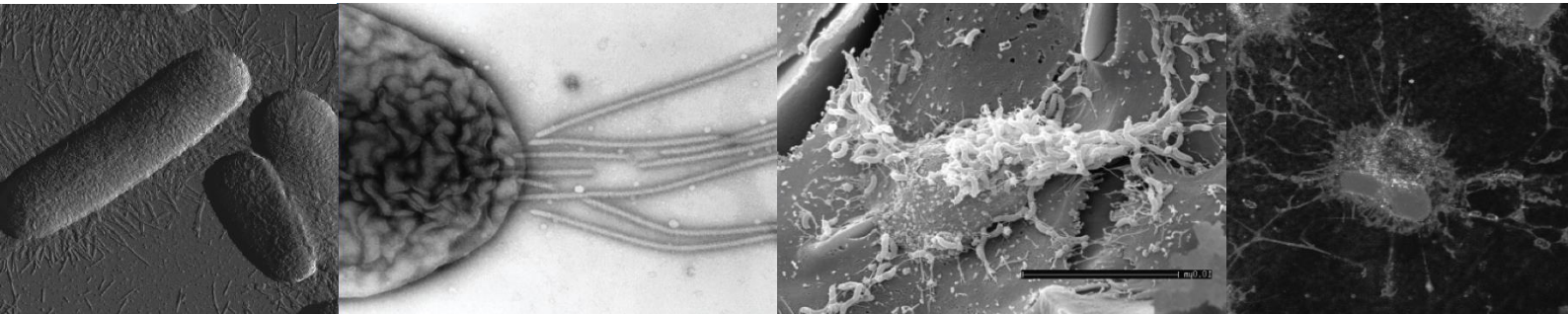


<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920



BACTERIAL PHYSIOLOGY & PATHOGENESIS, 7.5 ECTS

COURSE TIME: 30th September, 2021 –1st November, 2021

LOCATION: Lectures: Online via Zoom

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Practical (wet-lab): On-site in the “**Green**” and “**Red**” laboratories”, floor 1, Building 6L in the Department of Molecular Biology

Practical (dry-lab): Home studies, and On-site computer laboratory, **room Thymine / Uracil (6K-148)**, Building 6K in the Department of Molecular Biology

LITERATURE: For example:

1. Online resource: Todar’s Online textbook of Bacteriology at <http://www.textbookofbacteriology.net/index.html>
2. Online resource: Microbiology and Immunology Online at <http://pathmicro.med.sc.edu/book/bact-sta.html>
3. Online resource: N. Parker, M. Schneegurt, A.T Tu, B. M. Forster, P. Lister (2016) “Microbiology” Online at <https://openstax.org/details/books/microbiology>
4. Other material provided by the Department.

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

EXAMINATION: Monday, November 1st, 9.00-13.00, Östra Paviljongen

RE-EXAMINATION: Monday, December 10th, 16.00-20.00, Östra Paviljongen

COURSE LEADER: Sun NYUNT WAI
Phone: 785 6704; Email: sun.nyunt.wai@umu.se

Matthew FRANCIS
Phone: 785 6752; Email: matthew.francis@umu.se

ADMINISTRATOR: Ingela NILSSON / Lina Helgesson
Phone: 785 2869; Email: studieadm.molbiol@umu.se

LABORATORY ASSISTANTS: Julio Guerrero Castro (**JGG**)
Email: julio.guerrero@umu.se

Jennifer Pentz (**JPe**)
Email: jennifer.pentz@umu.se

LABORATORY SESSIONS: (Strictly Mandatory – performed individual)
“Genetic and physiological characterization of enriched bacterial isolates” (**JGG, JPe**)

LABORATORY EXAMINATION: (Strictly Mandatory – individual assessment)

- Oral presentation – 5 mins – highlighting the major objectives and achievements of the laboratory module, followed by a *viva voce* exam – 5 mins – where you will give a verbal defence of your oral presentation. (**Lab examination I**)
- Submission of **non-plagiarized** written answers to a laboratory quiz. (**Lab examination II**)
Answers are to be submitted electronically in Canvas under “Assignments”. (**JGG, JPe**)
- Submission of written answers to a **Dry Lab (Exercise 2)**
Answers are to be submitted electronically in Canvas under “Assignments”. (**MFr**)
- In addition, your own personal laboratory notebook **MUST** be utilized on every single laboratory session. It is also your responsibility to have this **CERTIFIED** (signed and dated) by a lab assistant (**JGG, JPe**) at the conclusion of **EVERY** laboratory session. You could think of this exercise as **examination III**.

Note: You **must** obtain a grade ‘G’ to gain credit for this laboratory module.

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

LECTURERS

Victoria SHINGLER (VSh)	<i>victoria.shingler@umu.se</i>
Kotryna SIMONYTĖ SJÖDIN (KSS)	<i>kotryna.simonyte@umu.se</i>
Jörgen JOHANSSON (JJo):	<i>jorgen.johansson@umu.se</i>
Matthew FRANCIS (MFr)	<i>matthew.francis@umu.se</i>
Sun NYUNT WAI (SNW)	<i>sun.nyunt.wai@umu.se</i>

LECTURER THEMES

Principles and Applications of Bacterial Diversity

- Bacterial Diversity (Lecture 1; SNW)
- Extreme Environments (Lecture 2; SNW)
- Bioenergetics (Lecture 3; MFr)

General Principles of Bacterial Regulatory Networks

- Transcriptional Regulation (Lecture 4; VSh)
- Signal Transduction by Two-Component Regulatory Systems (Lecture 5; VSh)
- Post-transcriptional Regulation (Lecture 6; JJo)
- Translational Regulation (Lecture 7; JJo)
- Post-translational Regulation (Lecture 8; SNW)

Important Physiological Processes

- Bacterial Stress Responses – Global Regulation (Lecture 9; VSh)
- Solute Transport (Lecture 10; MFr)
- Protein Secretion Systems (Lecture 11; MFr)
- Bacterial Motion (Lecture 12; VSh)
- Prokaryotic Differentiation and Development (Lecture 13; SNW)

Bacteria-Host Associations

- The human microbiota in health and disease (Lecture 14, KSS)
- Bacterial Pathogenesis I – pathogen evolution and the study of bacterial pathogens (Lecture 15; MFr)
- Bacterial Pathogenesis II– the infection process and virulence mechanisms (Lecture 16; SNW)
- Bacterial Pathogenesis III – bacterial responses to the host cell (regulating virulence) (Lecture 17; SNW)
- Bacterial Pathogenesis IV – treatment and prevention (Lecture 18; SNW)

TUTORIALS

Two tutorial sessions have been planned.

This time is allocated for **YOU** to address **YOUR** questions to the course leader and/or other participating lecturers. Make full use of this available time by ensuring your advanced preparation (i.e.: go through the lecture material before the tutorial).

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Remember that:

- a) *Social distancing practices are enforced during on-campus studies*
- b) *Stay at home if you exhibit any illness symptoms, even if minor! If the department via the student departmental hotline.*
- c) *Students work individually*
- d) *Students must attend, either in real life or online, all laboratory orientation/introductory sessions and the full duration of **every** experimental session*
- e) *Any absence, even for a short period, must be first reported to, and/or agreed upon by the Course assistant in charge (i.e. if healthy, you **cannot** come and go when you please)*
- f) *Laboratory notebooks are to be certified by a lab assistant at the conclusion of each session*

Please use any “free” time wisely!

Important Information:

- i. *Lab equipment is very expensive – use with extreme care and concentration. If you are unsure, ask how to use a particular piece of lab equipment properly.*
- ii. *In the labs, you will be potentially working with pathogenic bacteria deserving of your respect. Follow all advice given to you about safety precautions.*
- iii. *Treat your lab assistants with respect; it is not an easy job and they do have more laboratory experience than you do.*
- iv. *To be allowed to sit the exam, all laboratory examinations must be completed and/or submitted.*

During a fire alarm, evacuate promptly to the clearing, a safe distance from the outside entrance to building 6L.

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 39

(working week 1)

Thursday (30-09-2021)

09.00 – 09.45	Course orientation & Roll-call (SNW)	Online via Zoom
10.00 – 12.00	L1: “Bacterial Diversity” (SNW)	Online via Zoom
Lunch		
13.00 – 14.00	L2: “Extreme Environments” (SNW)	Online via Zoom

Friday (01-10-2021)

09.00 – 09.45	Laboratory Safety (SNW; JGG; JPe)	Online via Zoom
10.00 – 11.00	Introduction to the laboratory course Information concerning laboratory examination I (oral) examination II (written quiz) & examination III (notebook) (SNW; JGG; JPe)	Online via Zoom
Lunch		
13.00 – 15.00	L4: “Transcriptional Regulation” (VSh)	Online via Zoom

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 40

(working week 2)

Monday (04-10-2021)

08.30 – 17.00	Laboration: “ Exercise 1 – Dry lab ” (JGG; JPe)	Computer suite (Thymine / Uracil)
	Computational sequence data analysis (bacterial identity/ <i>clustal W</i> analysis)	
Group 1: 08.30 – 11.00	Group 2: 12.00 – 14.30	Group 3: 14.45 – 17.15

Remember to use your **laboratory notebook!**

NOTE: The endpoint for laboratory session times is our best estimation. The endpoint depends upon numerous variables – not in the least on your performance, and growth rates of bacteria and eukaryotic cells.

Study time:
Use it wisely!

Tuesday (05-10-2021)

09.00 – 11.00	Laboration: “ Exercise 2 – Dry lab ” (MFr; JGG; JPe)	Online via Zoom
	<i>In vitro</i> bacterial infection model – HeLa cell association and uptake assay Understanding of experimental context and raw data analysis	

Study time:
Use it wisely!

Wednesday (06-10-2020)

09.30 – 11:00	L5: “ Signal Transduction by Two-Component Regulatory Systems ” (VSh)	Online via Zoom
	Lunch	
13:00 – 14:30	L12: “ Bacterial Motion ” (VSh)	Online via Zoom

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Thursday (07-10-2020)

09.00 – 11.00 L6: **“Post-transcriptional Regulation”** (JJo) Online via Zoom

Lunch

13.00 – 15.00 L7: **“Translational Regulation”** (JJo) Online via Zoom

Friday (08-10-2018)

09.00 – 11.00 L8: **“Post-Translational Regulation”** (SNW) Online via Zoom

Lunch

12:00-15:00 L9: **“Bacterial Stress – Global Regulation”** (VSh) Online via Zoom

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 41

(working week 3)

Monday (11-10-2021)

09.00 – 11.30 L3: **“Bioenergetics”** (MFr) Online via Zoom

Lunch

13.30 – 16.00 L10: **“Solute Transport”** (MFr) Online via Zoom

Tuesday (12-10-2021)

09.00 – 11.30 L11: **“Protein secretion systems”** (MFr) Online via Zoom

Lunch

13.00 – 15.00 L13: **“Prokaryotic Differentiation and Development”** (SNW) Online via Zoom

Wednesday (13-10-2021)

13.00 – 15.00 L14: **“The human microbiota in health and disease”** (KSS) Online via Zoom

Study time:
Use it wisely!

Thursday (14-10-2021)

09.00 – 12.00 L15: **“Bacterial Pathogenesis I”** (MFr) Online via Zoom

Study time:
Use it wisely!

Friday (15-10-2021)

09.00 – 12.00 L16: **“Bacterial Pathogenesis II”** (SNW) Online via Zoom

Study time:
1) Literature study of sequenced bacteria; preparation for experimental plan discussions
2) Preparation of study questions for tomorrow’s first theory Q&A tutorial

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 42

(working week 4)

Monday (18-10-2021)

09.00 – 12.00 L17: **“Bacterial Pathogenesis III”** (SNW) Online via Zoom

Lunch

14.00 – 15.30 Q&A session: **“Tutorial I”** (SNW) Online via Zoom

Study time:

Remember to have a prepared literature study of you sequenced bacteria; be preparation for experimental plan discussions

Tuesday (19-10-2021)

09.00 – 09.45 Laboration tutorial I: **“Exercise 2 – Dry lab”** Online via Zoom
(MFr; JGG; JPe)

Q&A session to ensure progression through this Dry-lab exercise!

10.00 – 12.30 L18: **“Treatment and Prevention”** (SNW) Online via Zoom

Lunch

13.30 – 15.30 Laboration tutorial II: **“Day 1 – Wet lab”** Online via Zoom
(JGG; JPe)

Bacterial strain selection

Wet-lab discussions of experimental protocols and workflow

Discussion of laboratory etiquette (vital during Covid19 times)

Wednesday (20-10-2021)

08.30 – 12.30 Laboration: **“Group 1, Day 2” Wet lab** Laboratory (Red and Green)
(JGG; JPe)

Lunch

13.30 – 17.30 Laboration: **“Group 2, Day 2” Wet lab** Laboratory (Red and Green)
(JGG; JPe)

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Thursday (21-10-2021)

08.30 – 12.30	Laboration: “ Group 1, Day 3 ” Wet lab (JGG; JPe)	Laboratory (Red and Green)
---------------	---	----------------------------

Lunch

13.30 – 17.30	Laboration: “ Group 2, Day 3 ” Wet lab (JGG; JPe)	Laboratory (Red and Green)
---------------	---	----------------------------

Friday (22-10-2021)

Study time:

Preparation for Lab examinations I, II and III

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 43

(working week 5)

Monday (25-10-2021)

09.00 – 10.30 Laboration “round-up” (JGG; ETo) Online via Zoom

Study time:

- 1) Preparation for Lab examinations I, II and III
- 2) Preparation of study questions for Thursday’s second and final theory Q&A tutorial

Tuesday (26-10-2021)

08.30 – 14.30 Laboration examination – Part 1 (Note: Individual schedule will follow)

Group 1 (room Uracil)
SNW & JGG

Group 2 (room Thymine)
MFr & JPe

Lab examination I “Individual oral presentations (5 mins) followed by a *viva voce* exam – 5 mins)”

Lab examination III “Present your laboratory notebook to SNW (group 1) or MFr (group 2)”

Mandatory

Closed individual examination – Not open to an audience

Study time:

Preparation of study questions for Thursday’s second and final theory Q&A tutorial

Wednesday (27-10-2021)

Private study

Thursday (28-10-2021)

9.30 – 11.30 Q&A session: “**Tutorial II**” (SNW) Online via Zoom

Private study

Friday (29-10-2021)

Private study

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 44

(working week 6)

Monday (01-11-2021) “Theory Examination”

9:00-13:00 Location: Östra Paviljongen ÖP

24.00

Lab examination II deadline

“Written quiz responses”

(Responsible: JGG; JPe)

Submit electronically to the Canvas course site under “Assignments”:

Dry Lab – exercise 2 deadline

“Written responses”

(Responsible: MFr)

Submit electronically to the Canvas course site under “Assignments”:

<https://umu.zoom.us/j/65440298920>
Meeting ID: 654 4029 8920

Week 50

Monday (11-12-2021)

17:00-21:00

“Re-Examination”

Location: Östra Paviljongen ÖP

<https://umu.zoom.us/j/65440298920>
 Meeting ID: 654 4029 8920

Summary of course composition

Week 41	Week 42	Week 43	Week 44	Week 45	Week 51
Lectures					
	Tutorial (I)			Tutorial (II)	
Dry-lab exercises (individual work assignment) <i>mandatory</i>					
			Wet-lab exercises (individual work assignment) <i>mandatory</i>		
			Laboratory 'Round-up'		
				Laboratory Examination I <i>mandatory</i>	
				Laboratory Examination II <i>mandatory</i>	
				Theory exam (4h)	Theory Re-exam (4h)