

Basidiomycota

This division has many features in common with the Ascomycota: mycelia with chitinous cell walls that are regularly septate, presence of an extended dikaryon stage, yeast stage and presence of macroscopic fruiting bodies, in some taxa, and conidia are produced if an asexual stage is present. As in the Ascomycota and Zygomycota, the characteristic that defines this subdivision is the sexual spore stage. The sexual spores produced are **basidiospores** that are typically borne, exogenously, on horn-like **sterigmata** (sing.=sterigma) of **basidia** (sing.= basidium) (Fig. 1). The morphology of the basidium, however, is variable and a few of the variations are shown in the micrographs below (Figs. 2-4), and the variations observed below were once thought to be of considerable significance in the phylogeny of the Basidiomycota.

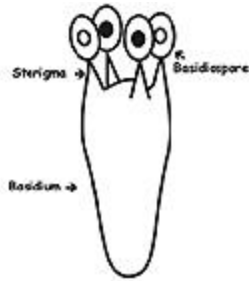


Figure 1: Unicellular basidium, with four sterigmata and basidiospores. Basidium illustrated to the left is commonly used as representative of the typical basidium.



Figure 2: Cruciate-septate basidium. This basidium is divided into four chambers. The basidium is named for the "cross" that can be seen when viewed from above, through the microscope.



Figure 3: Transversely septate basidium. This basidium resembles hyphal cells, with sterigmata. Because of its lack of

differentiation, this was once considered to be a primitive basidium.

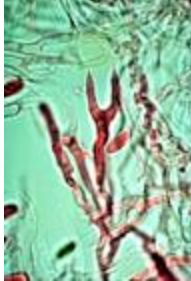


Figure 4: Tunning fork basidium. The basidium is named for its obvious resemblance to a tuning fork. This basidium produces only two basidiospores.



Figure 5: Transversely septate basidiospores germinating from a rust teliospore. Basidiocarp is absent.

Three classes are currently recognized:

- Class: [Basidiomycetes](#)
- Class: [Uredinomycetes](#)
- Class: [Ustomycetes](#)
- **Basidiomycetes**
- The class Basidiomycetes includes those members that produce their basidia and basidiospores on or in a basidiocarp. The morphology of the basidium is variable. Until recently the morphology of the basidium was believed to be a key to determining relationship in the Basidiomycota. Basidial morphology was once the basis for classifying the fungi to class or subclass. However, rDNA sequencing analyst (Swann and Taylor, 1993), **septal pore** morphology and cell wall biochemistry (McLaughlin et al, 1995) have determined that far too much emphasis was placed on this characteristic and all members of the Basidiomycota that produce basidiocarps are now included in a single class, the Basidiomycetes, and the morphology of the basidiocarp and basidium are characteristics that are now used to classifying fungi into the various orders of this class.
- Order: **Agaricales**
- This is the order of Basidiomycetes with which most of us are familiar. This is the order that is commonly referred to as mushrooms. Basidiocarps of this order typically are "fleshy" and have a **stipe** (=stalk), **pileus** (=cap), and **lamellae** (=gills) where the basidia and basidiospores are borne (Fig. 1-4). The Basidiospores in this order of fungi are forcibly

ejected from the basidium, into the area between the lamellar edges, which then allows the spores to fall free from the mushroom and be dispersed by wind. A **demonstration of this mechanism** can be observed [here](#).

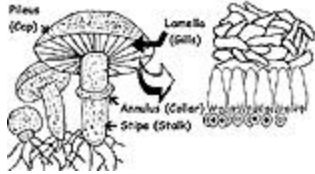


Figure 1: Typical mushroom of Agaricales: Stipe, annulus, lamella and pileus. Basidia and basidiospores are produced in an hymenium on the lamella surface.



Figure 2: Low magnification of a cross section through the lamella of a mushroom

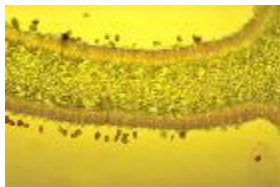


Figure 3: Higher magnification of section through the lamella of mushroom. Basidiospores now visible on the upper and lower edge of lamella.

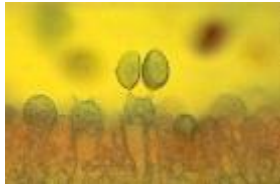
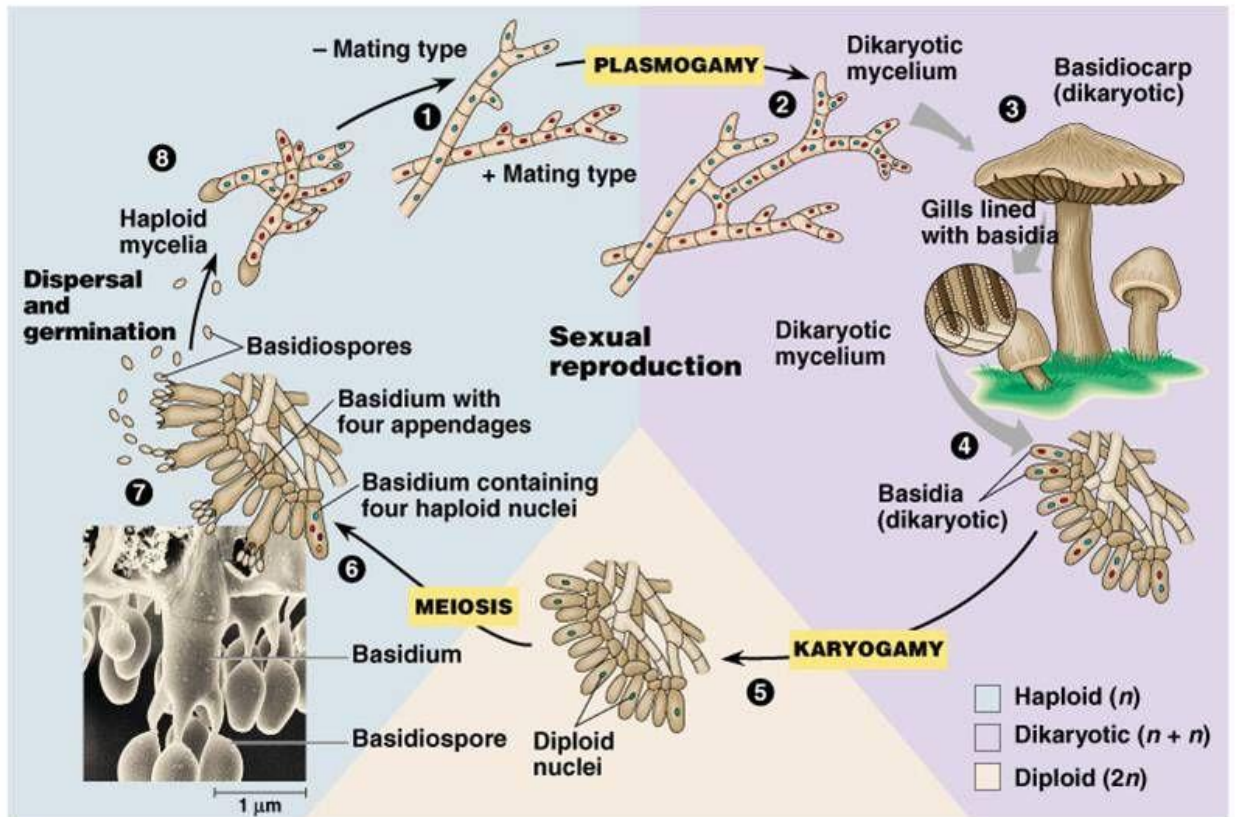


Figure 4: High magnification of basidia. Center basidium shows two basidiospores of four on sterigmata.

- The [mushroom life cycle](#) will be used as representative of the basidiomycete life cycle. Although clamp connections are present in the dikaryon of some species of, they are also absent in many. Clamp connections are believed to function in ensuring that each cell has a compatible pair of nuclei.



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.