ETH Zürich – Institute of Environmental Engineering
Wang Lab

Biosafety

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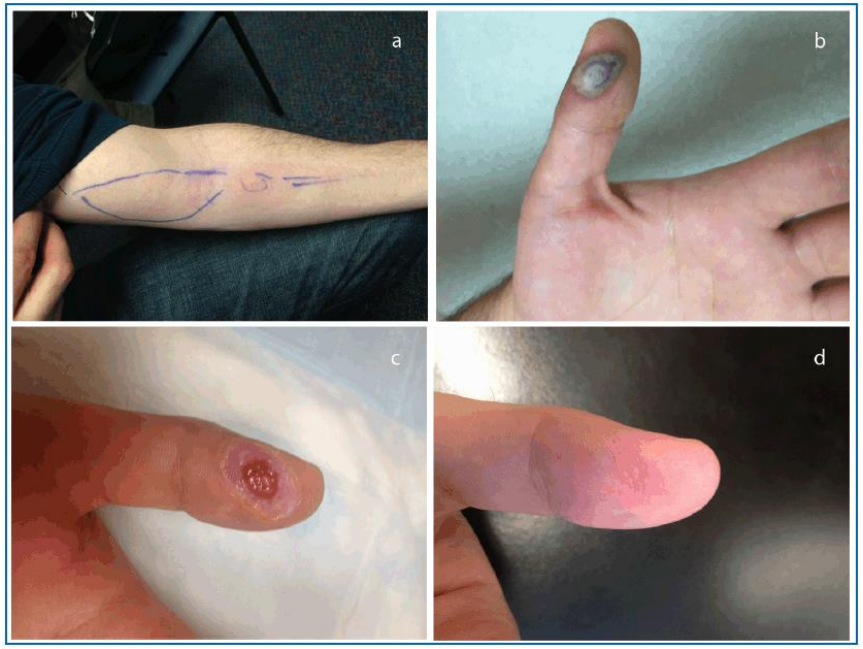
Overview

1. **Why Biosafety?**
2. How to protect yourself?
3. How to dispose of waste?
4. What to do in an emergency?

1. Why Biosafety?

Applies whenever you are working with a **living organism** or other **biohazard**



Lab aquired vaccinia-virus infections

Risk of exposure to yourself:
Infection with viruses or antibiotic resistance bacteria

Culling of livestock due to hand, foot and mouth disease escaped from a lab

Risk of biocontainment breach:
Spreading organisms or genetic material into the environment

1. Biosafety levels

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BSL-1

Microbes known to rarely cause disease

Minimal potential hazard:

Yeast, Skin bacteria

BSL-2

Microbes known to cause mild disease

Moderate potential hazard:

Herpes, Common cold

BSL-3

Microbes known to cause potentially deadly disease

Serious hazard:

SARS-CoV-2, Tuberculosis

BSL-4

Exotic microbes causing frequently deadly disease

High-risk hazard:

Ebola, Smallpox

1. Organisms in our Lab

BSL-1

- Bacterial cultures (antibiotic resistant *E. coli*)
- Mammalian cells (A549, MRC-5)

=> On any workbench

Infection with antibiotic resistant bacteria can cause:
- Diarrhea
- Stomach pain

BSL-2

- Coronavirus 229E (common cold)
- Environmental samples

=> Biosafety cabinet required

Infection with Coronavirus 229E can cause:
- headache
- fever
- cough

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2. How to protect yourself

- **Knowledge**:
  - Get training before you use an instrument
  - Check out our Website for more info

- **Personal Protective Equipment**:
  - Use a lab coat + gloves when working in the biolab
  - Remove them when leaving the lab

- **Behaviour:**
  - No eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food in the lab.
  - Limit touching your personal bags, clothes, phone in the lab

- **Hygiene**
  - Keep your workplace tidy
  - Disinfect surfaces after working
  - Disinfect your hands when leaving the lab

- **Infrastructure**:
  - Use the clean bench when working with BSL-2
  - Don’t take your experiments out of the lab
  - Label your experiments: “Name, Date, Content”

Infection routes:

- Direct skin contact, especially through open wounds
- Inhalation of aerosols or droplets
- Touching your face with contaminated hands

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3. Waste Management

Liquids:

Store in a safe container

Autoclave

or Disinfect by mixing in Ethanol or Bleach

Solids:

Collect in Biowaste bin with 2 bags

Autoclave at stocker lab

Sharps + Needles:

Do not dispose in regular waste

use the dedicated sharps container

3. Waste Management

Things to watch out for:

Antibiotics in liquid cultures:

Not all antibiotics are inactivated by autoclaving

⇒ check your antibiotics before you pour them into the sink

⇒ List is available on the Polybox

Do not autoclave Ethanol!

When inactivating bacteria, viruses or mammalian cells with ethanol, no autoclave step should be performed

Benchtop waste is also biowaste

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4. Spill managment

- Your safety goes first! Don’t endagner yourself to safe your experiment or equipment.
- Look out for shards of glass
- Equip shoe covers if there are splashes

1. Disinfect by pouring ethanol first around and then on the spill
2. Use paper towels to soak up the spill
3. Use a dustpan to transport the wet towels and shards

Dispose in the biowaste

5. Emergencies

General Emergency:

Call 888 (landline) or 044 342 11 88 (Handy)

safe this as a contact!

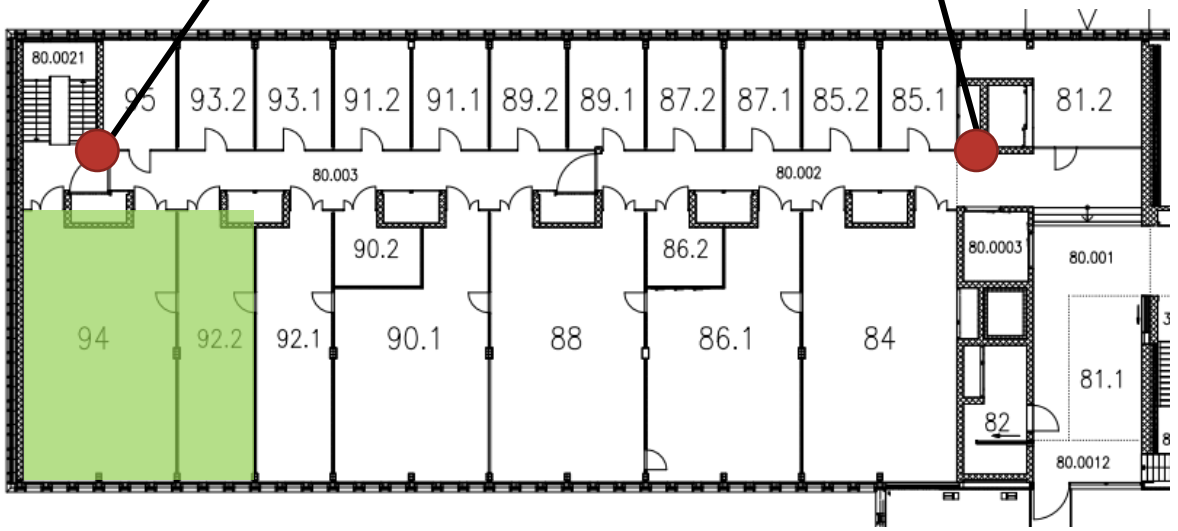
Small Injuries:
first-aid kit mounted on the wall at the end of the hallway, next to our lab

Eye injuries:
Eye showers are mounted next to every sink

Gas alarm:
Gas Sensor panel is in the hallway opposite to the elevator

First-aid kit

Gas alarm



Got everything?

- You’re just done with your experiment. What should you do before you leave the lab?
- How do you get rid of biowaste?
- You’ve just spilled a sample on the floor, what do you do?

Thank you for your attention!

and stay safe