COLLEGE ROLL NO:

UNIVERSITY NO: U15NB21S0065

S.P.V.V.S

G.P.PORAWAL ARTS COMMERCE & V.V.SALIMATH SCEINCE COLLEGE

SINDAGI – 586128 DIST – VIJAYAPUR

RANI CHANNAMMA UNIVERSITY,BELAGAVI

PROJECT REPORT ON MICROSPOROGENISIS & MEGASPOROGENISIS

DEPARTMENT OF BOTANY

2022-2023

DATE : 8/2/23

NAME	**: POOJA KANGAL**
SUBJECT	**: BOTANY**
TITLE OF THE PROJECT	**: MICROSPOROGENISIS & MEGASPOROGENISIS**
CLASS	**: B.sc 3rd SEM**
REG NO	**: U15NB21S0065**

Examiners

1) 23/02/23

2)

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SUBMITTED TO

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Dept. of Botany
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Microsporogenesis

→ The formation of microspores from microspore mother cell is called microsporogenesis.

Stamen

→ Stamen is the male reproductive part of flowering Plant, The stamens are arranged in a whorl. Collectively known as the androecium. They are found in the centre of the flower along with the stigma, if present. They can be either one in number or as many as thousands in number. The stamens can be arranged either spirally or in a whorl.

Structure of Stamen

* Stamen structure is made up of anther and filament anthers have a bilobed structure that transports Pollen grains in Pollen sac.

* A stamen filament emerges from the thalamus or Peduncle, giving rise to a knob-like anther, each lobe contains two thecae, indicating that an anther is Dithecous.

function of Stamen

* The primary capability of the stamen of a flower is to deliver the pollen grains, which house male gametes or sex cells & are fundamental for a generation

T.S of Anther

The male reproductive part of the flowering plant has stamens. These stamens are filaments structure that support the anther that produces the pollengrains. These anthers have two lobes and are termed bilobed anthers. The transverse section of the anther helps to distinguish this bilobed structure.

The 2 lobes of anther are formed by a septum. each lobe of a bilobed anther has two theca and two microsporangia. There are hundreds of microspores produced by each microsporangium. The anther are lobed so that they can accommodate more spores.

Structure of an Anther

=> The filamentous stamen supports the knob-like anther on its top. A typical anther is always bilobed and dithecous structure

=> The transverse section of anther shows two microsporangia in each lobe. Thus they have four microsporangia in total

=> The microsporangia or the pollen sac consist of the pollengrains.

Germination of Microspore

⟹ in flower pollination in which are developed numer-ous microspores (potential pollen grains); the pistil bears ovules, each enclosing an egg cell. when a microspore germi-nates, it is known as a pollen grain. when the pollen sacs in stamens anther are ripe, the anther releases them and the pollen is shed then fertilisation takes place

⟹ The microspore divides by mitosis producing two cells. The first of the cell (the generative cell) is small and is formed inside the second larger cell (the tube cell)

⟹ The members of each part of the microspores separate from each other

⟹ A double-layered wall then develops around each microspore.

These steps occur in sequence and when complete the microspores have become pollen grains.

in the anther after a microspore undergoes microsporogenesis, it can deviate towards embryogenesis and become star-like microspores.

Megasporogenesis

→ The formation of megaspores from the megaspore mother cell is called megasporogenesis

Types of ovules

1] Orthotropous (Atropous) :- This is where the body of these ovules is straight so that the Chalaza, where the nucellus and integuments merge.

2] Anatropous ovules :- In this case, the ovules become completely inverted during development so that the micropyle lies close to the hilum.

3] Amphitropous ovules :- The body of the ovule is very much curved that the embryo sac and the ovule itself take the shape of a horseshoe.

4] Hemi-Anatropous :- The body of these ovules becomes at a right angle in relation to the funicle, so it looks like the ovule is lying on its side

5] Circinotropous :- The funicle in this case is especially long that it creates a nearly full circle around the ovule whose micropyle is ultimately pointing upwards

6] Campylotropous :- The body of this type is bent and the alignment between the Chalaza and micropyle is lost. The embryosac is only slightly curved.

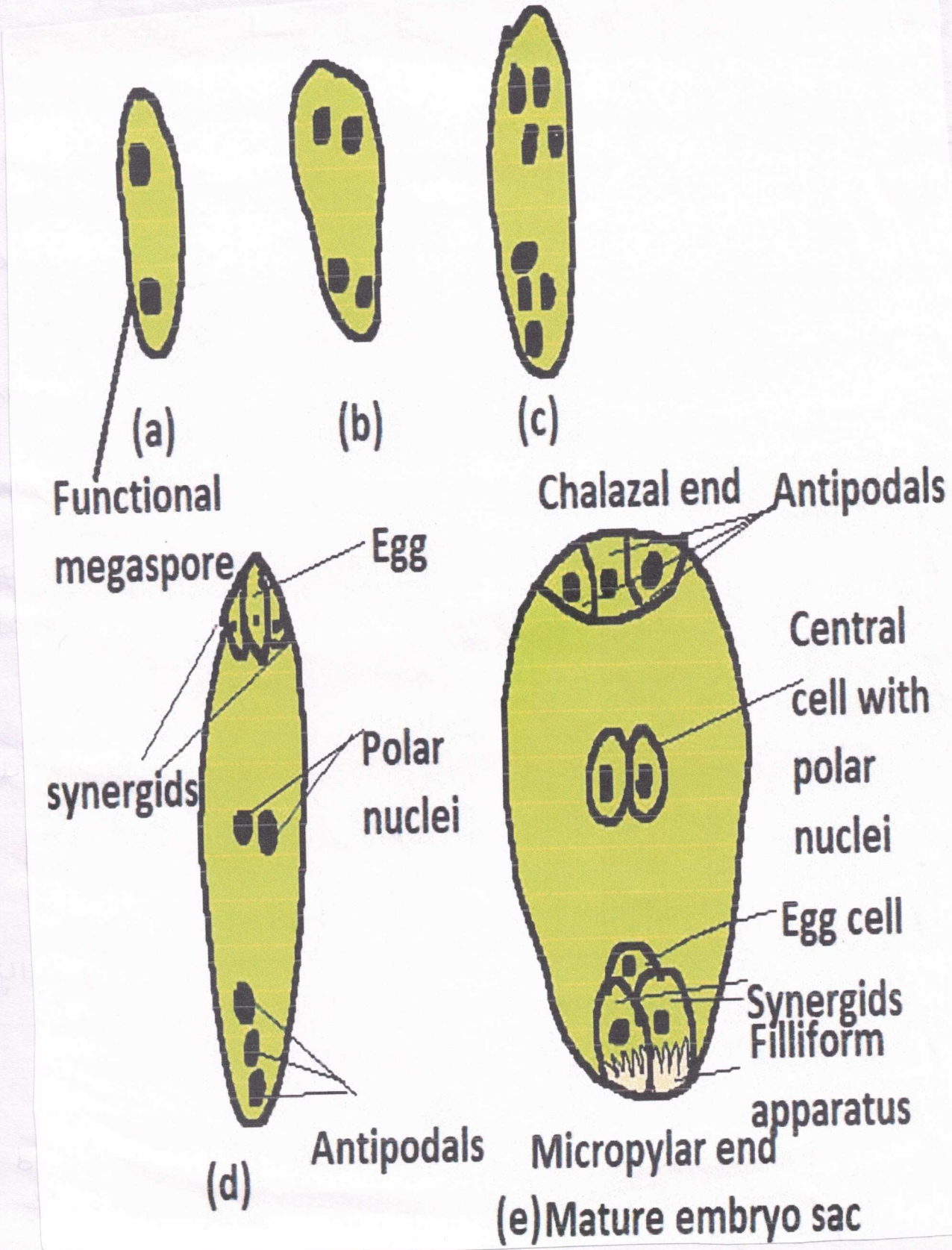
Development of Monosporic embryo sac

⟹ The formation of the female gametophyte from a single functional megaspore is called as monosporic development. The nucleus of functional megaspore divides mitotically to form two nuclei which move to opposite poles. This forms a two-nucleate embryo sac

Two more sequential mitotic nuclear division result in the formation of four-nucleate and eight-nuclea-te stages of embryo sac. These mitotic divisions are free nuclear type in which karyokinesis is not follo-wed immediately by cytokinesis.

After the eight nucleate stage, the walls are laid down leading to the organization of the typical female gametophyte. Six of eight nuclei are surrounded by cell walls and organize-d in to cells. the remaining two nuclei, called polar nuclei are situated below the egg apparatus in the large central cell.

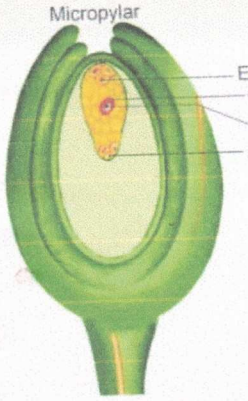
A typical angiosperm embryo sac at maturity is eight nucleate and seven cells. Three cells lie at micropylar end forming egg apparatus. Three ends at chalazal end called as antipodal cells. A single large central cell which has two polar nuclei.


(a)
(b)
(c)
Functional megaspore
Egg
synergids
Polar nuclei
Antipodals
(d)
Chalazal end
Antipodals
Central cell with polar nuclei
Egg cell
Synergids
Filliform apparatus
Micropylar end
(e)Mature embryo sac

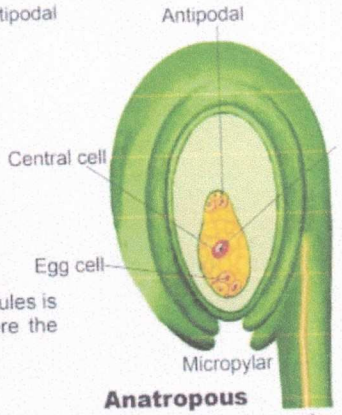
TYPES OF OVULES

The ovule is part of the makeup of the female reproductive organ in seed plants. It's the place where female reproductive cells are made and contained, and it is what eventually develops into a seed after fertilization. Ovules are contained in ovaries at the bottom of a vase-like structure, the carpel, which has a neck called a style and an opening at the top, called a stigma. Ovules have been separated into six categories based on their shapes.

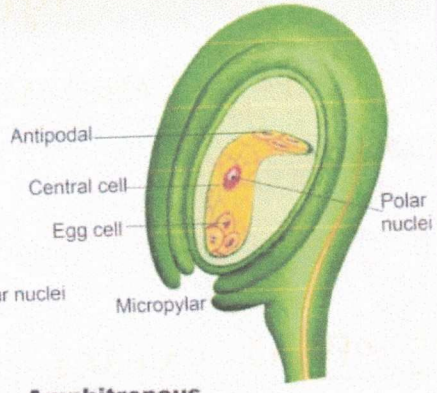
OVULES



Orthotropous (Atropous)
This is where the body of these ovules is straight so that the chalaza, where the nucellus and integuments merge.



Anatropous
In this case, the ovules become completely inverted during development so that the micropyle lies close to the hilum.



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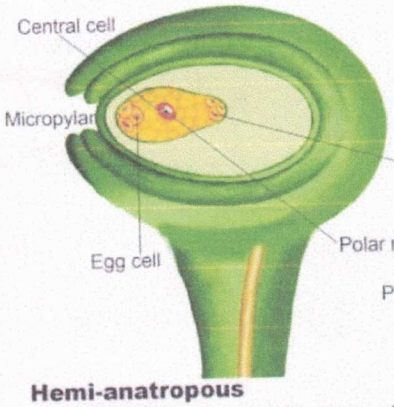
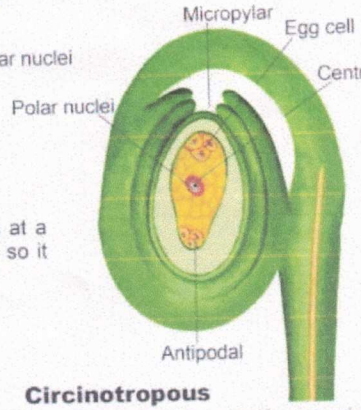
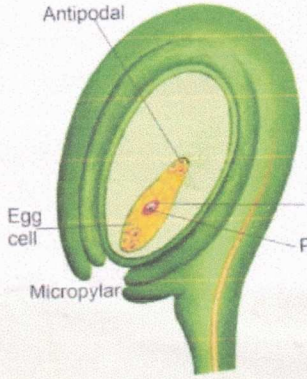


Hemi-anatropous
The body of these ovules becomes at a right angle in relation to the funicle, so it looks like the ovule is lying on its side.

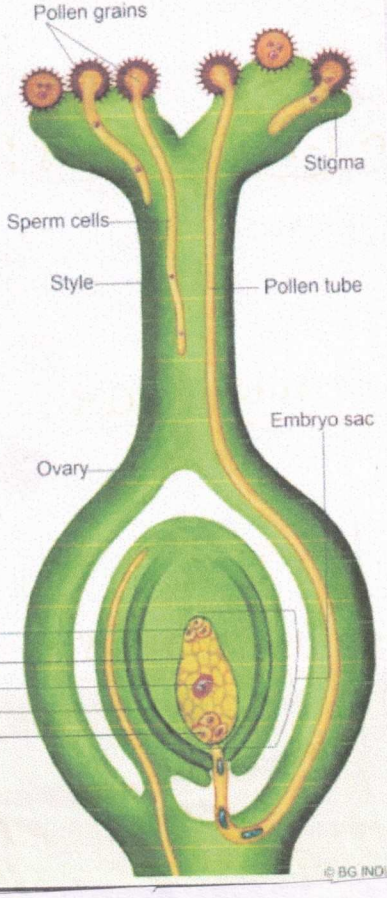


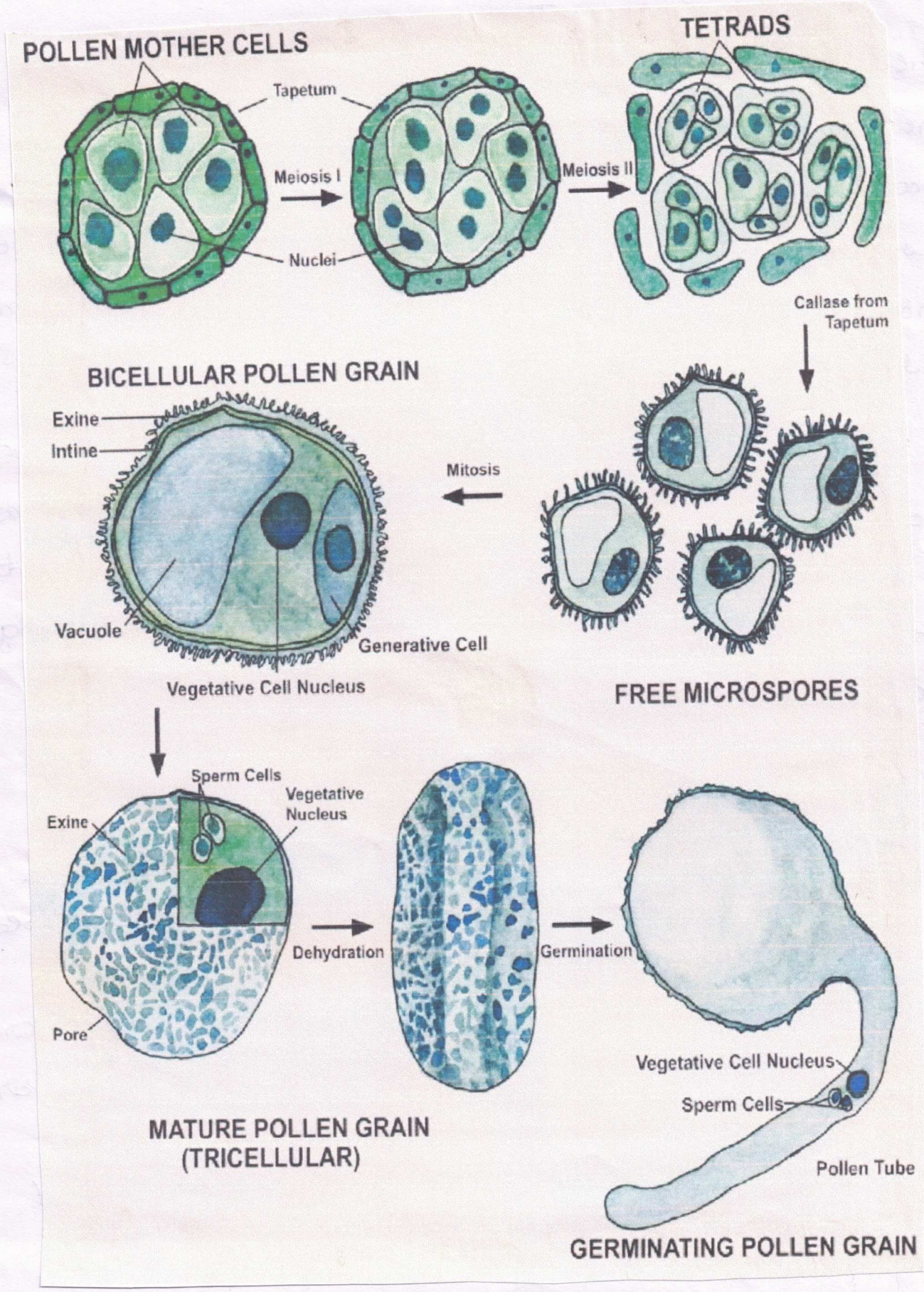
Circinotropous
The funicle in this case is especially long that it creates a nearly full circle around the ovule whose micropyle is ultimately pointing upwards.

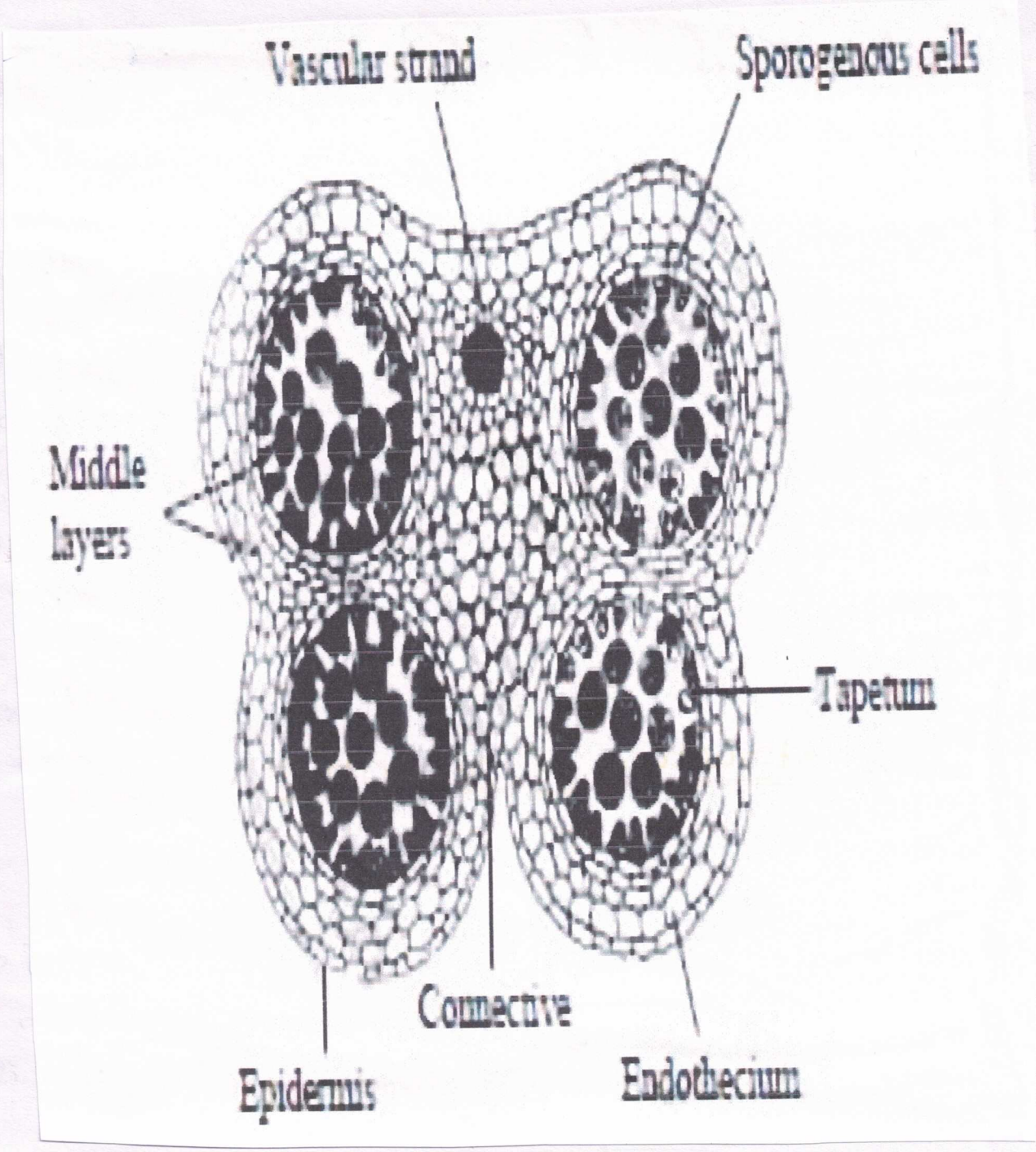


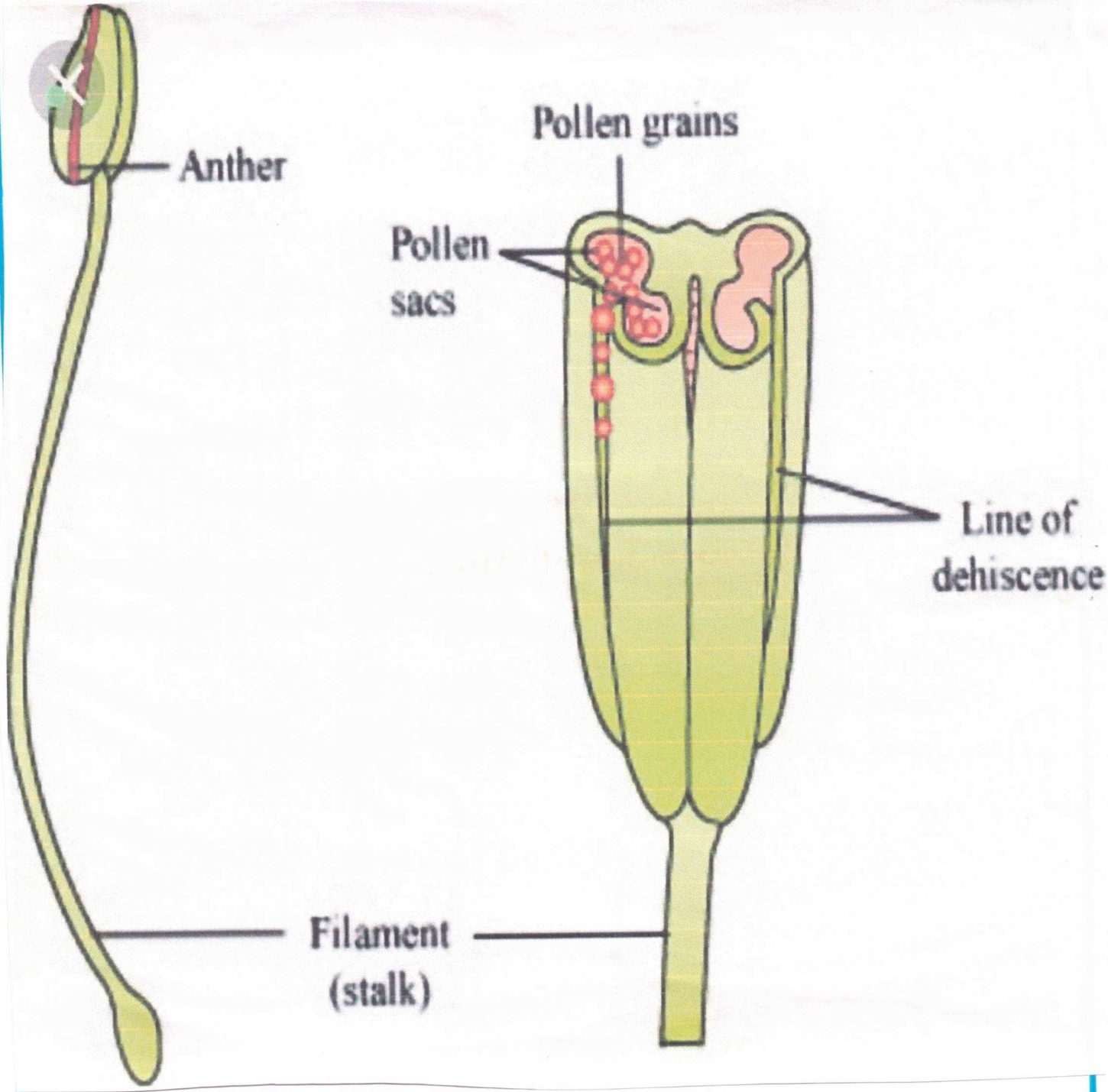
Campylotropous
The body of this type is bent and the alignment between the chalaza and micropyle is lost. The embryo sac is only slightly curved.

FERTILIZATION




POLLEN MOTHER CELLS
Tapetum
Meiosis I
Nuclei
Meiosis II
TETRADS
Callase from Tapetum
FREE MICROSPORES
Mitosis
BICELLULAR POLLEN GRAIN
Exine
Intine
Vacuole
Generative Cell
Vegetative Cell Nucleus
Sperm Cells
Vegetative Nucleus
Exine
Pore
Dehydration
MATURE POLLEN GRAIN (TRICELLULAR)
Germination
Vegetative Cell Nucleus
Sperm Cells
Pollen Tube
GERMINATING POLLEN GRAIN


Vascular strand
Sporogenous cells
Middle layers
Tapetum
Connective
Epidermis
Endothecium


Anther
Pollen grains
Pollen sacs
Line of dehiscence
Filament (stalk)