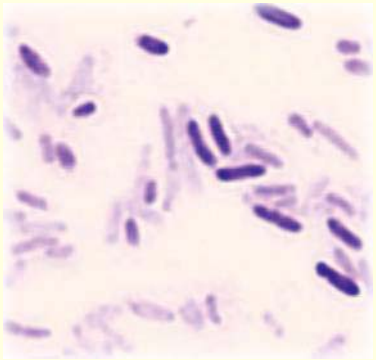
Biosafety Practices for the Microbiology Laboratory

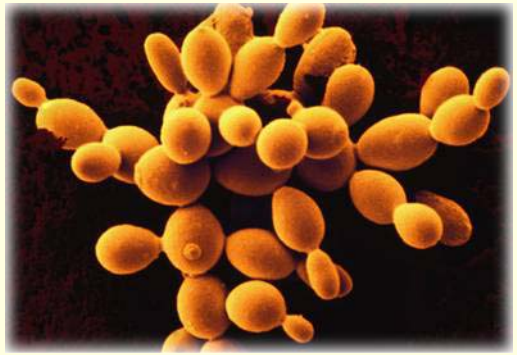
A Guide for Microbiology Students

What are microbes?

- Microorganisms such as bacteria, yeast and other fungi, viruses, and protozoans



Bacteria:
Escherichia coli

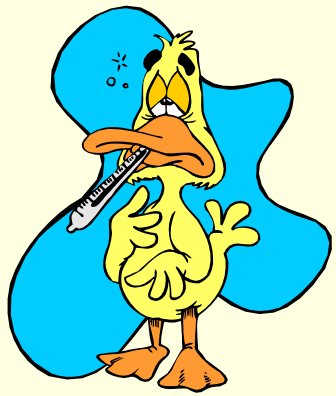


Fungus:
Saccharomyces

Protozoan:
Trypanosoma

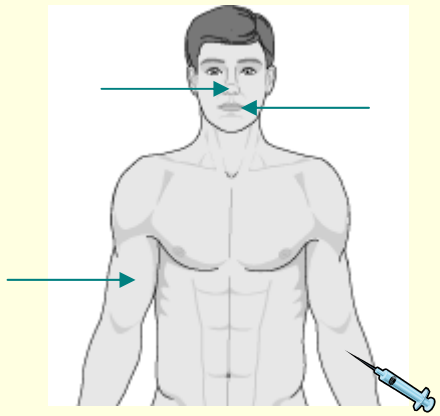
Why do we need special handling for microbes?

- Some microbes can cause infectious diseases
- Special protocols must be implemented to minimize the risk to students, faculty, and staff



Potential Routes of Transmission

- Contact with skin and mucous membranes
- Ingestion
- Inhalation
- Inoculation

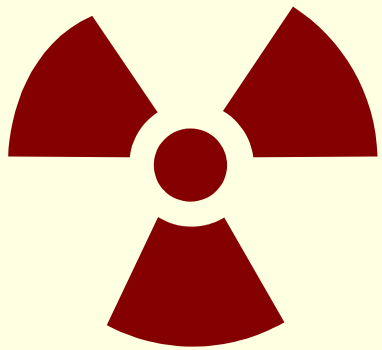


Precautions to Reduce Transmission

- Wear personal protective equipment
- Strictly prohibit eating and drinking in the lab
- Minimize aerosols and wear respirators when needed
- Take special precautions with sharps

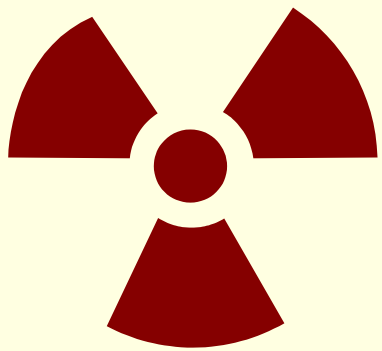
What types of microbes can be handled in our microbiology lab?

- The Centers for Disease Control divides microbes into 4 Biosafety Levels based on their ability to cause disease
- Only organisms designated BSL-1 and BSL-2 are used in Microbiology lab



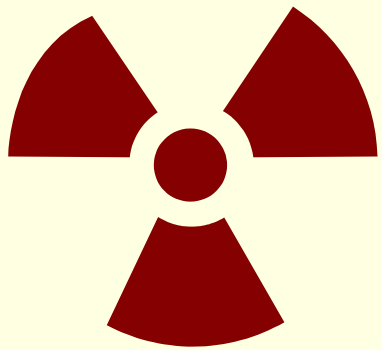
Biosafety Level 1

- Organisms which are not known to cause disease in healthy humans
- Eg: *Staphylococcus epidermidis, Bacillus megaterium*



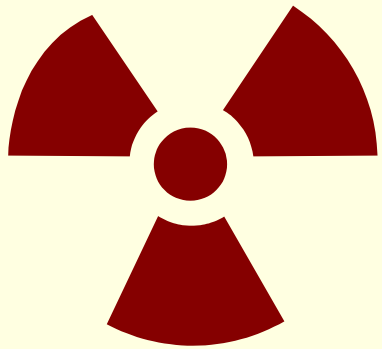
Biosafety Level 2

- Moderate-risk organisms associated with less serious human diseases
  - Potential for transmission is limited
  - Proven treatment for disease exists
- Eg: *Staphylococcus aureus, Streptococcus pyogenes*



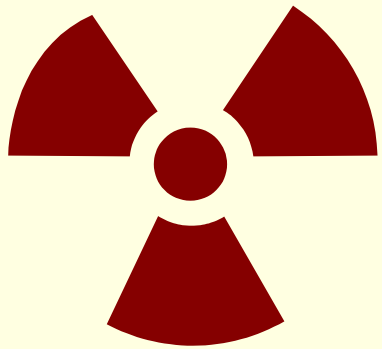
Biosafety Level 3

- High-risk organisms associated with serious or fatal human diseases
  - Potential for aerosol transmission is high
  - Vaccine or therapy is available
- Eg: *Mycobacterium tuberculosis, Bacillus anthracis*



Biosafety Level 4

- Very high-risk organisms associated with life-threatening human diseases
  - Easily transmitted
  - No vaccine or therapy available for disease
- Eg: *Ebola* and *Marburg* Hemorrhagic fever viruses



What are the general safety guidelines when working with BSL-1 organisms?

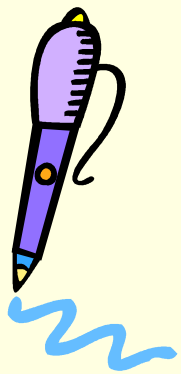
- Absolutely no food or drink in lab
- Students should practice sterile technique
- All microbial waste should be discarded in orange BIOHAZARD bags
- Sharps must be disposed of in proper container

Additional precautions for BSL-2 organisms

- Personal Protective Equipment:
  - Students must wear disposable gloves
  - Students must wear aprons or lab coats

Additional precautions for BSL-2 organisms

- Label ALL plates and tubes.
  - Your name/date/class section.
  - Name(s) of microorganisms.

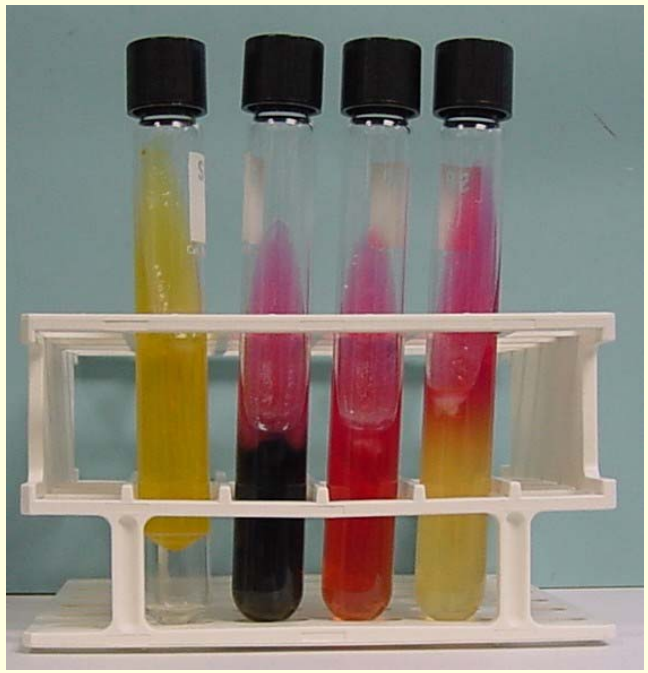


Additional precautions for BSL-2 organisms

- Agar plates must be taped shut on both sides before placing in incubator.

Additional precautions for BSL-2 organisms

- Test tubes must always be transported in a test tube rack.



Additional precautions for BSL-2 organisms

- All gloves must be disposed of in orange BIOHAZARD bag
  - Remove gloves inside-out.
  - DO NOT THROW IN REGULAR TRASH!

Additional precautions for BSL-2 organisms

- All contaminated sharps must be disposed of in red SHARPS container
  - Glass slides
  - Broken test tubes

Additional precautions for BSL-2 organisms

- All used test tubes must be placed in tube discard bin.
  - DO NOT pour cultures down the sink!
  - Tubes will be autoclaved.

Additional precautions for BSL-2 organisms

- All used pipettes must be placed in pipette discard box.

Accidents!

- Notify instructor **immediately**!
- Determine if anyone has been exposed and take appropriate measures
- Cover spills with paper towels and soak with bacteriocide.
  - Dispose of paper towels in Biohazard waste
  - Dispose of broken glass in Sharps waste

Questions?

- Please Ask!