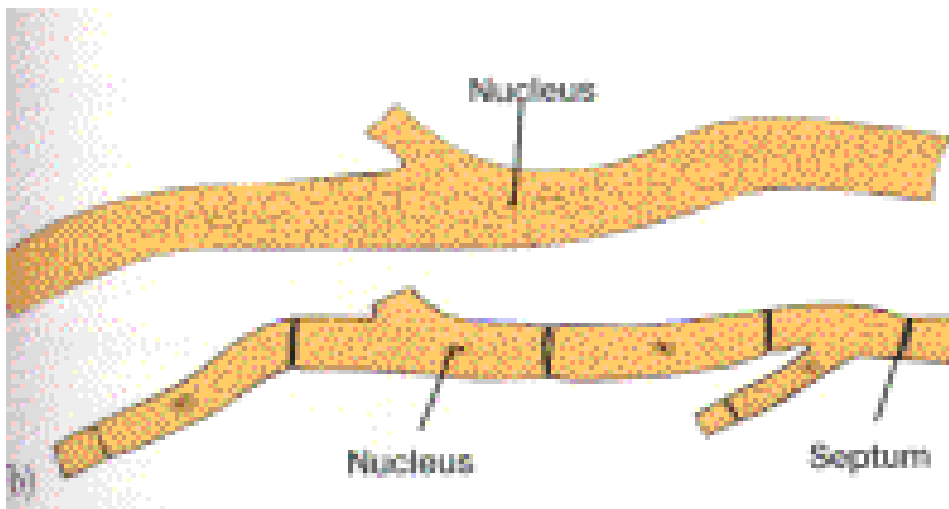


Morphology of fungi :

When fungi are grown on the 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 the 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 branch, a mat of growth called mycelium.

The part of growth which projects above the surface of the substrate called aerial mycelium- which holds the spores.

The part which penetrates into the substrate and absorbs food is known as vegetative mycelium.

The mycelium of parasitic fungi grows either by spreading between the cells or penetrating into them.

The mycelium of fungus generally begins as a short-germ-tube emerging from a germinating spore.

Fungal colonies tend to be circular in outline on solid medium, while the mycelium has a tendency to grow more or less equally in all directions from the central point, and to develop colonies- 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 grows as Plasmodium.

2- Yeast: are eukaryotic, single-celled microorganisms (Unicellular cells) which appear 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 the single-celled structure with a

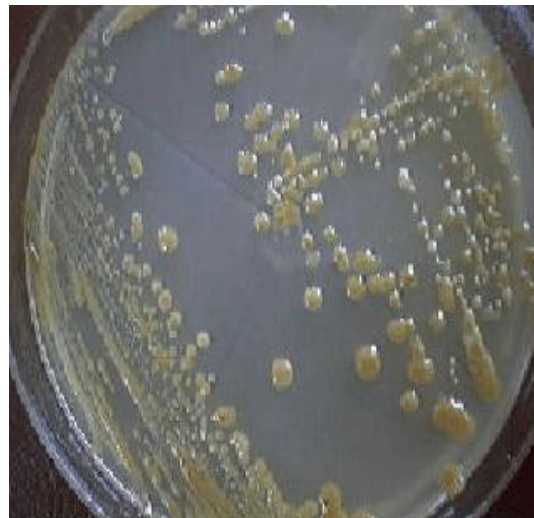
thick cell wall such as *Cryptococcus neoformans*. **Note:** The word "yeast" comes from Old English *gist*, *cyst*, and from the Indo-European root *yes-*, meaning "boil", "foam", or "bubble".

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 has two phases of growth – Dimorphic such as -*Histoplasma capsulatum*; *Blastomyces dermatitidis*.



Molds growing on solid medium



Yeast growing on a solid medium



Plasmodium (of slime mold)

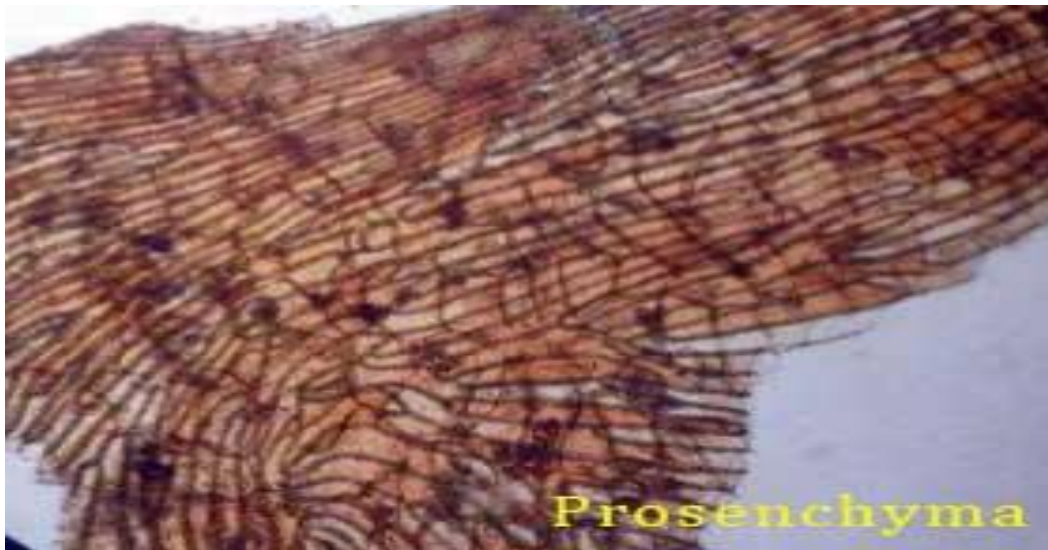
Hyphal Aggregation and Modifications in Fungi:

In the 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). Rhizomorphs (Mycelial cords)**
- (5). Appressoria (Appressorium)**
- (6). Haustoria (Haustorium)**
- (7). Stroma (stromata)**
- (8). Snares (hyphal traps)**
- (9). Rhizoids**
- (10). Clamp connections**

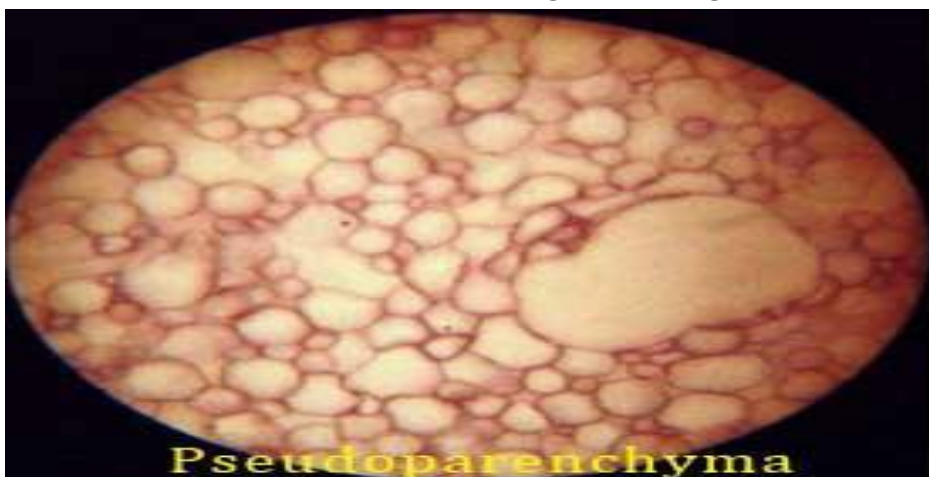
1. Prosenchyma (Plectenchyma or Pro so-plectenchyma)

is formed by the loosely packed tissue like the organization of fungi and is formed when the component hyphae are arranged more or less parallel to one another and the whole mass becomes 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 purpura*.



2. Pseudoparenchyma :

hyphae are closely intertwined and form 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 the parallel way They are perennating structures with high penetration and survive for many years and they give rise new mycelia in the favorable conditions. Ex: *Armillariella mellea*.



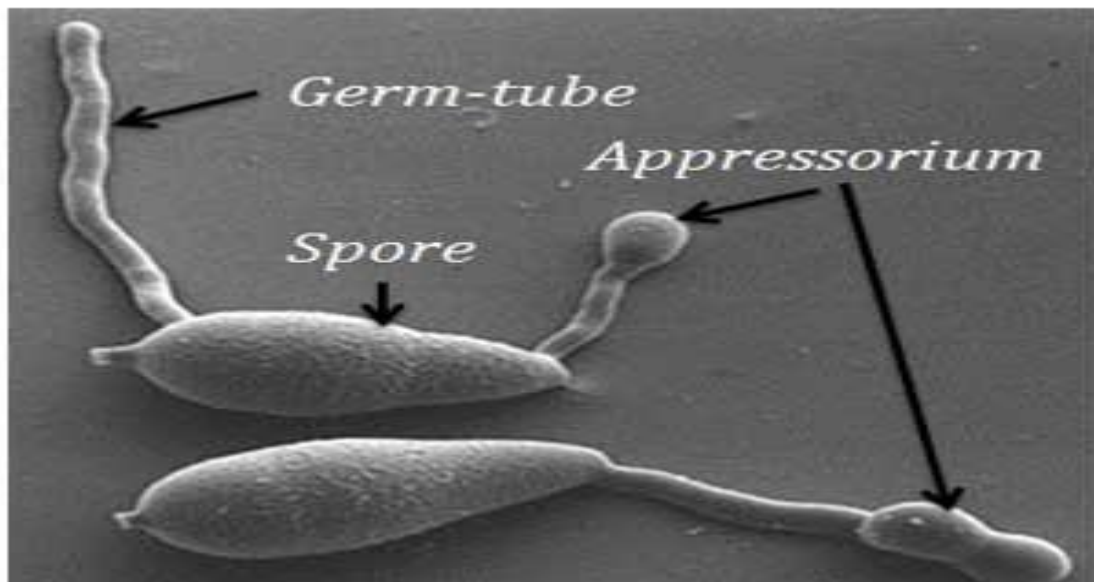
4. Sclerotia:

The sclerotium is a compact dark brown with inner cells are the colorless 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 becomes 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*.



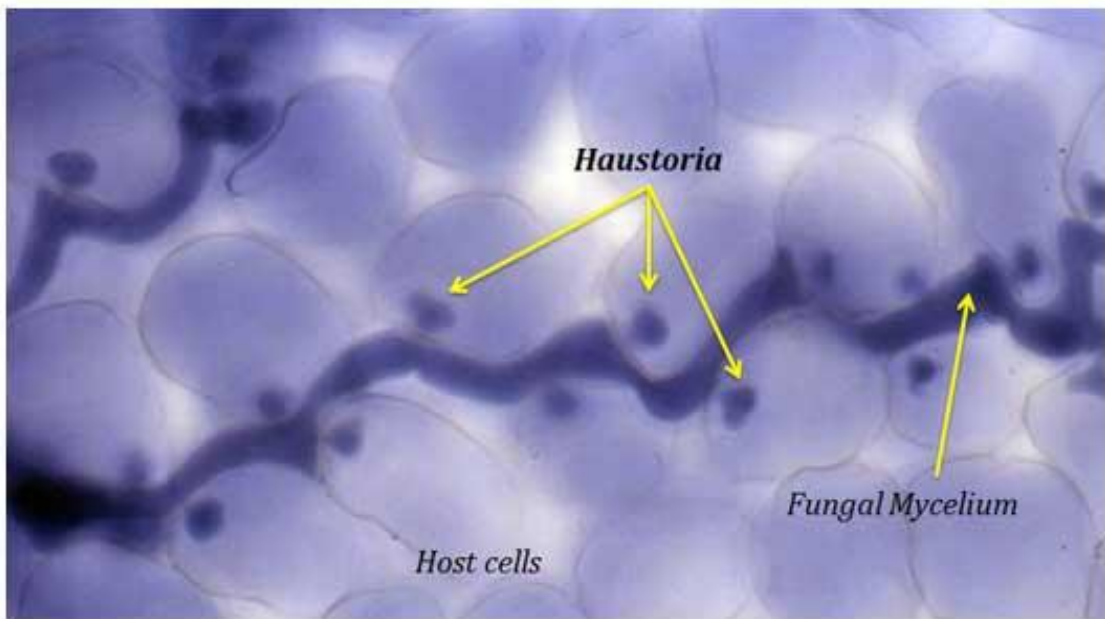
5. Appressorium:

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: *Erysiphe*.



6. Haustorium:

Is the intracellular absorbing knob like, the 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 the host, ex: *Albugo*.



7. Stroma:

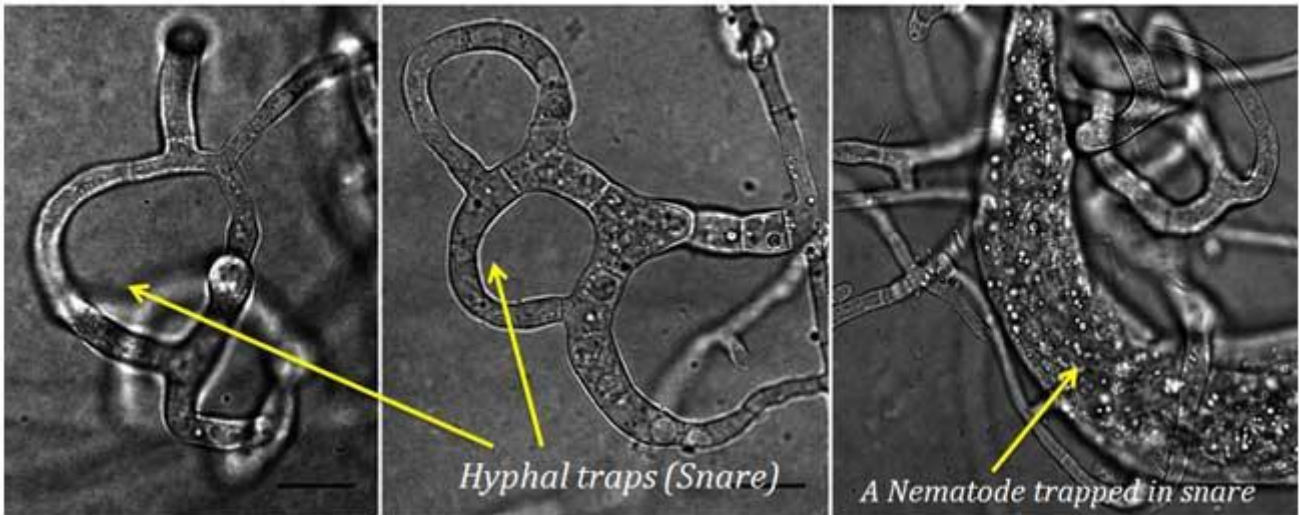
Stroma is compact somatic structures, They are flat cushion like pseudoparenchymatous structures and the fructifications are usually found on or in them.



8. Snares:

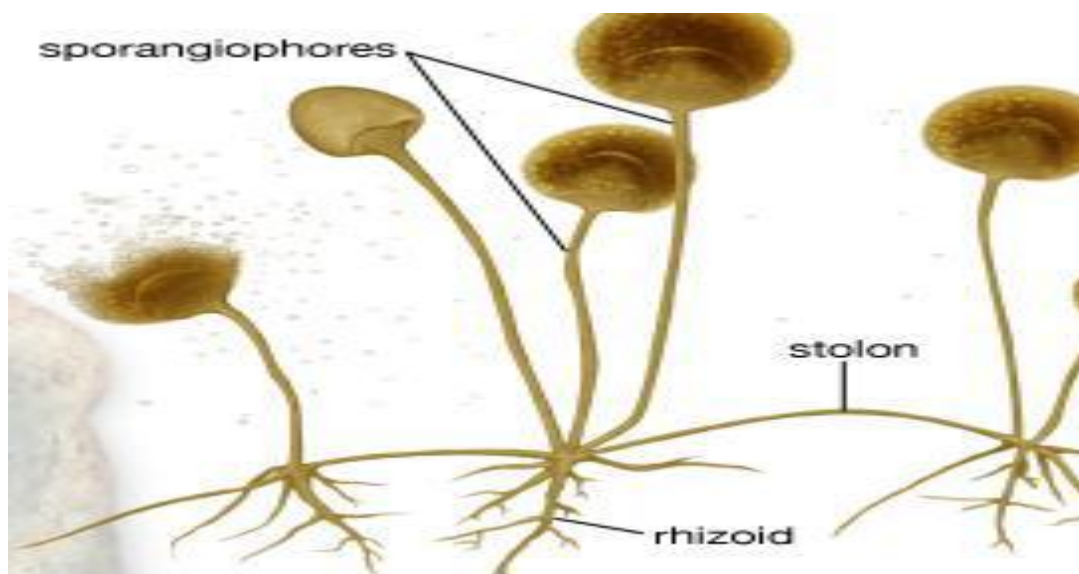
Snares are the trap like structures produced by predaceous fungi to capture small animals such as nematodes and protozoans.

Hyphal Traps or Snares



9. Rhizoids:

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.

