

## Advanced Eukaryotic Cell Biology 1 – Inside the Cell

Title	Advanced Eukaryotic Cell Biology 1 – Inside the Cell
Semester	F2024
Master programme in	Molekylær biologi / Mathematical Bioscience / Chemical Biology / Mathematical Bioscience / Molecular Health Science
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at <a href="https://ruc.dk">ruc.dk</a>  Læs mere om uddannelsen og find din studieordning på <a href="https://ruc.dk">ruc.dk</a>

### REGISTRATION AND STUDY ADMINISTRATIVE

Registration	<p>Sign up for study activities at <a href="#">stads selvbetjening</a> within the announced registration period, as you can see on the <a href="#">Studyadministration homepage</a>.</p> <p>When signing up for study activities, please be aware of potential conflicts between study activities or exam dates.</p> <p>The planning of activities at Roskilde University is based on the recommended study programs which do not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programs, an overlap of lectures or exam dates may occur depending on which courses you choose.</p>
Number of participants	
ECTS	5
Responsible for the activity	Pia Nyeng ( <a href="mailto:pnnyeng@ruc.dk">pnnyeng@ruc.dk</a> )
Head of study	Lotte Jelsbak ( <a href="mailto:ljelsbak@ruc.dk">ljelsbak@ruc.dk</a> )
Teachers	
Study administration	INM Registration & Exams ( <a href="mailto:inm-exams@ruc.dk">inm-exams@ruc.dk</a> )
Exam code(s)	U60179

### ACADEMIC CONTENT

Overall objective	Theoretical course in eukaryotic cell biology aiming to give the students a broad knowledge and understanding of form and function of cellular compartments and organelles as well as intracellular regulatory mechanisms
Detailed description of content	<p>Content:</p> <p>We will discuss essential components and processes INSIDE the cell. The aim is to provide an overview of how the inner mechanisms of the cell support each other. We will follow a flow according to the central dogma: 1) Processes and components in the nucleus (DNA/mRNA) 2) Processes and components in the endomembrane system 3) How are the cellular processes coordinated and organized? (Signaling/Cytoskeleton).</p> <p>In problem-solving workshops we will practice how to interpret research data and form hypotheses within cell biology, enabling students to develop ideas for master thesis projects in cell &amp; molecular biology.</p> <p>Topics include:</p> <p>Molecular structure of chromosomes, Control of gene expression, Membrane structure and transport, Biosynthesis and organelle sorting, Intracellular vesicular trafficking, Cytoskeleton, and Cell signaling.</p>
Course material and Reading list	<p>All course literature is in English. Textbook: "Molecular Biology of the Cell", Alberts et al. 6.ed., Garland Science 2015. ISBN 9780815344643.</p> <p>The curriculum also includes research papers, reviews, and movies, which will be mentioned in the course schedule on Moodle.</p>
Overall plan and expected work effort	<p><b>Study intensity:</b></p> <ul style="list-style-type: none"> <li>• Exam 3 hrs</li> <li>• Lectures 26 hrs</li> <li>• Problem solving and theoretical exercises 6 hrs</li> <li>• Question time 2 hrs</li> <li>• Preparation 98 hrs</li> </ul> <p>- Total 135 hrs</p> <p><b>Teaching and learning activities</b></p> <ul style="list-style-type: none"> <li>• Lectures, Interactive quizzes, Problem solution in groups</li> </ul>
Format	
Evaluation and feedback	<p>The course includes formative evaluation based on dialogue between the students and the teacher(s).</p> <p>Students are expected to provide constructive critique, feedback and viewpoints during the course if it is needed for the course to have better quality. Every other year at the end of the course, there will also be an evaluation through a questionnaire in SurveyXact. The Study Board will handle all evaluations along with any comments from the course responsible teacher.</p> <p>Furthermore, students can, in accordance with RUCs 'feel free to state your views' strategy through their representatives at the study board, send evaluations, comments or insights from the course to the study board during or after the course.</p>

Programme	<p>The course includes a program with the following topics within eukaryotic cell biology. Each topic will be treated during lectures with active participation elements and concluded with a problem solving session.</p> <ol style="list-style-type: none"> <li>1) Genetic organization, regulation and expression</li> <li>2) Cellular membranes, compartments and vesicular trafficking</li> <li>3) Cellular organization and signaling</li> </ol> <p>A more detailed program is provided in Moodle</p>
<b>ASSESSMENT</b>	
Overall learning outcomes	<p>After completing the course, the students will be able to:</p> <ul style="list-style-type: none"> <li>• explain the organization and function of chromosomes, membranes, organelles and cytoskeleton in the eukaryotic cell</li> <li>• explain the organization, coordination, and regulation of processes in eukaryotic cells, including gene expression, intracellular protein sorting, vesicular traffic and cell signaling</li> <li>• discuss how experiments have contributed to the current principles of cell biology</li> <li>• compare the various functions of proteins in eukaryotic cells such as receptors, transport proteins, ion channels and cytoskeletal proteins</li> <li>• describe, analyze, and evaluate results from cell biology experiments</li> <li>• complete a theoretical review of the latest scientific literature in eukaryotic cell biology</li> <li>• formulate new scientific hypotheses as the starting point for a thesis project in eukaryotic cell biology.</li> </ul>
Form of examination	<p>Individual written invigilated exam</p> <p>The duration of the exam is 3 hours.</p> <p>Permitted support and preparation materials for the exam: Own notes (maximum 10 A4 size pages). Dictionaries and non-programmable pocket calculator.</p> <p>Assessment: 7-point grading scale</p>
Form of Re-examination	<p>Samme som ordinær eksamen / same form as ordinary exam</p>
Type of examination in special cases	
Examination and assessment criteria	<p>Individual written invigilated exam consisting of a main question of 50 points and 5 minor sub-questions of 10 points each. Questions are essay-style and will include data interpretation.</p> <p>Evaluation criteria: It will be assessed to which degree the student:</p> <ul style="list-style-type: none"> <li>• Explains and describes the organization and function of chromosomes, membranes, organelles and cytoskeleton in the eukaryotic cell</li> </ul>

- Explains and describes the organization, coordination, and regulation of processes in eukaryotic cells, including gene expression, intracellular protein sorting, vesicular traffic and cell signaling
- Compares and describes the various functions of proteins in eukaryotic cells such as receptors, transport proteins, ion channels and cytoskeletal proteins
- Describes, analyzes, and evaluates given results/data from cell biological experiments and uses own conclusions to formulate scientific hypotheses
- Uses appropriate scientific language and terms in English
- Fulfills all formal exam requirements as described on the front page of the exam set

Exam code(s)      Exam code(s) : U60179

Course days:

Hold: 1

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time            05-02-2024 08:15 til  
05-02-2024 10:00

location    11.2-047 - gl. natfagsal (65)

Teacher    Peter Kamp Busk ( pbusk@ruc.dk )  
Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time            09-02-2024 08:15 til  
09-02-2024 10:00

location    11.1-047 - studiesal (40)

Teacher    Peter Kamp Busk ( pbusk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time            12-02-2024 08:15 til  
12-02-2024 12:00

forberedelsesnorm      ikke valgt

forberedelsesnorm D-VIP	ikke valgt
location	11.2-047 - gl. natfagsal (65)
Teacher	Peter Kamp Busk ( pbusk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time	15-02-2024 08:15 til 15-02-2024 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	11.2-047 - gl. natfagsal (65)
Teacher	David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB) - Note: Building 07

time	19-02-2024 10:15 til 19-02-2024 12:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	07.1-008 - undervisningslokale (60)
Teacher	David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time	22-02-2024 14:15 til 22-02-2024 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	11.1-047 - studiesal (40)
Teacher	Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time	27-02-2024 12:15 til 27-02-2024 14:00
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location 11.1-047 - studiesal (40)  
Teacher Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 01-03-2024 08:15 til  
01-03-2024 10:00  
location 11.1-047 - studiesal (40)  
Teacher Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 07-03-2024 08:15 til  
07-03-2024 10:00  
forberedelsesnorm ikke valgt  
forberedelsesnorm D-VIP ikke valgt  
location 11.2-047 - gl. natfagsal (65)  
Teacher David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 08-03-2024 08:15 til  
08-03-2024 10:00  
location 11.2-047 - gl. natfagsal (65)  
Teacher David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 12-03-2024 10:15 til  
12-03-2024 12:00  
forberedelsesnorm ikke valgt  
forberedelsesnorm D-VIP ikke valgt  
location 11.1-047 - studiesal (40)  
Teacher Ole Vang ( ov@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 14-03-2024 08:15 til  
14-03-2024 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 11.2-047 - gl. natfagsal (65)

Teacher Ole Vang ( ov@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 15-03-2024 08:15 til  
15-03-2024 10:00

location 11.2-047 - gl. natfagsal (65)

Teacher Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 18-03-2024 08:15 til  
18-03-2024 10:00

location 11.2-047 - gl. natfagsal (65)

Teacher David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 21-03-2024 08:15 til  
21-03-2024 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 11.2-047 - gl. natfagsal (65)

Teacher David Møbjerg Kristensen ( davidmb@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 - Question Hour (MHS, CB)

time 25-03-2024 08:15 til  
25-03-2024 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 11.2-047 - gl. natfagsal (65)

Teacher Ole Vang ( ov@ruc.dk )  
Peter Kamp Busk ( pbusk@ruc.dk )  
Pia Nyeng ( pnyeng@ruc.dk )  
David Møbjerg Kristensen ( davidmk@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 - Exam (MHS, CB)

time 27-03-2024 10:00 til  
27-03-2024 13:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 25.1-035 - teorirum 25.1 (130)

Teacher Pia Nyeng ( pnyeng@ruc.dk )

## Advanced Eukaryotic Cell Biology 1 - Reexam (MHS, CB)

time 15-08-2024 10:00 til  
15-08-2024 13:00

location 28b.0-01 - store teorirum (30) / 28b.0-05 - lille teorirum (20)

Teacher Pia Nyeng ( pnyeng@ruc.dk )