MORPHOLOGY

&

GROWTH:

Bacterial & Fungal Characteristics

“ 240 MIC ”

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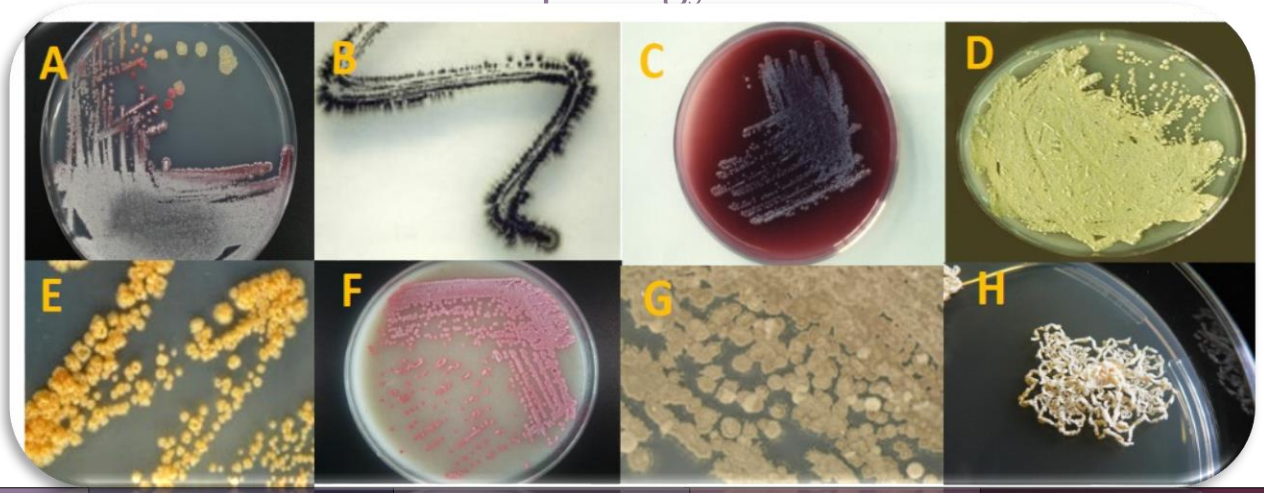
When a single bacterial cell is deposited on a solid or in a liquid medium, it begins to divide.

One cell produces two, two produce four, four produce eight, and so on.

Eventually, a colony appears where the original organism was.

When grown on a variety of media, microorganisms will exhibit visible physical differences in appearance in their isolated colonies and their growth.

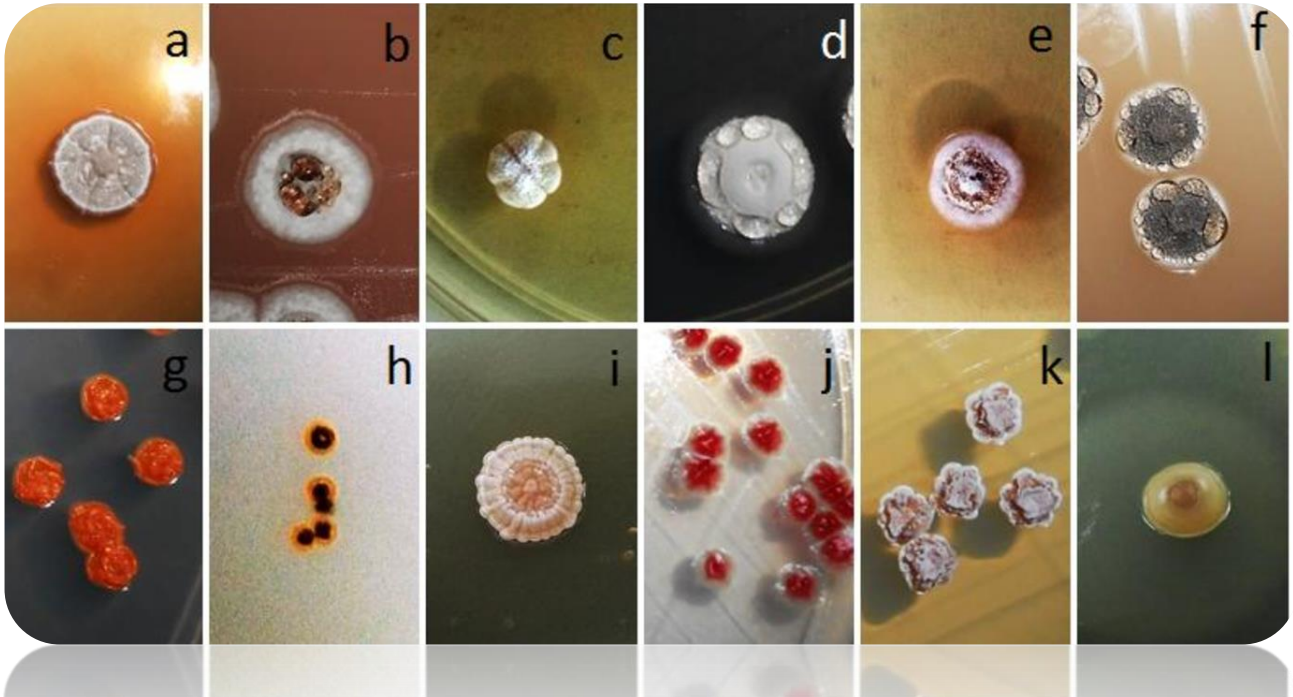
These differences are called Cultural characteristics or Morphology.



- **Cultural characteristics or morphology may be used as an aid in** identifying and classifying some organisms.
- **These physical characteristics are often** specific for the type of bacteria making the colony and can be used as a means of recognition.
- **Cultural characteristics or morphology are determined by:**

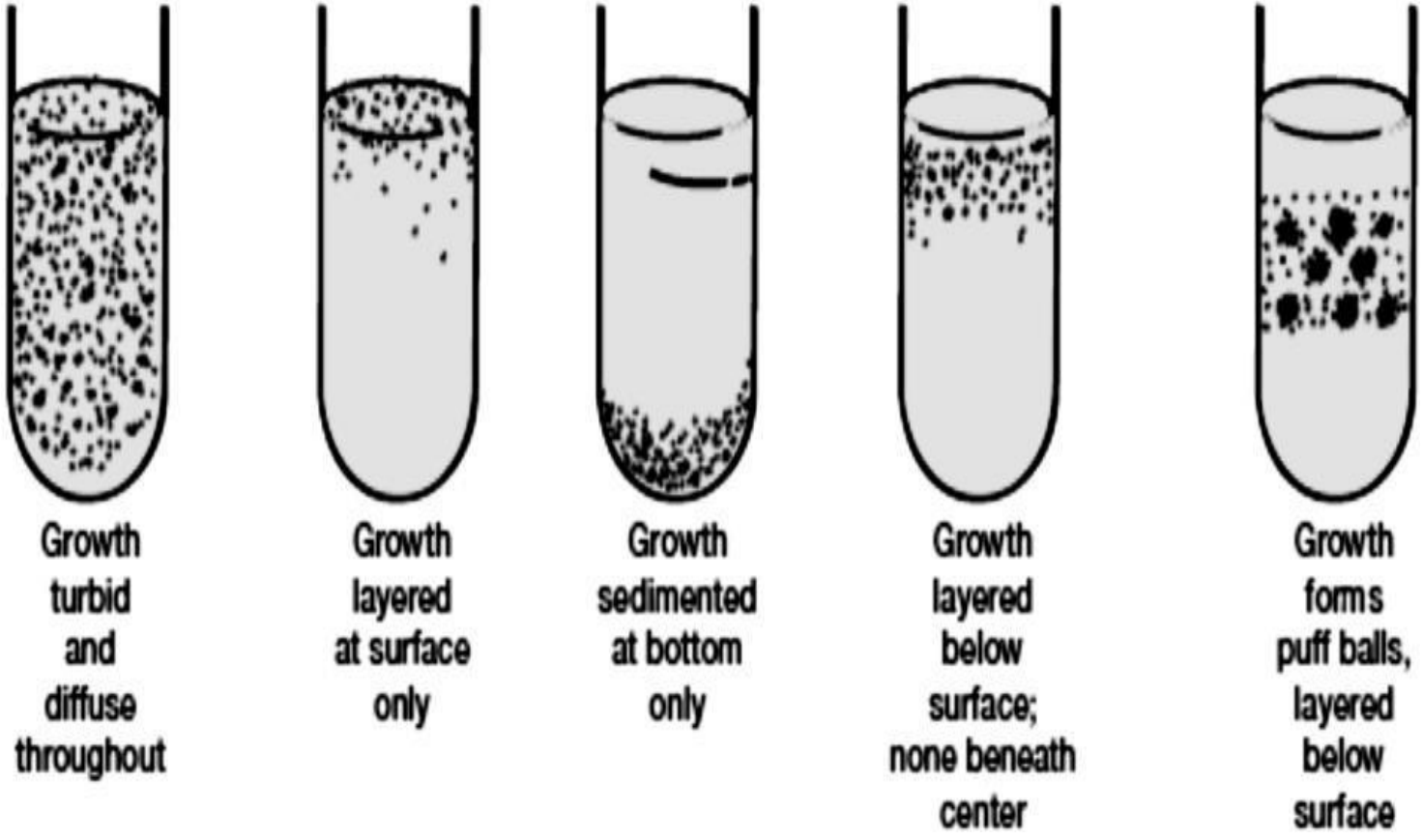
Culturing microorganisms in nutrient broth and on nutrient agar plates and slants.

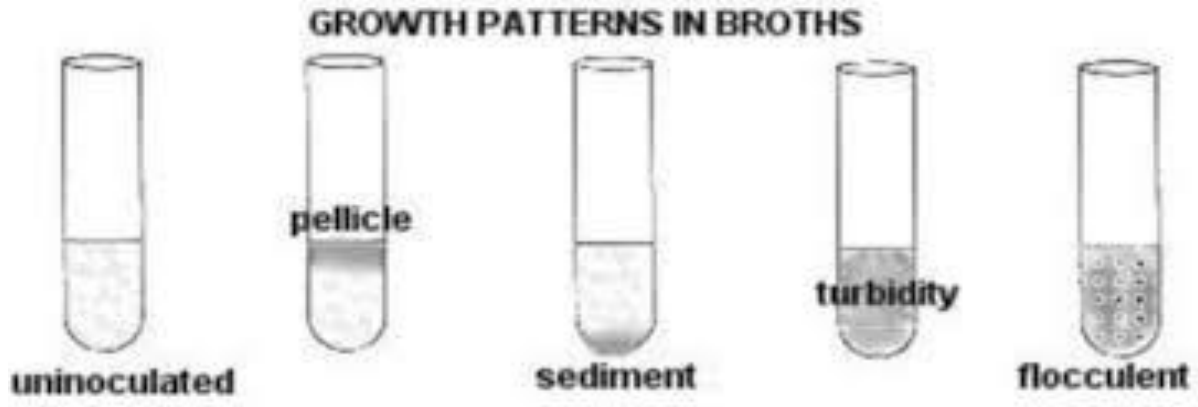
After incubation, the characteristics are observed.



TERMS USED FOR GROWTH IN NUTRIENT BROTH

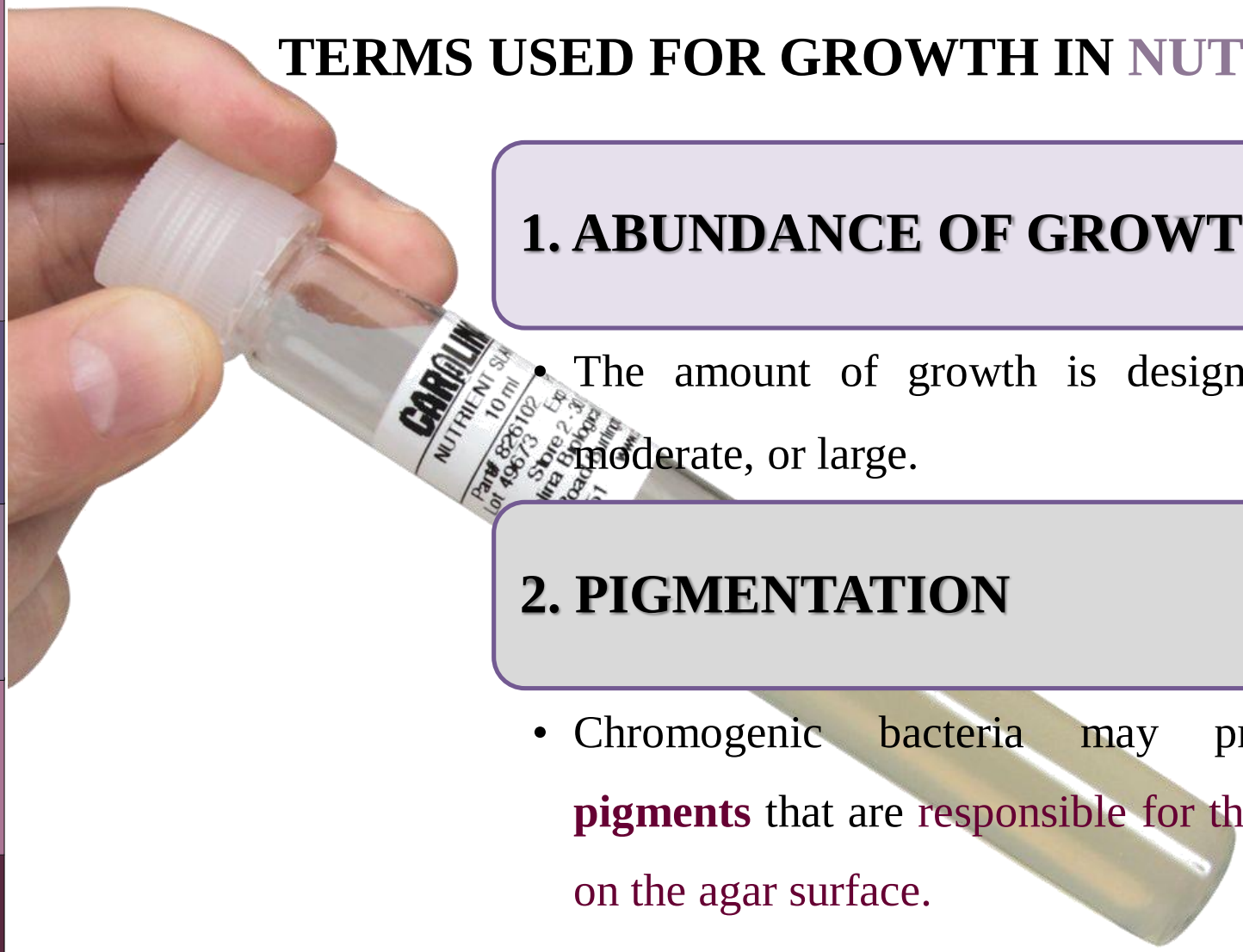
1. **Uniform fine turbidity** – finely dispersed growth throughout (cloudy)
2. **Flocculent** – flaxy aggregates dispersed throughout
3. **Pellicle** – thick, padlike growth on the surface
4. **Sediment** – concentration of growth at the bottom of the broth culture may be granular, flaxy, or flocculent
5. **Ring formation** – a ring of growth on the surface





COLONY MORPHOLOGY IN BROTH MEDIA

TERMS USED FOR GROWTH IN NUTRIENT SLANTS



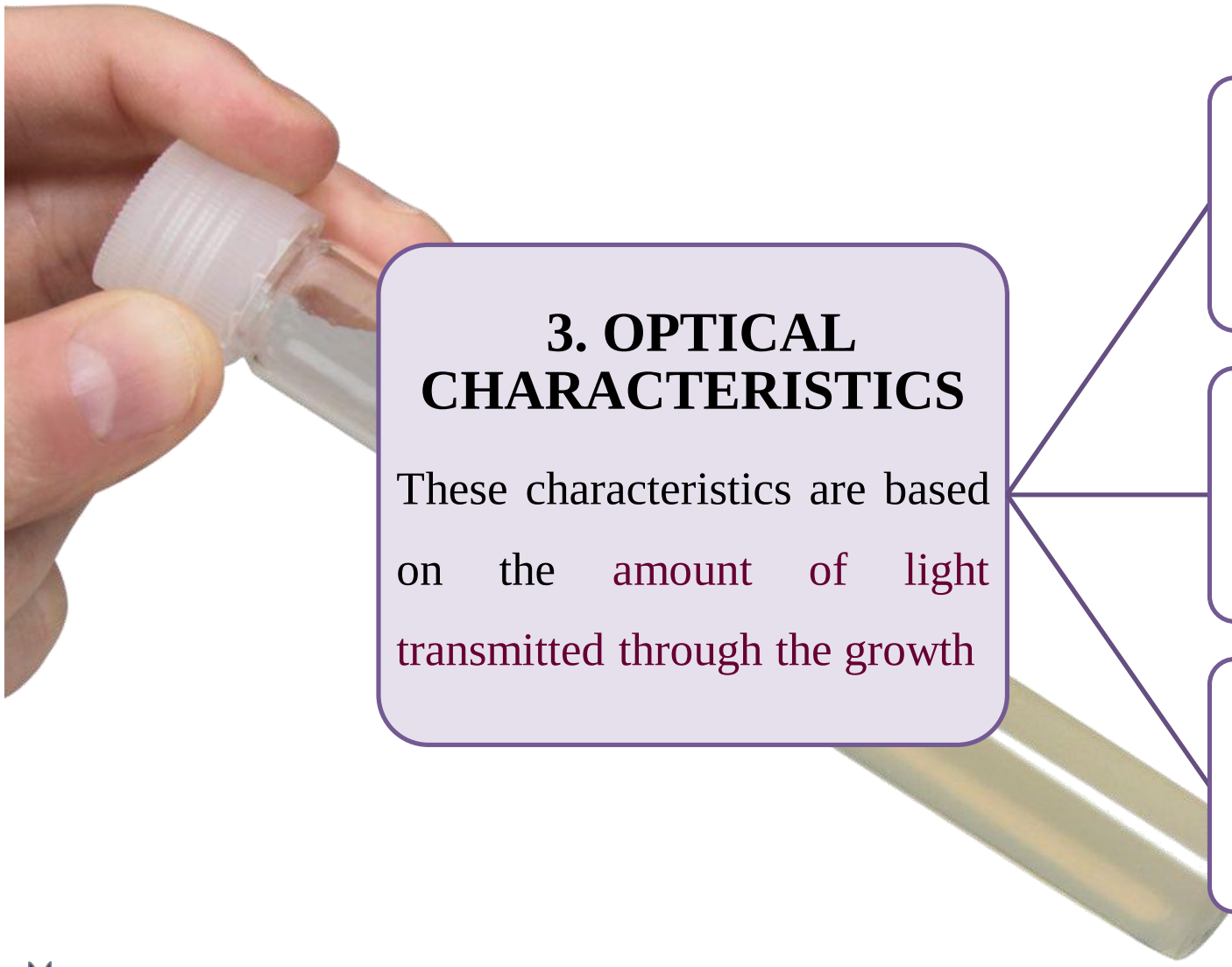
1. ABUNDANCE OF GROWTH

- The amount of growth is designated as none, slight, moderate, or large.

2. PIGMENTATION

- Chromogenic bacteria may produce **intracellular pigments** that are responsible for the color of the colonies on the agar surface.

TERMS USED FOR GROWTH IN NUTRIENT SLANTS



3. OPTICAL CHARACTERISTICS

These characteristics are based on the amount of light transmitted through the growth

OPAQUE

(No light transmitted)

TRANSLUCENT

(Partial transmission)

TRANSPARENT

(Full transmission)

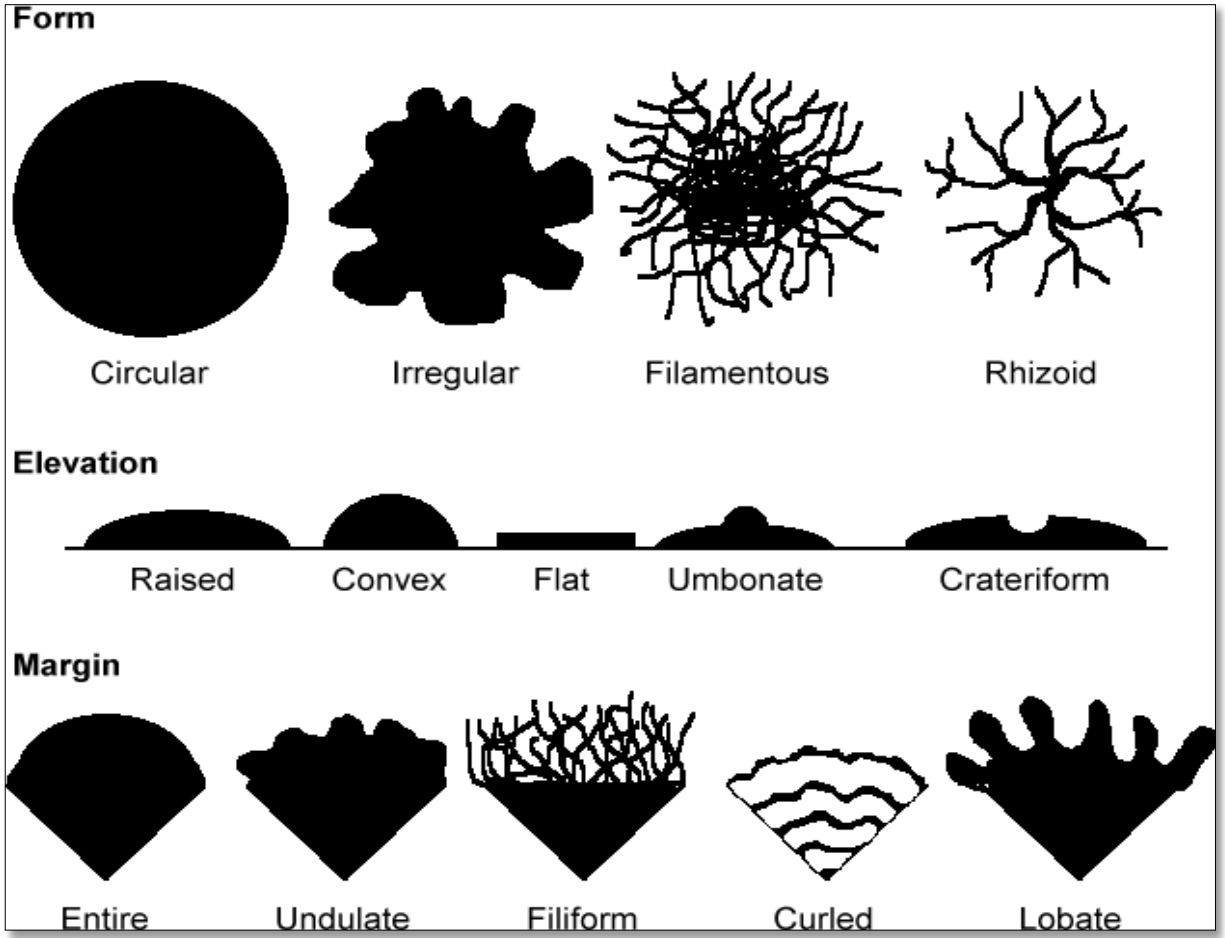
TERMS USED FOR GROWTH IN NUTRIENT SLANTS

4. FORM

The appearance of the single line streak of growth on the agar slant

Filiform	Echinulate	Beaded	Effuse	Arborescent	Rhizoid
Continuous, threadlike growth with smooth edges.	Continuous threadlike growth with irregular edges.	Non confluent to semi confluent colonies	Thin, spreading growth	Treelike growth	Rootlike growth

CHARACTERISTICS OF BACTERIA ON NUTRIENT AGAR PLATES



CHARACTERS OF FUNGI

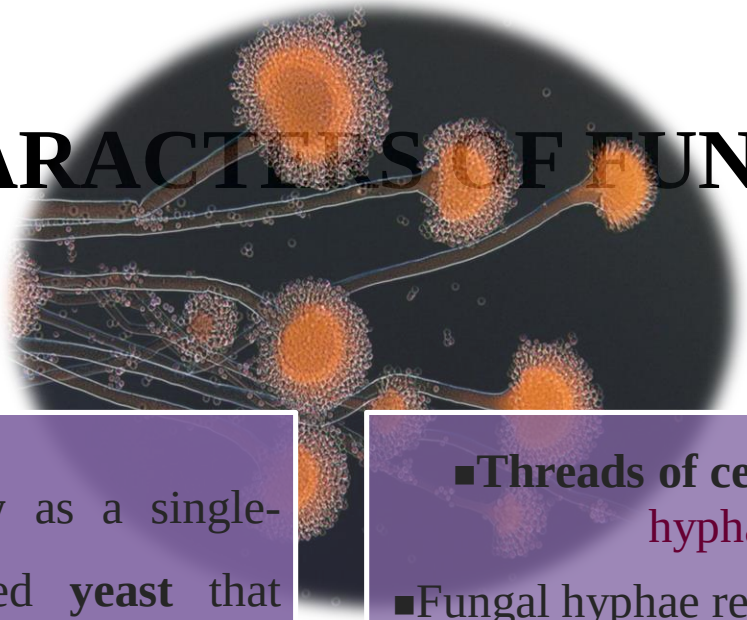
■A Fungus (Singular)

■Plural :Fungi

■Fungi are Eukaryotic plant-like organisms that lack chlorophyll.

■The study of fungi is called **Mycology**.

CHARACTERISTICS OF FUNGI



- Some **fungi grow** as a single-celled entity, termed **yeast** that grows either by a budding process or via binary fission.

- **Threads of cells** are called hyphae.
- Fungal hyphae repeatedly branch to form a network of filaments termed a mycelium
- (**sing**., mycelia).

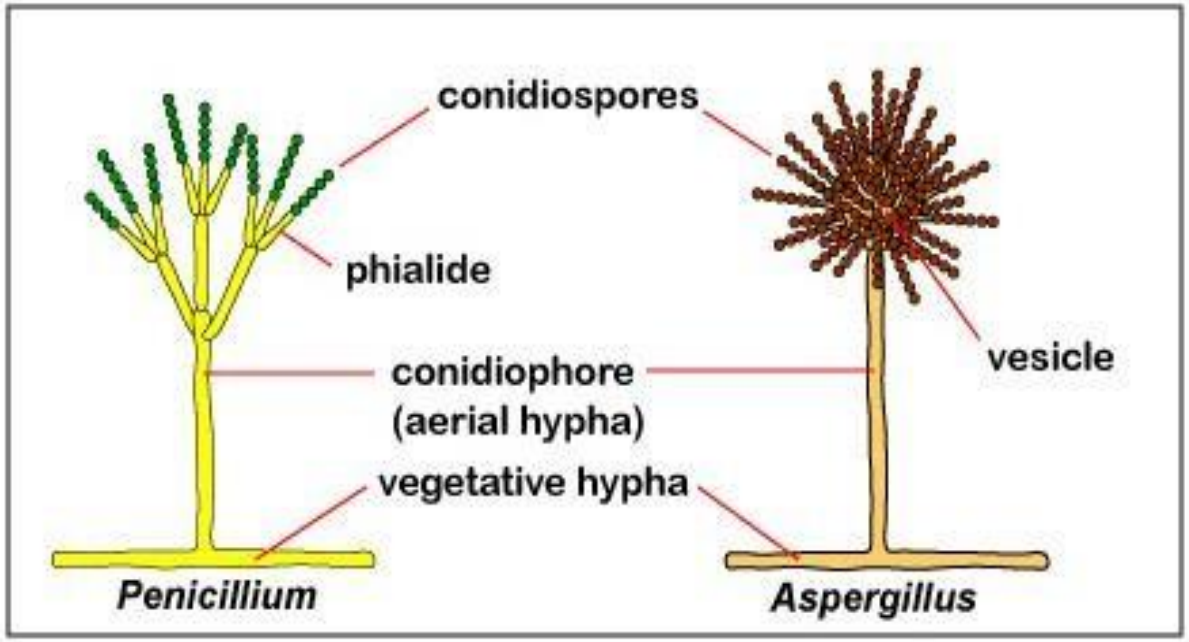
- **Fungi** are identified on the basis of macro and microscopic characteristics.

- Molds are commonly **cultured on fungal-selective** or **enriched media such as:**
- Saboraud Dextrose agar (**SDA).**
- Corn Meal agar.
- Potato Dextrose agar.

COMMON FUNGI

The two most common types of asexual reproductive spores produced by fungi are Conidiospores and Sporangiospores.

- **Conidiospores** are borne externally in chains on an aerial hypha **called a** Conidiophore.



* ***Penicillium*** **and** ***Aspergillus*** **are examples of molds that produce conidiospores.**

* ***Penicillium*** is one of the most common household molds and is a frequent food contaminant.

* The conidiospores of *Penicillium* usually appear grey, green, or blue and are produced in chains on finger-like projections called **phialides** coming off of the conidiophore.

* *Aspergillus* is another common contaminant. Although usually nonpathogenic, it may become opportunistic in the respiratory tract of a compromised host and, in certain foods, can produce mycotoxins.

* The conidiophore terminates in a ball-like structure called a vesicle. Its conidiospores, which typically appear brown to black, are produced in chains on phialides coming off of the vesicle

* Sporangiospores are produced within a sac or sporangium on an aerial hypha called a **sporangiophore**

* ***Rhizopus*** **is an example of a mold that produces sporangiospores.**

*Although usually nonpathogenic, it sometimes causes opportunistic wound and respiratory infections in the compromised host.

* At the end of its sporangiophore is dome-shaped end called a **columella** that extends into a sac-like structure called a sporangium. Its sporangiospores, typically brown or black, are produced within the sporangium .

* Anchoring structures called **rhizoids** are also produced on the vegetative hyphae.

* ***Fusarium*** **grows really fast with varying colony color depending on isolates.**

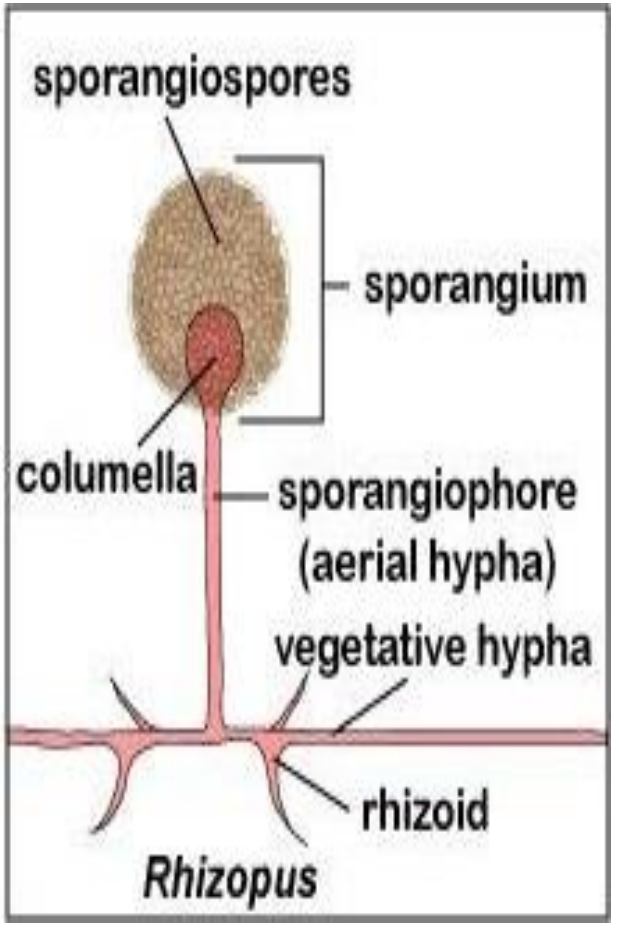
* Woolly to cottony, flat, spreading colonies. Within few days cover the entire agar plate. Conidia are the spores produced by Fusarium.

* **They are two types- macro and micro-conidia** both of which can be seen under microscope.

Macroconidia are multicelled while **micronidia** are single celled.

* ***Alternaria*** **develop and grow as elongated chains with conidiophores that are dark brown in color.**

* **In favorable conditions** (moisture or rain, nutrition), spores, referred to as conidia are produced (growing as buds from the conidiophores) from the conidiophores asexually.



DERMATOPHYTES

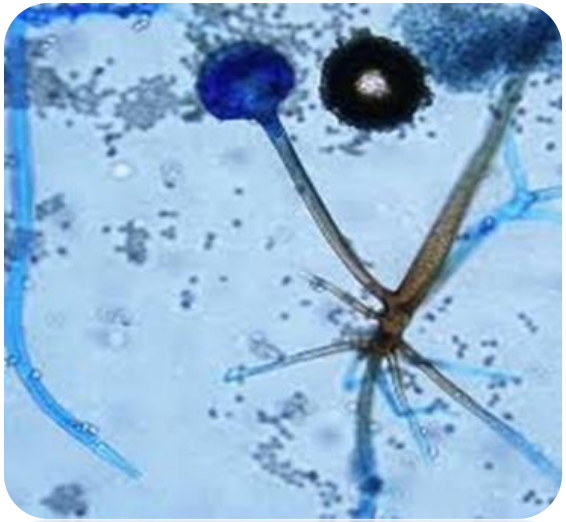
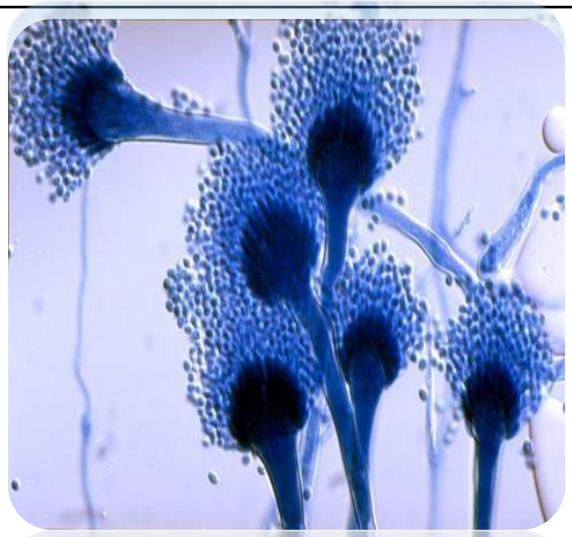
- The dermatophytes are a group of molds that cause superficial mycoses of the hair, skin, and nails and utilize the protein keratin, that is found in hair, skin, and nails, as a nitrogen and energy source.
- Infections are commonly referred to as ringworm or tinea infections.
- **The three common dermatophytes are:**

  Microsporum

  Trichophyton

  Epidermophyton.
- These organisms grow well at **25°C.**

SOME COMMON FUNGI

Name of fungus	Macro morphology (on agar plate)	Microscopic morphology
Rhizopus		
Aspergillus		

SOME COMMON FUNGI

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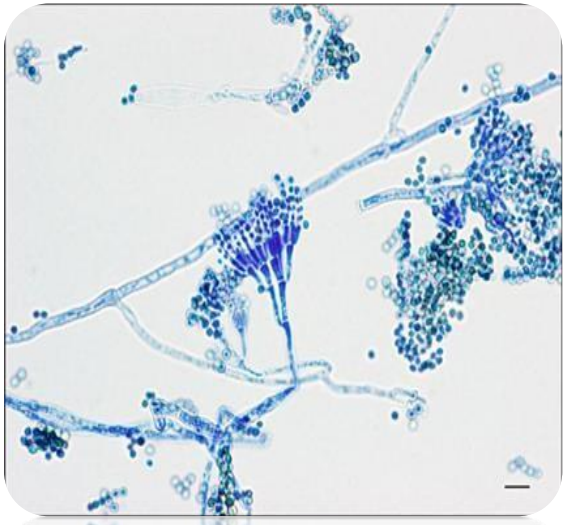
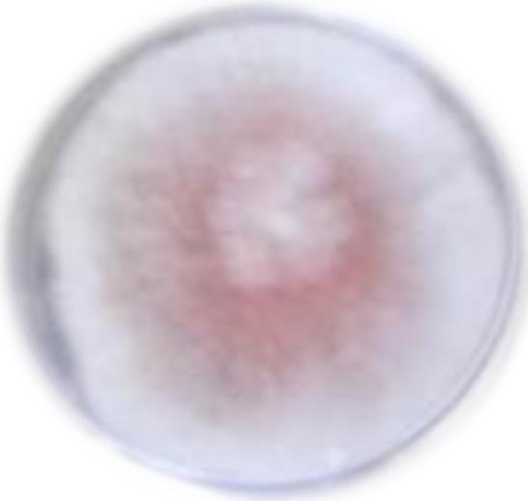
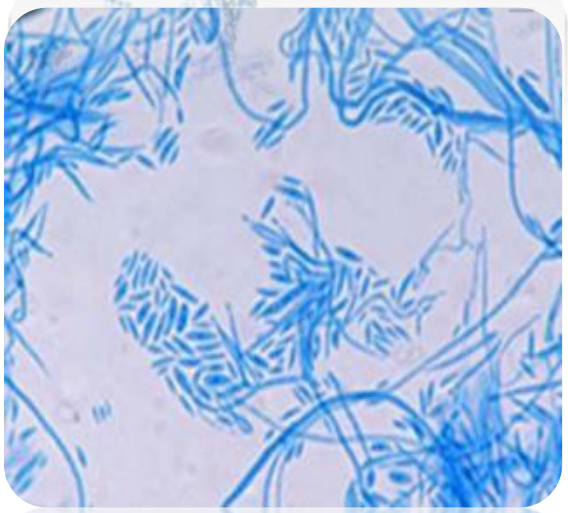
Penicillium		
Fusarium		

SOME COMMON FUNGI

Name of fungus	Macro morphology (on agar plate)	Microscopic morphology
Alternaria		

The End