Kingdom of fungi [Fungus]:

* Fungus [pl. Fungi] is alatin word which mean mushroom. The science of Mushrooms is known as " Mycology ".
* The fungi are evolutionary intermediates between plants and microorganisms.
* Fungi are non – vascular plants without chlorophyll their mode of nutrient is heterotrophic.
* They live as saprophytes or parasites or symbionts [mutulism]. They are found in soil, water, air and in our food stuffs.
* They reproduce by means of spores. There are about 1,00,000 of fungi.
* Fungi are economically important. They are used in many ways. At the same time many fungi are harmful, They cause plants diseases, and human diseases [skin, nail, hair, pneumonia].

The characteristics of fungi:

1- Fungi are eukaryotes [have true Nucleus].
2- They are non – green plants.
3- The body of fungus is known as thallus.
4- The thallus may consist of a single cell as in yeast or it consists of filaments (mould).
5- They do not possess stems, roots or vascular system.
6- In fungus the growth takes place at the tip or apex of filaments. This type of growth is known as apical growth or terminal growth.
7- Fungi are chemoorganotrophic Microorganisms.

8- They reproduce by means of spores. Spores are sexual and a sexual. Others reproduce by fragmentation of the filament (mycelium) or by budding (yeast).
9- The reproductive structures are important in classification and identification of fungi.
10- The optimum temperature for the growth of fungus between 20C° and 30C°.
11- Fungi prefer an acid media for growth (pH6).
12- Although light is not essential for growth, some light is essential for sporulation in many species.

The structure of fungal body:

1- The body of fungus is called thallus.
2- = = = = is not differentiated into root, stem and leaves.
3- They are either unicellular [yeasts] or multicellular [Mushroom, molds].
4- The multicellular fungi are inform of filaments.
5- The filamentous body is called " Mycelium ".
6- Each filament of the mycelium is called " Hyphae ".
7- The hypha is tubular in nature.
8- It consists of cytoplasm enclosed by plasma. Membrane and cell wall. The cytoplasm contains nucleus.
9- The hyphae are two types (kinds). Namly aseptate and septate hypha.
10- In aseptate hypha, cross wall (septa) are absent and nuclei are scattered in the continuous mass of cytoplasm. This cytoplasm having many nuclei without cross walls is called a "coenocyte ".

11- The septate hyphae may be uninucleated or multinucleate. The septum contains pores and cytoplasm of all the cells are interconnected.

12- The mycelium without septa is called aseptate mycelium and the mycelium with septum is called septate mycelium.

13- The cell wall is made up of fungal cellulose, which is a form of chitin.

14- The plasma membrane encloses the protoplasm.

15- The cytoplasm contains cell organelles includes Golgi apparatus, mitochondria, endoplasmic reticulum, vacuoles etc.

16- Lichen is a symbiont. It is an associated of fungus and alga. [Mutulasim between green algae and Ascomycetes or basidiomycetes].

17- Reproduction occurs by asexual and sexual methods.

A. <u>Asexual Reproduction</u>: occurs by

1- fragmentation 2- Budding 3- sporulation

* In fragmentation; a small piece of hypha develops into whole fungus.
* Budding; is common in yeast.
* Sporulation is the production of spores. The types of spores are;

1- conidia 2- aleuriospores 3- arthrospores
4- chlamydospores

5- blastospores 6- sporangiospores

B. <u>Sexual reproduction</u>: occurs by producing haploid spores (n) such as,

1- Zygospores 2- Ascospores 3- Basidiospores

In higher fungi such as Mushrooms, and Aspergillus, the spores are located on aspecialised structure called " fruiting body " Basidium and Ascocarp.

Classification of fungi:

All fungi are placed in the division or phylum:

Mycota (Mycotina).

There are two subdivisions in fungi;

1- Myxomycotina 2- Eumycotina

Subdivision I:

Myxomycotina or true slime moulds; in this subdivision;

1- Cell wall is absent.
2- The thallus is a multinucleate mass of protoplasm called plasmodium.
3- It is free living.
4- It moves by amoeboid movement.
5- It feed by ingestion of food.
6- This subdivision has a single class called " Myxomycetes " class: Myxomycetes:

This class includes all free living slime mold or slime fungi. There are about 450 species. Ex: *Physarum* spp., *Plasmodium* spp., *Chytridium*spp., *Allomyces*spp.

Subdivision II:

Eumycotina or true fungi. This subdivision;

1- Cell wall is present.
2- The thallus is a filamentous structure called mycelium. The unit of mycelium is hypha (exception yeast unicellular).
3- They reproduce both sexually and asexually. This subdivision includes 8 classes Ex: *Aspergillus*spp., *Penicillium* spp., *Rhizopus*spp., *Agaricus*spp., *Fusarium*spp., *Candida albicans*; *Puccinia*spp., *Phytophthora*spp., *Pythium* spp.

Fungi phyla

Phylum common name	Examples	Number of species	Characteristics
1. Chytridiomycot ((chytrids))	Physarium Plasmodium Allomyces Chytridium	1300	- unicellular - Most are aquatic. - Some are saprophytic - While others are parasitic - Produce flagellated spores - [Zoospores]
2. Zygomycota (common molds)	Rhizopus Mucor Pilobolus Pythium Absidia	800	- Multicellular - Most are terrestrial - Many form mutualistic. - Relationships with plants - Reproduce sexually and a

			sexually. - Spore (Zygospore) and sporangiospores
3. Ascomycota (sac fungi)	Asperiglus Penicillium Clavicepes Saccharomyces Truffles Morels Erysiphe	60,000	- Multicellular [most] - Some are unicellular - Variety of habitats - Produce Aflatoxin - Ascopores and conidia - Reproduce Ascopores in Ascoparps
4. Basidiomycota (club fungi)	Byffballs Mushrooms Agaricus Puccinia	25,000	- Most are multicellular - Most are terrestrial - Saprophytic or - Parasitic or - Mutualistic - Basidiospores
5. Deuteromycota (imperfect fungi) (fungi – Imperfecti)	Fusarium Rhizoctonia Botrytis Cladosporium Trichophyton Epidermophyton	25,000	- No sexual stage observed - Very diverse group - Might not be considered a true phylum

Economic importance of fungi:

1- Medicines: Antibiotics are obtained from fungi Penicillin is obtained from *Penicillium notatum* streptomycin is obtained from *Streptomyces griseaus*.
2- Fungal Food: They are 200 species of fungi E.g. Mushrooms.
3- Fermentation: Yeasts to bring about alcoholic fermentation.
4- Baking industry: Make the bread light and spongy.
5- Enzymes: Various enzymes are produced by fungi: E.g. Aspergillus flavus produces AFlatoxin poisons to human and animal. *A. niger* produces Amylase for digestion.
6- Growth hormone: The fungus, Gibberella Produces gibberellin. It is a plant hormone. It is used to accelerates the growth of several crops.
7- Soil fertility.
8- Plant diseases.
9- Genetical study.
10- Human fungal diseases.

1. Superficial mycoses	- Ring spots, tinea
	- Trichophyton
	- Epidermophyton
2. Cutaneous mycoses	- Skin, hair, nail
3. Subcutaneous mycoses	- Sporpthrix
	- Mycetoma
	- Cladosporiosis
4. Systemic mycoses	- Coecidioidomycosis
	- Histoplasma
	- Blastomycosis

5. Opportunistics mycoses - Aspergillosis
- Mucormycosis
- Fusariosis
- Alternariosis
- Candidiasis

The End