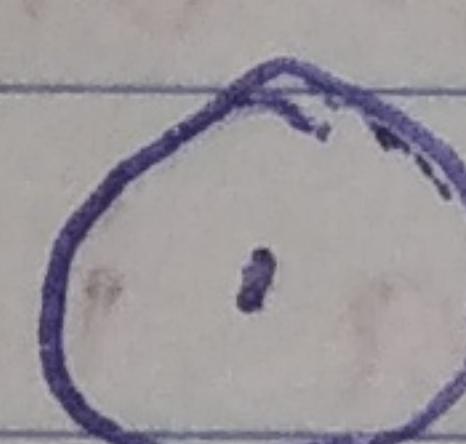


## Somatic Embryogenesis

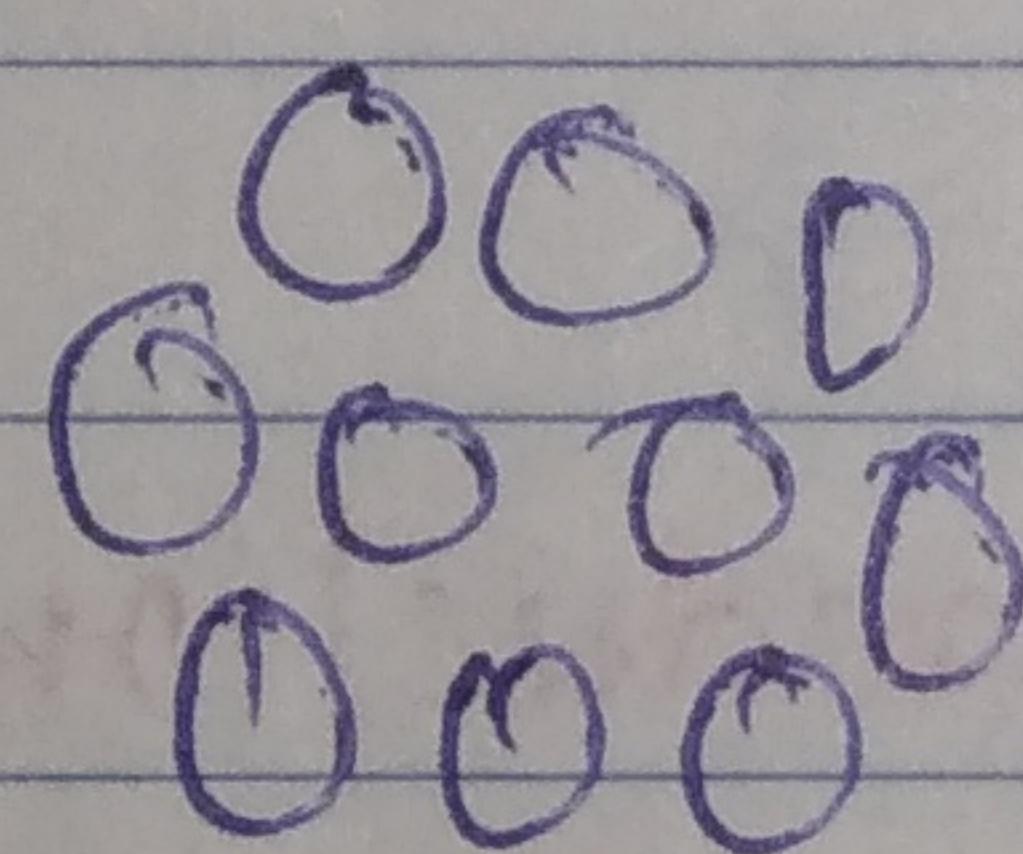
It is the process where somatic cell or tissue develop into differentiated embryo. These somatic embryo can develop into whole plants without undergoing the process of sexual fertilisation as done by zygotic embryo.

Somatic embryogenesis can be initiated either directly from Explant or callus.

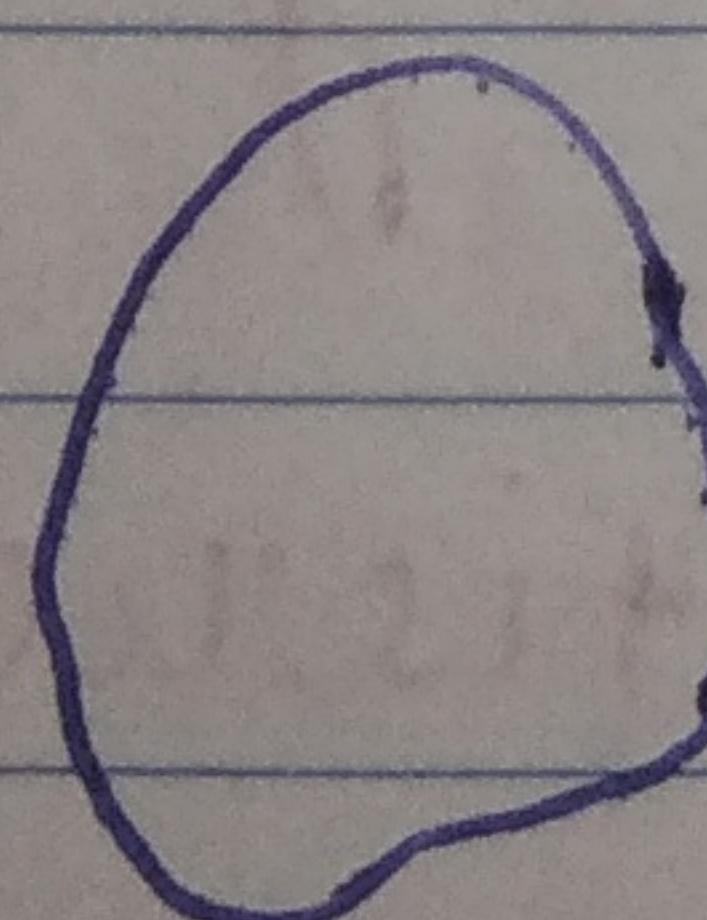
Somatic embryogenesis occurs by induction of embryogenic cultures from zygotic seed/leaf or stem segment. These mature embryos are further cultured for germination & development of plantlets & finally transferred to the soil.



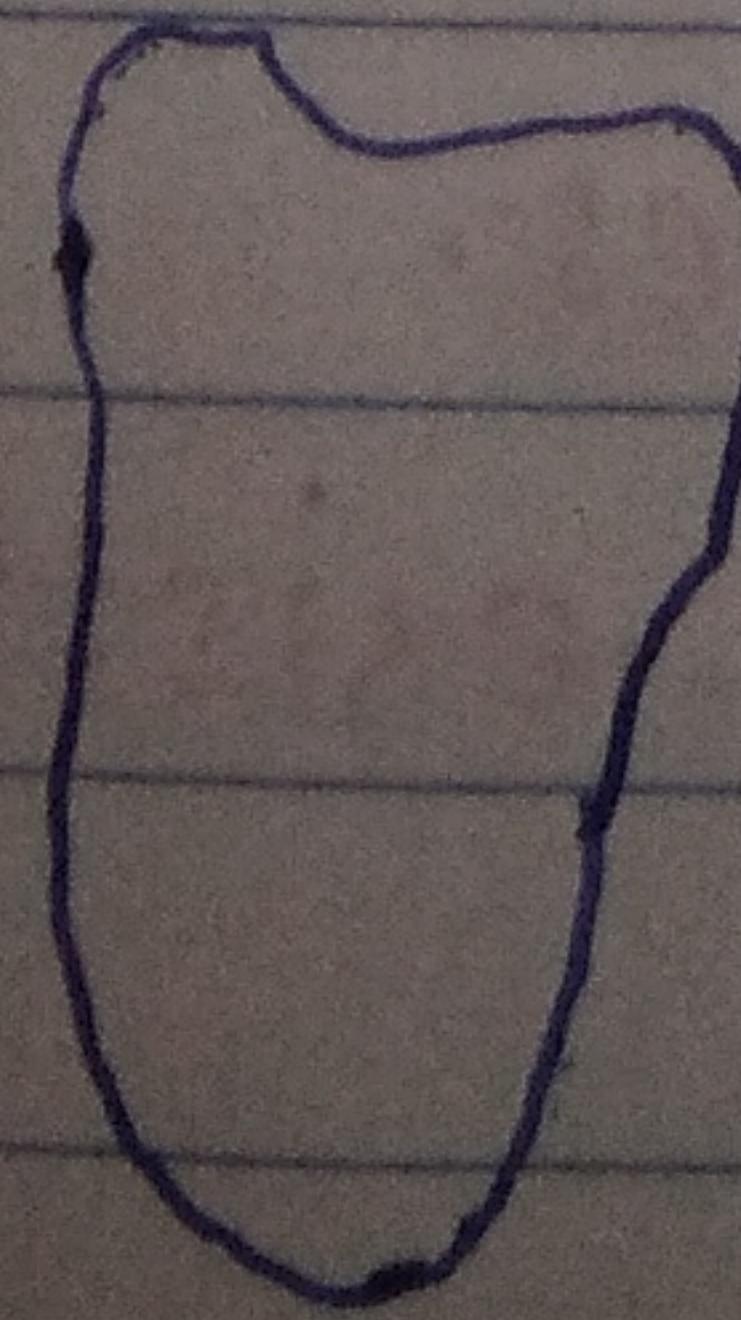
Single cell



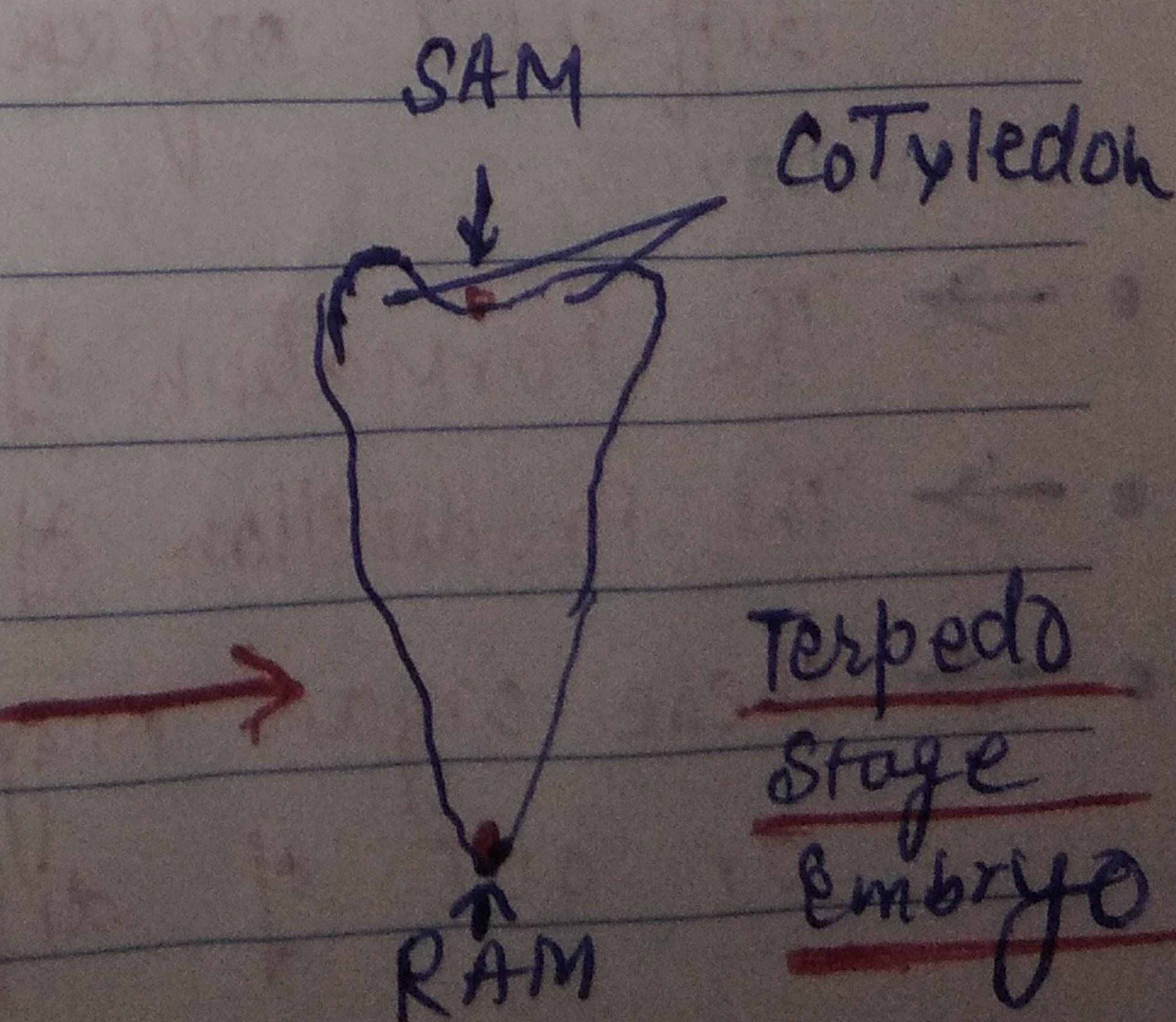
Group of cell



Globular embryo



Heart shaped  
Embryo



08

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IOrganogenesis -

The Process of Initiation & development of an organ is called organogenesis which is an important way to Regenerate Plants from the Culture.

The Two distinct Phases of organogenesis in Plant Tissue culture involves Firstly dedifferentiation and Secondary redifferentiation. Dedifferentiation deals with an acceleration of cell division and a consequent formation of mass of undifferentiated cell (callus).

The developmental process occur after the first callus formation is called Redifferentiation. In this process

Tissue called organ Primordia is differentiated

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From callus cell is generated into a

small meristems from which Vascular Tissue & organs are formed.

organogenesis which relies on the production of organs either directly from an Explant or callus structure.

This can be also explained by following characts -

- → The Ability of Non-Meristematic Plant tissue to form different organ de novo.
- 10 Sunday
- → The Formation of Adventitious organ.
- → The production of Root, Shoot or leaves.
- → These organ may arise out of pre-existing meristems or out of differentiated cells.

## Indirect organogenesis

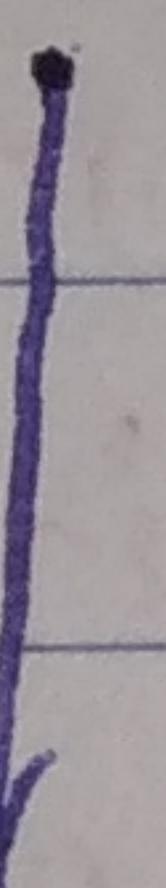
Plant Growth Regulators & differentiation →

Indirect organogenesis can be written in simple forms like -

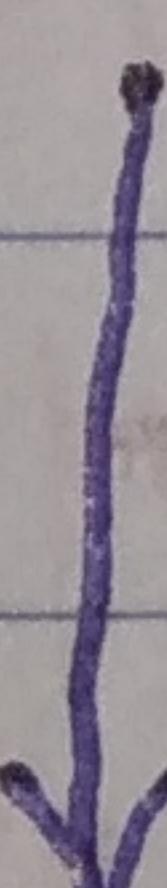
**Explant**



**Callus**



**Meristemoid**



**Primordium**

Skoog & Miller have much contribution to understand the mechanism of regeneration of whole plant or part of plant from cell. They observed that direction of differentiation could be influenced by the ratio of exogenously supplied auxin & cytokinin & found that -

→ A ↑ Ratio of auxin to cytokinin leads to initiation of Root.  
While low ratio of auxin to cytokinin leads to initiation of shoots  
In Tobacco stem pith culture.

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W  
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D  
7th Week • 044-321Direct organogenesis -The role of Growth Regulators

It is simply explained as Direct Root / Shoot formation from the explant.

Direct organogenesis is a process which bypasses the need for a callus phase. for ex - formation of somatic embryos through direct embryogenesis proceed from cells which were already embryogenically competent while they were part of the original, differentiated tissue.

The formation of these pre-embryogenic cell favored only in certain condition like wounding or application of Exogenous Growth

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regulators which allows the process of cell division & expression of embryogenesis and are tend to be more responsive than the pre-embryonic cells derived from indirect organogenesis and direct organogenesis don't require the auxin 'push' to initiate division. However, cytokinin play an important role in switching between shoot development & embryogenesis.