Bacteria

* Signs:
  + Sudden pH change (often yellowing)
  + Cloudy medium or whiteish film on surfaces
  + Granular appearance between cells (100x)
  + Tiny black dots or moving rods/cocci under 400x magnification
* Important Tip:
  + Can be confused with serum proteins — bacteria look regular in shape, serum precipitates are irregular

Fungus (Mold)

* Signs:
  + Filamentous strands (mycelia) and clumps of spores
  + Slow growing but can become visible as fuzzy white or black growth
  + Often overtakes the culture in advanced stages

Mycoplasma

* Signs:
  + Invisible to the naked eye and light microscopy
  + Detected only by special tests or staining
  + Colonies (on agar) have a "fried egg" appearance
* Important Tip:
  + Mycoplasma is very common and often missed — regular screening is essential

Yeast

* Signs:
  + Small round or ovoid particles
  + Seen budding in chains of 2–3 or more
  + In advanced cases, forms multi-branched chains
* Distinguishing Feature:
  + Smaller than mammalian cells and often form clusters

Bacteria need food to grow — this is provided by a **culture medium**, which can be:

* **Liquid (broth)** – No agar; good for growing large amounts of bacteria.
* **Semi-solid** – Contains a little agar (~0.5%); used to test bacterial **motility**.
* **Solid** – Contains more agar (1.5–2%); useful for growing **isolated colonies**.

Depending on your goal, you can also choose based on the medium’s ingredients:

* **Defined** – Exact chemical composition is known.
* **Undefined (complex)** – Contains natural ingredients like yeast extract or blood.
* **Minimal** – Only the basic nutrients needed to survive.
* **Selective** – Allows only certain bacteria to grow (e.g., with antibiotics).
* **Differential** – Shows visual differences between species (e.g., color changes).
* **Enriched** – Extra nutrients for picky (fastidious) bacteria.

**Knowing the Bacteria’s Oxygen Needs**

Bacteria differ in how they use oxygen:

* **Obligate aerobes** need oxygen.
* **Microaerophiles** need low oxygen.
* **Facultative anaerobes** grow with or without oxygen.
* **Obligate anaerobes** die if exposed to oxygen.
* **Aerotolerant anaerobes** don’t use oxygen but can survive in it.

If you’re culturing **anaerobes**, you’ll need **oxygen-free tools** like anaerobic jars or glove boxes.

**Inoculating the Bacteria**

To transfer bacteria onto or into your medium:

* **On solid media:** Use a sterile **inoculation loop** and perform the **streak plate method** to spread bacteria and isolate colonies.
* **In liquid media:** Use a sterile pipette or loop to transfer a small amount into a tube or flask.

🔥 We should always sterilize tools before and after use using a **Bunsen burner** or an **autoclave**.

**Incubating at the Right Temperature**

Most bacteria grow well at **37°C** (human body temperature), but some might prefer cooler or warmer conditions depending on their natural environment. Place the inoculated media in an **incubator** for 12–48 hours, depending on the species.

**Subcultering Regularly**

Once bacteria grow, you need to transfer (or **subculture**) them into fresh media to:

* Keep them alive and healthy
* Prevent overcrowding or nutrient depletion
* Isolate individual colonies from mixed populations