

Advanced Eukaryotic Cell Biology 1 – Inside the Cell

Title	Advanced Eukaryotic Cell Biology 1 – Inside the Cell
Semester	F2025
Master programme in	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 ruc.dk Læs mere om uddannelsen og find din studieordning på ruc.dk

REGISTRATION AND STUDY ADMINISTRATIVE

Sign up for study activities at [stads selvbetjening](#) within the announced registration period, as you can see on the [Studyadministration homepage](#).

When signing up for study activities, please be aware of potential conflicts between study activities or exam dates.

Registration

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.

Number of participants

ECTS 5

Responsible for the activity

Pia Nyeng (pnycng@ruc.dk)

Head of study Lotte Jelsbak (ljelsbak@ruc.dk)

Teachers

Study administration INM Registration & Exams (inm-exams@ruc.dk)

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

Content:

Detailed description of content 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).

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 & molecular biology.

Topics include:

Molecular structure of chromosomes, Control of gene expression, Membrane structure and transport, Biosynthesis and organelle sorting, Intracellular vesicular trafficking, Cytoskeleton, and Cell signaling.

Course material and Reading list All course literature is in English. Textbook: “Molecular Biology of the Cell”, Alberts et al. 7.ed., Norton & Company 2022. ISBN 9780393884852

The curriculum also includes research papers, reviews, and movies, which will be mentioned in the course schedule on Moodle.

Study intensity:

- Overall plan and expected work effort
- Exam 3 hrs
 - Lectures 26 hrs
 - Problem solving and theoretical exercises 6 hrs
 - Question time 2 hrs

- Preparation 98 hrs

- Total 135 hrs

Teaching and learning activities

- Lectures, Interactive quizzes, Problem solution in groups

Format

The course includes formative evaluation based on dialogue between the students and the teacher(s).

Evaluation and feedback 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.

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.

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.

Programme

- 1) Genetic organization, regulation and expression
- 2) Cellular membranes, compartments and vesicular trafficking
- 3) Cellular organization and signaling

A more detailed program is provided in Moodle

ASSESSMENT

Overall learning outcomes

After completing the course, the students will be able to:

- explain the organization and function of chromosomes, membranes, organelles and cytoskeleton in the eukaryotic cell
- explain the organization, coordination, and regulation of processes in eukaryotic cells, including gene expression, intracellular protein sorting, vesicular traffic and cell signaling
- discuss how experiments have contributed to the current principles of cell biology
- compare the various functions of proteins in eukaryotic cells such as receptors, transport proteins, ion channels and cytoskeletal proteins
- describe, analyze, and evaluate results from cell biology experiments
- complete a theoretical review of the latest scientific literature in eukaryotic cell biology
- formulate new scientific hypotheses as the starting point for a thesis project in eukaryotic cell biology.

Individual written invigilated exam

The duration of the exam is 3 hours.

Form of examination Permitted support and preparation materials for the exam: Own notes (maximum 10 A4 size pages). Dictionaries and non-programmable pocket calculator.

Assessment: 7-point grading scale

Form of Re-examination Samme som ordinær eksamen / same form as ordinary exam

Type of examination in special cases

Examination and assessment criteria 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.

Evaluation criteria: It will be assessed to which degree the student:

- Explains and describes the organization and function of chromosomes, membranes, organelles and cytoskeleton in the eukaryotic cell
- 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 11-02-2025 12:15 til
11-02-2025 14:00

location 15.0-003 - auditorie 15 (68)

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

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 14-02-2025 08:15 til
14-02-2025 10:00
location 15.0-003 - auditorie 15 (68)
Teacher Peter Kamp Busk (pbusk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 18-02-2025 12:15 til
18-02-2025 16:00
location 11.2-047 - gl. natfagsal (65)
Teacher Peter Kamp Busk (pbusk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 25-02-2025 12:15 til
25-02-2025 14:00
location 15.0-003 - auditorie 15 (68)
Teacher David Møbjerg Kristensen (davidmk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 28-02-2025 08:15 til
28-02-2025 10:00
location 07.1-008 - undervisningslokale (60)
Teacher David Møbjerg Kristensen (davidmk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 04-03-2025 12:15 til
04-03-2025 16:00
location 11.2-047 - gl. natfagsal (65)
Teacher David Møbjerg Kristensen (davidmk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 07-03-2025 08:15 til
07-03-2025 10:00
location 15.0-003 - auditorie 15 (68)
Teacher David Møbjerg Kristensen (davidmk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 13-03-2025 08:15 til
13-03-2025 12:00

location 11.2-047 - gl. natfagsal (65)

Teacher David Møbjerg Kristensen (davidmk@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 17-03-2025 12:15 til
17-03-2025 14:00

location 15.0-003 - auditorie 15 (68)

Teacher Pia Nyeng (pnyeng@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 21-03-2025 08:15 til
21-03-2025 10:00

location 15.0-003 - auditorie 15 (68)

Teacher Pia Nyeng (pnyeng@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 24-03-2025 14:15 til
24-03-2025 16:00

location 15.0-003 - auditorie 15 (68)

Teacher Ole Vang (ov@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 28-03-2025 08:15 til
28-03-2025 10:00

location 15.0-003 - auditorie 15 (68)

Teacher Ole Vang (ov@ruc.dk)

Advanced Eukaryotic Cell Biology 1 (MHS, CB)

time 31-03-2025 14:15 til
31-03-2025 16:00

location 11.2-047 - gl. natfagsal (65)

Teacher Ole Vang (ov@ruc.dk)
Pia Nyeng (pnyeng@ruc.dk)

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

time 03-04-2025 10:15 til
03-04-2025 12:00

location 11.2-047 - gl. natfagsal (65)

Ole Vang (ov@ruc.dk)

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

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

time 10-04-2025 11:00 til
10-04-2025 14:00

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forberedelsesnorm D-VIP ikke valgt

location 20.1-009 - teorirum (72) / 22.1-009 - undervisningslokale (72)

Teacher Pia Nyeng (pnyeng@ruc.dk)

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

time 15-08-2025 10:00 til
15-08-2025 13:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 28b.0-05 - lille teorirum (20)

Teacher Pia Nyeng (pnyeng@ruc.dk)