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SEM IV,PAPER I (2020-2021)

BO241 PLANT ANATOMY & EMBRYOLOGY 2 CREDITS

CHAPTER NO 10 ENDOSPERM AND EMBRYO

10.1) Endosperm –

1) Introduction to Endosperm –

Endosperm is the nutritive tissue developed from primary endosperm nucleus which is formed as a result of triple fusion .The main function of endosperm is to provide nutrition to the developing embryo .

On the basis of presence or absence of endosperm in mature seeds ,the seeds are broadly classified in to two groups .

1) Endospermic seed –

These seeds are also known as albuminous seeds. In this the developing embryo never utilises the whole endosperm tissue .Thus ,in seeds some amount of endosperm is preserved in mature seeds.ie *Castor* seeds.

2) Non-endospermic seeds –

Non endospermic seeds are also known as exalbuminous seeds. In this the developing embryo utilises the whole endosperm tissue .Thus in this the endosperm is not preserved .ie Legumes .

2) Types of endosperm –

Depending upon the mode of development ,endosperm is classified into three different types .

A) Nuclear endosperm—

It contains free nuclei in the beginning .In this the first and other subsequent divisions of primary endosperm cell is not followed by cell formation .ie Angiosperms .

Development of this type of embryo takes place in the following way –

1) The primary endosperm cell undergoes many free nuclear divisions .
2) The cell first begins to enlarge in its size.
3) Then it is followed by the nuclear divisions of primary endosperm cell.
4) The central vacuole begins to appear.
5) The central vacuole pushes the cytoplasm containing all the nuclei to the periphery .

A large number of nuclei are produced in a common sheath of cytoplasm and remains at the peripheral side .The multinucleate cytoplasm undergoes cleavage and gives rise to a multicellular tissue .

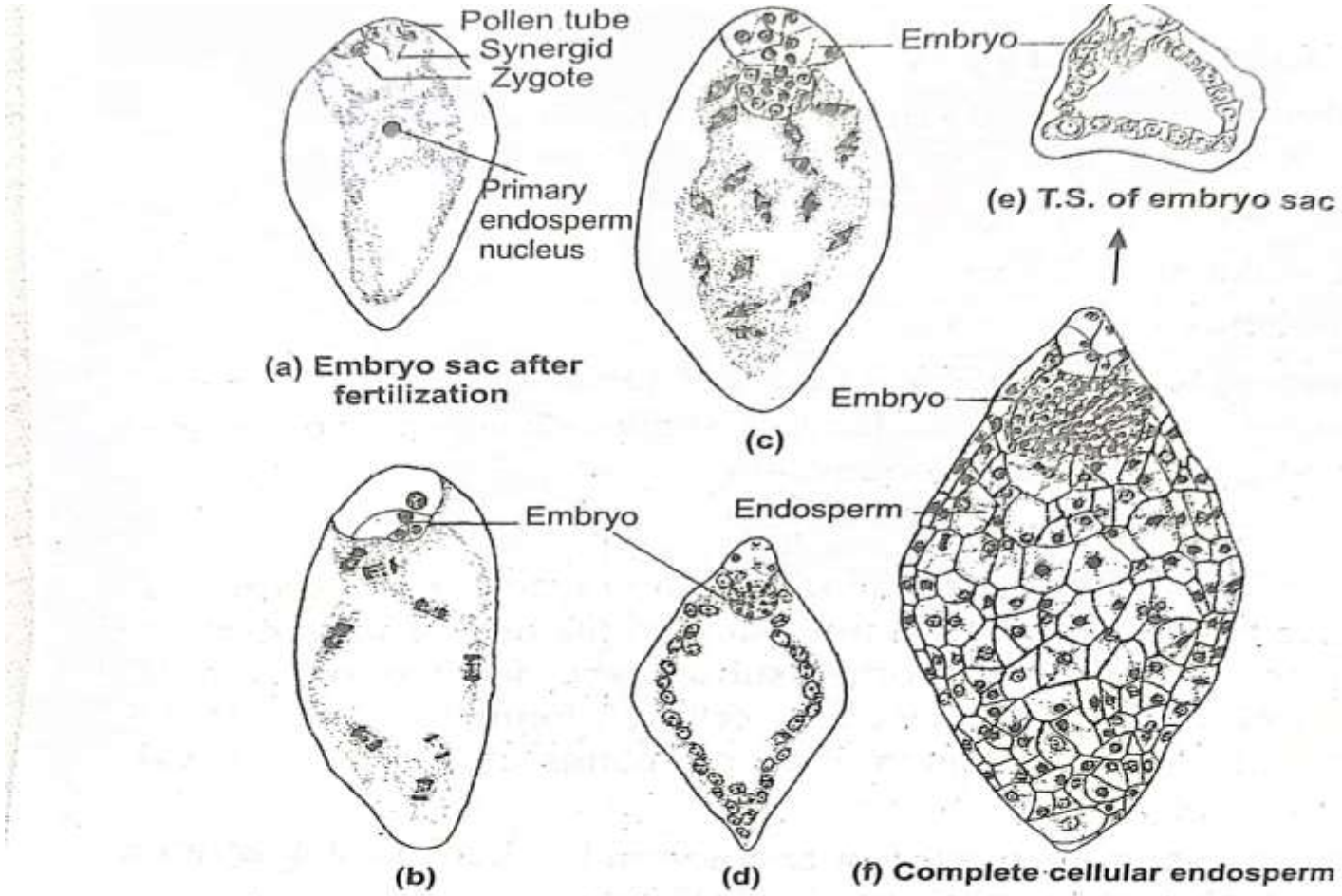

Fig. 10.1: Development of Nuclear Endosperm

2) Cellular Endosperm ---

In this the first and other subsequent divisions of primary endosperm cell are followed by cell wall formation .Hence it becomes cellular .ie *Datura*.

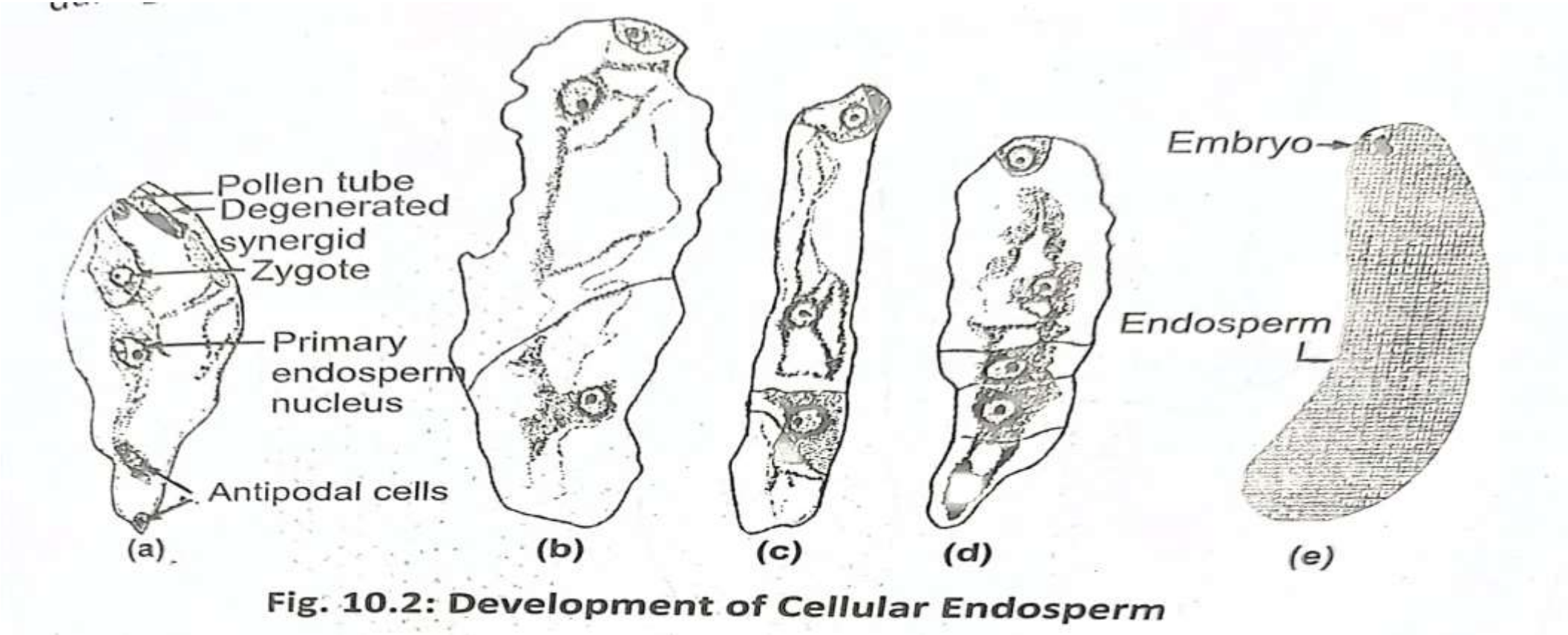

Fig. 10.2: Development of Cellular Endosperm

3) Helobial endosperm–

This is intermediate between the nuclear and cellular types. This type is characteristics of order Helobiales.In this case ,the first division of primary endosperm cell is followed by transverse wall producing micropylar and chalaza cell. Subsequently ,normal free nuclear divisions take place in the micropylar cell as well as chalazal cell.

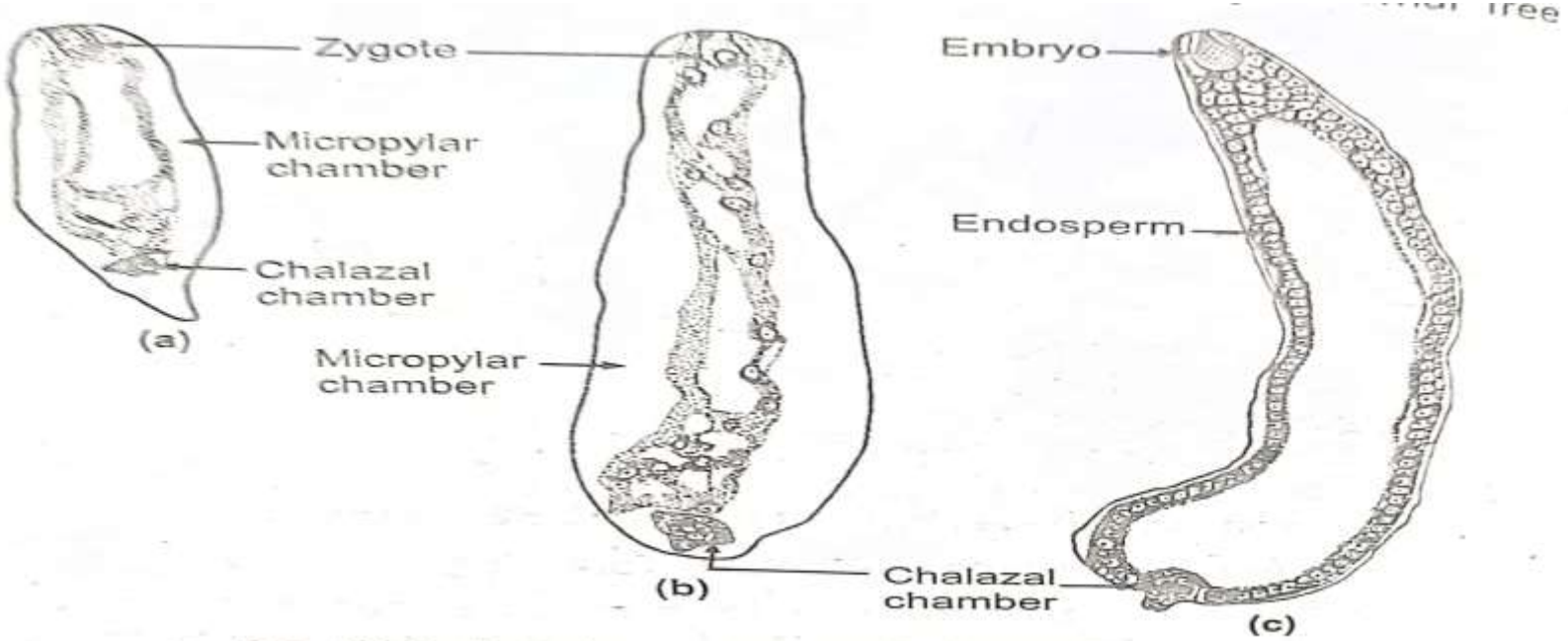

Fig. 10.3: Development of Helobial Endosperm

Embryo –

An embryo is structure developed from a diploid zygote by repeated mitotic division through embryogenesis which is capable of emerging into a new plant .

Embryo in Dicotyledons –

The dicot embryo development starts with division of zygote transversely to form a small apical cell and a large basal cell .The basal cell divides transversely and forms two superposed cells. Now the apical cell undergoes vertical division giving rise to two cells opposite each other . Thus leads to the formation of T- shaped four celled pro-embryo .Out of two daughter cells one divides transversely to give rise to n and n1 .These two cells divides to form linear row of 3 to 4 suspensor cell .Vertical division results in to globular embryo .Cells of upper tier differentiate in to the plumule and cotyledons .*Ground nut.*

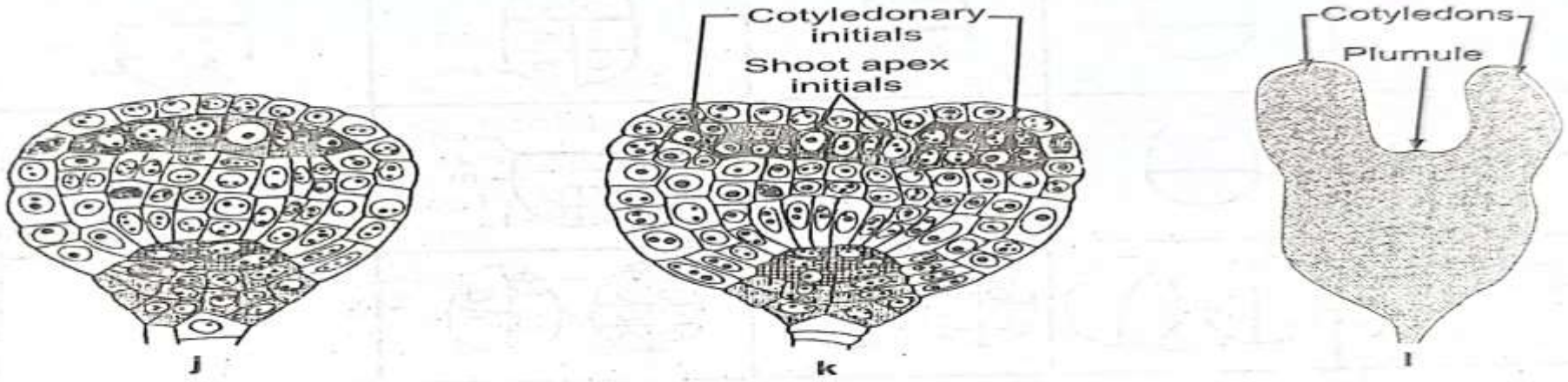

Fig. 10.5: Development of Embryo in Dicotyledons

2) Embryo in monocotyledons ---

The transverse division of zygote results in to a large basal cell and small apical cell. The basal cell forms a single cell *haustorium* .Thus the entire embryo is derived from the apical cell which divides transversely into two cells. Out of this upper divides transversely and forms pro -embryo of four cells. The rapidly growing upper portion of tier forms single cotyledons. The radical is organized from the derivative of n.

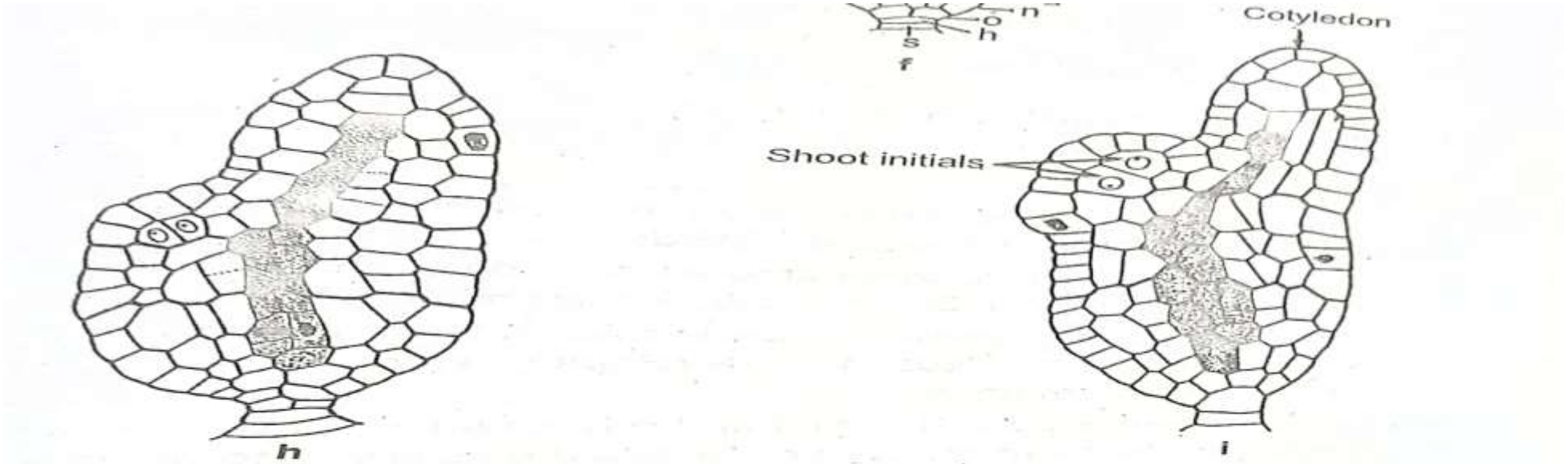

Fig. 10.6: Development of Embryo in Monocotyledons