

Difference Between Anther and Stigma

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Key Difference – Anther vs Stigma

The [angiosperm](#) flower is composed of male and female reproductive units: androecium and gynoecium respectively. The androecium is composed of anther and filament. The gynoecium is composed of stigma, style, and ovary. **Anther is involved in the production of [pollen](#) grains and release of mature pollen grains into the environment whilst stigma is involved in receiving pollen grains and providing suitable conditions for germination.** This is the key difference between anther and stigma.

What is Anther?

The androecium or the male reproductive part of the flower is composed of an anther and a filament which is referred to as the stalk. These two units together are called as the stamen. Stamens are considered as individual parts of the androecium and the anther is composed of four microsporangia or pollen sacs. The function of the anther is to produce, bear and release pollen grains that will be deposited on the stigma of the flower for reproduction.

The number of stamens present in a flower differs from species to species. As an average count, five to six stamens are located centrally in the flower. The filament is a long structure that is attached to the base of the petal of the flower. The positioning of the anther is an important aspect of pollination. If the plant species favor [self-pollination](#), the anther and the filament are bent towards the stigma of the flower. To prevent self-pollination and promote cross-pollination, the filament and the anther is kept away from the stigma of the flower.



Figure 01: Anther

In a typical angiosperm anther, two distinct lobes are present. Each lobe consists of two structures known as thecae. A theca is a microsporangium. Therefore, each anther possesses four microsporangia. The microsporangium is composed and surrounded by 04 distinct cell layers which include epidermis, endothecium, middle layers and tapetum. The tapetum provides nourishment to the pollen grains whilst the other outer layers are involved in releasing pollen grains. The development of the pollen grains occurs in the sporangium tissue by mitotic division. A pollen sac is defined as the microsporangium which contains pollen grains. Once the pollen grains mature, they are released into the external environment, depending on the type of pollination.

What is Stigma?

The female reproductive part of the flower is referred to as the gynoecium. It comprises of stigma, style, and ovary. The stigma is present at the distal end of the reproductive structure (distal portion of the style). It is present in order to receive mature pollen grains that are produced and released by the anther of the flower. The stigma is a sticky structure and allows [germination](#) of pollen grains. It is composed of a special type of structures known as stigmatic papillae, cells that are receptive to mature pollen grains. The stigma is normally present at a lower level in comparison to the anther. This is to ensure that pollen grains successfully land on the stigma once they are released from the anther during self-pollination.

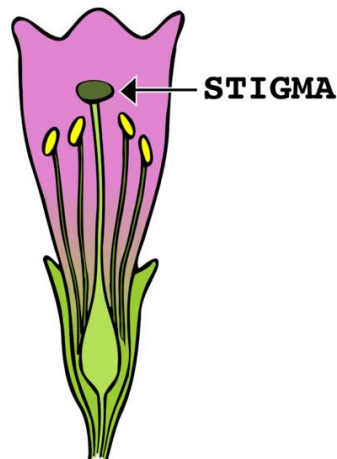


Figure 02: Stigma

The structure of the stigma is involved in different functions during [pollination](#) and pollen germination. Stigma possesses different types of structures such as hairs and flaps in order to trap mature pollen grains which are pollinated by different means which include wind, insects, and water. Once pollen grains are released from the anther into the external environment, the pollen grains get desiccated. The sticky nature of the stigma provides adequate hydration to pollen grains. This helps pollen grains to germinate successfully and promotes the development of the germinating pollen tube.

The stigma plays a major role in pollen specificity. It ensures that correct species of pollen grains adhere to the stigma. If incorrect pollen is deposited, a rejection mechanism is initiated by the stigma. Once the pollen tube is formed, it gradually develops towards the ovary of the flower along the style and helps in [fertilization](#).

What are the Similarities Between Anther and Stigma?

- Both are reproductive structures of the flower
- Both are involved in reproduction.

What is the Difference Between Anther and Stigma?

Anther vs Stigma	
Anther is a part of the androecium that is involved in the production and release of pollen grains.	Stigma is a part of the gynoecium that receives mature pollen grains for fertilization.
Composition	

Anther is composed of four pollen sacs.

Stigma is composed of stigmatic papillae, cells that are receptive to pollen.

Summary – Anther vs Stigma

Anther and stigma are two reproductive parts of the angiosperm flower. Anther is located in the male reproductive unit of the flower and produces and releases mature pollen grains into the external environment. Stigma is a major part of a female reproductive unit of the flower and it plays a major role in receiving mature pollen grains and providing adequate conditions for pollen germination and fertilization. Pollen grains are produced in the pollen sacs of the anther. This is the difference between anther and stigma.

Reference:

1. “Androecium: Definition & Concept”, Study.com, [Available here](#).
2. “Gynoecium: Definition & Concept”, Study.com, [Available here](#).

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