PRESENTED BY :-
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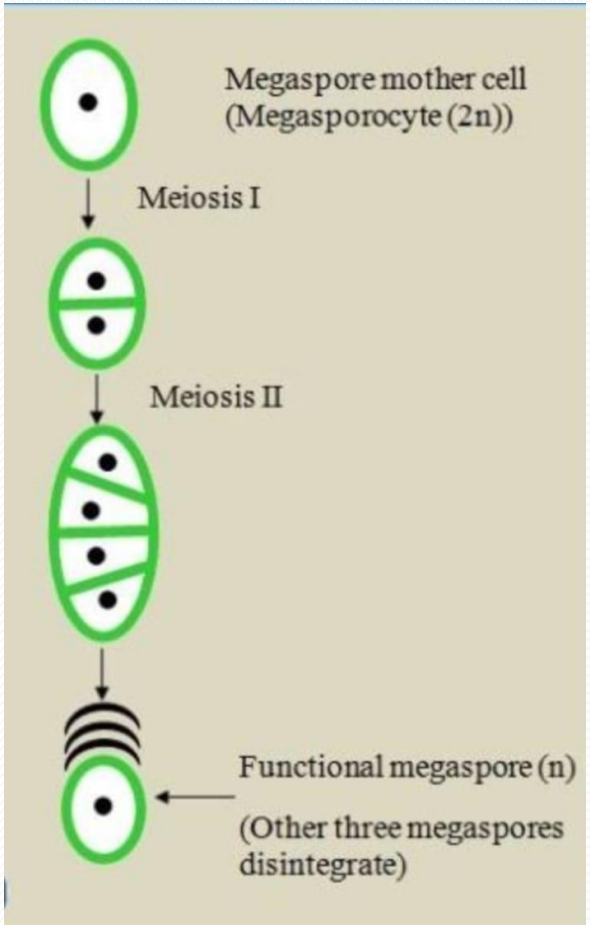
SUBJECT:- BOTANY
GOVT. NAVEEN GIRLS COLLEGE
BAIKUNTHPUR

MEGASPOROGENESIS



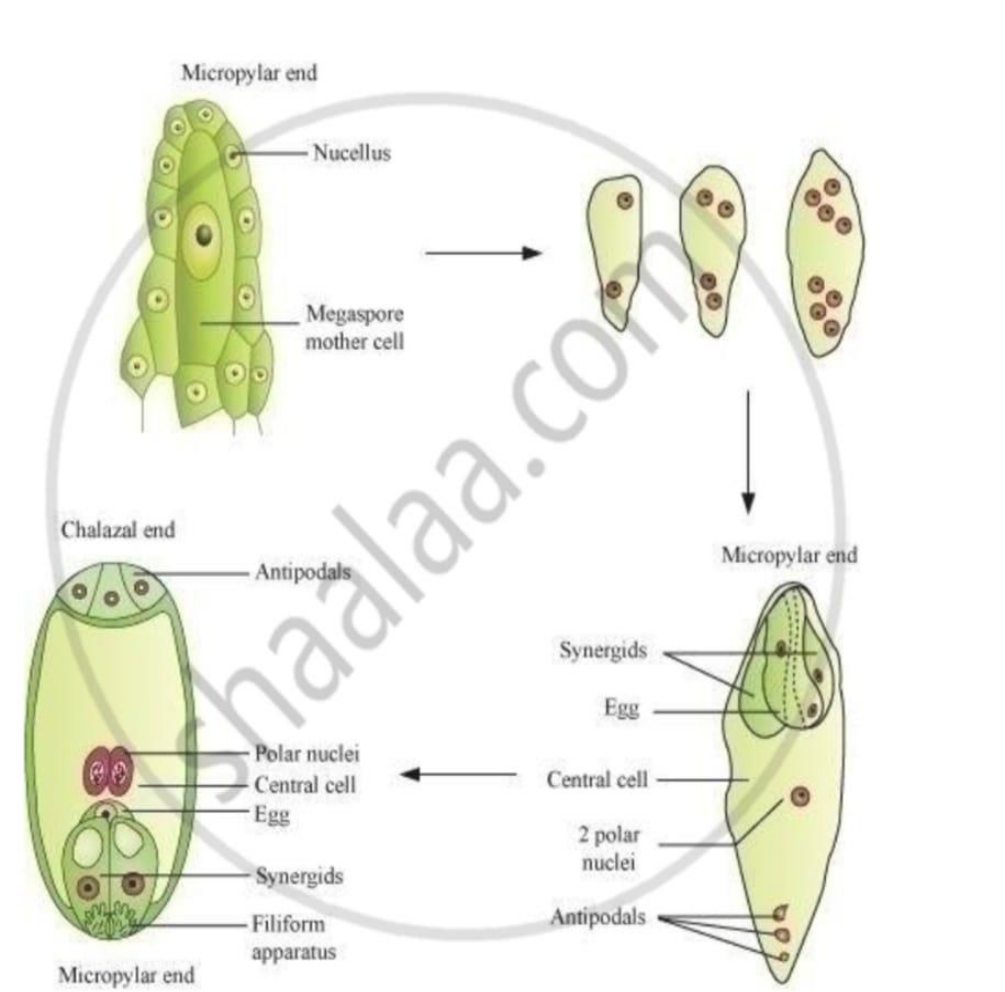
Megasporogenesis refers to the development of megaspores from the megasporocyte, the cell that undergoes meiosis. Meiosis of the megasporocyte nucleus results in the formation of four haploid megaspore nuclei. In most taxa, meiosis is followed by cytokinesis, resulting in four megaspore cells. This pattern is termed **monosporic** megasporogenesis; because of the four megaspores produced, only one of them contributes to the female gametophyte.

PROCESS OF MEGASPOROGENESIS:-

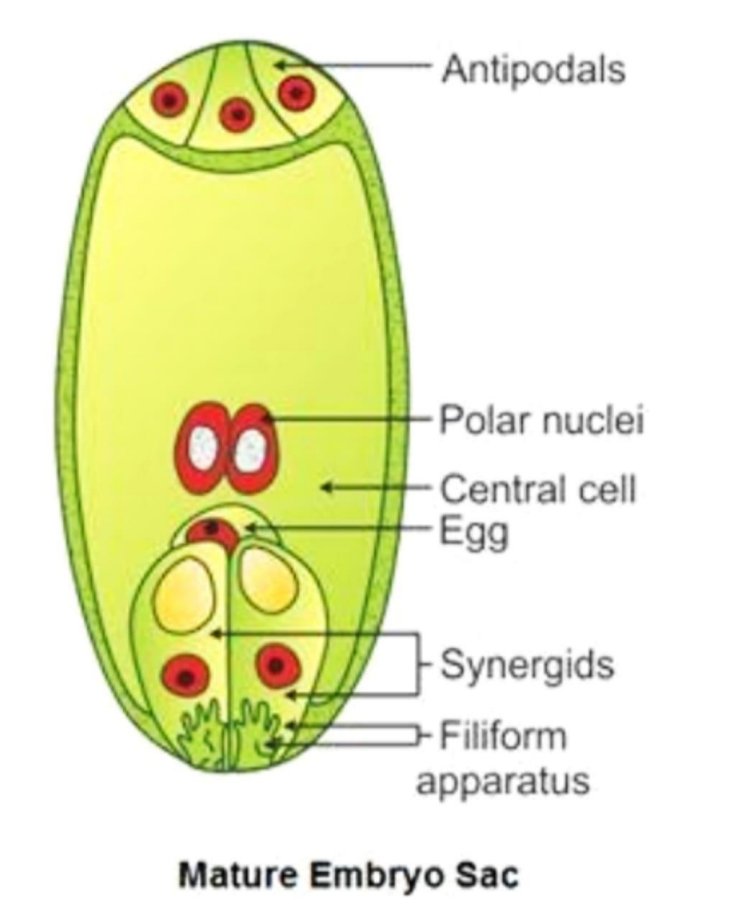
- The process of formation of megasporesfromthe megaspore mother cell is called megasporogenesis.
- The megaspore mother cell undergoes mitosis to form two nuclei that migrate to opposite poles, forming a 2-Nucleate Embryo sac .
- Further mitotic divisions lead to the formation of 4-nucleate and 8-nucleate stages of the embryo sac in these mitotic divisions, a nuclear division is not followed by cell division.

- Afer the 8-nucleate stage, cell walls are laid down and a typical female gametophyte or embryo sac is formed.
- Among the eight nuclei, six are enclosed by cell walls and organized into cells, while he remaining two nuclei (called polar nuclei) are situated below the egg apparatus in a large central cell .
- Out of the six cell, three are grouped at the micropylar end and constitute the egg apparatus made up of two synergids and one egg cell.
- The other three cells are located at the chalazal end are called antipodals.

- A typical angiosperm embryo sac after maturity is 8-nucleated and 7- celled.



MATURE EMBRYO SAC



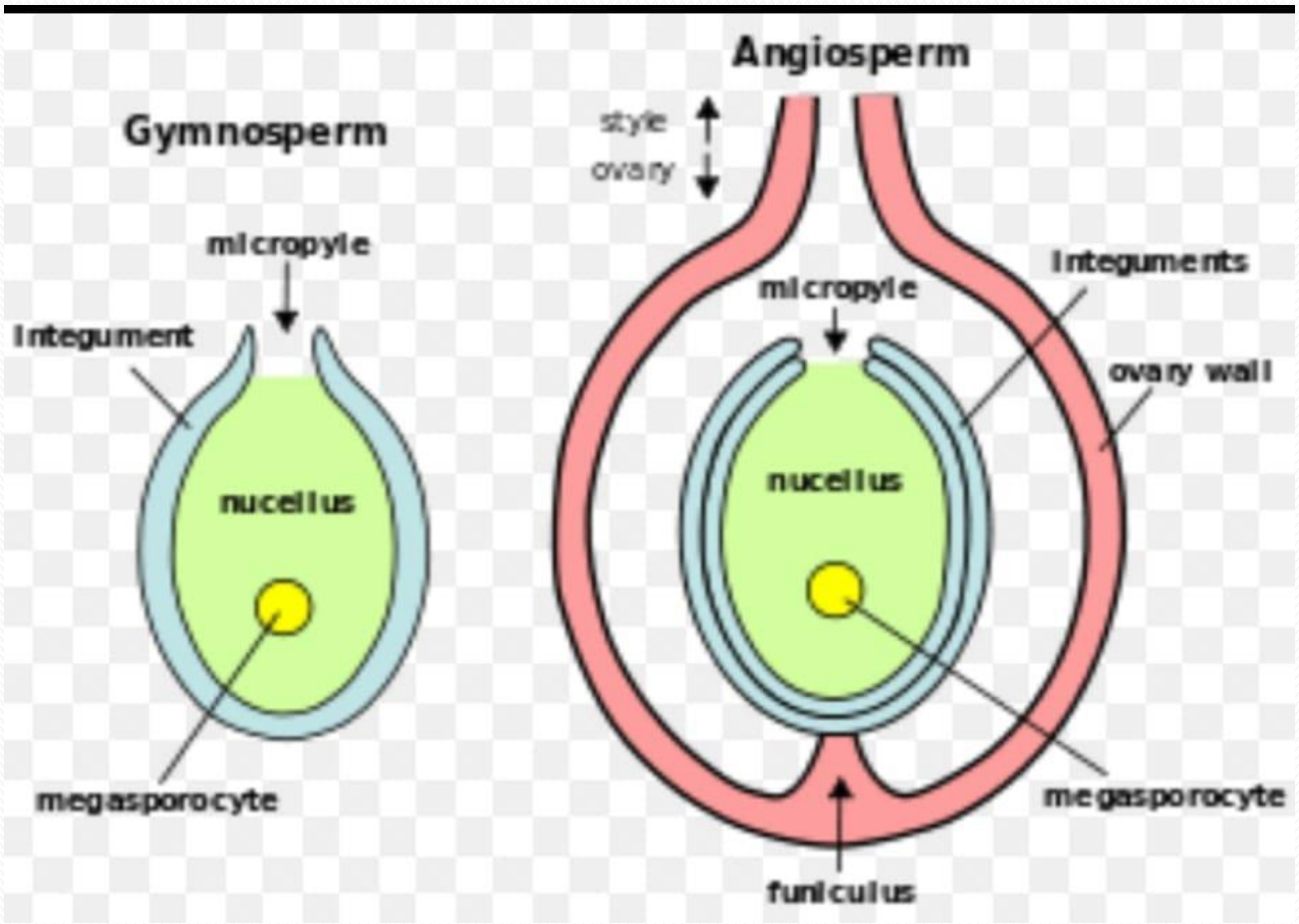
Mature Embryo Sac

- The typically mature embryo sac of an angiosperm consists of two ends that are the chalazal end and another one is the micropylar end.
- At the micropylar end, there are two cells called synergids cells with an egg apparatus.
- The two synergid cells contain filiform apparatus like element which helps in guiding the pollen tubes entry in the embryo sac during the event of fertilization.

- It also helps to stimulate the division and another function of filiform is to produce lots of nectar and also to identify the pollen at the very stage of stigma.
- When we see at the middle portion that means the between of the two ends there is a presence of two polar nuclei.
- The function of these two polar nuclei is to fuse, which will happen before the fertilization and form the diploid secondary nucleus.
- So eight nuclei are being present in seven cells that's why the embryo sac is called 7 celled and eight nucleated.

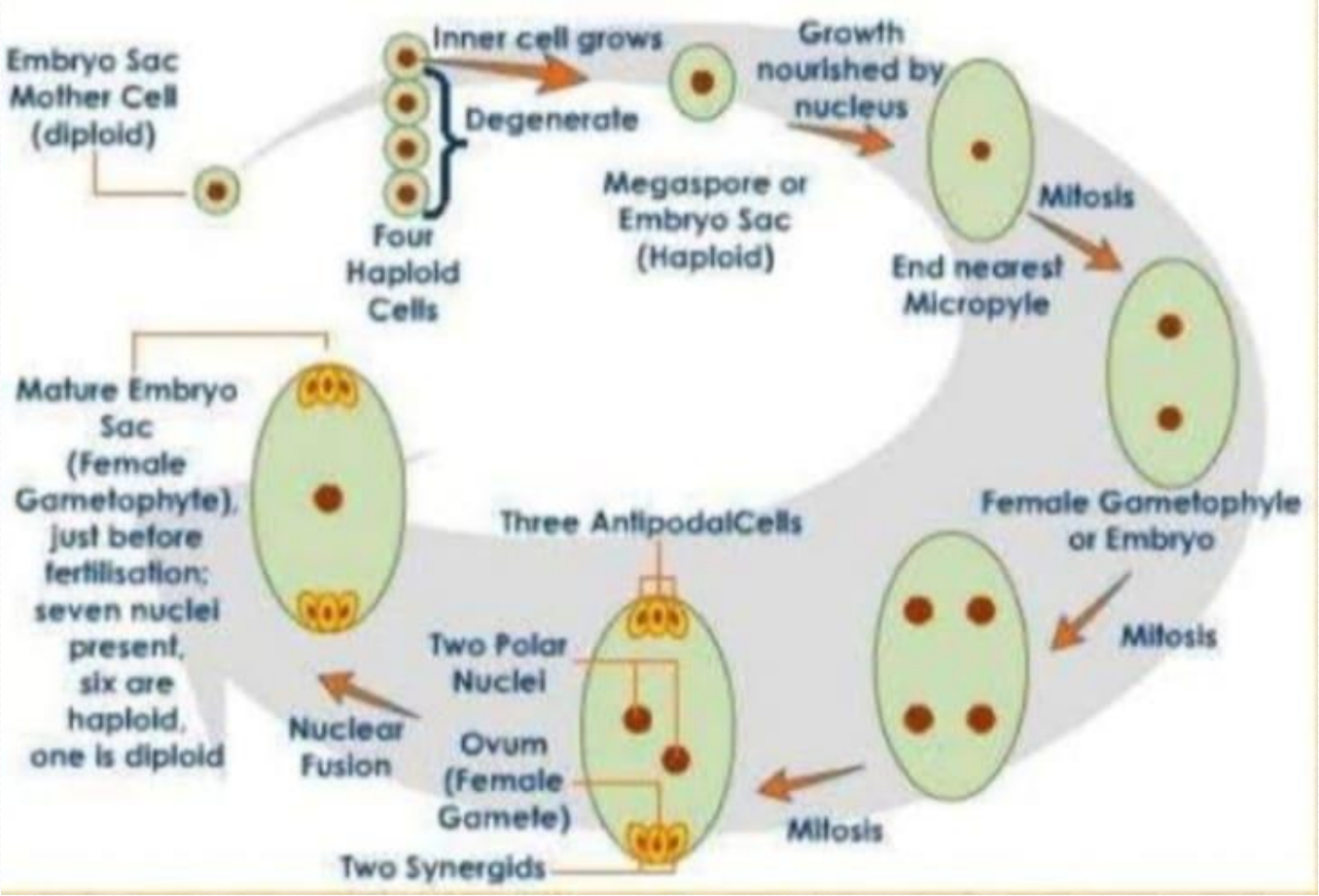
MEGASPORE :-

- Megaspores are also called macrospores are a type of spore found in Heterosporous plants.
- Megaspores which germinates into a female gametophyte which produces egg cells.
- These are Fertilized by the male gametophyte developing from the microspore.


Gymnosperm
micropyle
integument
nucellus
megasporocyte
Angiosperm
style
ovary
micropyle
integuments
ovary wall
nucellus
megasporocyte
funiculus

MEGASPOROGENESIS

MMC(2n) → MEGASPORE(n)



- Female gametophyte development begins early in ovule development with the formation of a diploid megaspore mother cell that undergoes meiosis. One resulting haploid megaspore then develops into the female gametophyte.

- Genetic and epigenetic processes mediate specification of megaspore mother cell idenity and limit megaspore mother cell formation to a single cell per ovule.

- Auxin gradients influence female gametophyte polarity and battery of transcription factors mediate female gametophyte cell specification and differentiation.

OVULE:-

Ovules are the precursors to seeds and as such are critical to plant propagation and food production. Mutant studies have led to the identification of numerous genes regulating **Ovule Development**. Genes encoding transcription factors have been shown to direct ovule spacing, ovule identity and integument formation. Particular co-regulators have now been associated with activities of some of these transcription factors, and other protein families including **cell surface receptors** have been shown to regulate ovule development.

Ovule diversification has been studied using orthologs of **regulatory-genes** in divergent **angiosperm** groups. Combining modern genetic evidence with expanding knowledge of the fossil record illuminates the possible origin of the unique bitegmic ovules of **angiosperms**.

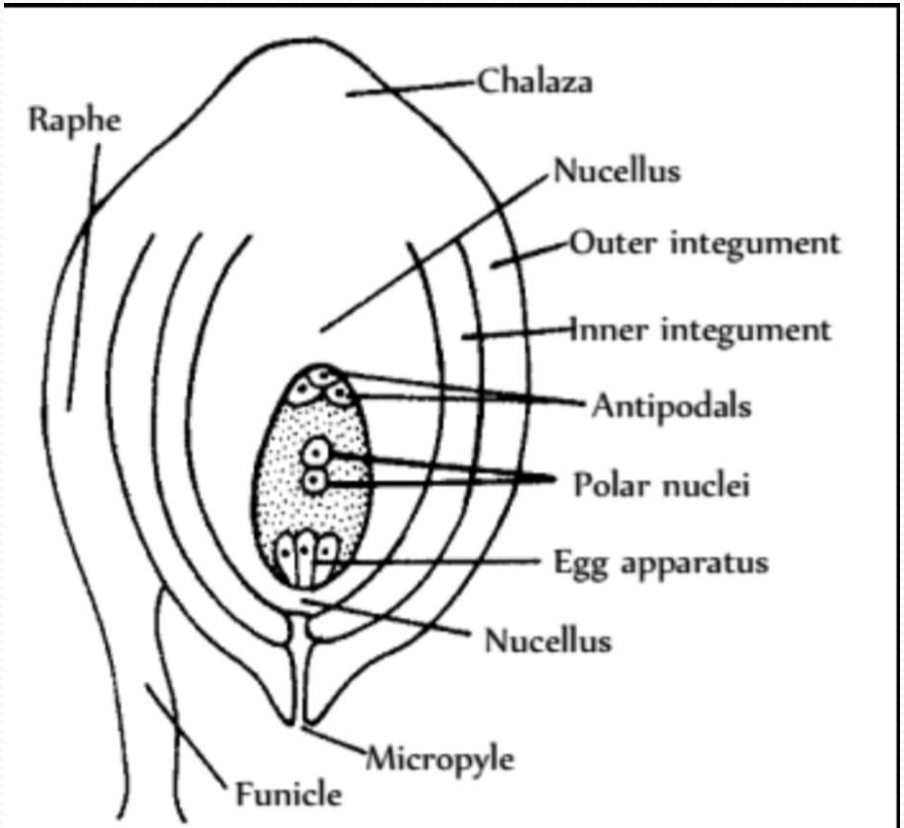
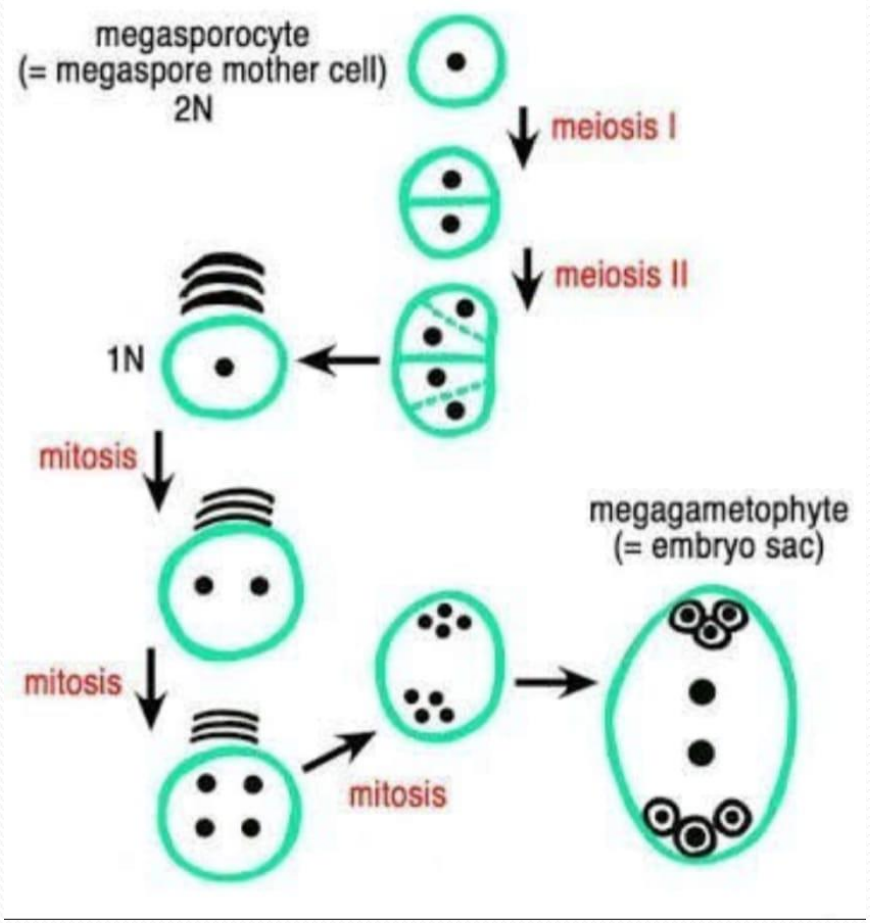


Fig : Structure of ovule


megasporocyte
(= megaspore mother cell)
2N
meiosis I
meiosis II
1N
mitosis
mitosis
mitosis
megagametophyte
(= embryo sac)

Thank you……