

- Assignments last week
- Lab manual exercises
- Lab safety aspects
- Report writing

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**Laboratory
safety aspects**

20.9.2021

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Biohazard vs. biosafety



- How would you define these?
- Biohazard: a risk to human health or the environment arising from biological work, especially with microorganisms.
- Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards. Biosafety defines the containment conditions under which infectious agents can be safely manipulated.

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Biosafety levels (BSLs)

- Classification 1-4
- See e.g. <https://handling-solutions.eppendorf.com/sample-handling/centrifugation/biosafety/biosafety-levels-and-their-meaning/>
- Infectious material might include bacteria, viruses, cell cultures, parasites, or particular types of fungi.
- Which level our teaching lab is?
- Level 1 microbe definition: "GMOs or pathogens that are generally speaking harmless for humans"

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Protecting yourself and the others

- Biosafety is about protecting not only yourself but also others, the community and the environment
- Note that you are also protecting the experiment!
- For this lab course: read through the starting session lab rules, e.g.: Wear lab coat, goggles and gloves.
- Do NOT wear laboratory clothing outside the laboratory, e.g. in coffee rooms and toilets. Why?
- Do NOT wear open toe shoes. Why?
- Wash hands before leaving the laboratory.
- No eating or drinking in the lab.

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Transmission routes

- Which transmission routes of microbes out from the lab to different kinds of surfaces can you think of?
- Think about your hands before you touch any of the following or similar



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Good microbiological practices (GMP)

- consists of aseptic techniques and other good microbiological practices that are not uniformly defined but are necessary to prevent contamination of the laboratory with the agents being handled and contamination of the work with agents from the environment.

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Working area and procedures

- Aseptic work essential
- Aseptic vs. sterile

- Aseptic: A surface, object, product, or environment has been treated such that it is free of contamination. Bacteria, viruses, or other harmful living organisms cannot survive or reproduce.
- Sterile: A product that is completely free of microscopic organisms.

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How do you promote aseptic work while working in the lab?

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Working area

- The laboratory should be kept neat, clean and free of non-necessary materials.
- Work surfaces must be decontaminated after any spill and at the end of the day.
- All contaminated materials must be decontaminated before disposal or cleaning.
- Chemical decontaminants (e.g., bleach, EtOH) can be used to decontaminate lab benches.

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Procedures

- All procedures should be performed in a way that minimizes the formation of aerosols and droplets.
- Contaminated liquids must be decontaminated (chemically or physically) before discharge.
- All material (written documents etc.) that are expected to be removed from the laboratory need to be protected from contamination.
- All spills, accidents and exposures to infectious materials must be reported to the supervisor.

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Biosafety cabinet

- NOT a fume hood!
- What are the differences?

E.g.

- Air flow direction?
- Air originating from?



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Autoclave

An autoclave is a pressured vessel producing steam

Sterilization usually takes about 20 mins at 121°C

Dry or steam sterilization

Note that not some materials cannot be autoclaved
(Which?)

Attention: things are HOT when you remove them
from the autoclave

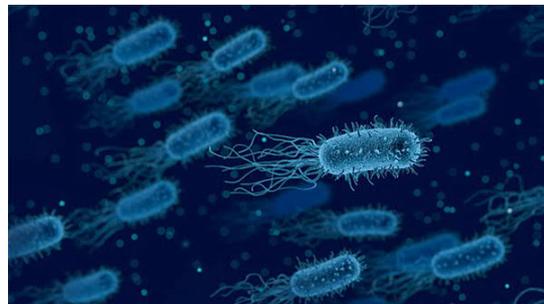
Proper training required for operating



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Know the microbes before you proceed

- Which organism? Prokaryote/eukaryote?
- Suitability to your research (e.g. genotype, expression efficiency)
- -> GMO status?
- How to order?
- Biosafety level required?
- Cultivation requirements?
- Waste disposal?



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Handling biological waste

- Where to dispose?
- What happens to the waste?

- In the lab, solid waste must be placed in a biohazard waste container with an autoclavable biohazard bag
- Liquids are inactivated either chemically (e.g., with bleach) or autoclave.
- Any liquids allowed to be disposed via conventional sink?

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Reporting

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- The summaries of your practical work can be kept short, but please take care of proper results presentation, interpretation, and discussion of potential mistakes.
 - Suggestion for the structure:
 - a) Aim (Why was the experiment performed?)
 - b) Method (What was done? You can link to this manual and mention possible changes.)
 - c) Result presentation (If possible, show figures and make sure that the reader has all the relevant information to understand the figure.)
 - d) Interpretation & Discussion (What do these results mean? Was the aim reached? If the experiment failed, please speculate about reasons and possible changes.)

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Remote sessions

- Tuesday, 10.15 am groups 2 and 3
- Wednesday, 10.15 am group 1

- First the new assignment about recombinant plasmid, then going through the PCR primer work

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