

BIOSAFETY & LAB BASICS

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Biosafety

- **Biosafety** is the prevention of large-scale loss of biological integrity, focusing both on ecology and human health.
- A **biosafety level** is the level of the biocontainment precautions required to isolate dangerous biological agents in an enclosed facility.



Biosafety levels

□ **BL1**

- Well-characterized agents not known to consistently cause disease in healthy adult humans, and of minimal potential hazard to laboratory personnel and the environment.

□ **BL2**

- Agents of moderate potential hazard to personnel and the environment. Mild disease to humans or are difficult to contract via aerosol in lab setting.

Biosafety levels

□ **BL3**

- ▣ Clinical, diagnostic, teaching, research or production facilities. Agents may cause serious or potentially lethal disease after inhalation but treatment exists.

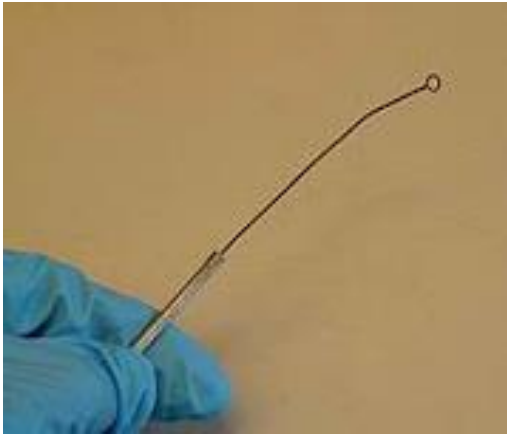
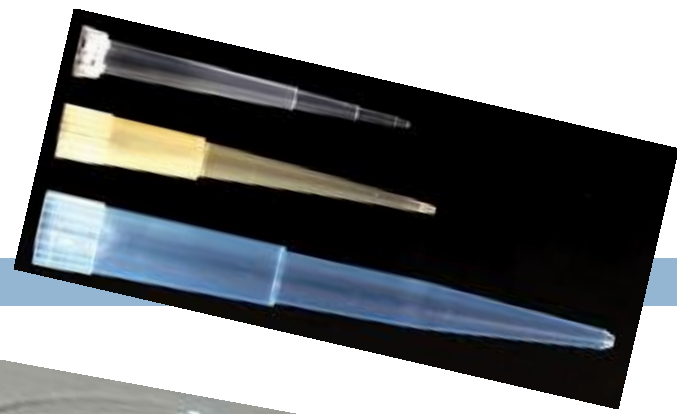
□ **BL4**

- ▣ Dangerous and exotic agents that pose a high individual risk of aerosol-transmitted laboratory infections, cause severe fatal disease for which vaccines are not available.

Garbage disposal



Instruments



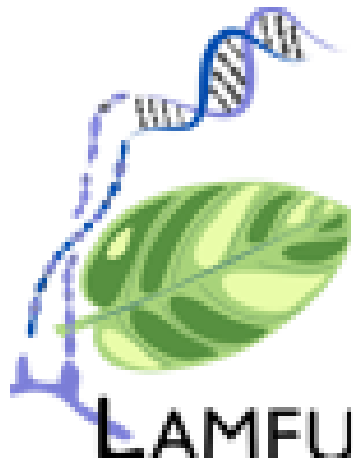
What do you need?



Our Labs

□ Lab J204/201

□ Lab Q 405

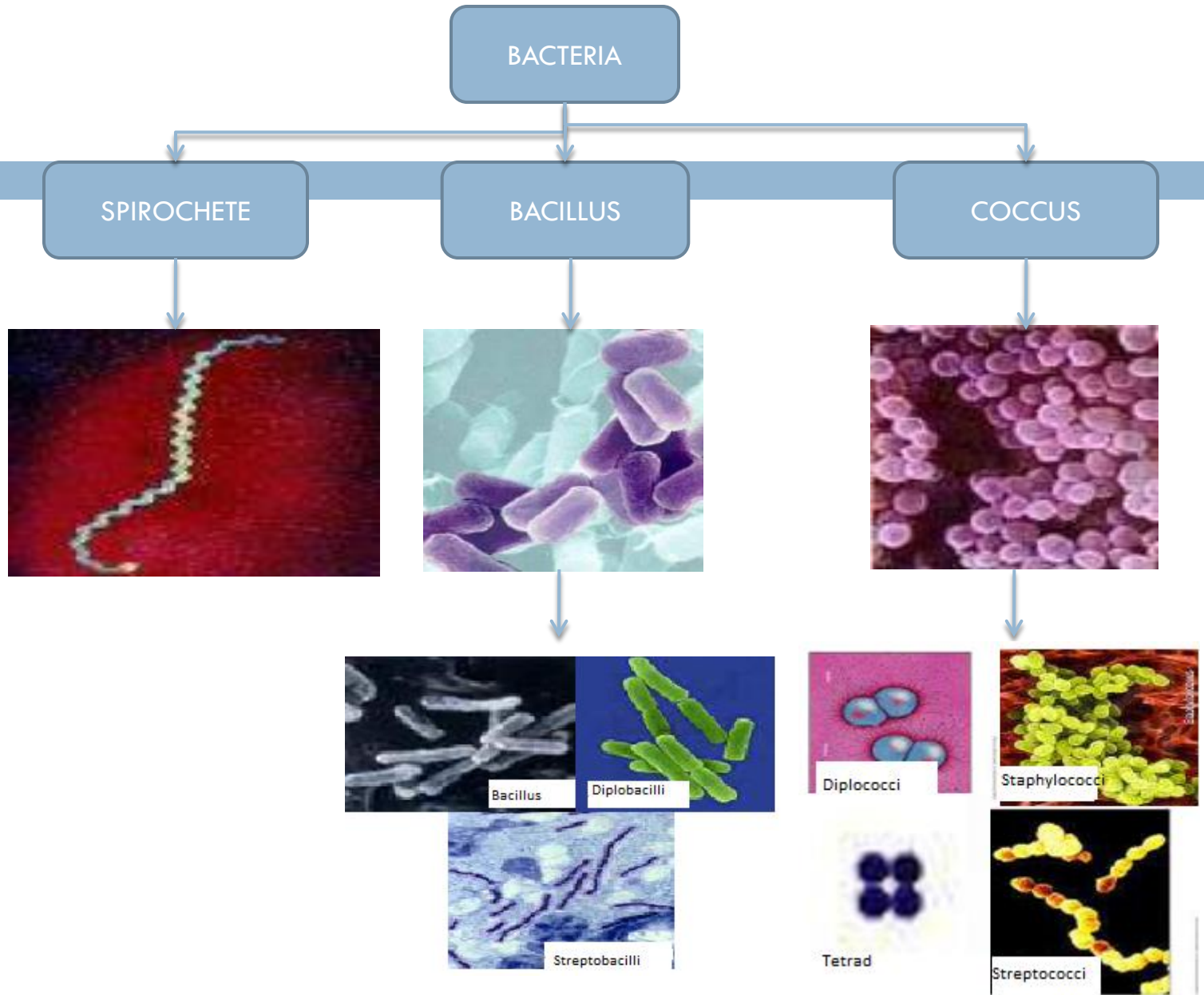


BIOPHYSICS RESEARCH GROUP

Our tiny world ☺

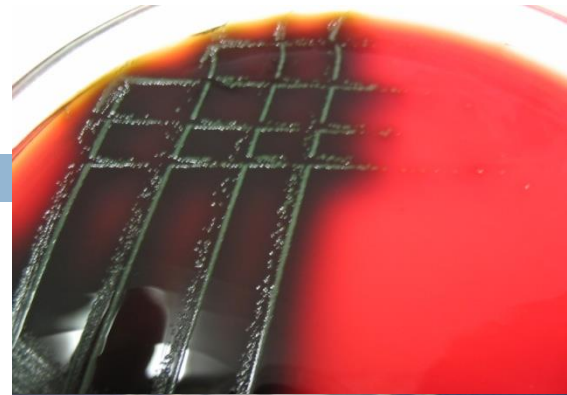


Bacterial morphology

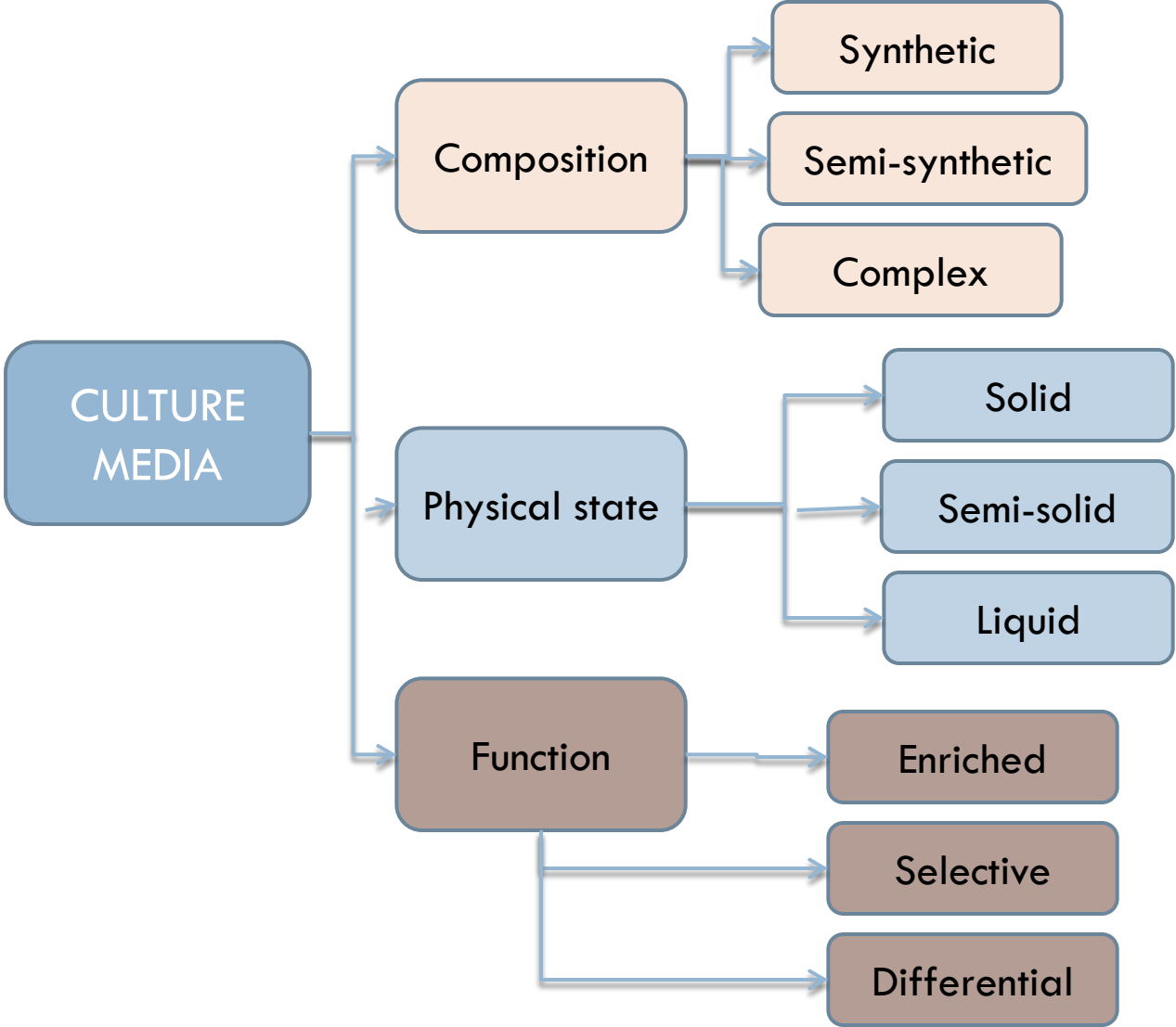


CULTURE MEDIUM

- Liquid or gel designed to support the growth of microorganisms or cells, providing them with minimum or various nutrients for their survival.
 - ▣ Sterile prior to being inoculated with a bacterial sample



TYPES OF CULTURE MEDIA



Composition



- 1. SYNTHETIC:** Very specific recipes in which certain ingredients must be present in specific amounts, chemically defined, regulated pH.
 - Growth factors
 - Aminoacids
 - Vitamines
 - Minerals (MMM)
- 2. SEMI SYNTHETIC:** Organic extracts, with chemical compounds or defined pH
(Ex: M. M. M+ GLUCOSE+ Yeast extract)
- 3. COMPLEX:** Complex media are composed of partially digested yeast, beef, soy and additional proteins, in which the exact concentration and composition is unknown.

Physical state

1. **SOLID:** Agar or agar-agar is a gelatinous substance derived by boiling a polysaccharide in red algae → tubes or petri dish.
2. **SEMI-SOLID:** Less % of agar (0.5% less), used to evaluate motility, SIM → tubes
3. **LIQUID:** Enriched media, nutrient broths



Solid



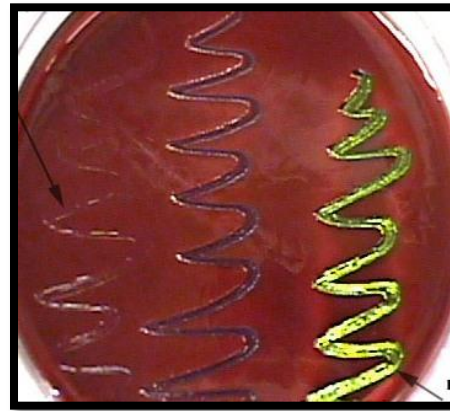
Semi-solid



Liquid

Function

1. **ENRICHED:** Enriched media contain the nutrients required to support the growth of a wide variety of organisms, including some of the more fastidious ones. They are commonly used to harvest as many different types of microbes as are present in the specimen. Blood agar.
2. **SELECTIVE:** For the growth of only selected microorganisms. Contains products that inhibit growth of certain organisms and/or encourage the growth of others. Antibiotics
3. **DIFFERENTIAL:** Indicator media distinguish one microorganism type from another growing on the same media. Display a color change when the bacteria growing metabolize a certain ingredient. Xgal



Luria-Bertani medium

- LB media formulations have been an industry standard for the cultivation of *Escherichia coli*
 - 1.0% Trypnone
 - 0.5% Yeast extract
 - 1.0% NaCl
 - 950 mL Water
 - Adjust pH 7



- Petri dish 20 mL

Media preparation!

□ ¡Merceditas! 😊

All of the ingredients must be weighted previously at the laboratory and deposited into a container, it must go properly labeled

DO NOT ADD ANTIBIOTICS

Antibiotics

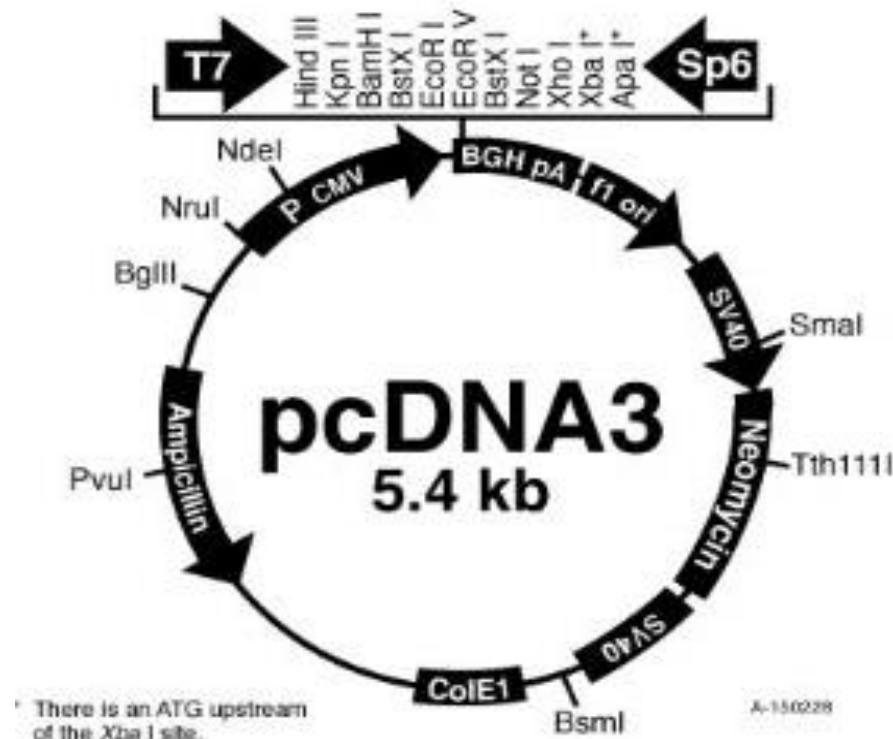
- Kanamycin
- Streptomycin
- Rifampicin*
- Chloramphenicol
- Tetracycline*
- Ampiciline

■ Stock

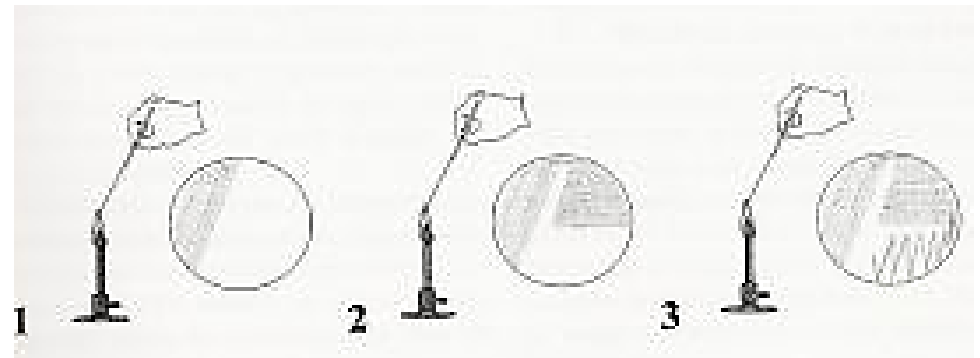
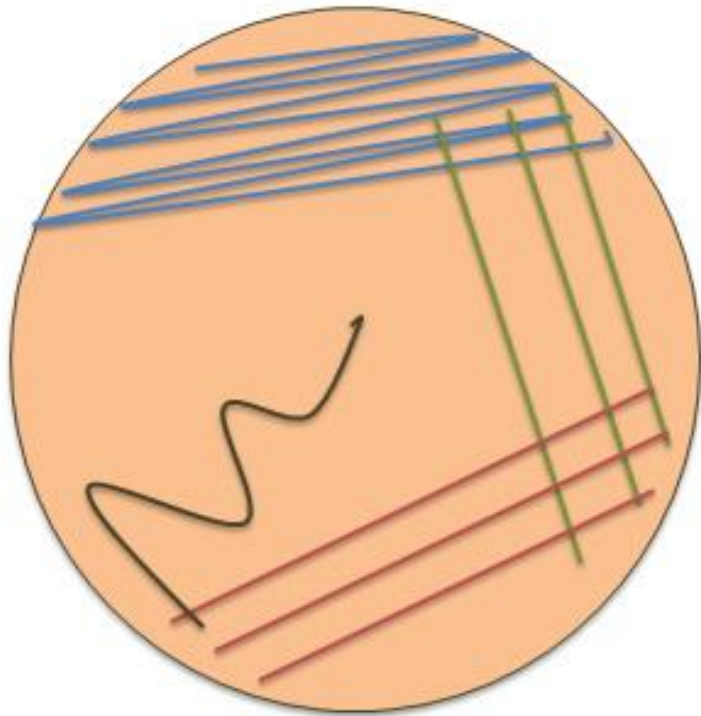


Antibiotics

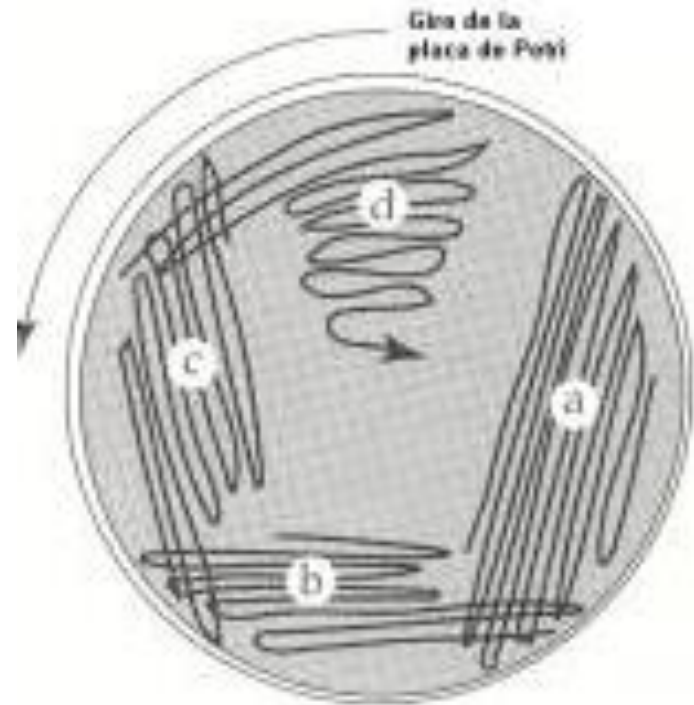
- The plasmids used in genetic engineering typically contain one or two genes that confer resistance to antibiotics (Select recombinant clones).



Isolation of bacteria



Isolation of bacteria



Ask!

