



NEET 2025

CLASS 12

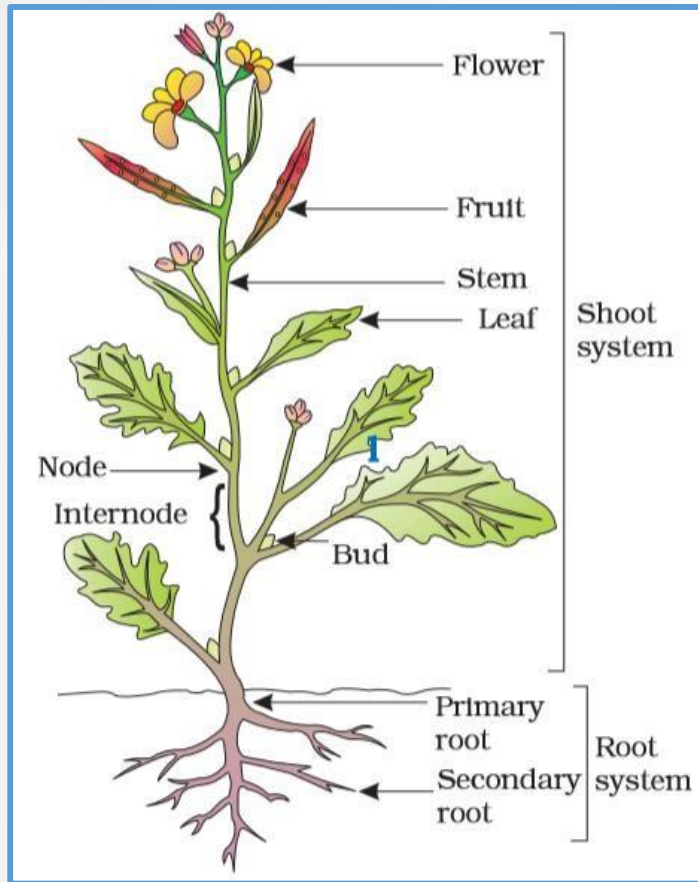
SEXUAL REPRODUCTION IN FLOWERING PLANTS

Lecture

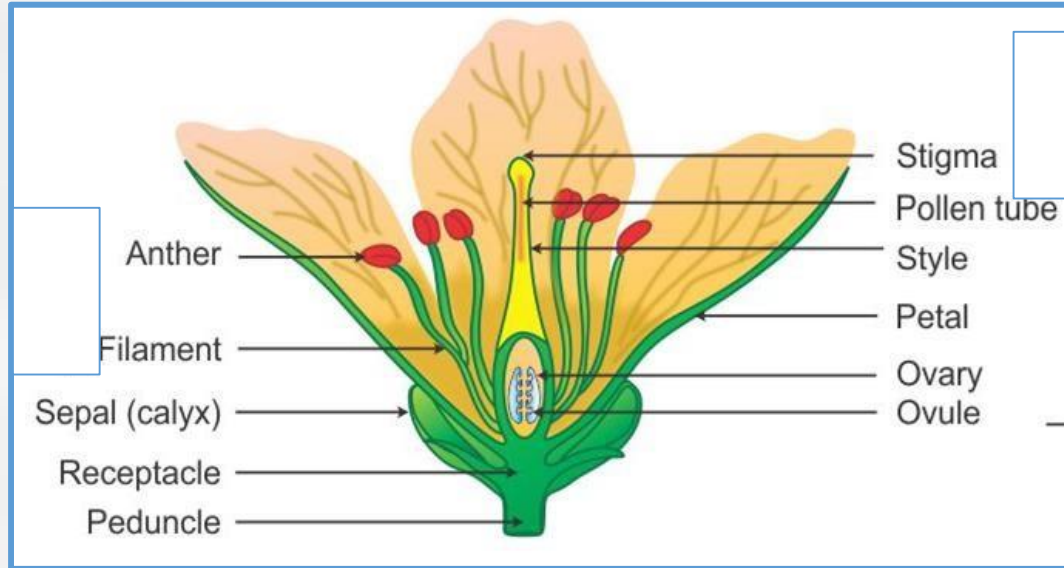
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A Typical Angiosperm

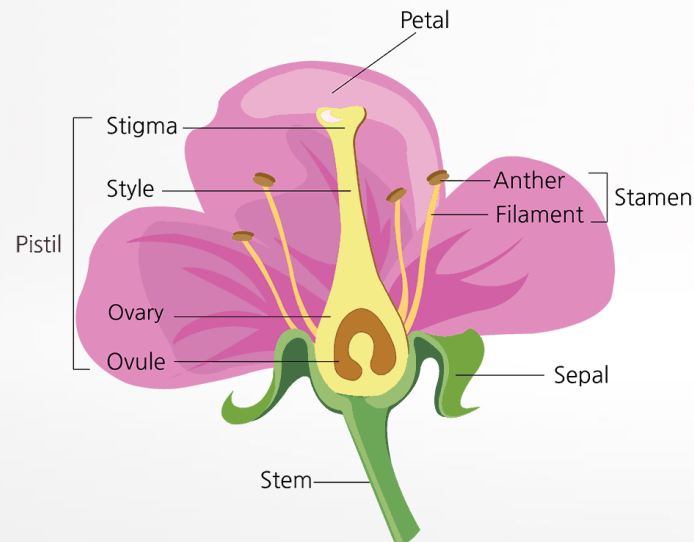


A Typical Complete Flower



Parts of a Flower

- ❖ The stalk of the flower is called pedicel.
- ❖ The floral leaves are arranged in whorls on the swollen end of the pedicel (thalamus).
- ❖ Calyx and corolla are the accessory or non-essential whorls of a flower.
- ❖ Androecium and gynoecium are the reproductive or essential whorls of a flower.

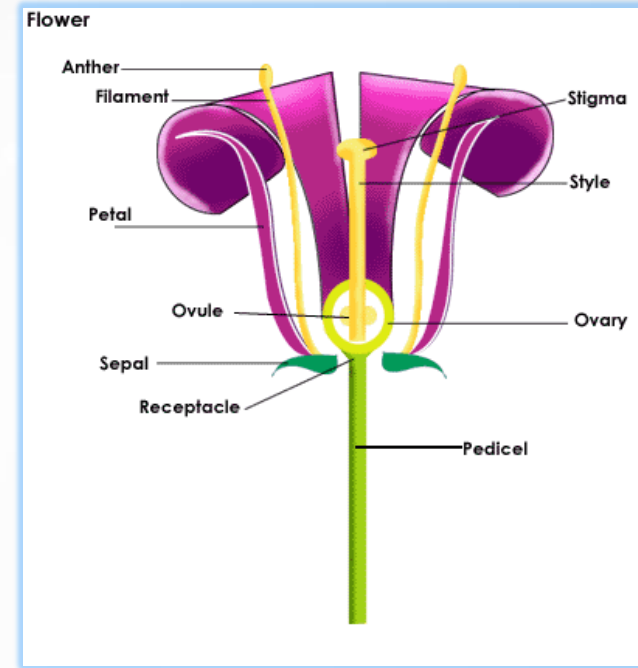


Calyx

- ❖ Whorl of Sepals
- ❖ Calyx is either polysepalous (sepal are free)
- ❖ Gamosepalous (sepal are fused).

Corolla

- ❖ Whorl of Petals.
- ❖ Corolla is either polypetalous (Petal are free) or gamopetalous (petal are fused)



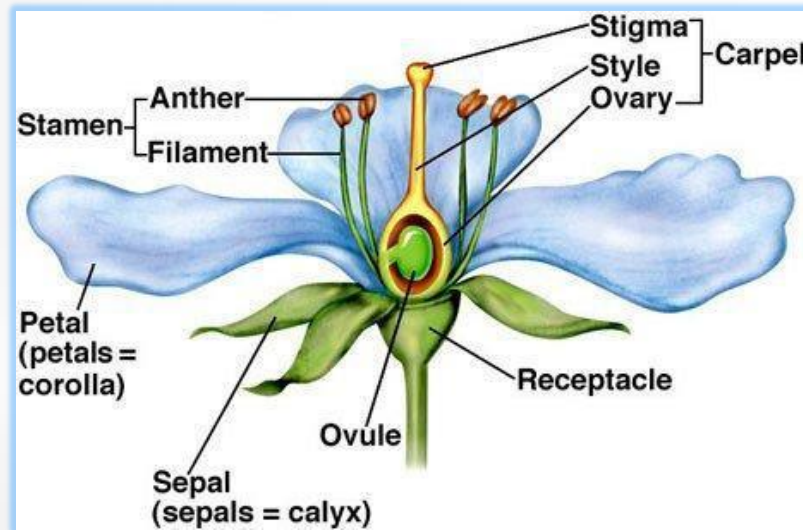
Perianth

- ❖ **Sepals and petals are not clearly differentiated from each other.**
- **Individual units are called perianth leaves or tepals.**
- **When the tepals are free, the terms polyphyllus is used.**
- **When the sepals are fused, the terms gamophyllous is used.**



Androecium

- ❖ Androecium is the male reproductive whorl
- ❖ It is composed of one or more stamens
- ❖ If the stamen is sterile and does not produce pollen grains, it is called a staminode.
- ❖ If the stamens are attached to the petals, they are described as epipetalous.

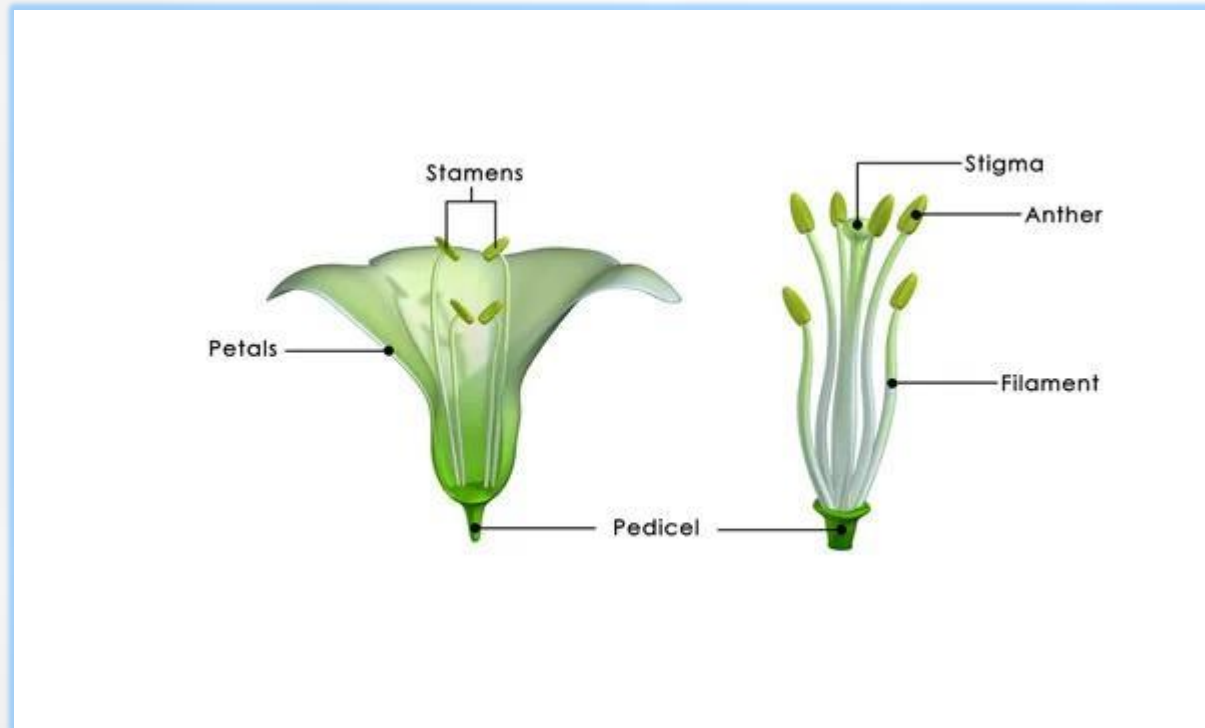


Androecium

- ❖ If they are attached to the perianth/tepals, they are called epiphyllous.
- ❖ If the stamens are free from one another and also from other floral whorls, the androecium is polyandrous.

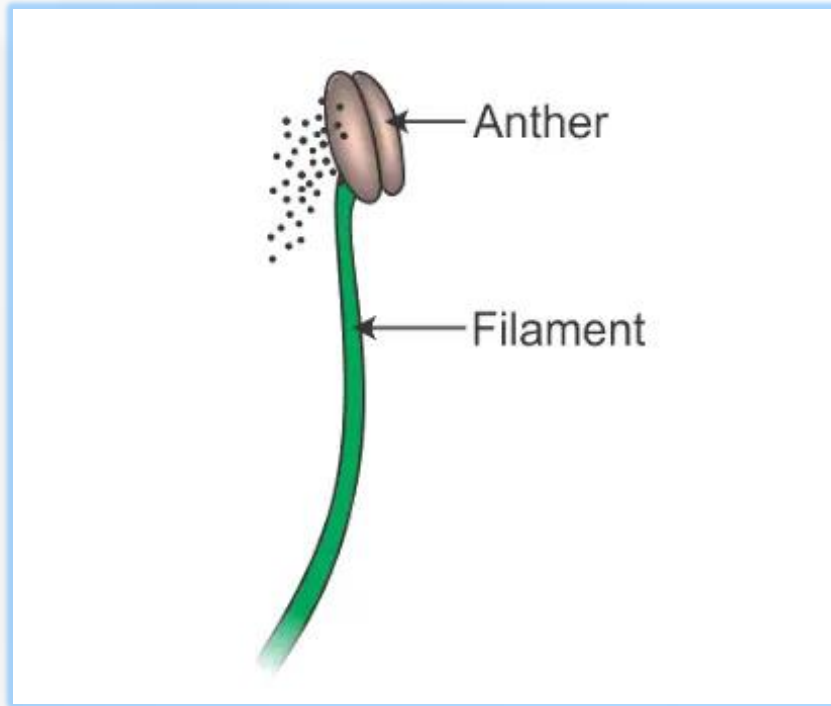
Androecium

- ❖ Each stamen has two parts - a filament and an anther.
- ❖ Anther is bilobed and each lobe encloses two microsporangia.
- ❖ Pollen grains are formed in each of the microsporangia.



Structure of anther

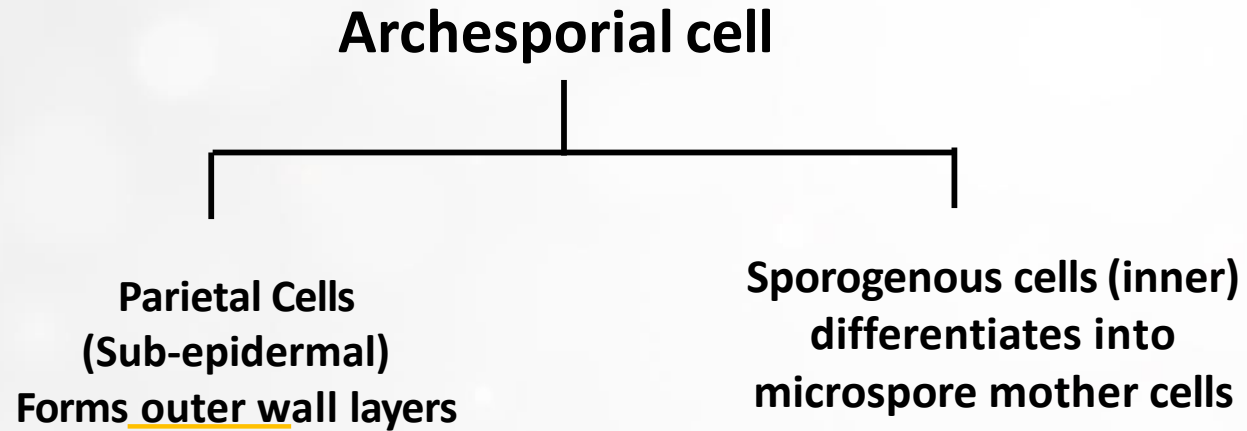
❖ Stamen = Filament + Anther



Structure of Microsporangia

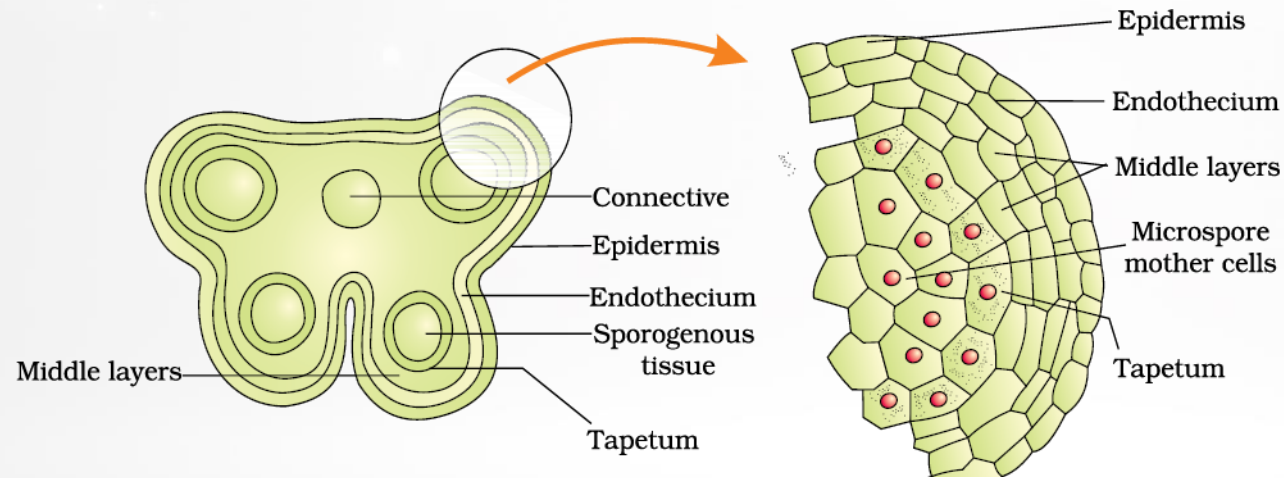
- ❖ The development of microsporangia in angiosperms is Eusporangiate.
- ❖ The archesporial cells show periclinal division and gives rise to:-
 - Outer parietal cells
 - Inner sporogenous cells.

Structure of Microsporangia



Structure of Microsporangia

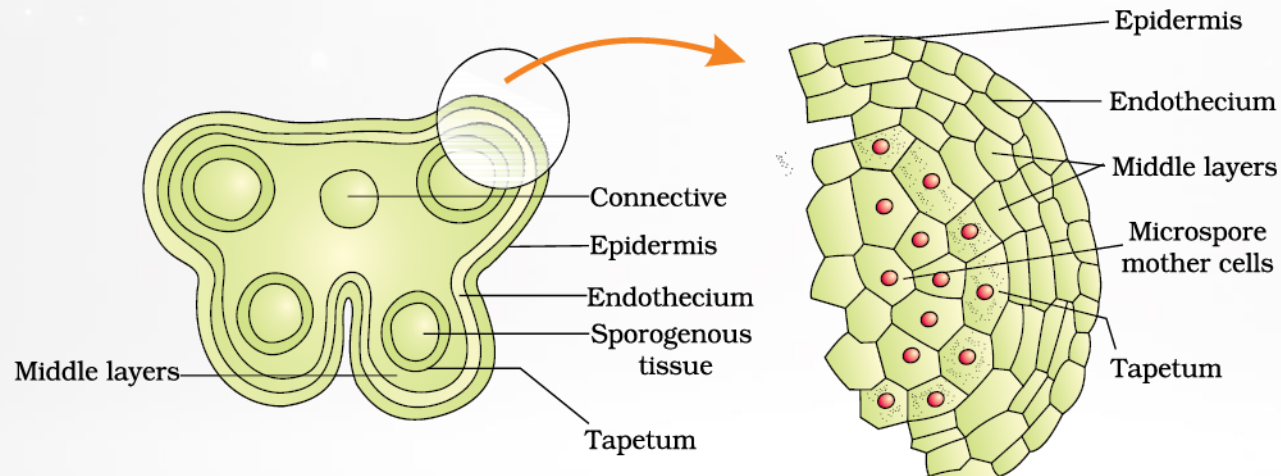
- ❖ The parietal cells again divide by periclinal division to produce a 3-5 layered wall of microsporangia.
- ❖ The wall consists of endothecium, middle layers and tapetum.



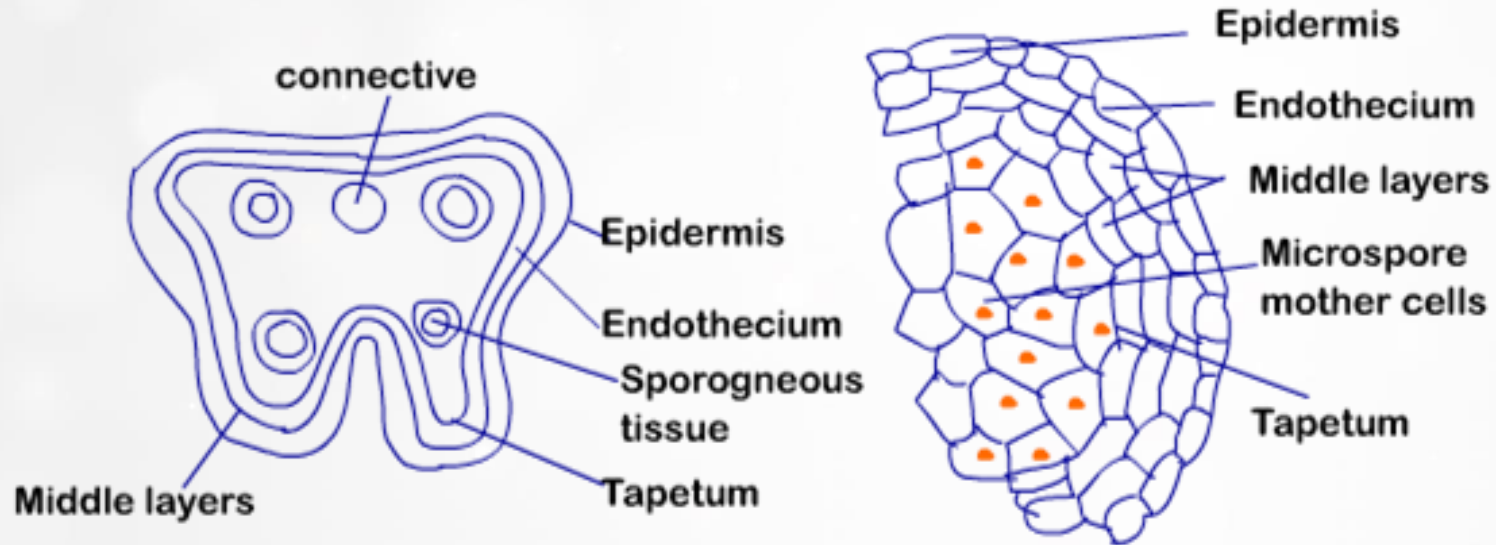
Layers of Anther Wall

❖ The anther wall is made of the following layers.

- Epidermis
- Endothecium
- Middle Layers
- Tapetum



Structure of Microsporangia



Functions of layers of Anther Wall

Epidermis

- ❖ Epidermis is usually protective in nature.

Endothecium

- ❖ It is the 2nd layer below the epidermis
- ❖ The endothelial cells develop fibrous thickenings of α -cellulose on the inner and radial walls and become dead at maturity.
- ❖ The fibrous bands present on the walls of endothecium helps in dehiscence of pollen at maturity.

Functions of each layer of Anther Wall

Middle Layers

- ❖ Cells of the middle layers degenerate to provide nourishment to the growing MMC.

Tapetum

- ❖ Tapetum performs a number of functions.

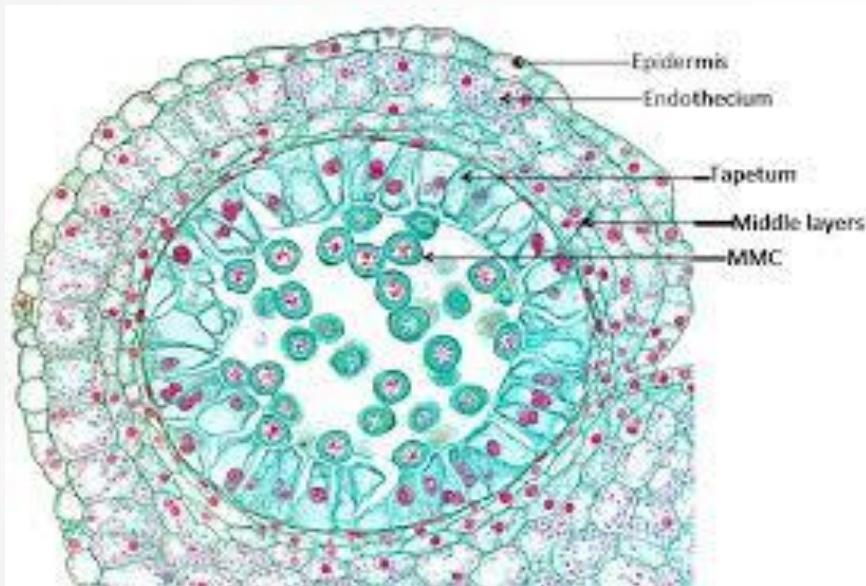
Tapetum is of two types

- Amoeboid
- secretory

Functions of each layer of Anther Wall

Amoeboid tapetal cells

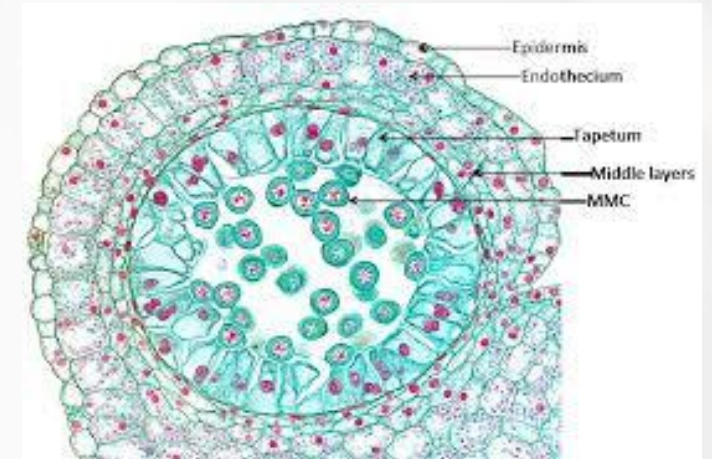
- ❖ These fuse to form a plasmodium or peri plasmodium and it passes in between the sporogenous cells to nourish them.



Functions of each layer of Anther Wall

Secretory tapetal cells:

- ❖ They secrete substances for the sporogenous cells for their growth and differentiation.
- ❖ It also produce Sporopollenin and various proteins.
- ❖ Towards maturity both the types of tapetum degenerate.
- ❖ These cells are metabolically very active, regulate the process of microsporogenesis.



Functions of Tapetum

- ❖ **Secrets proteins for compatibility reactions.**
- ❖ **Hormones like IAA.**
- ❖ **Secretes callase enzyme.**

Microsporogenesis

Microsporogenesis

- ❖ The microspore mother cells or microsporocytes develop an internal layer of callose (β -1, 3 glucan).
- ❖ This layer breaks the plasmodesmatal connections between the cells.
- ❖ The separated mother cells round off and undergo meiosis to produce tetrads of haploid microspores or pollen grains.

Example

Proximal end of the filament of stamen is attached to the (NEET-I 2016)

**(a) placenta (b) thalamus or petal
(c) anther (d) connective.**

Example

**In a flowering plant, archesporium gives rise to
(2003)**

- (a) only the wall of the sporangium**
- (b) both wall and the sporogenous cells**
- (c) wall and the tapetum**
- (d) only tapetum and sporogenous cells.**

Example

**Which one of the following is surrounded by a callose wall?
(2007)**

- (a) Male gamete**
- (b) Egg**
- (c) Pollen grain**
- (d) Microspore mother cell**

Example

In an angiosperm, how many microspore mother cells are required to produce 100 pollen grains?

- (a) 75 (b) 100**
- (c) 25 (d) 50**

Example

Anther is generally composed of

- A. One sporangium**
- B. Two sporangia**
- C. Three sporangia**
- D. Four sporangia**

Example

Endothecium, Middle Layer and tapetum in anther are derived from:

- A. Primary sporogenous cell**
- B. Primary parietal cells**
- C. Both**
- D. None of the above**

Example

Main function of endothecium (in anther) is :

- A. Mechanical**
- B. Nutritive**
- C. Dehiscence**
- D. Storage**

Example

How many pollen sacs are present in a mature anther

A. 4 B. 1 C. 3 D. 2

Example

'Callase' enzyme which dissolve callose of tetrad of microspores to separate 4 microspores is provided by:

- A. Pollen grains**
- B. Middle layer**
- C. Tapetum**
- D. Endothecium**

Example

What is pollen grain

- A. Microspore mother cell**
- B. Male gamete**
- C. Male gametophyte**
- D. Partially developed embryo**