RAMA UNIVERSITY

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Course: B. Tech Biotechnology
Sub Code: BBT-515

Semester: 5th
Sub Name: Plant Biotechnology

LECTURE 3

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2. Multiplication by adventitious shoots

- The stem and leaf structures that are naturally formed on plant tissues located in sites other than the normal leaf axil regions are regarded as adventitious shoots.
- There are many adventitious shoots which include stems, bulbs, tubers and rhizomes.
- The adventitious shoots are useful for in vivo and in vitro clonal propagation.
- The meristematic regions of adventitious shoots can be induced in a suitable medium to regenerate to plants.

3. ORGANOGENESIS

Definition:

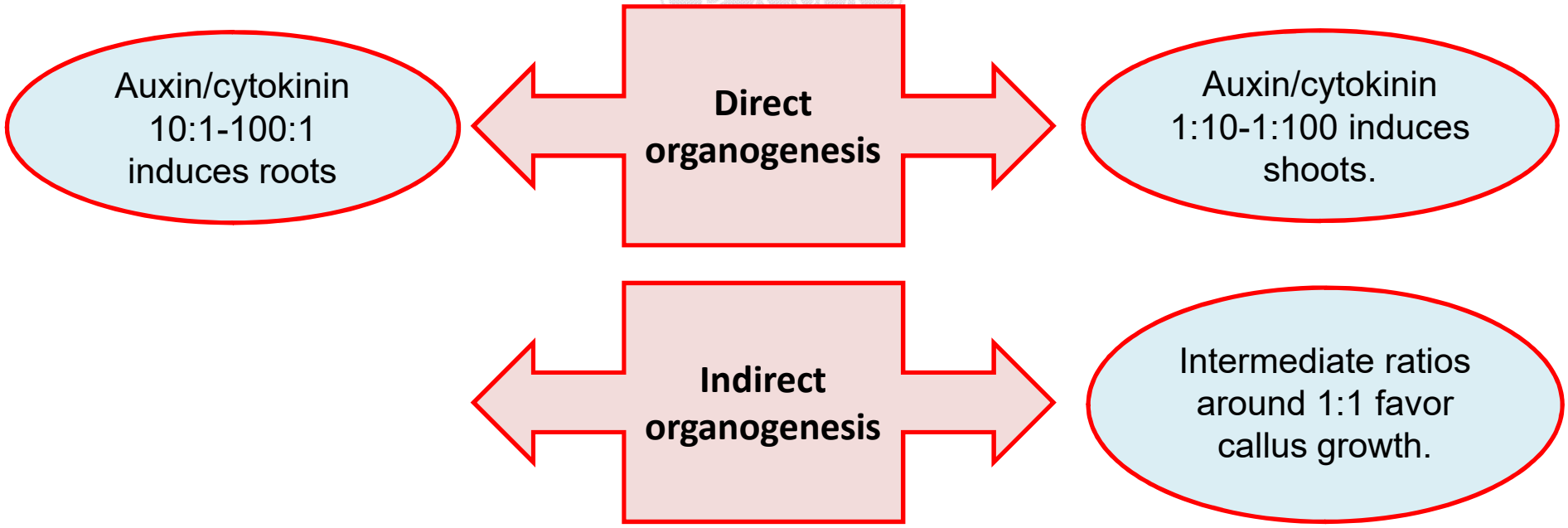
"The formation of roots, shoots or flower buds from the cells in culture in manner similar to adventitious root or shoot formation in cuttings is called organogenesis"

- ✓ Organogenesis starts in the callus in response to the stimulation given by the chemicals in the medium.
- ✓ Organogenesis takes place in two stages, namely caulogenesis or shoot initiation and rhizogenesis or root initiation.
- ✓ Both types of organogenesis are controlled by the hormones present in the medium. generally a high auxin:cytokinin ratio induce shoot formation.
- ✓ Organogenesis starts with the development of a group of meristematic cells called meristemoids, which initiate the formation of a primordium.
- ✓ Depending on the factors within the system, this primordium develops into shoot, root or embryoid.

Two types of organogenesis

1. Direct organogenesis
2. Indirect organogenesis

This two types depend on hormonal combination of the culture media.



Direct organogenesis

- In many plants, subculturing of callus results in undesired variations of clones (somaclonal variations).
- To avoid this, direct regeneration of the explants into plantlets can be tried.
- This has been achieved in many plant species by altering the hormonal combination of the culture media.

Direct organogenesis from different explants.

a) Shoot induction from shoot tip explant on a medium,

b) Shoot induction from hypocotyls explant on a medium,

c) Shoot induction from cotyledon explant on a medium,

d) Regenerated shoot showing rhizogenesis and

e) Hardened plantlet regenerated from different explants

https://www.researchgate.net/publication/267630716_Influence_of_different_cytokinins_on_direct_shoot_regeneration_from_the_different_explants_of_Carthamus_tinctorius_L_Var_Annigeri-2_A_high_oil-yielding_variety/figures?lo=1

QUIZ