PLANT GROWTH AND DEVELOPMENT

DIFFERENTIATION, DEDIFFERENTIATION AND REDIFFERENTIATION

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Differentiation : The cells derived from root apical, shoot apical meristems and cambium differentiate and mature to perform specific functions . This act leading to maturation is termed as differentiation.

During differentiation cells undergo few to major structural changes both in their cell walls and protoplasms.

Example : To form a tracheary element. the cells would lose their protoplasm. They also develop a very strong. elastic lignocellulosic secondary cell walls. to carry water to long distances under extreme tension.

Dedifferentiation : The living differentiated cells, that by now have lost the capacity to divide can regain the capacity of division under certain conditions. This phenomenon is termed as dedifferentiation.

Example : Formation of secondary meristems (interfascicular cambium and cork cambium) from fully differentiated parenchyma cells.

Redifferentiation : Cells of secondary meristems are able to divide and produce cells that once again lose the capacity to divide and mature to perform specific functions. Such cells are called redifferentiated and phenomenon is termed as redifferentiation.

List of tissues in a woody dicotyledonous plant that are the products of redifferentiation :

- Secondary xylem
- Secondary phloem
- Cork or phellem

- Secondary cortex or phelloderm

Q. How would you describe a tumour ?

Ans. Tumour is a product of dedifferentiation.

Q. What would you call the parenchyma cells that are rl'lade to divide under controlled laboratmy conditions during plant tissue culture ?

Ans. It is dedifferentiation and cells are dedifferentiated cells.

Differentiation in plants is open because cells/tissues arising out of the same meristem have different structures at maturity. The final structure at maturity of a cell/tissue is also determined by the location of the cell within the plant body.

Example : Cells postioned away from root apical meristems differentiate as root cap cells, while those pushed to the periphery mature as epidermis.