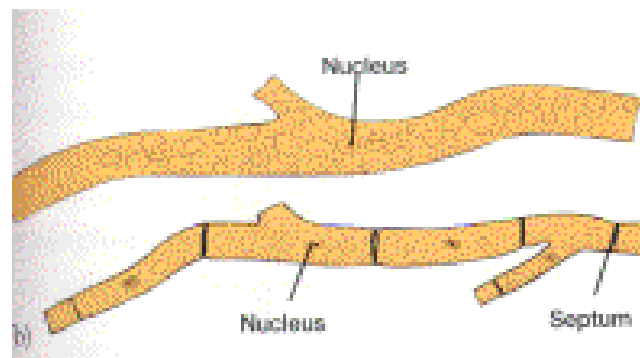


## Morphology of fungi

When fungi are grown on suitable medium, produce long, branching filaments, those called -Mold-. Each filament is called hyphae. Hyphae are long, slender transparent, wall filled or lined with a large of protoplasm varying in thickness. Generally 3-10 microns in diameter. If hyphae have cross wall, the fungus is said to be septate- if not -aseptate-(coenocytic hyphae).



### Aseptate (or coenocytic) and septate hyphae

The presence or absence of these cross wall can be important in differentiating between certain classes. Hyphae may become divided into a chain of cells by the formation of septa (septum). As the hyphae continue to grow and branched a mat of growth called mycelium. The part of growth which project above the surface of substrate called aerial mycelium- which hold the spores-. The part which penetrate into the substrate and absorbs food is known vegetative mycelium.

The mycelium of parasitic fungi grows either by spreading between the cells or penetrating into them. The mycelium of fungus generally beings as a short-germ-tube emerging from a germinating spore. Fungal colony tend to be circular in out-line on solid medium, while the mycelium has a tendency to grow more or less equally in all

directipons from central point, and to develop colony- you can observe this by growing certain fungi on liquid and solid media.

### A: Somatic phase (Soma)

Fungi can be classified into four groups according to their morphology:

- 1- Mold – Mould - :** Which grow as branching filaments - hyphae - and produce the mycelium, while in slime molds the somatic phase grow as plasmodium .
- 2- Yeast:** are eukaryotic, single-celled microorganisms (Unicellular cells) which appears as round cells, do not form spores but reproduce by budding of the parent cells. This process of budding results in the production of two cells. Most are single celled structure with a thick cell wall such as *Cryptococcus neoformans*.  
**Note:** The word "yeast" comes from Old English *gist, gyst*, and from the Indo-European root *yes-*, meaning "boil", "foam", or "bubble".
- 3- Yeast-like fungi:** Also reproduce by budding and grow as non branching filament-pseudohyphae- such as *Candida albicans*.
- 4- Dimorphic fungi:** They grow as yeast form in tissue when incubated at 37°C in vitro, but when incubated at 22°C grow as mycelium form. This group of fungi have two phases of growth – Dimorphic such as :-*Histoplasma capsulatum* ; *Blastomyces dermatitidis*



Molds growing on a solid medium



Yeast growing on a solid medium



**Plasmodium (of slime mold)**

## **Hyphal Aggregation and Modifications in Fungi**

In majority of fungi, hyphae are simple. But, in some advanced fungi, hyphae may undergo certain modification in response to functional needs. Hyphal modifications are hyphal aggregations are required to do specific functions during the life cycle of fungi Important hyphal modifications in fungi are:

- (1). Prosenchyma**
- (2). Pseudoparenchyma**
- (3). Sclerotia (Sclerotium)**
- (4). Rhizomorpha (Mycelial cords)**
- (5). Appressoria (Appressorium )**
- (6). Haustoria (Haustorium)**
- (7). Stroma (stromata)**
- (8). Snares (hyphal traps)**
- (9). Rhizoides**
- (10). Clampconnection**

### **1. Prosenchyma (Plectenchyma or Proso-plectenchyma)**

is formed by the loosely packed tissue like organization of fungi and is formed when the component hyphae is arranged more or less parallel to one another and the whole mass become a felt like structure. The hyphae unite to form a loosely interwoven structure. In prosenchyma, the individuality of fungal hyphae is not lost . ex: *Claviceps purpurea*

## 2. Pseudoparenchyma

hyphae are closely intertwined and forms a tissue like structure in cross section and the hyphae lose their individuality and they are not distinguishable from each other. ex: higher fungi.

## 3. Rhizomorphs

Rhizomorphs (mycelial cords) are thick strands or root like aggregation of somatic hyphae in some fungi, gelatinous, dark brown and rope like coiled structures. the intertwining of hyphae is too tight so that hyphae lose its individuality. Individual hyphae are arranged in parallel way They are perennating structures with high penetration and survive for many years and they give rise new mycelia in the favourable conditions. Ex: *Armillariella mellea*.

## 4. Sclerotia

Sclerotium is a compact dark brown with inner cells are colourless globose structure formed by the aggregation of hyphae in some fungi. The interwoven hyphae are very much compact so that the individuality of hyphae is lost and the mass become rounded and cushion like structures. Sclerotium survives for long periods, sometimes for many years and they represent the resting stage of some fungi. They accumulate food materials and helps in vegetative reproduction. Ex: *Rhizoctonia solani*.

## 5. Appressorium

Appressorium is a terminal simple or lobed swollen structure of germ tubes on infecting hyphae, It adheres to the surface of host and help in the penetrating of hyphae. The infection peg is originated from the appressorium, ex: *Erysiphae*

## 6. Haustorium

Is the intracellular absorbing knob like, elongated, finger like or branched structure of obligate parasites , it is the meant for absorbing food materials from the host tissue and They secrete some special enzymes which help in hydrolyzing proteins and carbohydrates of host, ex : *Albugo*

### 7. Stroma

Stroma are compact somatic structures, They are flat cushion like pseudoparenchymatous structures and the fructifications are usually found on or in them.

### 8. Snares

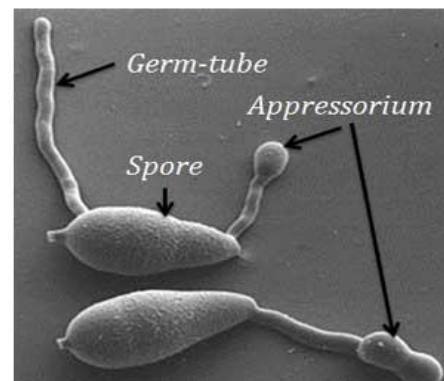
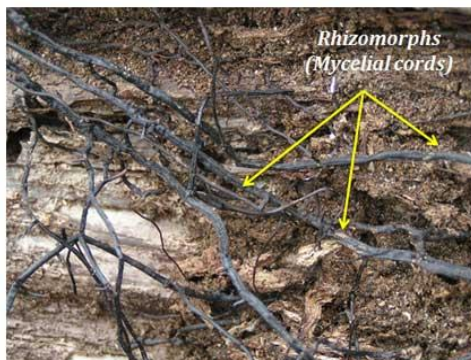
Snares are trap like structures produced by predaceous fungi to capture small animals such nematodes and protozoans.

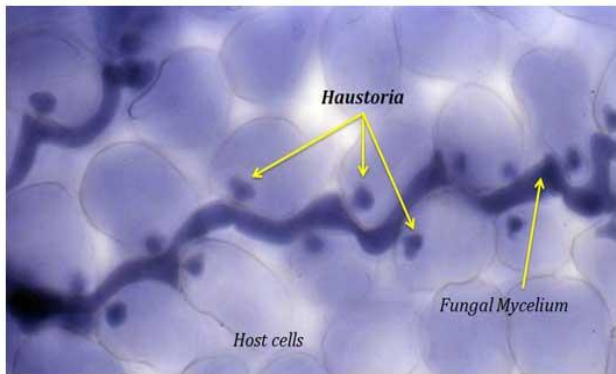
### 9. Rhizoides

a short, thin filament, resembles a root that anchors the growing (vegetative) body to a substratum and that is capable of absorbing nutrients. It may serve either as a feeding organ ( in *Rhizopus*) or to anchor the thallus to its substratum ( in *Chytridium*).

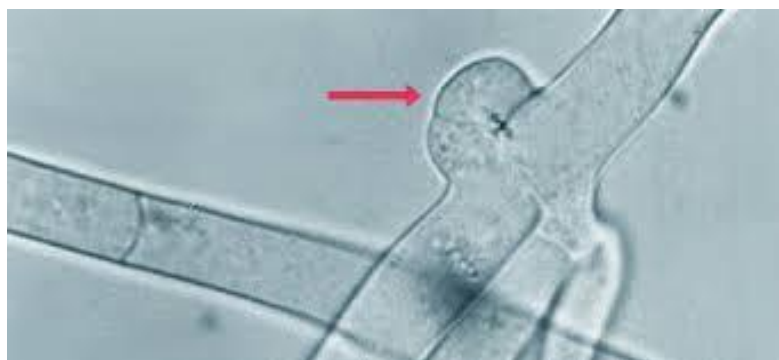
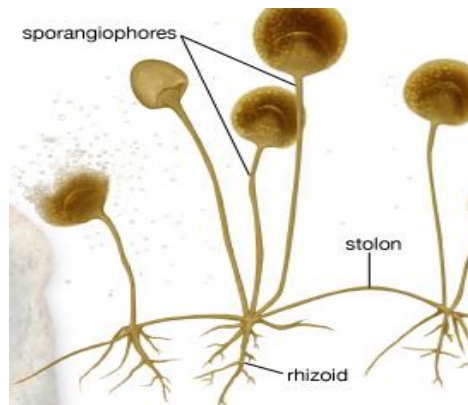
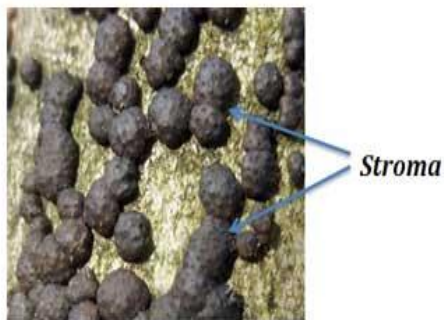
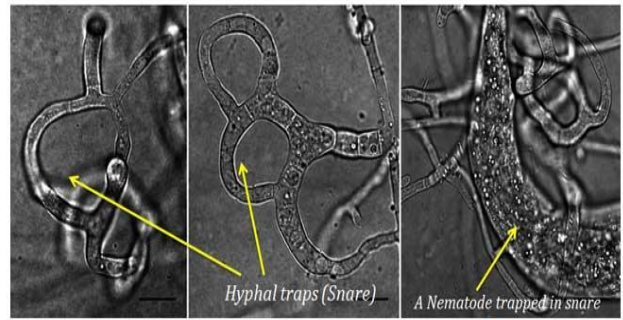
### 10. Clamp connection:

A bridge like hyphal connection characteristics of the secondary mycelium of many Basidiomycota; involved in maintaining the dikaryotic condition.





Hyphal Traps or Snares



Clamp connection