

Microsporogenesis

Q. What do you understand by microsporogenesis? Explain it with suitable diagram.

Microsporogenesis consists of the formation of the microsporangium and the microspore.

The process of microsporogenesis was first of all described by Nageli in 1842 but Warming 1873 described in detail.

A typical anther consists of four elongated microsporangia which are separate from each other in the beginning but at maturity, they unite due to the dissolution of the separation wall between them. A very young anther, in transverse section possesses a mass of homogenous meristem surrounded by epidermis. With further growth the anther becomes four lobed and a procambial strand develops in its centre. Four rows of cells are differentiated from the hypodermal layer which are distinguished from other cells by their larger size, radially elongated cells, more conspicuous nuclei denser protoplast and are called archesporial cells. The archesporial cell may be present either singly in each lobe eg. Sansevieria Boerhaavia or more than one forming plates at four lobes eg. Urginea, Ophiopogon. The archesporial cell divides by a periclinal division and gives rise to primary parietal cell in the outer region and primary sporogenous cell in the inner region. The primary parietal cell

Lilium, Ranunculus.

Tapetum - It is the innermost layer of anther wall. It is the nourishing layer and is of great physiological importance because the developing tissues get nourishment through tapetum. The cells of this layer are characterized by the presence of dense cytoplasm. Recent studies have proved that the nuclei of tapet cells may divide by normal mitosis or by endomitosis or by sticky type of nuclear division.

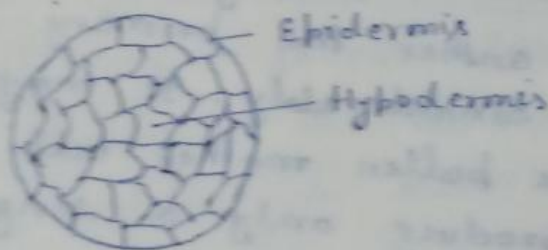
Based on its behaviour, tapetum is of two types - Amoeboid type and Secretory or glandular type.

Sporogenous tissue → During the development of wall layers in the anther, the primary sporogenous cells can enlarge considerably. It may either directly behave as the pollen mother cell and divide by meiosis to produce only a single haploid (n) microspore tetrad or more commonly it first divides by several mitosis forming a large number of diploid microspore mother cells which ultimately divide by meiosis to produce several haploid microspore tetrad. During meiotic division of pollen mother cell, two types of cytokinesis have been recognized - Successive type found in monocot and simultaneous type found in dicot.

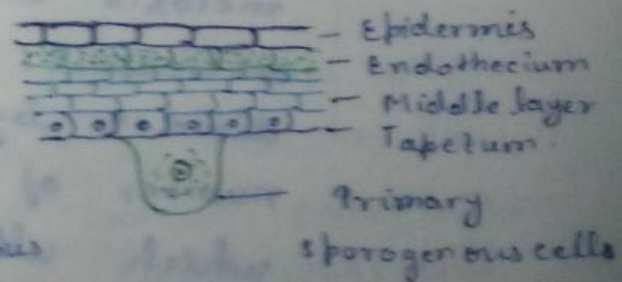
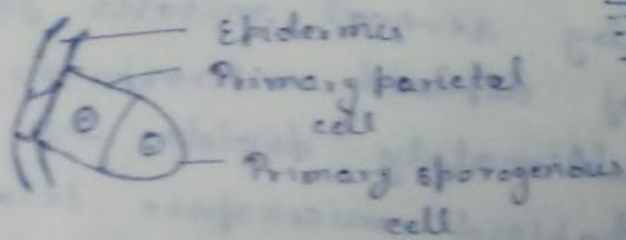
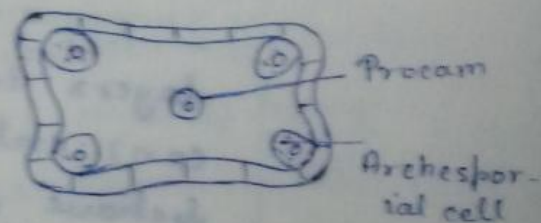
The microspore thus formed by these divisions are arranged in several manners eg:

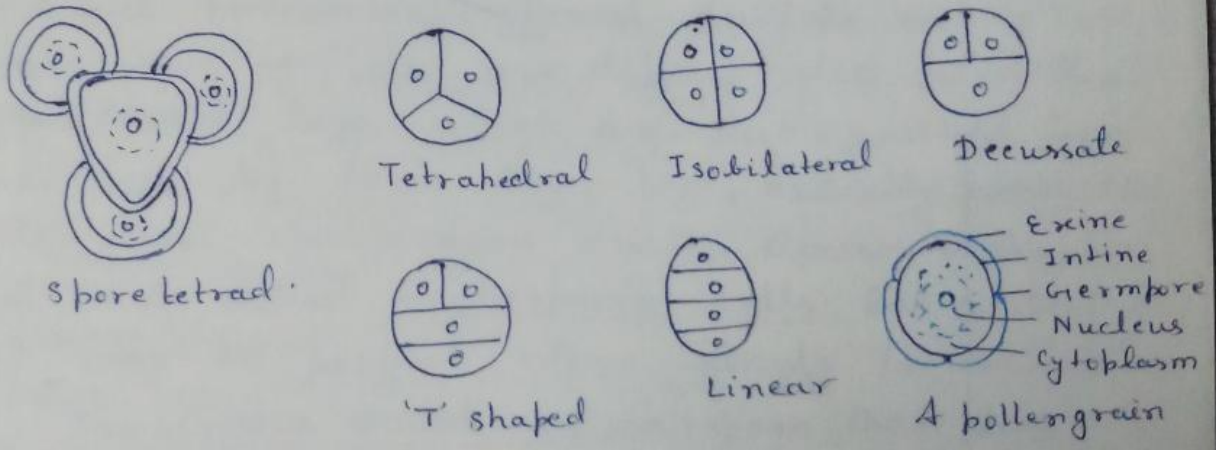
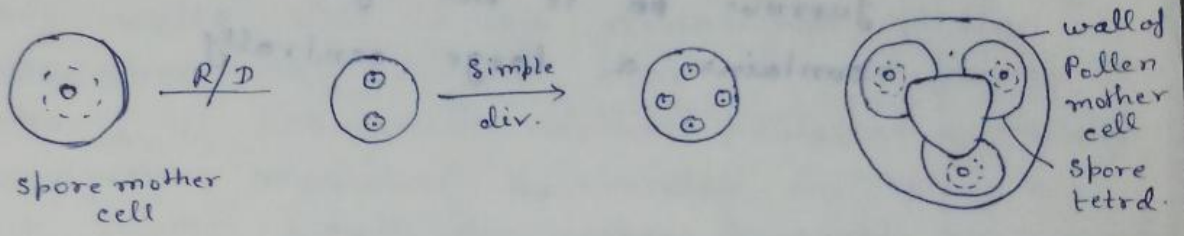
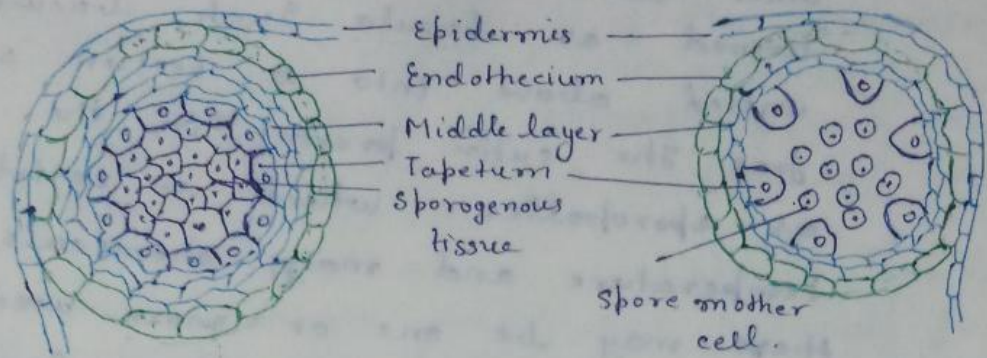
1. Tetrahedral :- The pollen grains lie at the four corner of a tetrahedron. It is found in dicot.
- or 2. Isobilateral :- found in monocot.
- or 3. Decussate arrangement :- eg. Magnolia
- or 4. Linear tetrad :- Asclepi
- or 5. T shaped :- Aristolochia.

In some members two or three types of disposition may be seen in one sps. eg. Musa, Agave, Laurus etc.



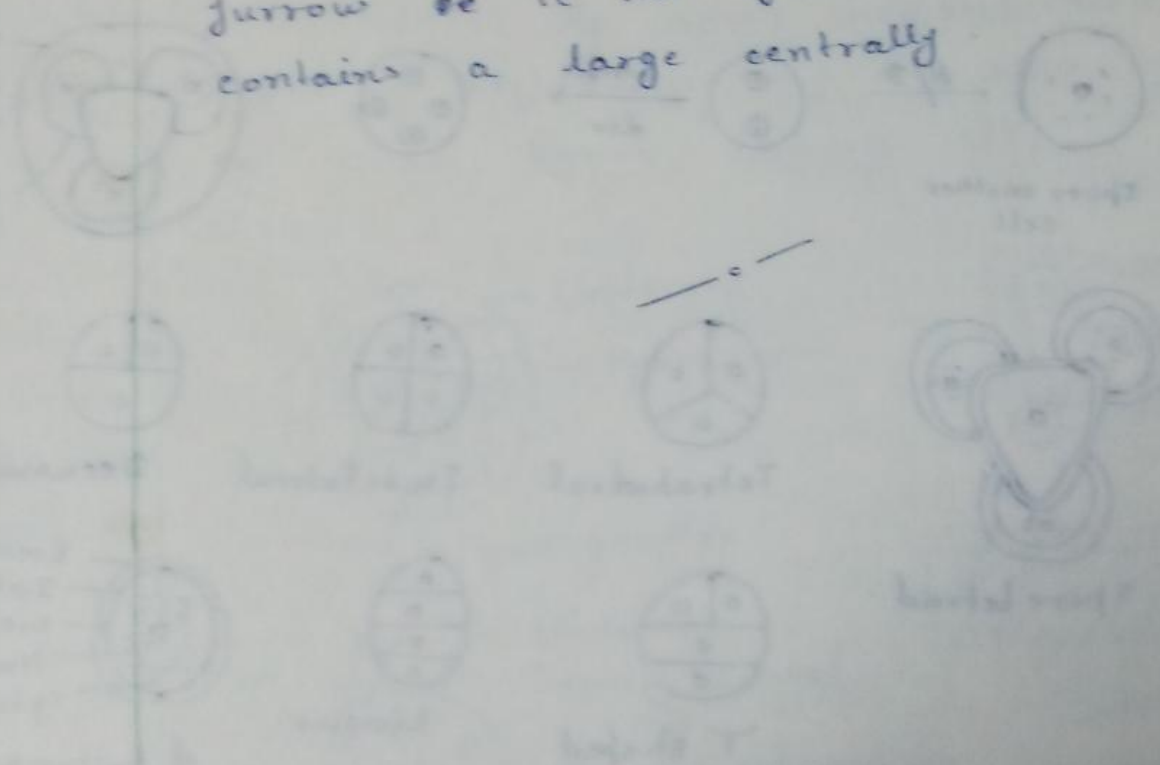
T.S. of young anther





Each microspore has two layers - outer thick smooth or rough exine and thinner thin and smooth intine. In the beginning the exine is thin but at maturity it becomes thick and is distinguishable into an outer layer sexine and

inner nexine. Both are associated with each other with the help of rod like structures termed as bacula. Such bacula may be united above into a bectum or may remain free. The cutin present in the exine is termed as sporopollenin which is resistant to high temperature and many chemicals. In the exine there may be one or more weak spots or furrow i.e. the germ pore. Each microspore contains a large centrally



Each microspore has two layers - outer thick layer or exine and inner thin layer or nexine. The exine is made of sporopollenin which is resistant to high temperature and many chemicals. The nexine is made of cellulose and pectin. The two layers are associated with each other with the help of rod-like structures called bacula. The bacula may be united above into a bectum or may remain free. The cutin present in the exine is termed as sporopollenin which is resistant to high temperature and many chemicals. In the exine there may be one or more weak spots or furrow i.e. the germ pore. Each microspore contains a large centrally