

Microbiology and Basic Molecular Biology HT20 15 ECTS. (5MO103, 3MB036)

31 August –1 November 2020

Course leader:

Felipe Cava (FC), felipe.cava@umu.se

Department of Molecular Biology, Building 6L

Additional lecturers:

Ellen Bushell (EB)

Barbara Sixt (BS)

Jennifer Pentz (JP)

David Cisneros (DC)

Johan Henriksson (JH)

Annika Bindler (AB), Studieverkstaden/Academic Research Centre.

Laboratory assistants:

David Cisneros (DC), david.cisneros@umu.se, main assistant

Barbara Riztl (BR)

Course administrator:

Lina Helgesson, lina.helgesson@umu.se, Department of Molecular Biology, Building 6L

Medical library: Helene Rova, helene.rova@umu.se

Course content

- I. Material produced by the department
- II. Literature/text books:

N. Parker, M. Schneegurt, A.T Tu, B. M. Forster, P. Lister (2016) “Microbiology” OpenStax

<https://openstax.org/details/books/microbiology>

Freely available as online version, pdf, print copy (order from amazon.co.uk or amazon.de) and iBook.
- III. Contents of lectures and seminars
- IV. Journal club - **MANDATORY (part of PPT 2 points)**
- V. Individual seminars – **MANDATORY (part of PPT 2 points)**
- VI. Labs: **ALL LABS ARE MANDATORY! (5 points)**

Mandatory exercises:

Labs, journal club and seminars are mandatory. Absence from lab course or other obligatory exercises due to illness should be reported to the course administrator immediately.

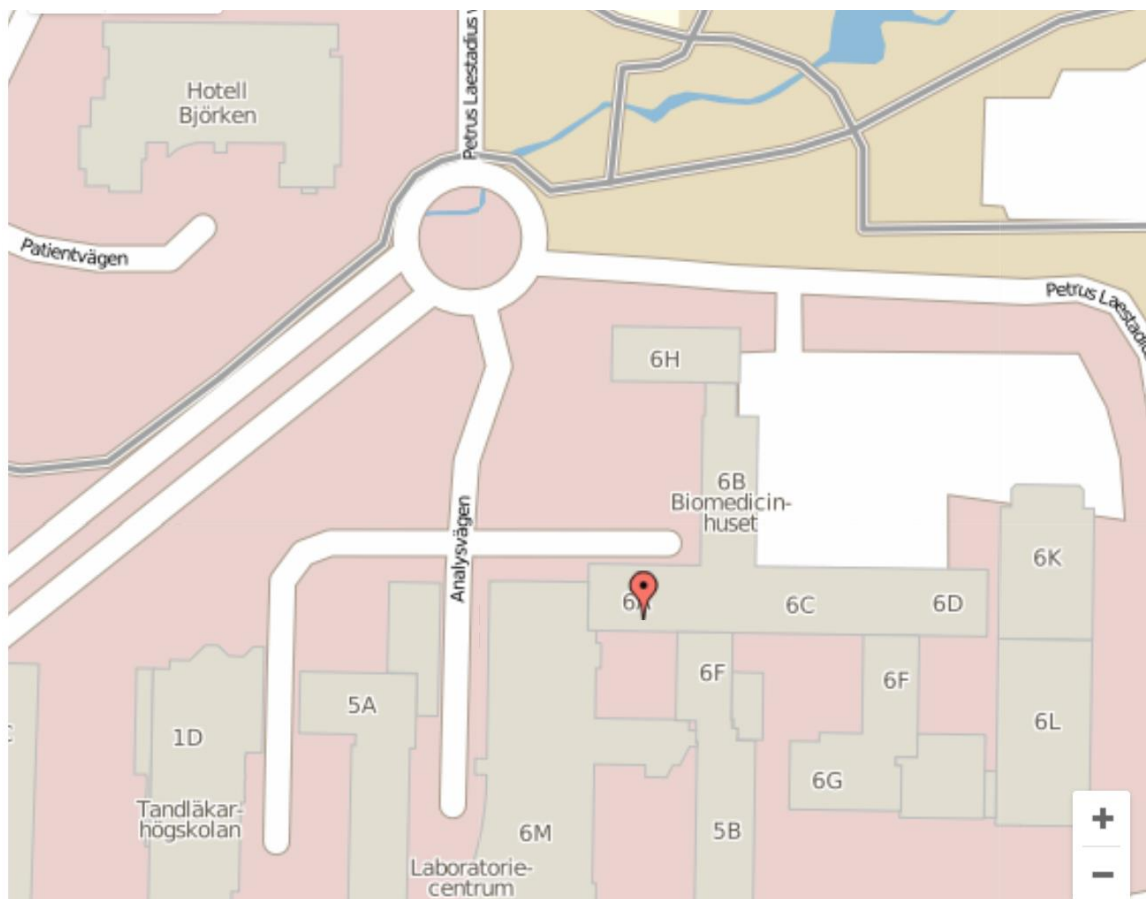
Organization

Due to the COVID-19 pandemic and according to the guidelines of Umeå University, all lectures and the article discussion will be conducted by Zoom. The laboratories and oral presentations will be held onsite. All presentations and additional resources will be uploaded to Cambro.

Oral presentations: Astrid Fagraeus Hörsal A 103 Unod R 1 (A103).
Building 6A

Laboratory: The laboratories will be held onsite at the Red and Green labs (Address: Försörjningsvägen 2B. 6L building, entrance (målpunkt): J. Floor: 1. Door: J11.), following all the necessary safety guidelines to ensure social distancing and reduced virus spread. Guidelines for the lab work will be provided during the “Lab introduction and safety” lecture.

Campus map: <http://www.umu.se/english/about-umu/campus-maps>



Exams (venue to be defined)

Mid-term exam (Dugga): Thursday 24 September. Not mandatory but recommended.

Exam: Friday 30 October

Re-exam: Saturday 5 December

IMPORTANT: Register no later than 10 working days before in Student web! (<https://www.umu.se/en/student/my-studies/examination/>)

Course goals (Expected study results, FSRs)

- Describe structure and function of prokaryotic and eukaryotic cells, and bacteriophages. Describe differences.
- Describe nutritional and energy requirements for cells (metabolism) and the principles underlying cell growth. How to measure cell growth.
- Describe the processes in the central dogma for information flow in the cell and provide examples of their regulation
- Describe the genetic material of bacteria and the mechanisms behind the origin of genetic variation and its consequences with regards to for example emergence and spread of antibiotic resistance and the evolution of pathogens
- Show theoretical knowledge and practical skills in basic microbiological and molecular methodology for safe work in a laboratory environment and avoidance of spreading microorganisms to the environment
- Within given time frames, search, collect, assess and critically interpret relevant scientific original literature in microbiology and molecular biology. Summarize and present results from original literature both in oral and written form.

Cambro – www.cambro.umu.se

Cambro is the learning platform used for this course. Here you can find information about the course, course materials and announcements. More information is available at <http://www.student.umu.se/english/about-cambro/>

Student web

In Student Web you will find your study records, your student e-mail, the consent service to get access to student discounts, the degree application service and many of the services provided by the University Library (UB). More information is available at <https://www.umu.se/en/student/my-studies/how-to-use-the-student-web/>

Schedule Microbiology and Basic Molecular Biology

5MO103/3MB036, 31 August –1 November 2020

DATE	TIME	LEARNING ACTIVITY	TEACHER	ROOM	MANDATORY
Week 36					
Mon 31/8	9:00-10:00	Welcome (biomedicine)	head of the Department	A103	
	10:15-11:15	Welcome (Life science)			
	13:00-15:00	Introduction to course and roll call	FC		Zoom/Cambro
		1. Introduction to microbiology and molecular biology	FC		Zoom/Cambro
		2. Microscopy	FC		Zoom/Cambro
Tue 1/9	09:00-12:00	3. Microbial growth and methodology	FC		Zoom/Cambro
		4. Cell structure	FC		Zoom/Cambro
Wed 2/9	09:00-12:00	5. Central dogma I. Replication and DNA	FC		Zoom/Cambro
		6. Central dogma II. Transcription and RNA	FC		Zoom/Cambro
Thu 3/9	09:00-12:00	7. Central dogma III. Translation and proteins	FC		Zoom/Cambro
		8. Central dogma IV. Regulation of translation, transcription, translation, growth	FC		Zoom/Cambro
		<i>Seminar topics</i>	FC		Zoom/Cambro
Fri 4/9		Self-study			
Week 37					
Mon 7/9	9:00-12:00	9. Regulation of gene expression	EB		Zoom/Cambro
		10. Mutation	EB		Zoom/Cambro

	13:00-15:30	Central dogma seminar I	FC/EB	Zoom/Cambro	
Tue 8/9	9:00-11:30	Central dogma seminar II	FC/EB	Zoom/Cambro	
Wed 9/9	9:00-12:00	Student sports day			
Thu 10/9	8:30-10:00	GROUP 1. Searching literature databases (ENGLISH)		University library U1	
	10:30-12:00	GROUP 2. Söka i litteratordatabaser (SVENSKA)		University library U1	
	14:00-15:30	11. Bacterial genetics and transfer of genetic materials	EB	Zoom/Cambro	
Fri 11/9	10:00-12:00	12. Microbial metabolism, Prokaryotic diversity and evolution <i>Seminar topics</i>	EB	Zoom/Cambro	
	14:00-15:00	13. Reading scientific literature and writing abstracts	FC	Zoom/Cambro	
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Week 38					
Mon 14/9	9:00-11:00	Antimicrobials, mechanisms of action	BS	Zoom/Cambro	
	13:00-14:30	15. Oral presentation	AB	Zoom/Cambro	
Tue 15/9	14:30-16:30	16. Lab introduction and safety	BR, DC	Zoom/Cambro	Mandatory
Wed 16/9	8:00-17:00	Lab 1	BR, DC	Red/Green labs	Mandatory
Thu 17/9	8:00-17:00	Lab 1	BR, DC	Red/Green labs	Mandatory
Fri 18/9	8:00-17:00	Lab 1	BR, DC	Red/Green labs	Mandatory

Week 39					
Mon 21/9	9:00-11:00	17. Genetic engineering	DC	Zoom/Cambro	
Tue 22/9	13:00-15:00	18. Signal transduction, chemotaxis	DC	Zoom/Cambro	
Wed 23/9		Self-study midterm exam			
Thu 24/9	9:00-11:00	Midterm exam		Venue to be defined	
Fri 25/9		Self-study - lab report writing			
Week 40					
Mon 28/9	9.00-12.00	19. Antimicrobial resistance	BS	Zoom/Cambro	
		20. Factors contributing to AMR, Risks to society	BS		
		21. Alternatives to antimicrobials	BS		
	13.00-16.00	Self-study Antimicrobial resistance			
Tue 29/9	8:00-17:00	Lab 2	BR, DC	Red/Green labs	Mandatory
Wed 30/9	8:00-17:00	Lab 2	BR, DC	Red/Green labs	Mandatory
Thu 1/10	8:00-17:00	Lab 2	BR, DC	Red/Green labs	Mandatory
Fri 2/10	9.00-12.00	Seminar Antimicrobial resistance	BS	Zoom/Cambro	
Week 41					
Mon 5/10	9:00-12:00	22. Biofilms and quorum sensing	JP	Zoom/Cambro	
		23. Microbial genomics	JP	Zoom/Cambro	
Tue 6/10	9:00-12:00	24. Eukaryotic microbes and differences from prokaryotes	EB	Zoom/Cambro	

		25. Viruses, phages, prions	EB	Zoom/Cambro	
Wed 7/10	9:00-11:00	26. Bacterial physiology, pathogenicity and host interactions	JP		
Thu 8/10		Self-study lab report, abstracts presentations		Zoom/Cambro	
Fri 9/10		Self-study (Journal club. Article reading)			
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Week 42					
Mon 12/10		Self-study lab report, abstracts, presentations Deadline lab report (1st)			Mandatory
Tue 13/10	9:00-12:00	Article discussion all groups	FC/EB	Zoom/Cambro	Mandatory
Wed 14/10	13:00-15:00	27. Bioinformatics	JH	Zoom/Cambro	
Thu 15/10	13:00-16:00	28. Bioinformatics seminar	JH	Zoom/Cambro	
Fri 16/10	14:00	Deadline seminar abstracts			
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Week 43					
Mon 19/10	9:30-12.00	Oral presentations 1/2	FC	A103	Mandatory
Tue 20/10	9:30-12.00	Oral presentations 3/4	FC	A103	Mandatory
Wed 21/10	9:30-12.00	Oral presentations 5/6	FC	A103	Mandatory
Thu 22/10	9:30-12.00	Oral presentations 7/8	FC	A103	Mandatory
Fri 23/10	9:30-12.00	Oral presentations 9/10	FC	A103	Mandatory

Week 44

Mon 26/10		Deadline lab report (2nd)		Mandatory
Tue 27/10		Self-study exam		
Wed 28/10		Self-study exam		
Thr 29/10		Self-study exam		
Fri 30/10	16:00-20:00	Exam	Venue to be defined	

Week 45

Mon 2/11		Deadline self-reflection		Mandatory
Mon 9/11		Deadline report (3rd)		Mandatory

Sat 5/12	09:00-13:00	Re-exam	Venue to be defined	
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