# Difference Between Microsporogenesis and Megasporogenesis

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## Key Difference – Microsporogenesis vs Megasporogenesis

Flower is the reproductive structure of angiosperms. It contains male and female reproductive parts within it. Male reproductive part is known as stamen and female reproductive part is known as carpel. Angiosperms produce two types of spores (gametes) named microspores and megaspores. Male spores are known as microspores. Microspores are produced inside the pollen sacs of the anthers. Microspores are haploid and produced from diploid microspore mother cells (microsporocytes) by meiosis. This process is known as microsporogenesis. Female spores are known as megaspores. Megaspores are produced inside the megasporophylls. Megasporangium contains megaspore mother cells (megasporocytes). Megaspore mother cells undergo meiosis and produce megaspores which later become female gametes. Formation of haploid megaspores from diploid megaspore mother cell is known as megasporogenesis. The key difference between microsporogenesis and megasporogenesis is that **microsporogenesis is the process of microspore formation while megasporogenesis is the process of megaspore formation.**

## What is Microsporogenesis?

Stamens are the male reproductive organs of the flower. Stamen has two components: anther and filament. The anther contains microsporangia. Each microsporangium contains microspore mother cells or microsporocytes. These cells are diploid cells and divide into haploid cells called microspores by meiosis. Microsporocytes undergo two nuclear divisions at meiosis followed by cytokinesis to produce a tetrad of four haploid microspores. This process is known microsporogenesis. Microspores undergo two mitotic divisions and produce pollen grains or male gametes. Every microspore develops into pollen grains.

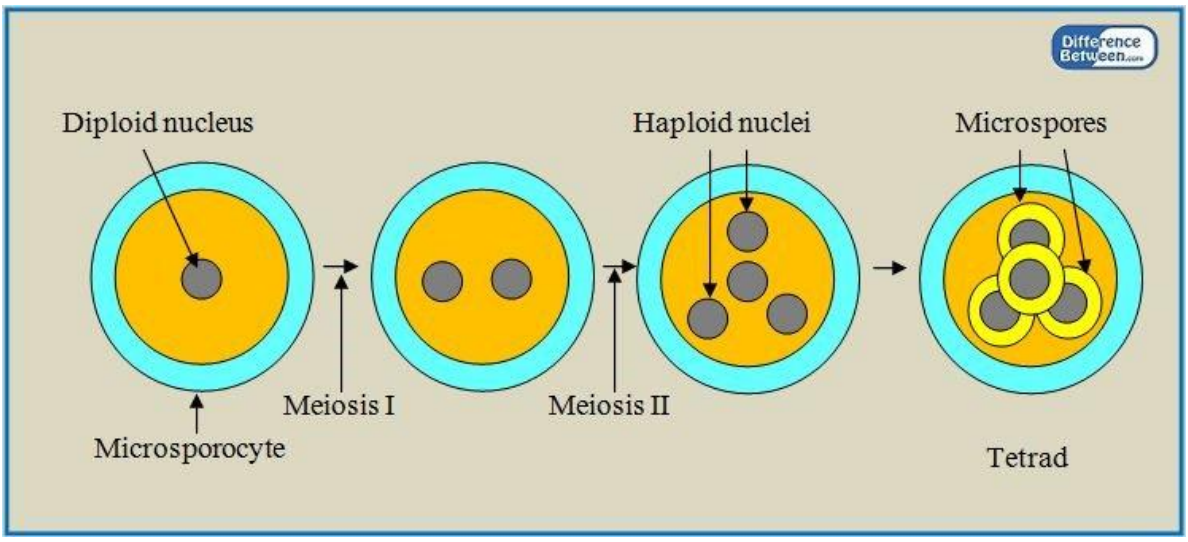


**Figure 01: Microsporogenesis**

Pollens or microspores are very tiny round structures. After the formation, microspores or pollen grains dry up and become powdery. The anther becomes a dry structure and pollens are liberated from the anther to the environment by dehiscence of the anther.

## What is Megasporogenesis?

Megaspores are produced by the megaspore mother cells (megasporocytes). Megasporangium or the ovule contains megaspore mother cells. Megaspore mother cells are diploid cells (2n cells). These mother cells divide by meiosis to produce haploid cells (n cells). One mother cell divides by meiosis and creates four haploid megaspores. This process is known as megasporogenesis. Megasporogenesis takes place within a structure called nucellus (central part of the ovule). In most plants, only one megaspore develops into the megagametophyte or the embryo sac. Other three megaspores disintegrate. That particular megaspore divides into eight nuclei by two consecutive mitotic divisions and produces the megagametophyte.

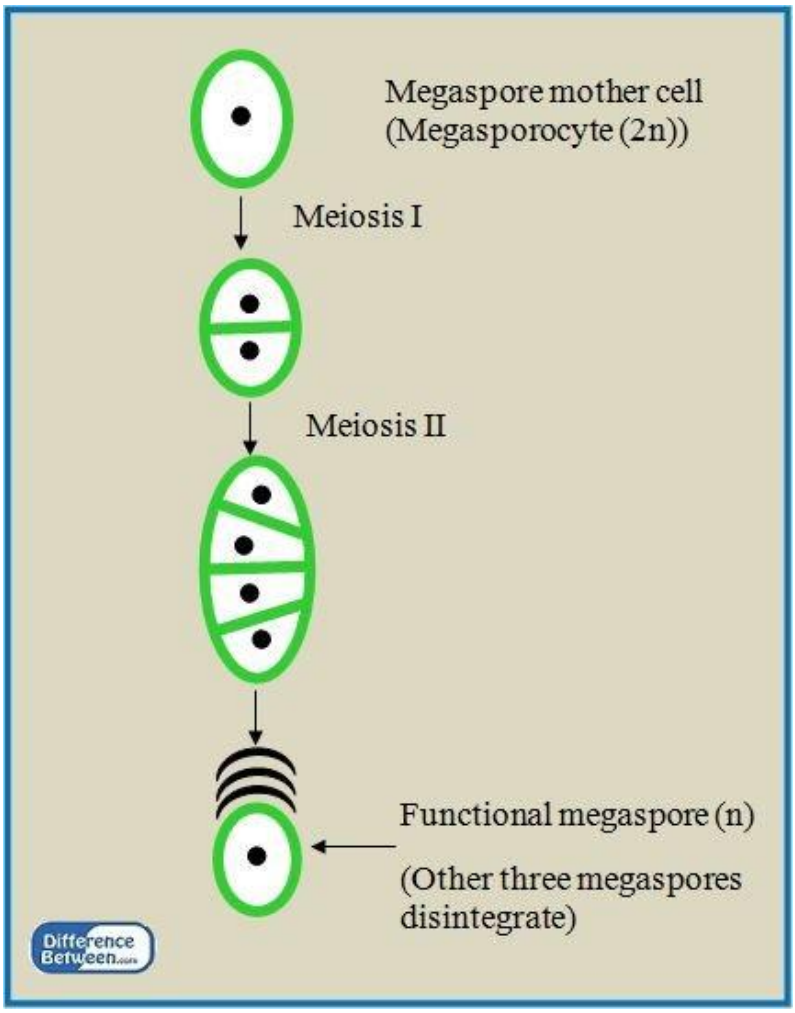


**Figure 02: Megasporogenesis**

## What are the similarities between Microsporogenesis and Megasporogenesis?

- Microsporogenesis and megasporogenesis are processes of haploid cell formation.
- In both processes, diploid cells divide by meiosis.
- Both processes produce spores which give gametophytes.
- Both processes occur in flowers.

## What is the difference between Microsporogenesis and Megasporogenesis?

| Microsporogenesis vs Megasporogenesis | |
|---|---|
| Microsporogenesis is the formation of haploid microspores from a diploid microspore mother cell by meiosis. | Megasporogenesis is the formation of haploid megaspores from a diploid megaspore mother cell by meiosis. |
| **Arrangement of Spores in a Tetrad** | |
| The arrangement of microspores in a tetrad is tetrahedral in microsporogenesis. | The arrangement of megaspores in a tetrad is linear in megasporogenesis. |
| **Functional Spores** | |
| All four microspores produced by microsporogenesis are functional. | Only one megaspore out of four megaspores produced by megasporogenesis is functional. |
| **Location** | |
| Microsporogenesis occurs inside pollen sacs. | Megasporogenesis occurs inside the ovule. |
| **Production of Gametophytes** | |
| Microspores produce pollens. | Megaspores produce embryo sacs |

## Summary – Microsporogenesis vs Megasporogenesis

Microsporogenesis and megasporogenesis are two processes that occur in seed plants. Microspores and megaspores are male and female spores, respectively. Microsporangia are located in the anthers of stamens and contain microspore mother cells which are 2n cells. Microspore mother cells undergo meiosis and result in microspores which are n cells. This process is known as microsporogenesis. Microspores undergo mitosis and produce pollen grains which are male gametes. Megasporangia are known as ovules. Ovules contain megaspore

mother cells. Megaspore mother cells divide by meiosis and result in megaspores which are n cells. The formation of megaspores from megaspore mother cells is known as megasporogenesis. Megaspores undergo mitosis and form embryo sacs. This is the difference between microsporogenesis and megasporogenesis.

**References:**

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2. "Microsporogenesis and Microspore (With Diagram)." Biology Discussion. N.p., 16 Oct. 2015. Web. Available here. 27 July 2017.

**How to Cite this Article?**

**APA:** Difference Between Microsporogenesis and Megasporogenesis. (2017, July 31). Retrieved (date), from http://www.differencebetween.com/ difference-between-microsporogenesis-and-vs-megasporogenesis/

**MLA:** "Difference Between Microsporogenesis and Megasporogenesis" Difference Between.Com. 31 July 2017. Web.

**Chicago:** "Difference Between Microsporogenesis and Megasporogenesis." Difference Between.Com.http://www.differencebetween.com/ difference-between-microsporogenesis-and-vs-megasporogenesis/ (accessed [date]).