RAMA UNIVERSITY

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FACULTY OF ENGINEERING & TECHNOLOGY

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

Semester: 5th
Sub Name: Plant Biotechnology

LECTURE 4

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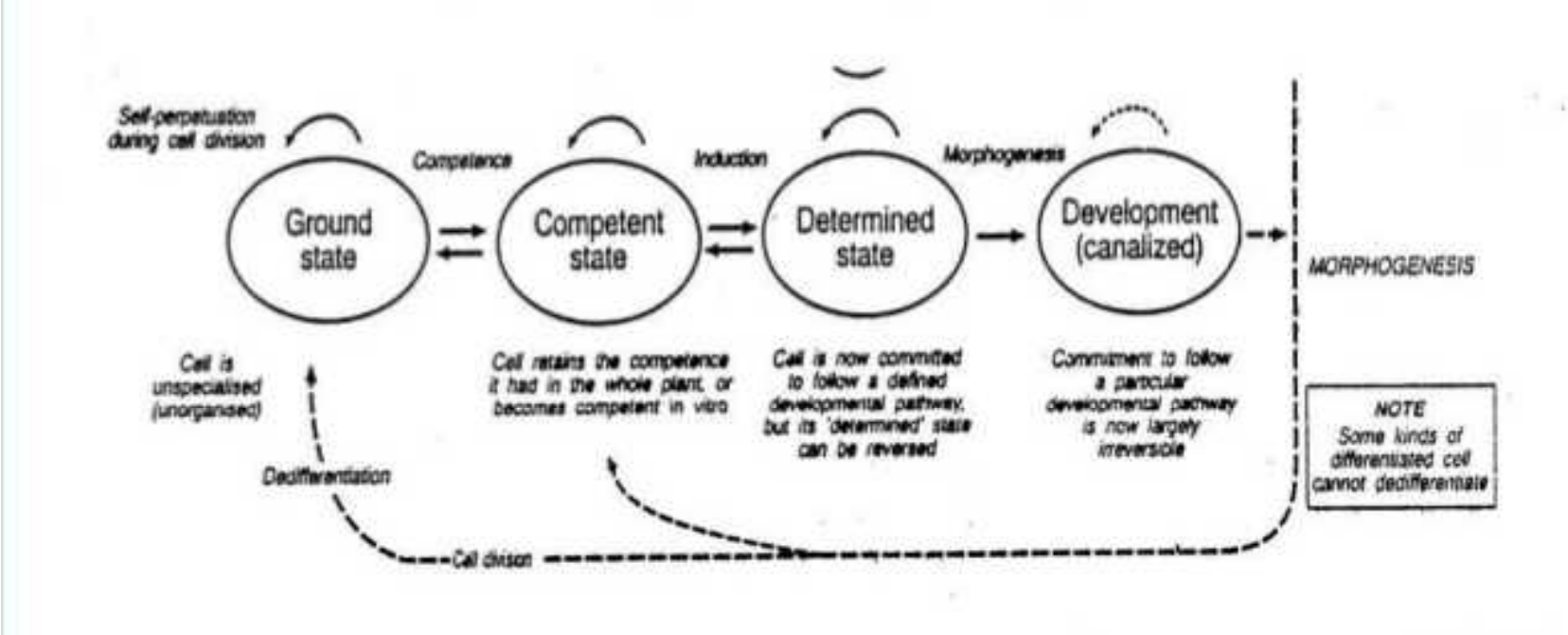
COMPETENCY

- Competency means the ability to do something successfully or efficiently.
- In other words, it describes the endogenous potential of a given cell or tissues to develop in a particular way.
- For example, as embryogenically competent cells are capable of developing into fully functional embryos. The opposite is non-competent or morphogenetically incapable.

Diagrammatic Example of Cellular Stage



Progressive steps in the capacity of a cell to become differentiated and/or morphogenic

https://www.slideshare.net/AshokMourya1/plant-tissue-culture-66802585

Determinism

Ability of a cell to respond to the stimulus that initiates a developmental process leading to morphogenesis.

Explant

- An excised piece of differentiated tissue or organ is regraded as explant.
- The explant may be taken from any part of the plant body e.g., leaf, stem, root etc.
- Plant tissue cultures are generally initiated from multicellular tissue fragments, called explants, obtained from living plants. Explants may originate from a wide range of plant tissues, such as… leaf, stem, root, petiole, hypocotyl, cotyledon, embryo, or meristem

Inoculum

Engineering Fundamentals of Biotechnology

S. Sood, ... A. Kumar, in Comprehensive Biotechnology (Second Edition), 2011

Abstract

Inoculum preparation involves obtaining the organisms in an optimal state that is compatible with inoculation into cell culture, tissue culture, media, and fermentors. The prime objective is usually to achieve a high level of viable biomass in a suitable physiological state for use as an inoculum. This has application in industrial microbiology for obtaining products such as antimicrobials, enzymes, beverages, drugs, toxins, vitamins, amino acids, organic acids, solvents, food products, and recombinant proteins. A proper inoculum must be at active growth stage and size, free from contamination, and have product-forming ability. Adequate culture and production medium are essential for providing the right environment for inoculum. Inoculum quality is further enhanced by strain improvement and cell immobilization technology. In the preparation process, biomass is monitored, which involves sensors, exhaust gas analysis, and mass spectrophotometers. Inoculum standardization has a bearing on medical and research microbiology also. Antibiotic susceptibility methods, as standardized by Clinical Laboratory Standards Institute (CLSI), involve the preparation of pure culture of a single type of organism at specific cell density, which constitutes the inoculum. McFarland standard, used since decades, and other recently launched automated systems are required to define the density of

Acclimatization

- **Acclimatization** or **acclimatisation** (also called **acclimation** or acclimatation) is the process in which an individual organism adjusts to a change in its environment (such as a change in altitude, temperature, humidity, photoperiod, or pH), allowing it to maintain performance across a range of environmental conditions.
- This is the final stage of micropropagation. Once plantlets are well rooted, they must be acclimatized to the normal greenhouse environment.

- The plants regenerated via organogenesis or embryogenesis need to be acclimatized before their transfer to pots.

- The plants are washed gently to remove the culture media and planted in plastic pots containing soil-rite (material consists of coconut shells and other organic material).

- The pots are covered with polythene bags and maintained in the laboratory at room temperature for 1-2 weeks.

- When plants appear strong and healthy the bag is removed and transferred to a regular pot containing a mixture of soil and manure.

Acclimatized plants

In culture conditions

In green house conditions

Hardened plants

https://slideplayer.com/slide/10808714/

QUIZ