
6	Communication between cellular organelles in calcium signaling	Molecular biology of the cell Fifth Edition p.912-916 Scientific papers.
7	Neurodegenerative disorders	Scientific papers.
8	Vesicular Transport	Molecular biology of the cell, chapter 13
9	Cytoskeleton- Actin, Microtubule	Molecular biology of the cell, chapter 16
10	Signal transduction- Receptor Tyrosine Kinases (RTKs)	Molecular biology of the cell, chapter 15
11	Structure and function of the Nucleus	Molecular biology of the cell, chapters 12, 17
12	Mitochondria structure and oxidative phosphorylation	Molecular biology of the cell, chapters 12, 14
13	Cancer characteristics	Scientific papers.
14		

Required text: shown in the table above.