

## **KB5006\_Biokemi III**

“The life and death of a protein”

Autumn 2017

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Lectures are in KÖL, K439  
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### **Scope**

This course will follow the life and death of a protein. We will marvel at its birth on the ribosome, admire the complexities of its journey through the cell and be amazed at the intricacies of its folding and assembly into a functional unit. We will also explore how it functions to carry out biochemical processes. Ultimately we will wonder at the way the protein is degraded so that the cycle can be repeated. Along the way you will receive grounding in important methodologies to study proteins.

### **Course responsible**

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### **Responsible for practicals**

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### **Teachers**

Daniel Daley (DD)  
Tara Hessa (TH)  
Martin Högbom (MH)  
Mikael Oliverberg (MO)  
Martin Ott (MOtt)

### **Assistants**

Riccardo Diamanti (RD)  
Theresa Kriegler (TK)  
Marco Salvatore (MS)

### **Suggested reading**

- Lehninger: Principles of Biochemistry, 5<sup>th</sup>, 6<sup>th</sup> or 7<sup>th</sup> ed., Nelson & Cox
- Articles and handouts given by the lecturers

## Course schedule

Week	Day	Date	Time								
			9	10	11	12	1	2	3	4	
35	Mon	28-Aug	Course Introduction / Daniel Daley					Group works			
	Tues	29-Aug	Protein synthesis 1 / Martin Ott					Group works			
	Weds	30-Aug	Protein synthesis 2 / Martin Ott					Group works			
	Thurs	31-Aug	Group works					Group works			
	Fri	01-Sep	Group works					Group works			
36	Mon	04-Sep	Protein trafficking 1 / Daniel Daley					Group works			
	Tues	05-Sep	Group works					Group works			
	Weds	06-Sep	Protein trafficking 2 / Daniel Daley					Group works			
	Thurs	07-Sep	Group works					Group works			
	Fri	08-Sep	Protein assembly into complexes / Daniel Daley					Group works			
37	Mon	11-Sep	Protein structures 1 / Martin Högbom					Group works			
	Tues	12-Sep	Group works					Group works			
	Weds	13-Sep	Protein structures 2 / Martin Högbom					Group works			
	Thurs	14-Sep	Group works					Group works			
	Fri	15-Sep	Group works					Group works			
38	Mon	18-Sep	Protein turnover / Tara Hessa					Group works			
	Tues	19-Sep	Group works					Group works			
	Weds	20-Sep	Hand in group work assignment					Group works			
	Thurs	21-Sep	Group works					Group works			
	Fri	22-Sep	Presentation of group works_DD_Mott					Presentation of group works_DD_Mott			
39	Mon	25-Sep	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Tues	26-Sep	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Weds	27-Sep	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Thurs	28-Sep	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Fri	29-Sep	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
40	Mon	02-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Tues	03-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Weds	04-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Thurs	05-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Fri	06-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
41	Mon	09-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Tues	10-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Weds	11-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Thurs	12-Oct	Lab practicals (see separate schedule)					Lab practicals (see separate schedule)			
	Fri	13-Oct	Protein folding / Mikael Oliverberg					Lab practicals (see separate schedule)			
42	Mon	16-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Tues	17-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Weds	18-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Thurs	19-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Fri	20-Oct	Oral presentation of lab practicals					Oral presentation of lab practicals			
43	Mon	23-Oct	Pre-exam Q&A session_DD_TH					Pre-exam Q&A session_MH_Mott_MO			
	Tues	24-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Weds	25-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Thurs	26-Oct	Finalise lab reports and study for exam					Finalise lab reports and study for exam			
	Fri	27-Oct	Exam					Exam			

### **Group works**

The group works are designed to develop (1) the students' self-learning skills, (2) their ability to work in groups, and (3) their ability to present scientific concepts. All of these skills are important in the workplace.

Students will be divided into small groups and given an exciting and contemporary area of protein biogenesis to investigate. The group will then be expected to delve into the primary scientific literature and write a single report, which will be circulated to the class. They will also be expected to present a seminar to the class and answer questions. The scope of the projects is usually quite broad, but nevertheless the groups are encouraged to focus on molecular details and mechanisms.

### **Lab practicals**

There are three practicals in the course. These practicals are linked to the lectures and are designed to give you 'hands on' experience in protein chemistry. The practicals are compulsory. A separate schedule for practicals will be handed out at a later stage (once class numbers are known).

1. Practical 1: Computer analysis of protein 3D structure
2. Practical 2: Insertion of proteins into membranes
3. Practical 3: Assembly of proteins into complexes

Written laboratory reports should be submitted through Mondo (assignments / uppgifter) no later than 2 weeks after the lab has been completed. The lab instructors will provide feedback and corrections on these reports. The reports should be approved no later than 3 weeks after the course has finished.

### **Assessment**

Students will be assessed on three activities.

1. Group works-  
Students will be given a mark for their written report (5% of the course) as well as a mark for the oral presentation (5% of the course). There will also be questions in the exam related to these projects (10% of the course)
2. Laboratory practical's-  
Attendance at all labs is a requirement to pass the course and the reports must be completed within the designated time frame.
3. Theory-  
There will be a final exam consisting of short questions that are designed to assess the students' knowledge of material covered in the lectures (80% of the course). There will also be three questions on the material covered in the group works; you will be asked to answer two of these questions.