Kingdom: Fungi

Phylum: Basidiomycota

General characteristics:

1- Reproduce sexually by the formation of specialized club-shaped end cells called **basidia** that normally bear external spores called **basidiospores** (usually four).
2- Basidiospores on the basidium is naked in nature or inside a vegetable composition called **basidiocarp.**
3- Hyphae forming a **clamp connection** between adjacent cells, which are characteristic of this phylum.
4- Include mushrooms, puffballs, stinkhorns, bracket fungi, other polypores, jelly fungi, boletes, chanterelles, earth stars, smuts, bunts, rusts, mirror yeasts, and the human pathogenic yeast *Cryptococcus*.

Asexual reproduction:

Asexual reproduction of Basidiomycota fungi by budding or fragmentation the mycelium or by the formation of conidia or by urediospores.

Basidiocarp:

A perfect basidiocarp of mushroom consisting of the following structures (Figure 1):
a- Cap or pileus b- Gills c- Ring or annulus d- Stipe (stem)

e-Volva

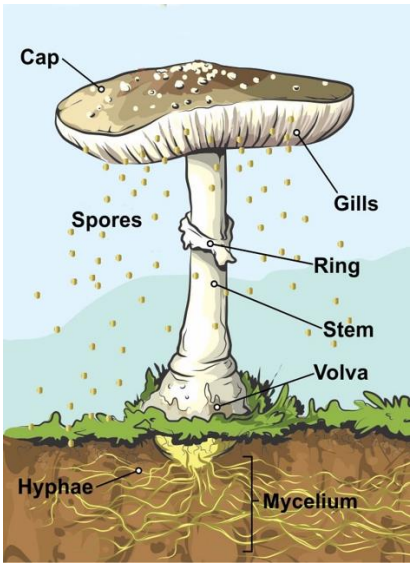

Figure (1) Basidiocarp structures

Basidium:

A reproductive structure in Basidiomycota fungi carried four strigma (perfect number) each strigma carry one basidospores.

Types of Basidium:

1- **Holobasidium**: consists of one cell different sizes undivided
2- **Phragmobasidium**: divided by septa Longitudinal or transverse
3- **Teiliobasidium**: Represent Teliospore **(Figure 2)**

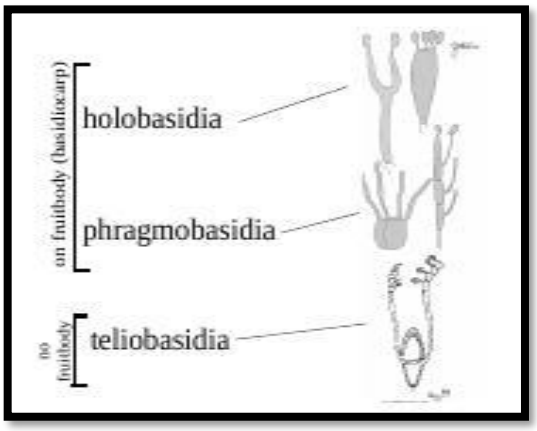

Figure (2) Types of Basidium

Basidiospores:

The stages of sexual reproduction plasmogamy and karyogamy and then the meiosis، the last two stages occur in the basidium and eventually consists of four **basidiospores** on each basidium **(Figure 3).**

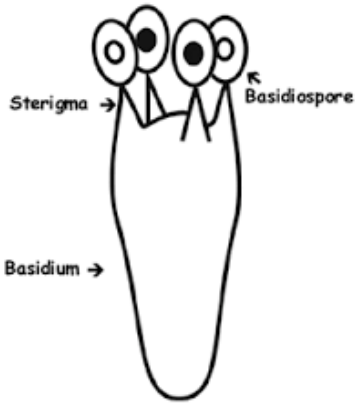

Figure 3: Typical basidium and basidiospore

Class: Homobasidiomycetes

Order1: Agaricales

1- Called gilled mushrooms.
2- Members live in the soil rich in organic matter and the remains of dead trees, many of which enter into the relationship of Mycorrhizae with trees
3- Includes Mushrooms (Edible) and Toadstool (poisonous).

- **Family1: *Agaricaceae***
  Genus: *Agaricus sp.* (white mushroom) (Slide available)
  is a genus of mushrooms (white mushroom) containing both edible and poisonous species, with possibly over 300 members worldwide.

- **Family2: *Boletaceae***
  Genus: *Boletus sp.* (Slide available)

The genus *Boletus* contains many members which are edible and tasty such as *Boletus edulis* and *B. aereus*.

Order2: Lycoperdales

The members of this order have characterized by the formation of Basidiocarp over the soil and contains the peridium, Basidiocarp called puff ball, all are edible, contains many families:

- **Family: Lycoperdaeaceae**

Genus: *Lycoperdron* sp. (Slide available)

The genus has a widespread distribution and contains about 50 species. it contains the smaller species such as the pear-shaped puffball.

Class2: Pucciniomycetes

Order: Pucciniales

Obligate plant pathogens, most species of rust fungi are able to infect two different plant hosts in different stages of their life cycle, and may produce up to five morphologically and cytologically distinct spore-producing structures viz.,

pycniospore, **aeciospore**, **urediniospore**, **teliospore**, and **basidiospore** in successive stages of reproduction. Each spore type is very host-specific, and can typically infect only one kind of plant.

- **Family: Pucciniaceae**

Genus: *Puccinia graminis* (Stem rust) (Slide available)

Also known as cereal rust, black rust, red rust or red dust, causes significant disease in cereal crops. Crop species that are affected by the disease include bread wheat, durum wheat, barley and triticale.

Class 3: Teliomycetes

Order: Ustilaginales

Parasitic on plants, causing smut of many cereal grains, including wheat, barley, corn, and rice. Their fungi characterized by the production of teliospores (diploid overwintering spores) and dimorphic life histories that include a saprobic yeast state and a pathogenic filamentous state.

- **Family: Ustilaginaceae**

Genus: *Ustilago tritici* (Loose Smut of wheat) (Slide available)

Pathogen that infects barley, rye and wheat, it is an exclusively seedborne disease.