

# [Cellular eukaryotic, prokaryotic and archaea. within these,](https://assignbuster.com/cellular-eukaryotic-prokaryotic-and-archaea-within-these/)

Cellularlife on earth can be divided in three different domains – the eukaryotic, prokaryoticand archaea. Within these, further sub distinctions can be made, resulting in abranched and complex annotation of life.  Fungi belong to the eukaryotic domain, inwhich they constitute their own kingdom, besides the plant and animal kingdoms. As other eukaryotic cells, fungi cells accommodate organelles and a truenucleus, all contained within a membrane, while they differ by having a cellwall consisting of chitin, as well as lacking chlorophyll. The general schemeof a fungi is relatively simple.

Composing of a main body, a mycelium, made upby a branched network of tubes, hyphae. Through hyphae, nutrients are absorbed, in which organic carbon, from either living or dead biological organisms, function as the main energy source. Reproduction of fungi can occur in two separate, yet connected, ways. Either reproduction takes place asexually, mainly through themeans of the release of small identical copies of parent fungi as spores, orreproduction occurs sexually. Sexual reproduction varies between differentphylums and therefore a generic description does not make sense.

Instead adetailed description is integrated within the description of each phylum. The fungikingdom can be subdivided in 5 different phyla, these are named Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota and Deuteromycota. Phylum Chytridiomycotacontainsall fungi, which at some point in their life cycles exists as flagellatedswimming cells and these fungi are therefore, primarily, found in aquaticenvironments. These fungi reproduce asexually when a zoospore, who areuniflagellate asexual spores, lands on a suitable substrate, after which a cellwall forms around it, thus, creating a fungi body. Long threads, rhizoids, attach to the substrate and through these nutrient is absorbed. After a periodof feeding, the fungi body is converted into a sporangium, a structure whichcontains and subsequently releases zoospores. Sexual reproduction occurs byfusing zoospores, thus creating a diploid zygote, which then hardens andcreates a meiosporangium. Later fusing of nuclei create meiospores, which can thenswim away to find a suitable substrate and form a new fungi body.

Fungi of thisphyla are mostly harmless, saprotrophic fungi, although a few pathogens such asBatrachochytriumdendrobatidis, which causeschytridiomycosis in amphibious animals have been found. Phylum Zygomycota clusters more than 1100 different species, mostlysaprotrophic soil fungi, who exploits nutrients by decomposing waste products, such as rotten fruit. Their name, refers to their reproductive sexualmechanism, as it forms a structure called zygosporangium, arising from theconjugation between two compatible hyphae.  After conjugation, a cell wall is formedbehind the fusing hyphae, which at this point are called gametangia. Next tothis, the wall separating the two hyphae is broken down, leading to fusion of bothhyphae’s cell components into one organism, except their nuclei, which arestill separate entities. Following this, their nuclei fuse and the walls aroundthe zygosporangium grows even harder and thicker than before, this creates thezygospore, responsible for the naming of the phylum. After a long restingperiod, meiosis occurs, and the fused nuclei are divided into two separaterecombinant nuclei.

These are then laterintegrated and released as meiospores. Asexual reproduction occurs by therelease of mitospores. Most Zygomycota are harmless to humans, although a feware pathological causing a disease called mucormycose, which arises when spores are inhaled from dusty environments.  Fungi in the thirdphyla, phylum Ascomycota, are themost abundant phylum as more than 65. 000 species belong here.

Their trademarkis their structural component, the ascus, which is a sac-like unit, harboringeight ascospores, in which sexual and asexual reproduction occurs. The formationof this component arises when a spore lands on a suitable substrate, whichforms a haploid mycelium. From this, asexual structures can be produced, orsexual structures, gametangia, can be formed. The female sexual structure iscalled ascogonium, while the male sexual structure is an antheridium.  Fusing of these leads to plasmogamy (oneorganism, with two nuclei) and forms an ascogonius hypha.

Karyogamy (fusing of nuclei)takes place at the tip of this hyphae, creating a diploid ascus, who undergoesmeiosis and thus produces 4 haploid nuclei. Followed by a round of mitosiseight ascospores are formed, which can then be released and the cycle repeats. Dueto the sheer amount of species, phylum Ascomycota, exert both a positive andnegative effect on the human condition. Beneficial species such as Penicillium notatum and Saccharomyces cerevisiae contribute toour health and or ability to produce beverages, while malign effects are seenby species of the Aspergillus genus who can cause a respiratory disease, decayfood, synthetize carcinogenic toxins in nuts etc. The Aspergillus genus will beinvestigated extensively later in this paper. Thefourth phyla, Basidiomycata, are nextto Ascomycota the most abundant phyla with more than 30.

000 separate speciesand because of this abundance, their diversity is large and plentiful. Thisphylum encompasses the largest and most complex fungi, in which most species sharea common structural component coined basidium. The basidium is a club shaped structure, in which meiosis takes placeand where basidiospores are synthesized, often located on fruiting bodies suchas mushrooms.

Basidiomycota reproduce asexually by producing spores or by amechanism called budding, in which an extension of a cell is separated into itsown cell. Sexual reproduction happens when haploid hyphae meet and fuse, oftenfollowed by the transfer of a nuclei from each parent hyphae to the other, which reproduces mitotic, thus, creating a dikaryotic mycelium.  From dikaryotic mycelium a fruiting bodyarises, by hyphae, who communicate and create different components. Some createthe stalk, other the gills of the fruiting body.

The tips of the hyphae whichconstitutes the gills is the basidium and when these swell, nuclei are fusedand a bit after 4 basidiospores are formed, which will then be ready to bereleased. Basidiomycota play an important role in ecosystems, as they achievenutrient by breaking down decomposing organic material, unfortunately they alsobreak down wood, which have negative economical consequences. The last phyla, phylum Glomerucyto, is a fairly newaddition to the additional four phylae. These fungi live in close associationwith the roots of trees. Their relationship is symbiotic in which the rootscontribute with carbohydrates and carbon, while the fungi stacks essentialvitamins and minerals which the plant can utilize. Glomeromycota do notreproduce sexually and cannot sustain life without support from plant roots. Theremaining fungi that do not fit in any of these phyla, belong to a sixthinformal phylum called phylum Deuteromycata. These fungi all reproduce solelyasexually are as individuals closer to other phyla but not close enough to beconsidered a valid part of these.