

Quadrant II- Transcript and Related Materials

Programme : S. Y. B. Sc.

Subject : Botany

Course Code : BOC 103

Course Title : Plant Anatomy and Embryology

Unit : 5- Structural Organization of Flower

Module Name : Structure and Development of Female Gametophyte

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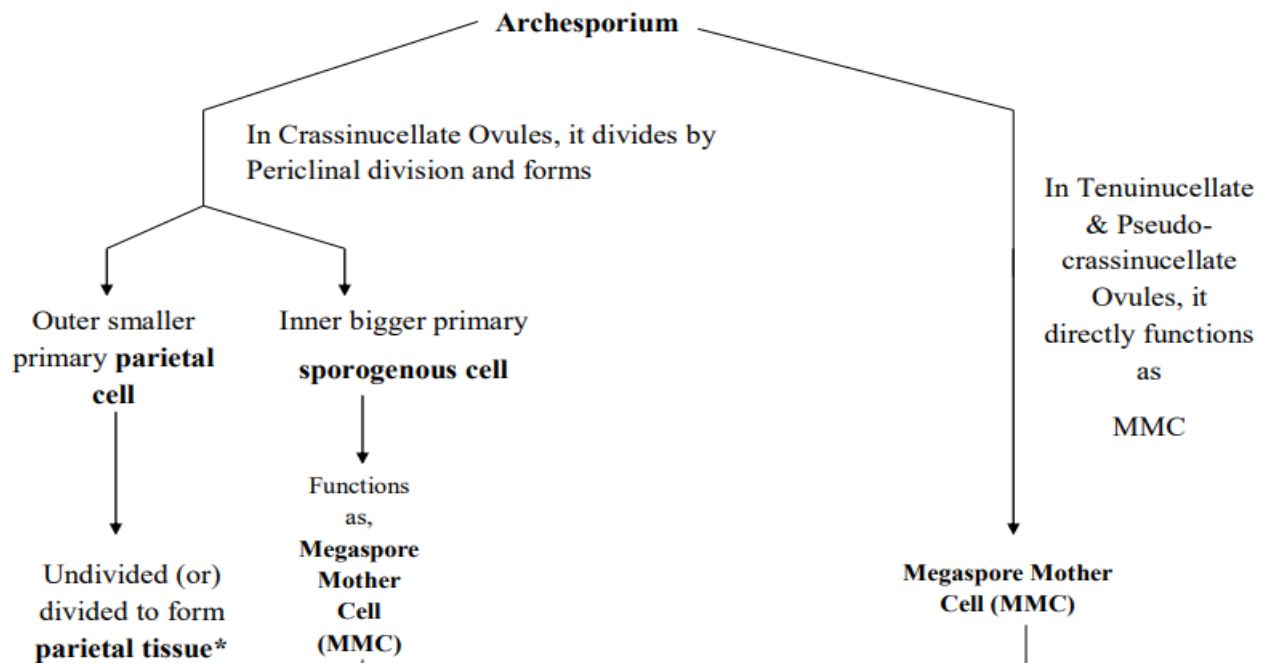
Notes:

INTRODUCTION

- The gametophyte is the sexual phase in the life cycle of plants.
- The female gametophyte is also called the embryo sac.
- In angiosperms it mostly develops as a seven celled, eight-nucleate structure.
- Female gametophyte is developed in the nucellus of the ovule or megasporangium.

Steps in the development Nucellus into Embryo sac

- The primordial nucellus function as archesporium or primary archesporial cell (It is a prominent cell in comparison to its surrounding cells due to large size dense cytoplasm and large nucleus).



Steps in Megasporogenesis

- Formation of haploid megaspores from diploid megaspore mother cell is known as Megasporogenesis.
- It involves meiotic division (reductional division).
- Four megaspore is formed but three of them degenerate and only one act as functional megaspore.

Steps in Megagametogenesis

- Formation of female gametophyte or Embryo sac from megaspore is known as megagametogenesis.
- Megaspore at micropylar end undergoes three consecutive mitotic nuclear division forming 8 nuclei.
- 8 nuclei divides into two group of 4 nuclei each and they migrate to chalazal and micropylar end.

Megagametogenesis

- One nuclei from each group migrate in the centre and develop into polar nuclei.
- Migration is followed by cell wall formation (Cytokinesis).
- Three nuclei at the micropylar end develop into egg apparatus (2 Synergids and 1 Egg).
- Three nuclei at the chalazal end develop into antipodal cells.

Structure of Female Gametophyte

- Also called embryo sac, is mostly a **7-celled** structure. At the time of fertilization, central nucleus divides to form 2 Polar nuclei. That is how it becomes **8-nucleated**.
- It has two ends upper end **Chalazal** end and lower is called **Micropylar** end.
- There is a large central vacuole with 2 polar nuclei, which later fuse to form the **secondary nucleus**.
- The micropylar end of the central cell is occupied by the **egg apparatus**, comprising an **1egg cell** and **2 synergids**.
- At its chalazal end, **3 antipodal** cells are present.
- Cells of the egg apparatus are uninucleate & haploid, whereas the central cell is binucleate or diploid.
- At the base Egg apparatus there is finger like projections called **Filiform apparatus**.