Department of biology

2025-2026

((Mycology))

Stage (-3-)

LEC- ((3))

(Fungi Reproduction)

By

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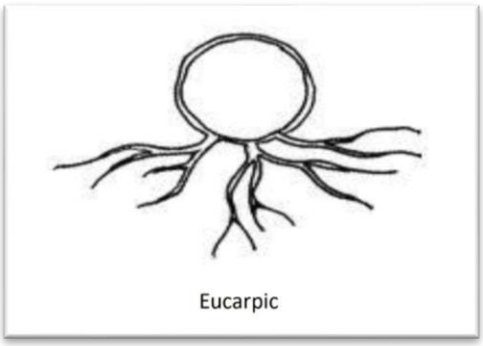
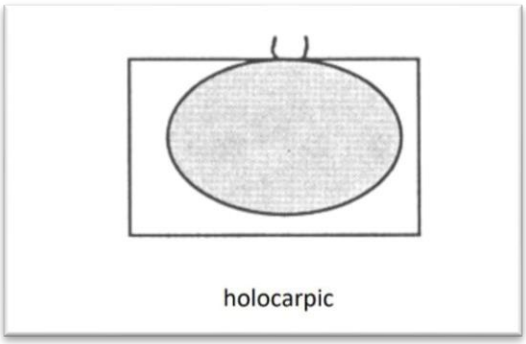
(Fungi Reproduction)

Reproduction is the process of producing new individuals that are similar to the parents. It is a characteristic unique to each species and plays a vital role in preserving species from extinction.

Holocarpic fungus: the entire body of the fungus transforms into a fruiting structure (reproductive unit)

Eucarpic fungus:Only part of the fungal body transforms into reproductive units, while the rest continues to perform its normal physiological functions.





Fungi are classified based on the presence of sexual reproductive organs on the fungal body (thallus) in to:

1-Homothallic (Monoecious): Both male and female organs are present on the same thallus

2-Heterothallic (Dioecious): Male and female organs are found on separate thalli

A- Asexual reproduction (Vegetative Reproduction)

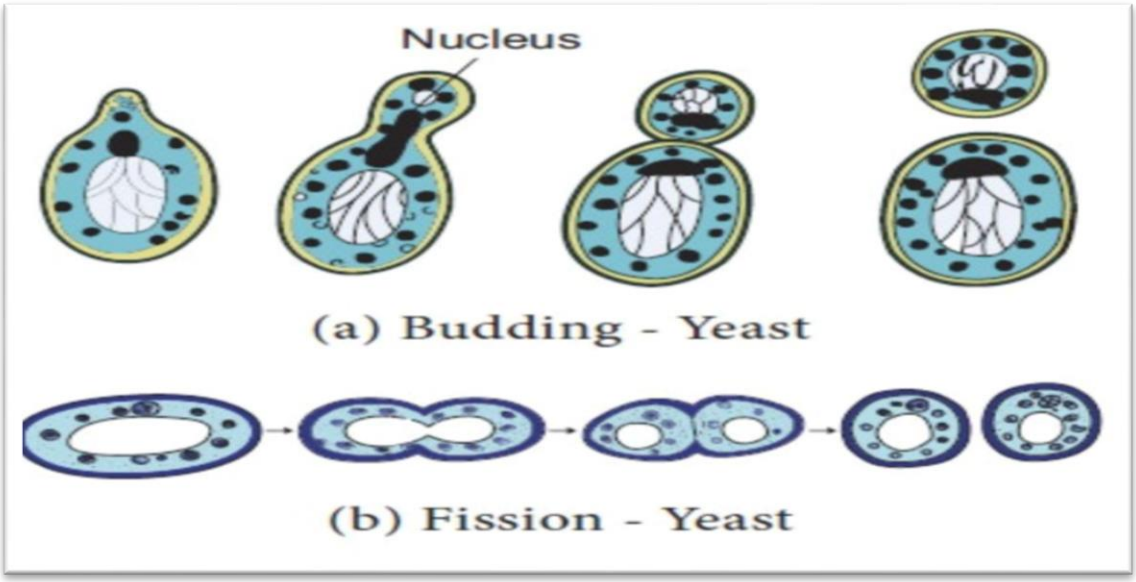
It is the type of reproduction which involves the somatic portion of the fungal thallus. It occurs by the following methods.

a-Fission: In this process, the parent cell splits into two equal halves, each of

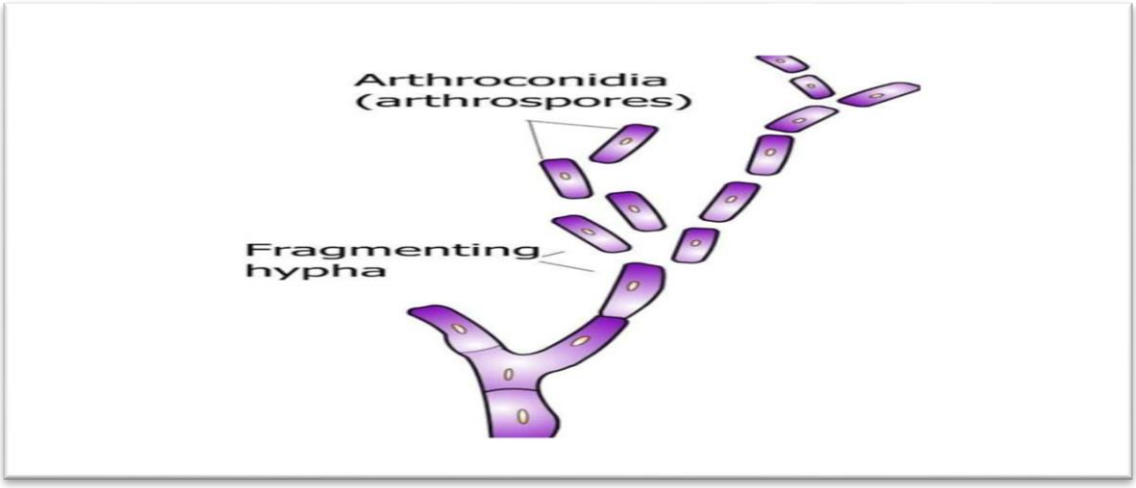
which develop into a new individual. Fission is also common in yeast.

b-Budding: The parent cell produces one or more projections called buds, which

later develop necessary structures and detach to grow into new individuals. Budding is common in unicellular forms like yeast.



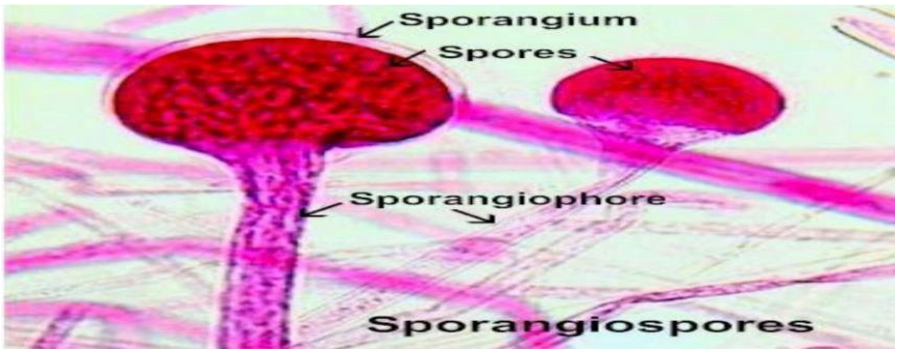
c-Fragmentation:In this process, the mycelium breaks into two or more similar fragments either accidentally or due to some external force. Each fragment grows into a new mycelium.



d-Asexual spore formation: is the primary method of reproduction in fungi, through which they produce large numbers of reproductive units—often in the millions or even trillions.
Spores vary in size, shape, color, structure, and number of cells depending on the fungal species, making them an important diagnostic characteristic

Spores can be of endogenous origin, meaning they develop inside specialized structures called sporangia, and in this case, they are referred to as sporangiospores.

The sporangium is an asexual reproductive structure whose internal components differentiate to produce spores.



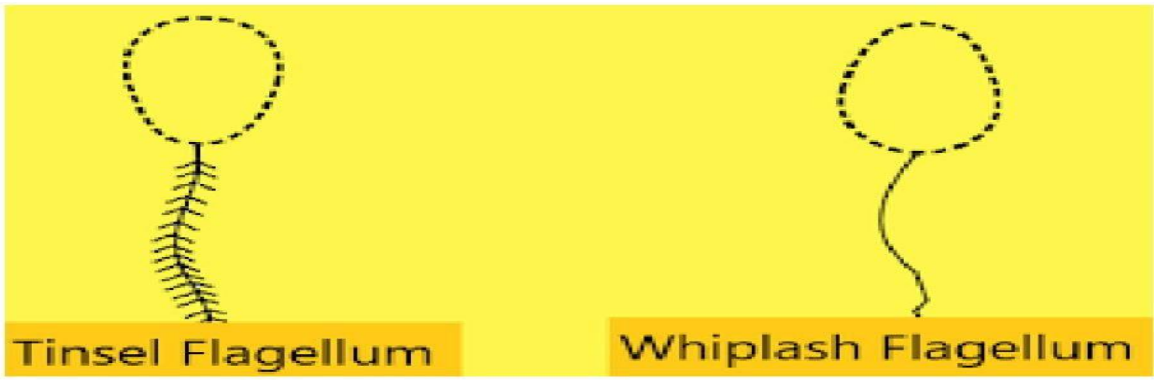
These spores may be:

1-Motile spores: known as zoospores, which are typically equipped with one or more flagella.

Flagella are classified into two main types:

1. **Whiplash type:** This type is characterized by a flagellum with a basal region connected to a long, smooth, and simple upper portion, lacking any lateral structures.
2. **Tinsel type:** This type features lateral hair-like projections along the flagellum, giving it a feathery appearance.

2- non-motile spores:called aplanospores



Alternatively, spores may form directly on hyphae or on specialized spore-bearing structures, in which case they are known as conidia, or exogenous spores.

*Conidia are formed directly on the hyphae or on specialized structures called conidiophores.

*Conidia may develop individually, in clusters, or in chains. The conidiophores are elongated, cylindrical structures that can be either simple (arising singly) or compound (branched or grouped).

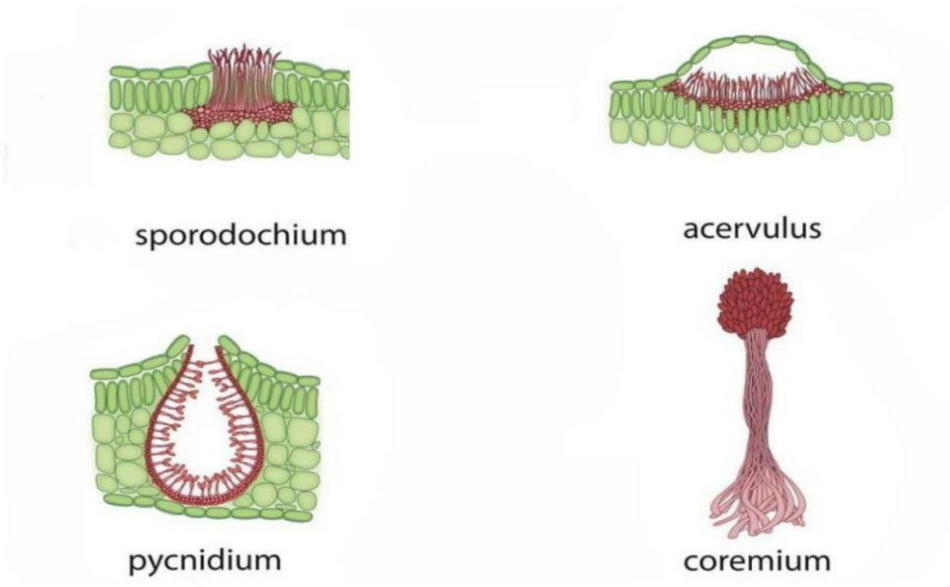
*The compound conidiophores give rise to distinct asexual reproductive structures, the most important of which include:

a- Pycnidium

b- Acervulus

c- Sporodochium

d- Synnema(Corenium)



الاشكال الثمرية اللاجنسية الناتجة من تجمع الحوامل الكونيدية

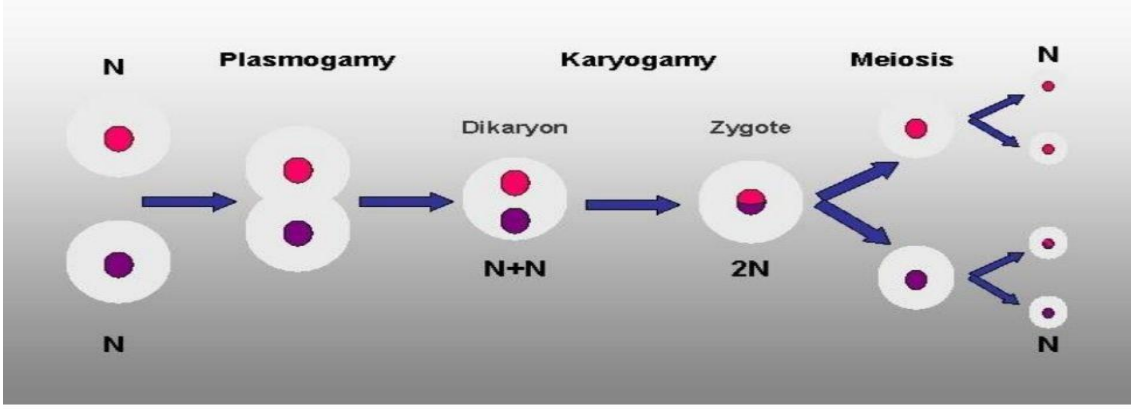
B-Sexual reproduction

Sexual reproduction in fungi proceeds through three distinct stages:

1-Plasmogamy :This initial stage involves the fusion of the cytoplasm from two compatible mating cells. During this process, either partial or complete cytoplasmic union occurs, and the male nucleus is transferred into the female cell.

2-Karyogamy :In this stage, the two nuclei subsequently fuse to form a single, diploid nucleus. The resulting cell, known as the zygote, carries a diploid set of chromosomes.

3-Meiosis :Following karyogamy, meiosis takes place, leading to genetic recombination and the generation of novel genetic traits. This phase results in the formation of sexual spores, such as oospores, ascospores, and basidiospores.



*There are several mechanisms of sexual reproduction

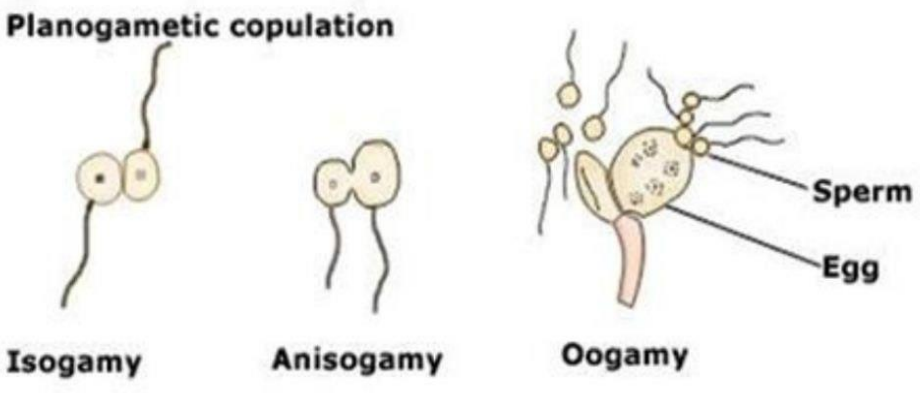
1- **Planogametes conjugation** : Motile gamete fusion occurs in lower fungi that inhabit aquatic environments or the intracellular (cell sap) spaces of certain parasitic fungi.

This type of sexual reproduction requires the presence of a pair of motile, flagellated gametes that swim toward each other and undergo fusion.

If the two gametes are morphologically and size-wise identical, the process is referred to as isogamy.

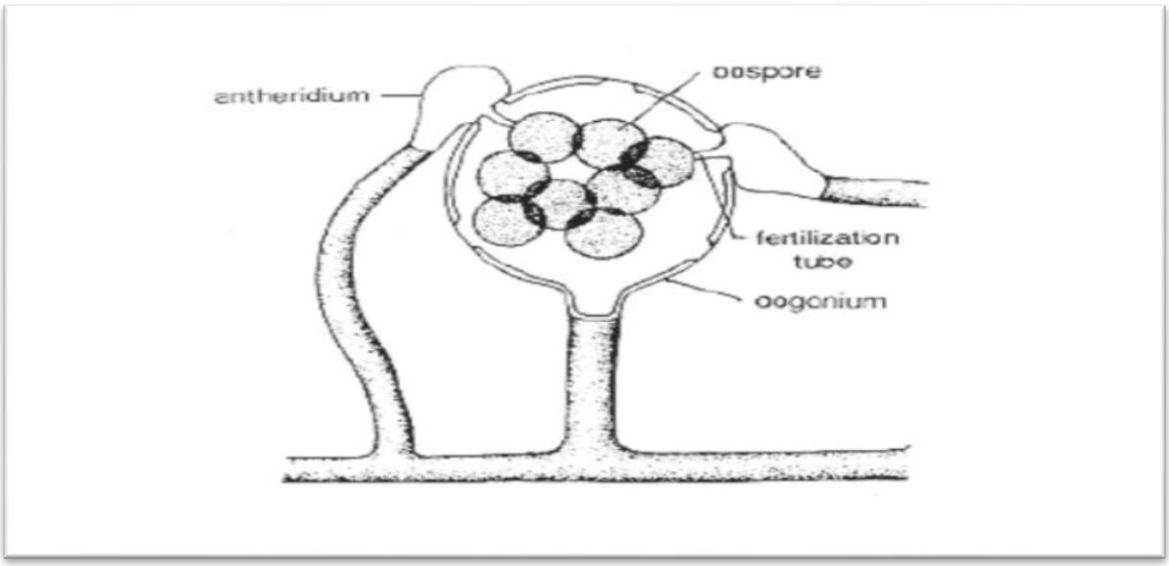
If they are similar in shape but differ in size, it is termed anisogamy.

When the gametes are different in both size and form, and one is motile while the other is non-motile, the fusion is classified as heterogamy, also known as oogamy.



2- **Gametangial contact**: is a type of sexual reproduction in which two gametangia come into contact. During this process, only the nuclei are transferred from the male gametangium to the female gametangium. This transfer occurs either through the dissolution of the separating wall between them or via the formation of a fertilization tube that allows the movement of nuclei only.

This form of reproduction is characteristic of oomycetes (water molds), and it results in the formation of sexual spores known as oospores.

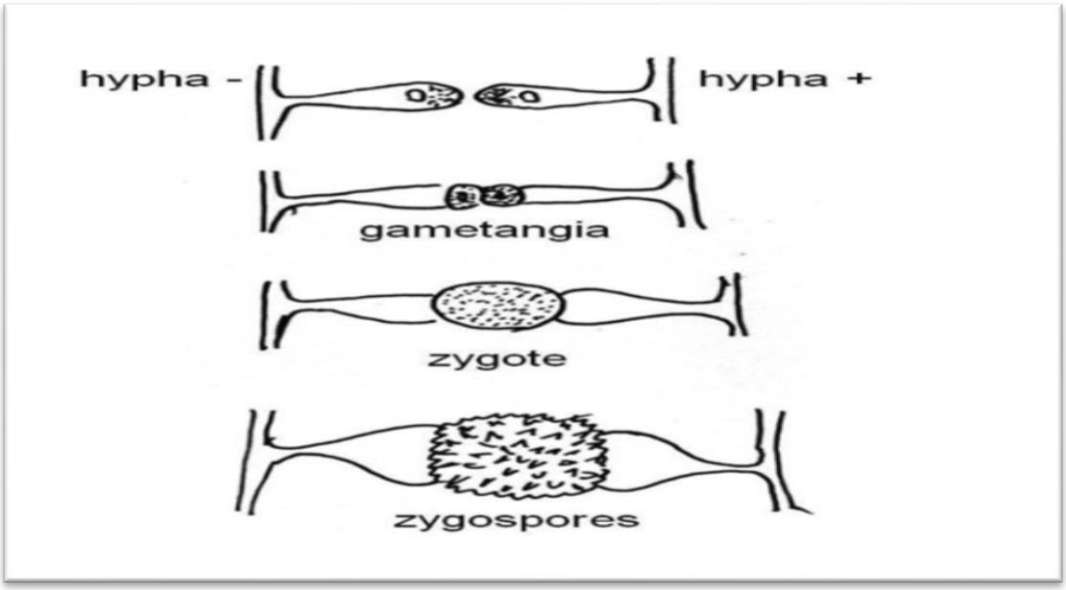


3- **Gametangial copulation** :is a form of sexual reproduction that involves a pair of gametangia, where the entire contents of one gametangium are transferred into the other.

In aquatic fungi, this transfer occurs through the formation of a pore between the two gametangia.

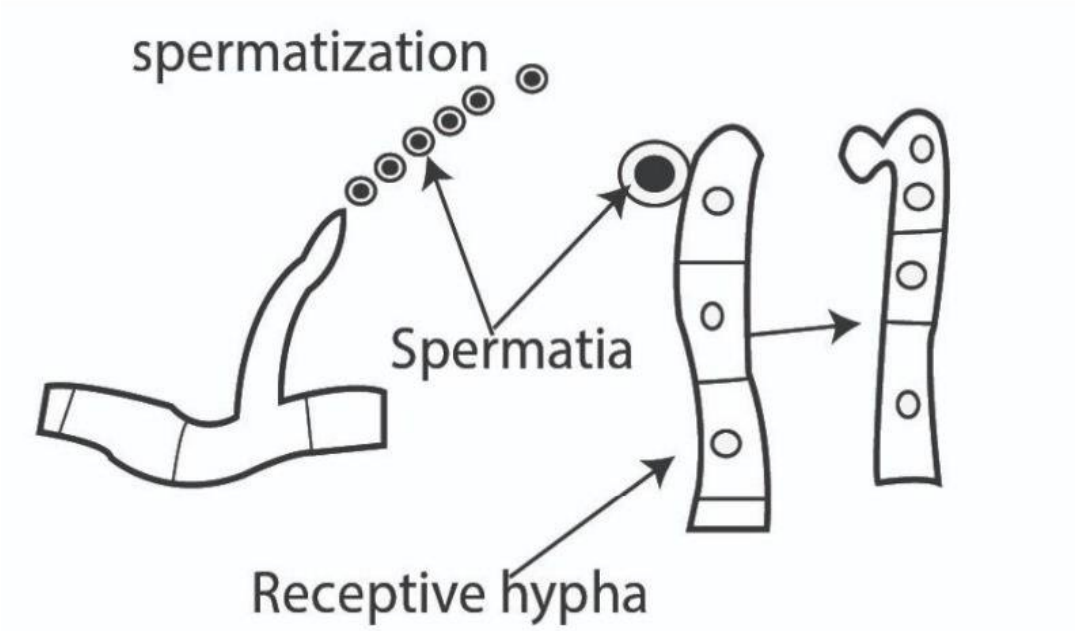
In terrestrial fungi, the two gametangia come into direct contact, and the contents of one are transferred into the other through the dissolution of the intervening wall.

This process results in the formation of a thick-walled, dormant spore known as a zygospore, characteristic of fungi in the phylum Zygomycota.



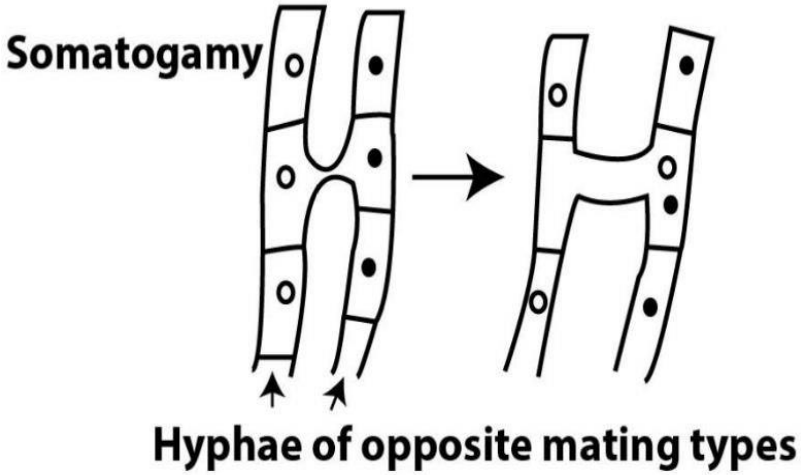
4- **Spermatization** :is a mode of sexual reproduction observed in higher fungi, in which the male gametes are extremely small and are referred to as spermatia.

The female structure is reduced to specialized receptive hyphae, which receive the spermatia and facilitate the transfer of their nuclei to the female nuclei.



5- **Somatogamy** :is a type of sexual reproduction that also occurs in higher fungi. It does not require the formation of specialized reproductive structures; instead, any somatic cell is capable of participating in the process.

Reproduction occurs through the formation of a conjugation bridge or channel, through which a nucleus is transferred from a cell in one hyphal strand to a cell in another.


Somatogamy
Hyphae of opposite mating types