

# Difference Between Plasmogamy and Karyogamy

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## Key Difference - Plasmogamy vs Karyogamy

Fertilization is a major stage in the [sexual reproductive](#) cycle of eukaryotic organisms. During [fertilization](#), two [gametes](#) are fused with each other to produce a [diploid zygote](#) which later becomes the new individual. The fusion of two gametes during fertilization is known as [syngamy](#). Syngamy can be divided into two stages named plasmogamy and karyogamy. Plasmogamy occurs first and is followed by karyogamy. In some organisms, these two occur simultaneously while in some species karyogamy is delayed for a considerable time duration. The key difference between plasmogamy and karyogamy is that **plasmogamy is the fusion of cell membranes and cytoplasm of two cells without the nuclei fusion** while **karyogamy refers to the fusion of two haploid nuclei to produce a diploid cell**.

## What is Plasmogamy?

The fusion of male and female gametes occurs in [sexual reproduction](#) in order to produce a diploid zygote. This is known as fertilization or syngamy. Prior to haploid nuclei fusion, cell membranes of the two gametes fuse and the two [cytoplasm](#) fuse with each other. The nuclei fusion delays for a certain time period. This process is known as plasmogamy. Plasmogamy is feasible among two gametes or between two vegetative cells of fungi which play the role of gametes. Plasmogamy is one stage of sexual reproduction in [fungi](#) and it brings two nuclei close to each other for fusion. Plasmogamy creates a new cell stage which differs from normal haploid or diploid cell since it contains both male and female nuclei coexisting within the same cytoplasm without merging as  $n+n$  state. At this phase, the resulting cell is called dikaryon or dikaryotic cell. Dikaryotic cell harbors a couple of nuclei from the two mating types.

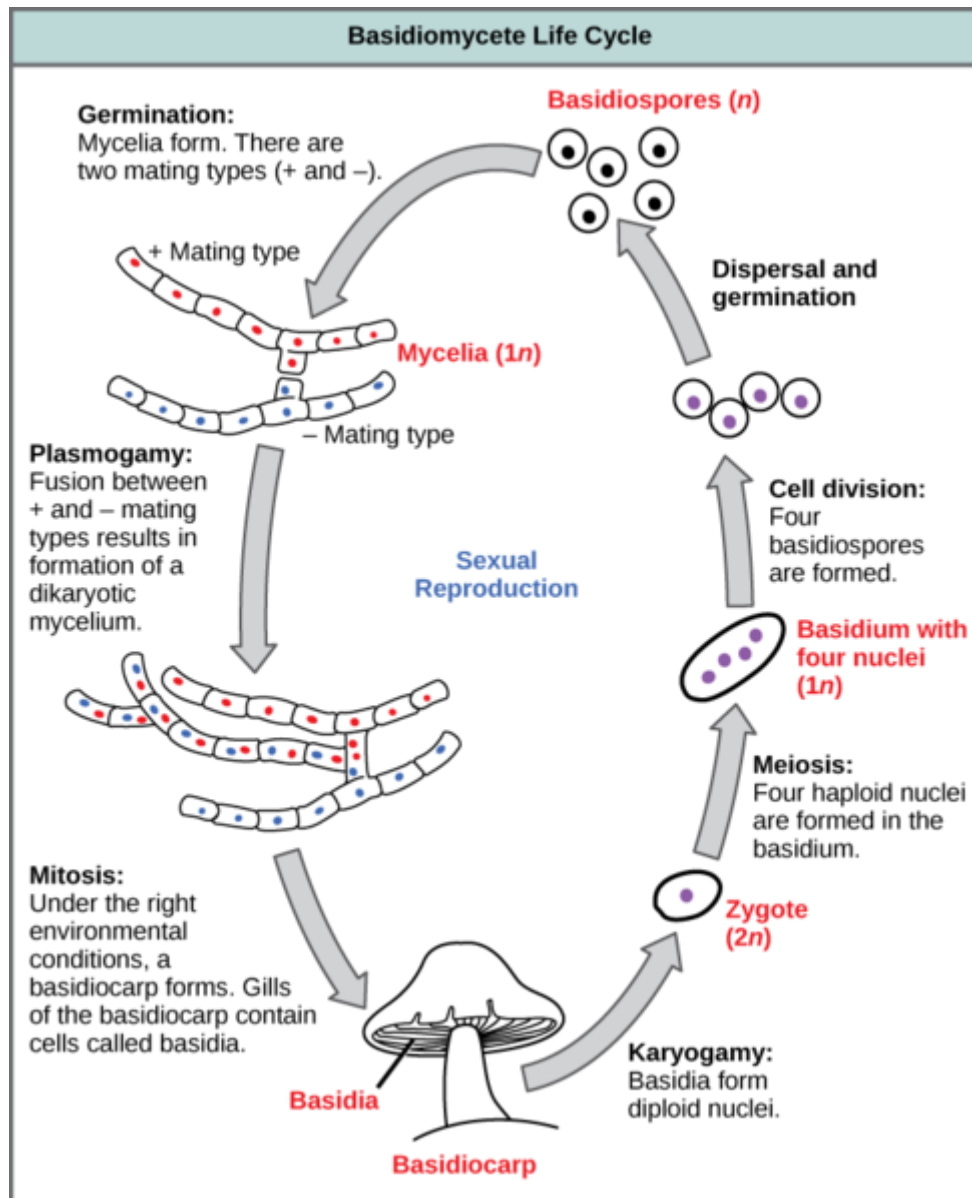


Figure 01: Plasmogamy

## What is Karyogamy?

Karyogamy is the step which makes the diploid zygote. Two haploid nuclei fuse with each other to produce diploid a zygote. Karyogamy occurs after the fusion of the two cytoplasms. This fusion of two nuclei produces a diploid cell, which has a mixture of two types of genetic materials.

Plasmogamy and karyogamy are clearly visible stages in fungal sexual reproduction. Fungi reproduce through plasmogamy, karyogamy, and [meiosis](#). Those are the main stages of fungal sexual reproduction. This dikaryotic stage is prominent in most fungi and in some fungi; it exists up to several generations. However, in lower fungi, karyogamy occurs immediately after the plasmogamy.

Ascomycota is a group of macrofungi which shows distinct phases of plasmogamy, karyogamy, and meiosis during sexual reproduction. The mating of two types of hyphae produces dikaryotic ( $n+n$ ) phase due to plasmogamy. Afterward, karyogamy occurs and produces a diploid zygote. The diploid zygote then divides into eight ascospores by two meiotic divisions.

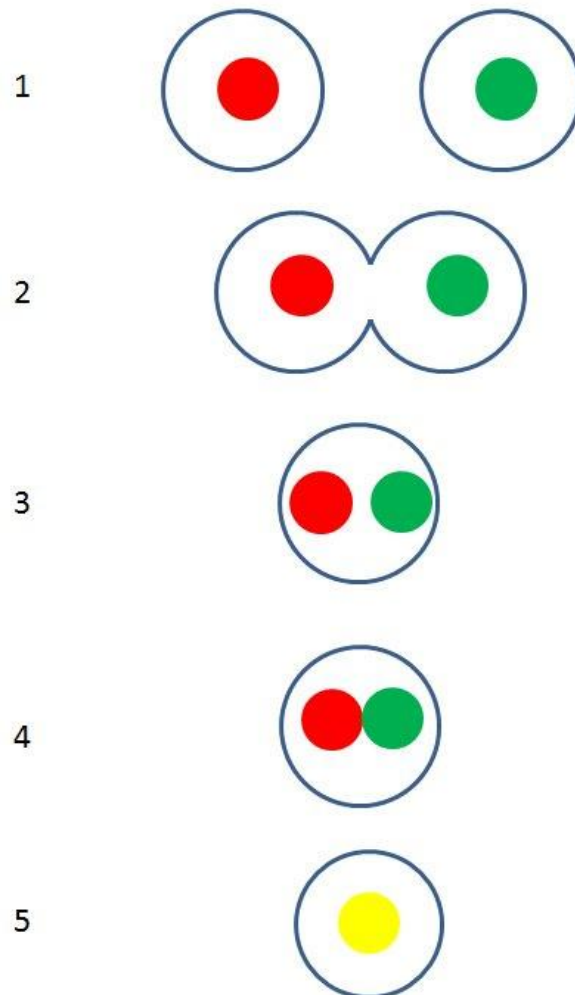


Figure 02: Karyogamy (Stage 4)

## What is the difference between Plasmogamy and Karyogamy?

Plasmogamy vs Karyogamy	
Plasmogamy refers to the fusion of the cytoplasm of two gametes or to two vegetative cells which work as gametes.	Karyogamy refers to the fusion of two nuclei during fertilization.
Nuclei Fusion	
Nuclei are not merged during plasmogamy.	Nuclei are fused with each other to produce a zygote.

Resultant Cell	
Plasmogamy produces a dikaryotic cell which possesses $n+n$ state (containing two types of haploid nuclei).	Karyogamy produces a $2n$ cell called the diploid zygote.
Followed by	
Plasmogamy occurs after meiosis	Karyogamy occurs after plasmogamy
Stage of Syngamy	
Plasmogamy is the first stage of syngamy.	Karyogamy is the second stage of syngamy.

## Summary - Plasmogamy vs Karyogamy

The fusion of two gametes during sexual reproduction is known as syngamy. Syngamy occurs via two stages named plasmogamy and karyogamy. Plasmogamy is the first stage of syngamy. It is the fusion of the cytoplasm of two gametes or two mating cells without the fusion of their nuclei. Plasmogamy brings the male and female nuclei together. When plasmogamy occurs, it produces a cell which contains two nuclei inherited from each parent and the cell is known as a dikaryotic cell. After the fusion of cytoplasm, two nuclei come closer and fuse with each other. This stage is known as karyogamy. This is the difference between plasmogamy and karyogamy. Once karyogamy occurs, it yields a diploid cell called zygote. The zygote can divide by meiosis to produce spores or it can divide by mitosis to produce a new individual. In some organisms, karyogamy occurs immediately after the plasmogamy as in lower fungi. In some species, dikaryon phase exists for several generations.

### Reference:

1. "Environmental Microbiology: Fundamentals and Applications." Google Books. [Available here](#). N.p., n.d. Web. 03 June 2017.
2. "Karyogamy." Wikipedia. Wikimedia Foundation, 03 Apr. 2017. Web. [Available here](#). 03 June 2017.

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