

*Dr. Fadwa Abdul Razaq Jameel*

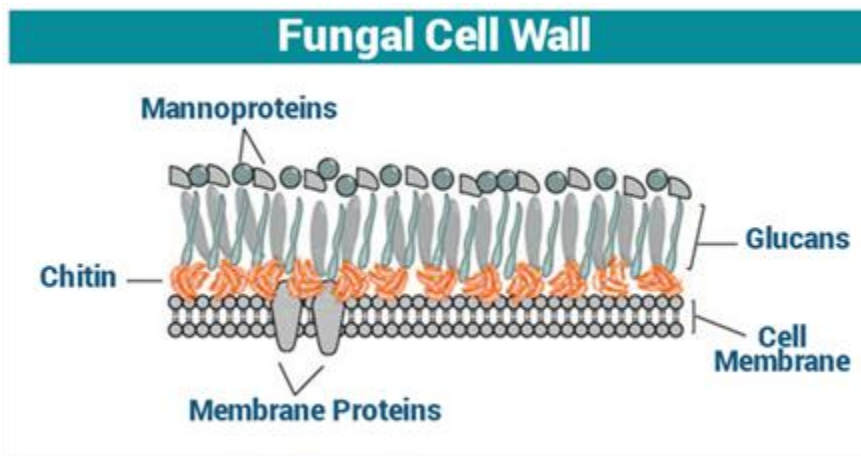
*Dep. Of Microbiology*

## Mycology

Fungi word is derived from the Latin word (**Fungour**) which means to **Flourish**, the study of fungi is known as **mycology** and scientist who studies fungi is known a **mycologist**. There are many species of fungi are known about more than **80,000 species**. Fungi are more similar to mammalian cells, which are also **Eukaryotic** than to bacterial cells, which are **Prokaryotic**.

### General properties of fungi:

- 1- Fungi are **Eukaryotic**: they have **nuclei** containing several chromosomes, mitochondria, Golgi apparatus, endoplasmic reticulum, lysosomes, vacuoles, etc.
- 2- All fungi possess **cell wall** made of **chitin and glucans**.



- 3- Fungi are **Hetrotrophic** in nutrition (depend on the other organisms for food), and **lack chlorophyll** which therefore not Autotrophic.
- 4- They obtain nutrients as **saprophytes** (live off on **decaying matter**) or **parasites** (live off on **living matter**).
- 5- All fungi require water and oxygen (**no obligate anaerobes**).

- 6- Fungi have **80S ribosomes** while in bacteria have 70S ribosomes.
- 7- Typically **reproduce asexually/ or sexually** by producing **spores**.
- 8- Fungi grow as **filaments** termed **hyphae** (singular: hypha) while **network of hyphae** termed **mycelium**.
- 9- Most fungi **don't have** flagella in any phase of their life cycle, they move toward food by **growing toward it** therefore called (**sedentary**).
- 10- Some of fungi produce pigments like (**melanin**)in their cell wall, which called **Phaeoid or Dematiaceous** and their colonies are **colored grey black or olive** but some fungi **don't produce** any pigment in their cell wall, which called **hyaline**.
- 11- Most fungi are **opportunistic** (**produce diseases in immunocompromized patients**).

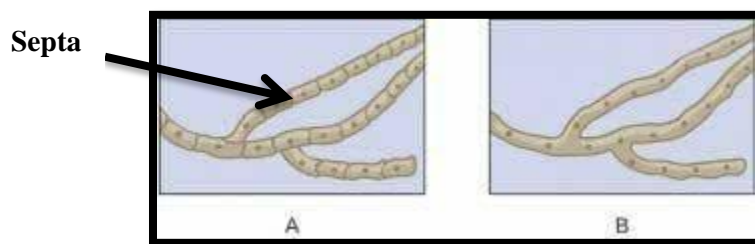
### Structure of fungi:

#### 1- Cell wall components:

- a- Chitin
- b- Glycan
- c- Cellulose
- d- Matrix polymers like ( Glucouronic acids , Mannoproteins)

**2- Septa:** generally is a regular interval along a length of a hypha, the functions of septa is structural support of the hypha.

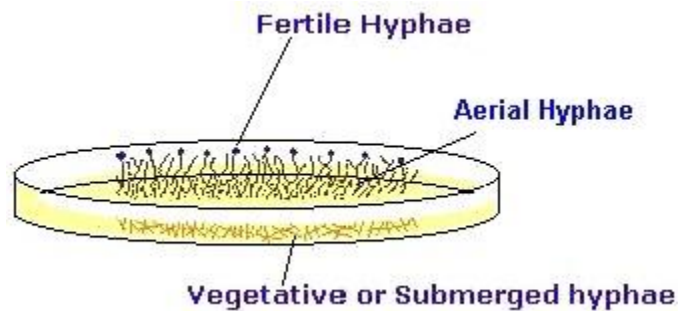
**3-Hyphae:** are threads like tubular structure, some fungi having septate hyphae while others have a septate hyphae and **Mycelium** are mass of hyphae.



A) Septate hyphae, B) Aseptate hyphae

### Types of Mycelium:

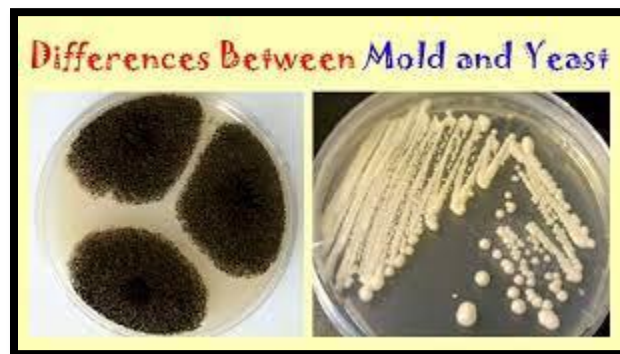
- a) **Vegetative mycelium** are those that penetrates the surface of the medium and absorbs nutrients.
- b) **Aerial mycelium** are those that grow above the agar surface
- c) **Fertile mycelium** are aerial hyphae that bear reproductive structures such as conidia or sporangia.



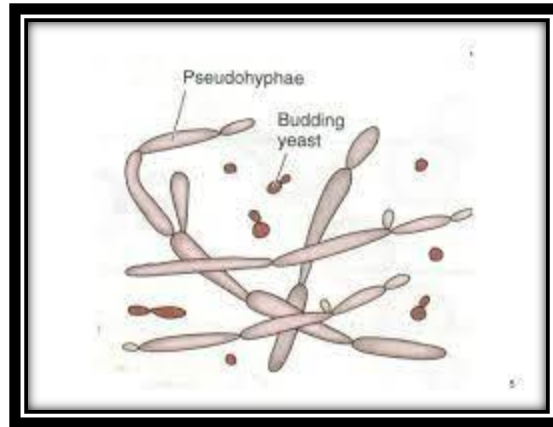
### 4- Fungal Nucleus and Cytoplasmic Organelles.

### 5- According to morphology, fungi exist in four forms:

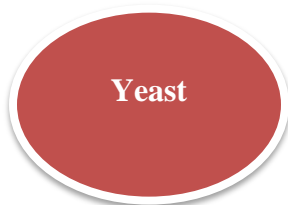
- a) **Mold:** filamentous fungi which grow with formation of hyphae.
- b) **Yeast:** unicellular fungi (single celled cells) (rounded or oval in shape).



- c) **Yeast like:** similar to yeast but produce **pseudohyphae** (there is a constriction at the point of budding).



**d) Dimorphic:** capable of fungi to grow in two different shape yeast and mold depending on environmental conditions.



- In tissue or body
- At 37° C



- In room temperature or environment
- At 25° C

### **Difference from Bacteria**

- Fungi are eukaryotic while bacteria are prokaryotic
- Cell wall consists of chitin not peptidoglycan like bacteria, thus fungi are resistant to antibiotics as penicillin and Chitin is a polysaccharide composed of long chain of n-acetylglucosamine. , also the fungal cell wall contains other polysaccharide,  $\beta$ -glucan, which is the site of action of some antifungal drugs.
- Cell membranes consist of Ergosterol rather than cholesterol like bacterial cell membrane, Ergosterol is the site of action of antifungal drugs like amphotericin B & azole group.