

Difference Between Ascus and Basidium

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Key Difference - Ascus vs Basidium

[Ascomycetes](#) and [Basidiomycetes](#) are two major phyla in the kingdom fungi. Both groups represent macrofungi and produce visible fruiting bodies or sporophores to bear [spores](#). Spores are the mediators of propagation of these fungi. Ascomycetes fungi produce a sac-shaped cell, bearing eight haploid spores called [ascospores](#) during [sexual reproduction](#). This structure is known as ascus (plural: asci). Basidiomycetes produce a club-shaped cell which bears four protruded [haploid](#) spores called [basidiospores](#) during sexual reproduction. It is known as basidium (plural: basidia). The key difference between ascus and basidium is that **ascus produces ascospores internally** while **basidium produces basidiospores externally**. Both ascus and basidium are microscopic structures.

What is an Ascus?

Ascomycetes is a higher phylum of kingdom [fungi](#). Ascomycete is a big phylum which includes over 44,000 known species. Ascomycetes fungi are well known organic matter decomposers in the soil. They are also used in industries for antibiotic and organic acids production. This group of fungi produces conidia during asexual reproduction and ascospores during their sexual reproduction. These spores germinate and produce new fungal hyphae to continue their generations.

Ascospores are produced inside a special reproductive cell called ascus. Ascus is a sac-shaped cell which contains ascospores of ascomycetes fungi. It is a microscopic structure, which develops within the mycelial mat, and produces ascospores internally. Usually, ascus contains eight spores inside it. Hence, the name ascus is given to this structure. Some ascomycetes fungi produce four ascospores inside the ascus. There are also species with just one spore per ascus and others with over a hundred spores per ascus. Spore number within ascus changes with the fungal species. The production of ascus or asci is an important characteristic which distinguishes ascomycetes from other fungi. Ascospores and asci are specific to ascomycetes. Hence ascomycetes fungi are easily identified by the presence of asci within their mycelium.

Ascospores are produced by two meiotic divisions of the diploid [zygote](#) nucleus. Original diploid nucleus divides into four haploid nuclei by [meiosis](#). Then these four nuclei duplicate by [mitosis](#) to produce eight ascospores.

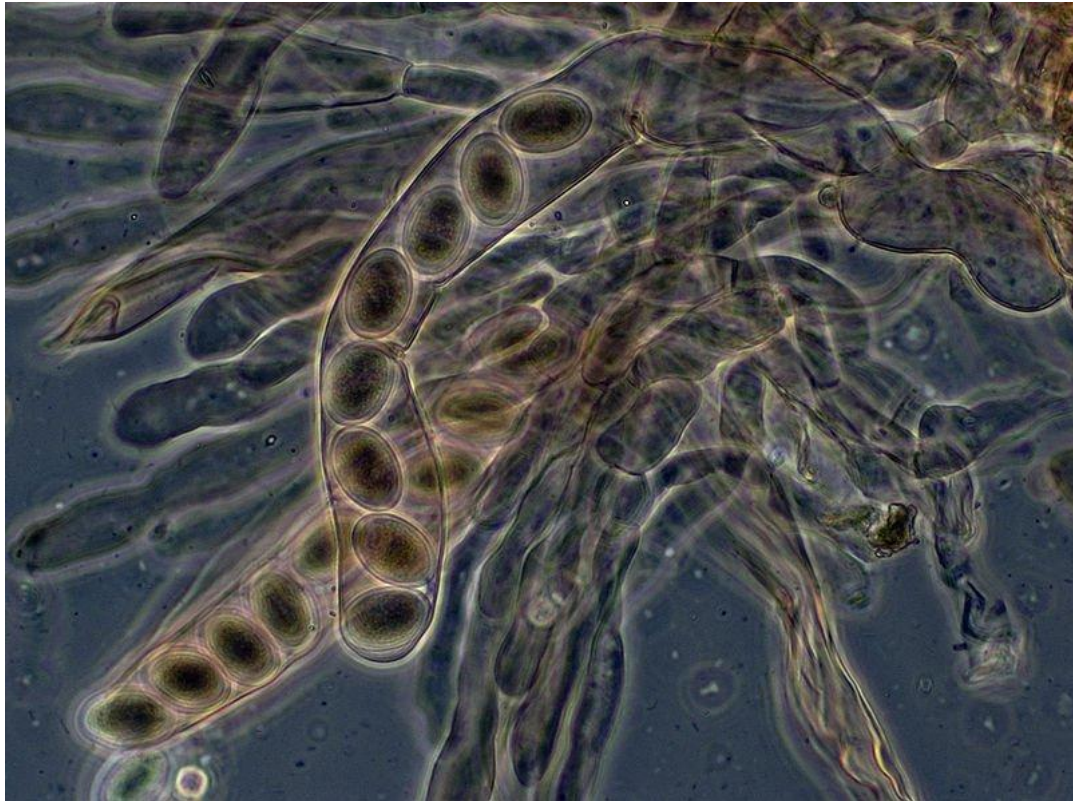


Figure 01: Asci

What is a Basidium?

Basidiomycetes is another phylum of kingdom fungi which belongs to higher macrofungi. There are about 25,000 species of basidiomycetes. [Mushrooms and toadstools](#) are two familiar types of basidiomycetes. Basidiomycetes are characterized by basidia formation. Basidium is a club-shaped structure which develops during the sexual reproduction of basidiomycetes. It is a microscopic structure and produces sexual spores called basidiospores. Basidia are developed on the hymenophore of fruiting bodies of basidiomycetes. The presence of basidia is unique to basidiomycetes.

A basidium usually produces four basidiospores and occasionally two or eight spores. However, it can change with the fungal species. Basidia produce narrow prong structures called sterigmata. One basidium produces four sterigmata, and at the tip of the sterigma, each basidiospore is developed externally. At the mature state, basidiospores are discharged forcibly from the sterigmata to the environment.

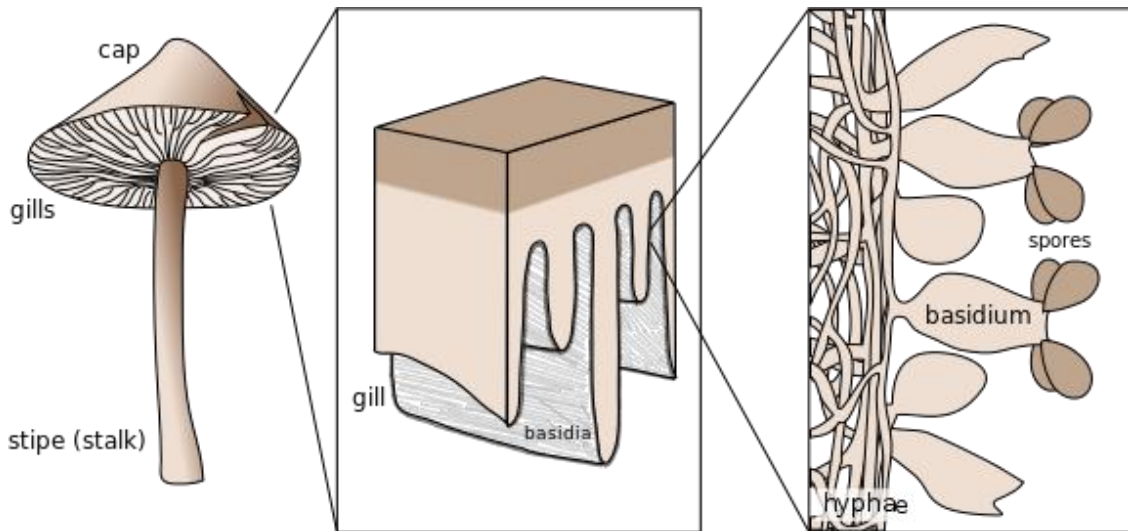


Figure 02: Basidium

What is the difference between Ascus and Basidium?

Ascus vs Basidium	
Ascus is a sac-shaped reproductive cell which produces sexual spores called ascospores.	Basidium is a club-shaped sexual cell which produces sexual spores of basidiomycetes called basidiospores.
Fungal Phylum	
Ascus is a sexual reproductive structure unique to phylum Ascomycetes.	Basidium is a sexual reproductive structure unique to phylum Basidiomycetes.
Spore Production	
Ascospores are produced internally by the ascus.	Basidiospores are produced externally by the basidium.
Spore Number	
An ascus usually bears eight ascospores.	A basidium usually produces four basidiospores
Examples	
<i>Aspergillus</i> and <i>Penicilium</i> are two common species of ascomycetes.	<i>Agaricus</i> (common mushrooms) is a best-known example of basidiomycetes

Summary - Ascus and Basidium

Ascus is a sexual spore-bearing cell produced in ascomycete fungi. It is a sac-like structure which contains sexual spores of ascomycetes. Ascus is developed within the mycelium and is a microscopic structure. Ascus usually produces eight ascospores internally by two meiotic cell divisions of the diploid zygote. Basidium is a sexual spore-bearing cell produced in basidiomycetes fungi. It is a club-like structure which contains sexual spores of basidiomycetes. Basidium produces four-minute projections called sterigmata, and at the end of the sterigmata, spores are produced externally. This is the difference between ascus and basidium.

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