Development of Male Gametophyte in Angiosperms

Learning Objectives:

At the end of this session, you will be able to

1. Define Microsporogenesis.

2. label the diagram showing T.S. of an anther

3. Describe the structure of an anther.

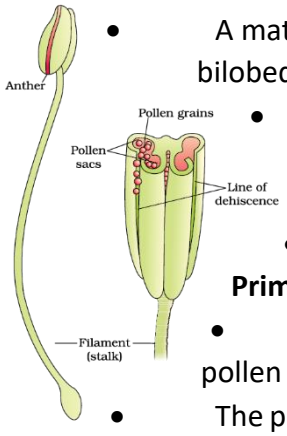
4. Write the steps / draw a flow chart showing the course of development of microspores

Discussion:

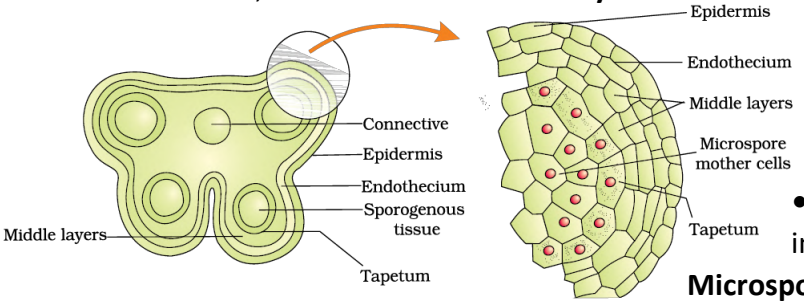
A **stamen** is the male reproductive organ of a flower. It consists of **filament** and **anther**. The anther bears pollen sacs in which microspores / pollen grains are formed. Pollen grains in turn develops the male gametes.

In this discussion, the topic will be dealt in two parts: **Microsporogenesis** (development of microspores) and **Microgametogenesis** (development of male gametes)

a) Microsporogenesis



- A mature anther is bilobed structure with two pollen sacs in each lobe. Thus a bilobed anther is tetrasporangiate.
- A young anther is made of homogenoius cells. One hypodermal cell in each of the four corners becomes differentiated to form **Archesporial cells.**
- The archesporial cells divides periclinally to give rise to outer layer of **Primary Parietal** layer and inner **Primary Sporogenous layer.**
- The cells of Primary Parietal layer divides successively to form layers of pollen sac wall.
- The pollen sac wallconsiste of **Endodermis** (single layer outer wall), single layer **Endothecium** , one to three **middle layers** and single layer of **Tapetum.**

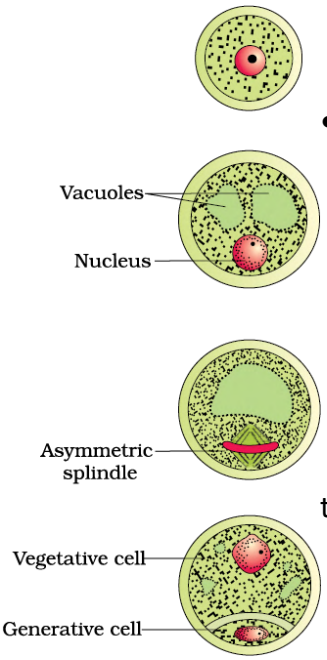


- The Primary sporogenous cells divided to give rise to several **Sporogenous tissue** (diploid).
- Sporogenous cells divides in different planes to form **Microsporocytes / Microspore mother cells.**

- After degeneration of some cells, the survived MMC undergoes meiosis division and produces four microspores (haploid) per MMC.
- The microspores are arranged in a **tetrad** in **tetrahedral** or **isobilateral** manner.
- Cells of the tapetum provides nourishment to the developing microspores

b) Microgametogenesis

- Microspore is the first cell of the gametophytic generation
  - Microspore starts germination *in situ* (while inside the pollen sacs)



  - Microspore nuclues divides mitotically to form two nuclei (n) and thus two cells- large **vegetative cell** and small **generative cell.**
  - In most of the angiosper species, pollen grains are shed in the two celled stage. However in certain few species it is shed in three celled stage also.
  - Pollination may take place accordingly in 2 or 3 celled stage of pollen grains.
  - Following a pollen-pistil interaction and mutual recognition, pollen tube (extended intine) germinates through the germ pore.
  - The vegetative nucleus takes the distal end of the tube.
  - The generative nucleus divides to form two male gametes while travelling inside the pollen tube.
  - The Vegetative nucleus later called **tube nucleus** denerates finally allowing the two male nuclei enter the ovule.

Image Sources: Biology Class XII, NCERT

If you have gone through the text and have understood it, it is time for you to take the Online test. Before that why not see what is there in the Infographics? I would suggest you to visit the Mind map / Concept map section to imprint on your brain the whole chapter in just a few minutes. Then take the CHAPTER PREPARATORY TEST. Please download and print the SELF MONITORING TOOL. This one sheet proforma will keep you vigilant on your progress. Try it, share it with your best friend.

Guidance

Please do not forget to give your feedback / comment. It will help us to create something of your choice.