

BIOLOGY • CLASS 12

1

CHAPTER

Sexual Reproduction in Flowering Plants

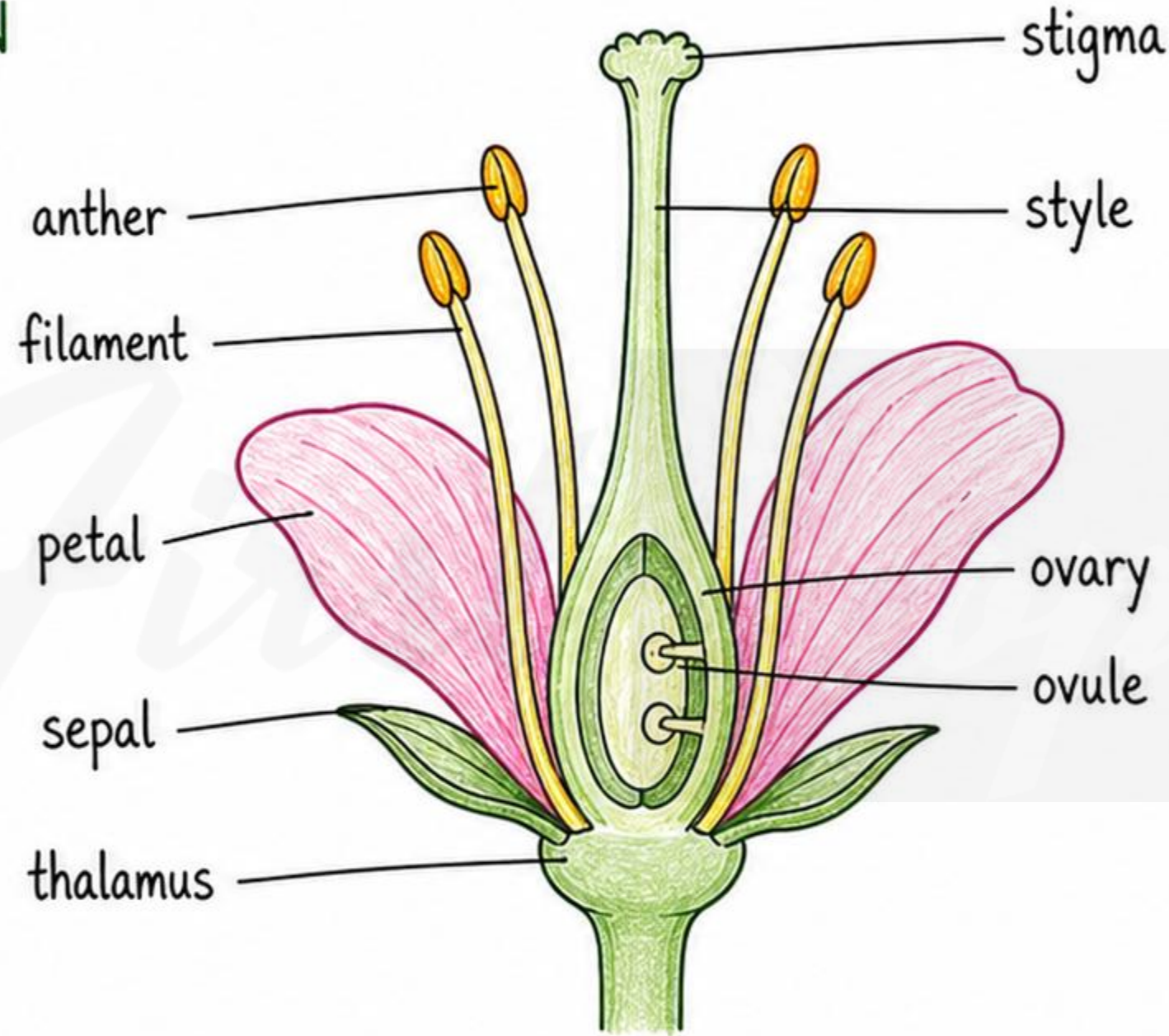
CHAPTER NOTES



SEXUAL REPRODUCTION IN FLOWERING PLANTS

FLOWER = REPRODUCTIVE ORGAN

- Flowers are the sites of sexual reproduction in angiosperms.
- **ANDROECIUM** = whorl of stamens; male reproductive part.
- **GYNOECIUM** = one or more pistils/carpels; female reproductive part.
- Floral primordium → inflorescence → floral buds → flowers.



CHAPTER FLOW

1 Pre-fertilisation: structures & events



2 Pollination + pollen-pistil interaction



3 Double fertilisation



4 Endosperm, embryo, seed & fruit



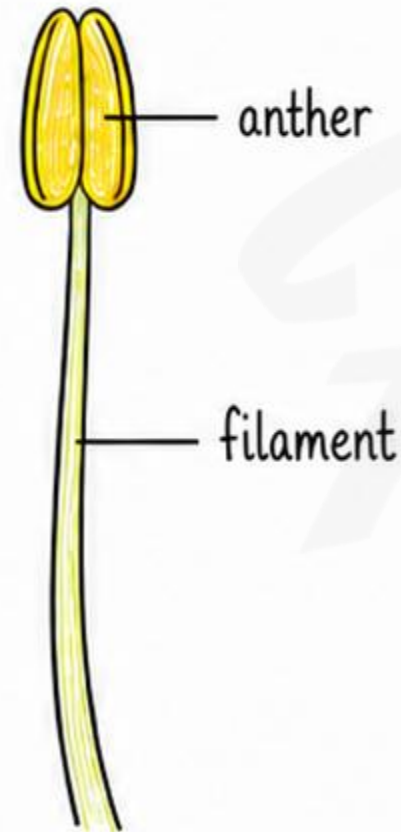
5 Apomixis + polyembryony

KEY OUTCOME: sexual reproduction forms the embryo, seed and fruit, and creates new genetic combinations.

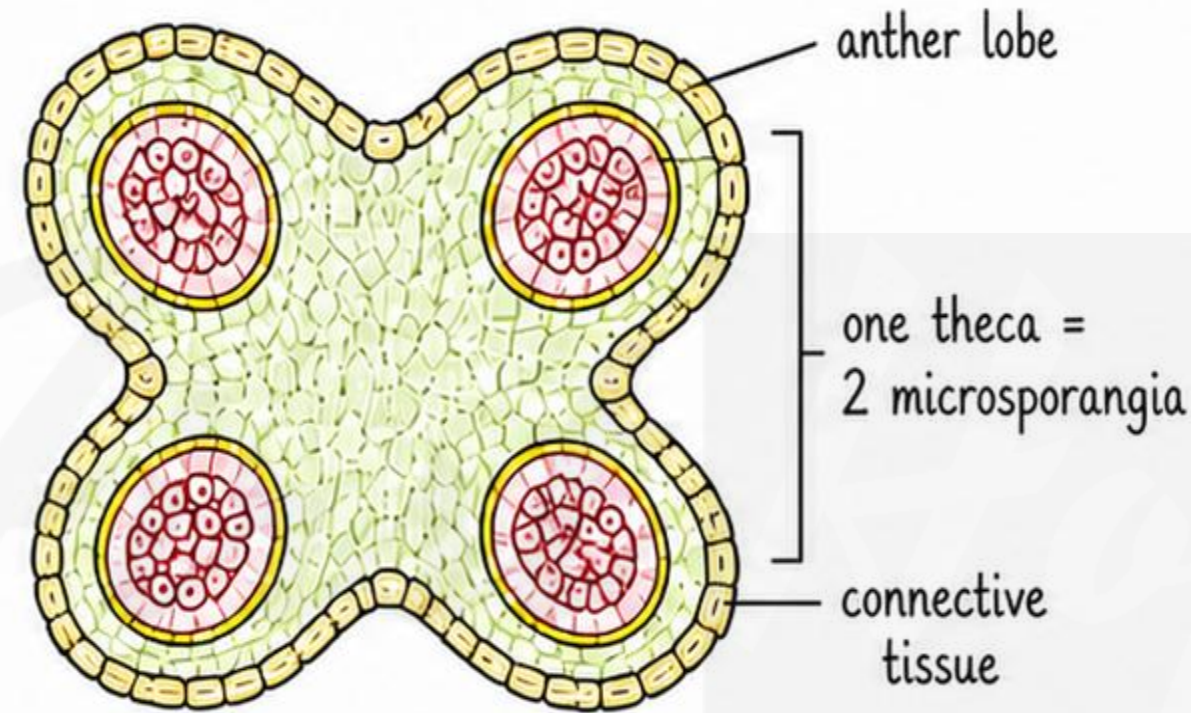
STAMEN, ANTHER & MICROSPORANGIUM

TYPICAL STAMEN

- STAMEN = filament + anther.
- Filament is the slender stalk attached to the thalamus or petal.
- Anther is generally bilobed and dithecous: two theca in total.

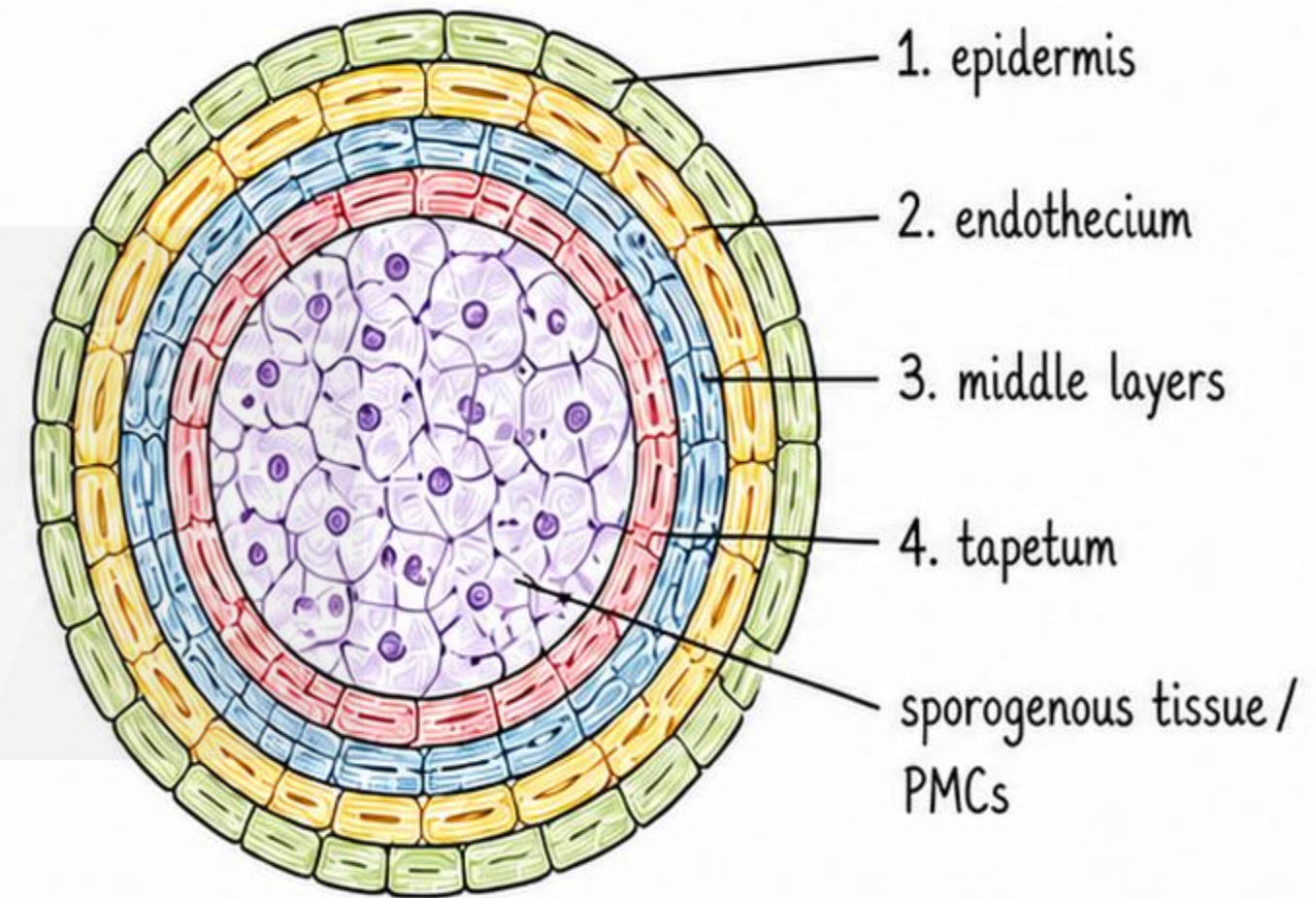


ANTHER IN T.S.



- Four microsporangia make the anther tetrasporangiate.
- Microsporangia later become pollen sacs.

WALL OF ONE MICROSPORANGIUM



OUTER 3 LAYERS →
protection + anther dehiscence

TAPETUM →
nourishes developing pollen grains;
cells have dense cytoplasm

SPOROGENOUS TISSUE →
gives rise to pollen or microspore
mother cells (PMCs)

MICROSPOROGENESIS: FROM PMC TO POLLEN

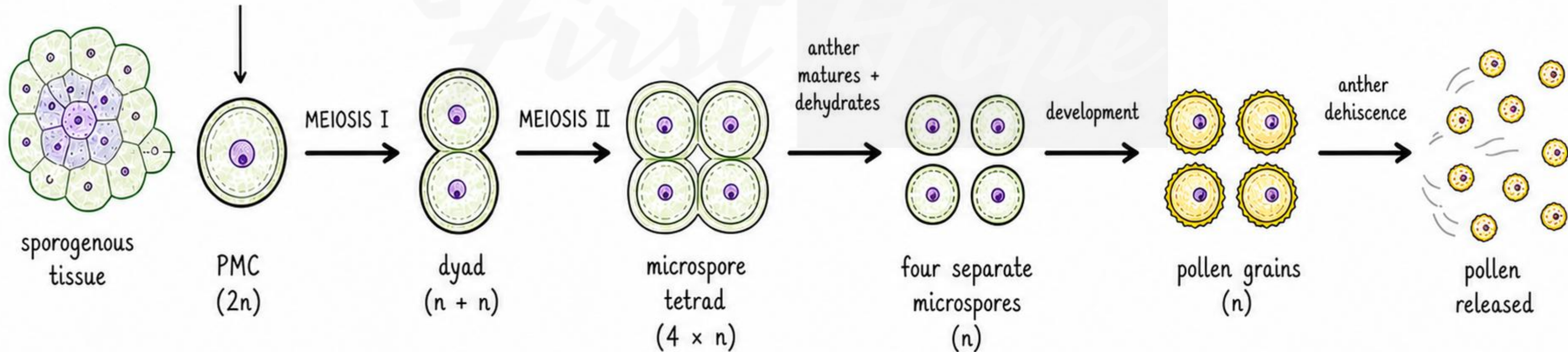
MICROSPOROGENESIS

Formation of microspores from a pollen or microspore mother cell (PMC) through meiosis.

- Young microsporangium contains compact sporogenous tissue.
- Each sporogenous cell can become a PMC.
- Each PMC produces one tetrad of four haploid microspores.

REMEMBER

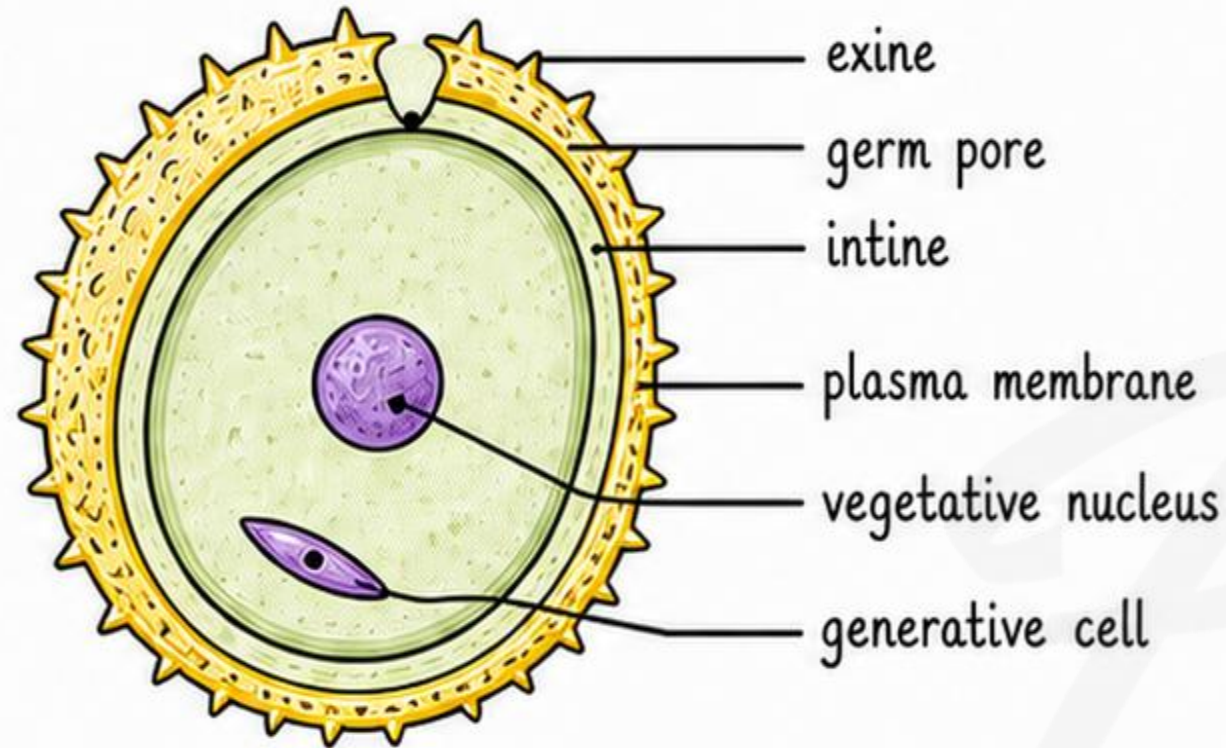
- Microspore = immediate haploid product of meiosis.
- Pollen grain = developed microspore; the male gametophyte.
- One anther forms thousands of pollen grains.



PMC (2n) $\xrightarrow{\text{meiosis}}$ 4 microspores (n each)

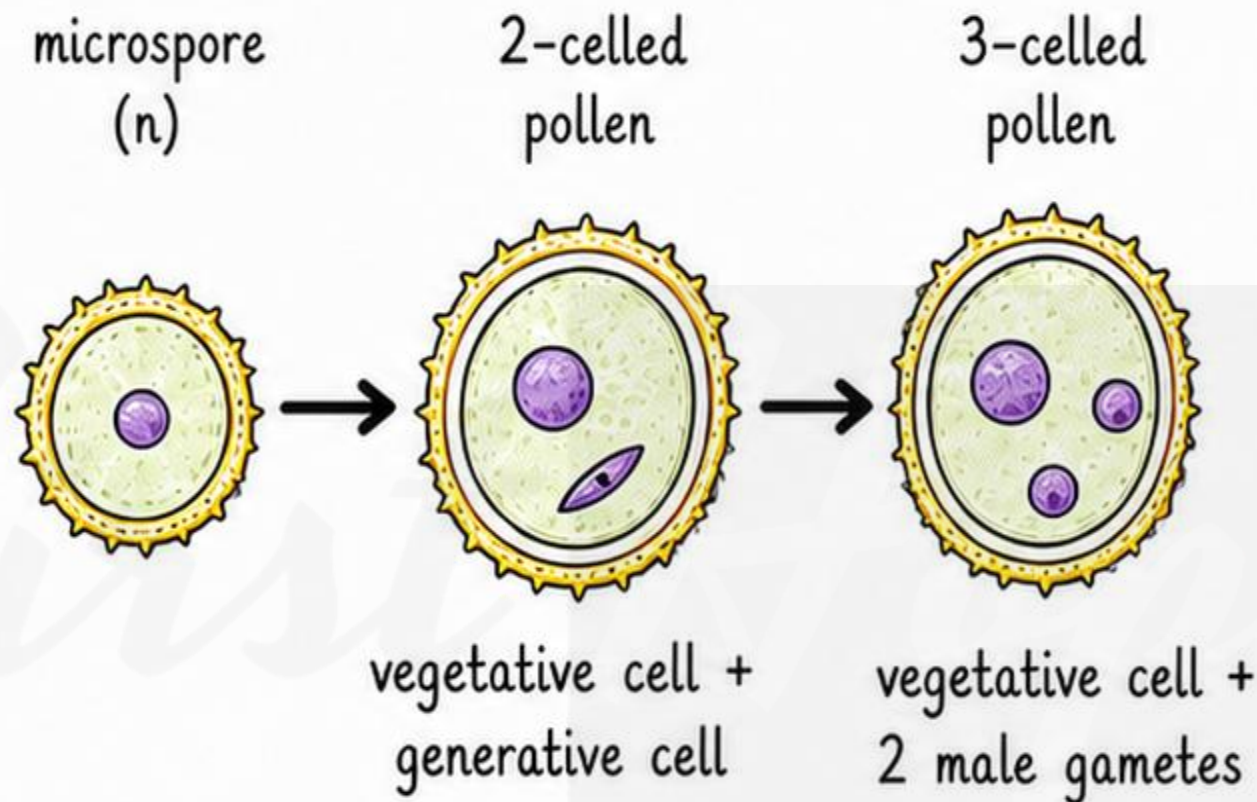
POLLEN GRAIN: STRUCTURE, CELLS & VIABILITY

TWO-LAYERED WALL



- Usually spherical, about 25–50 μm in diameter.
- EXINE: hard outer wall of sporopollenin; germ pores lack sporopollenin.
- INTINE: thin continuous inner wall of cellulose + pectin.
- Sporopollenin resists high temperature, strong acids and alkalis; pollen is well preserved as fossils.

CELLS AT SHEDDING



- Over 60% of angiosperms shed pollen at the 2-celled stage; in the rest, the generative cell divides mitotically before shedding.

VIABILITY & IMPORTANCE

- Rice and wheat: viable for about 30 minutes after release.
- Rosaceae, Leguminosae and Solanaceae: viability may last for months.
- Pollen can be stored for years in liquid nitrogen at $-196\text{ }^{\circ}\text{C}$.
- Stored pollen forms pollen banks used in crop breeding.
- Pollen is nutrient-rich; some products are sold as supplements.
- Parthenium pollen may cause allergy and respiratory problems.

POLLEN GRAIN = MALE GAMETOPHYTE; it carries or later forms the male gametes.

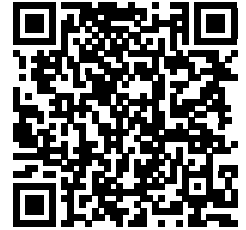


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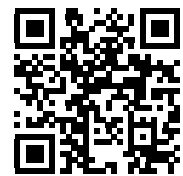


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