RIZVI COLLEGE
OF ARTS, SCIENCE AND COMMERCE

XII SCIENCE (SYJC)

REPRODUCTION IN LOWER AND HIGHER PLANTS

PART 1 : ASEXUAL REPRODUCTION

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DEPARTMENT OF BIOLOGY

REPRODUCTION

- Reproduction is the production of young ones like parents.
- Reproduction is an essential process as it leads to continuation of species as well as to maintain the continuity of life.
- Each organism has its own particular method of reproduction.
- All these methods generally fall into two categories :
- i. Asexual reproduction
- ii. Sexual reproduction.

ASEXUAL REPRODUCTION

- Asexual reproduction does not involve fusion of two compatible gametes or sex cells.
- It is the process resulting in the production of genetically identical progeny from a single organism and inherits the genes of the parent.
- Such morphologically and genetically identical individuals are called clones.

ASEXUAL REPRODUCTION

- Organisms choose to reproduce asexually by different modes or ways:
- 1 - FRAGMENTATION
- 2 - BUDDING
- 3 - SPORE FORMATION
- 4 - BINARY FISSION
- 5 - CONIDIA FORMATION
- 6 - GEMMULES FORMATION

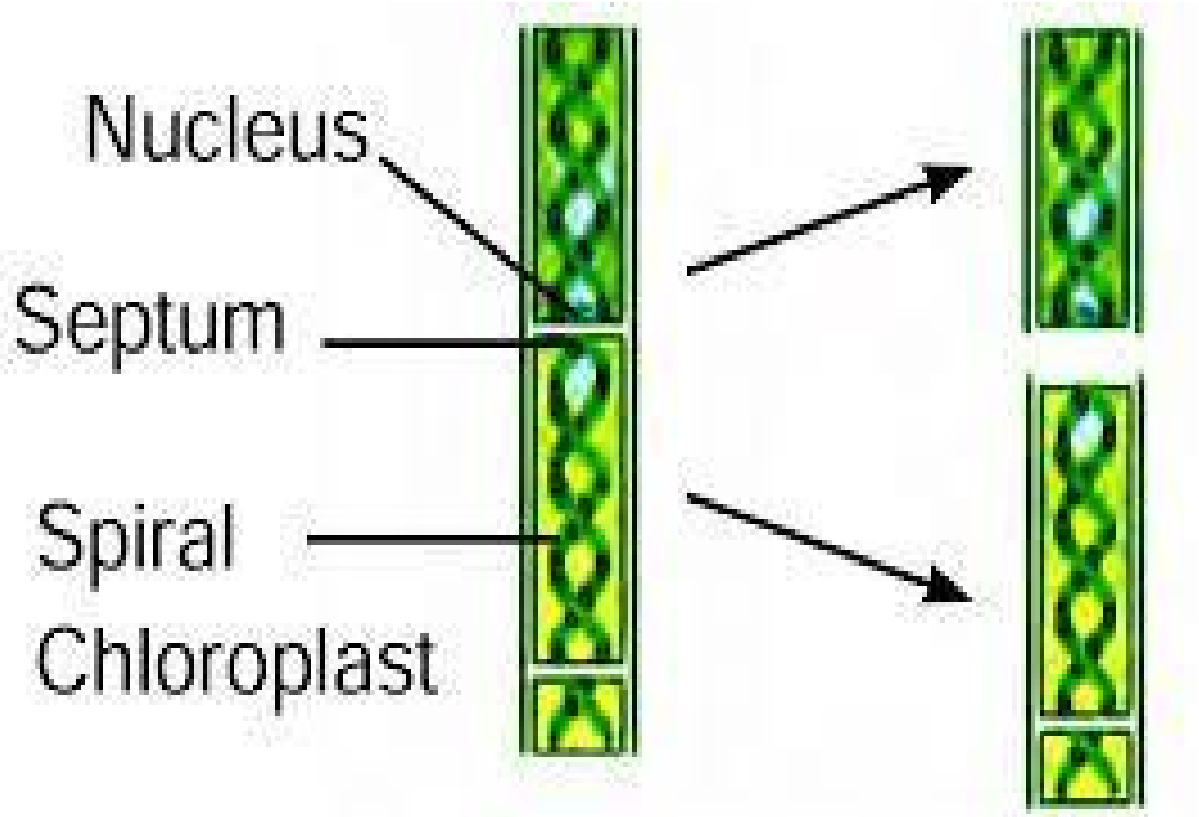
ASEXUAL REPRODUCTION

Fragmentation :

- Multicellular organisms can break into fragments due to one or the other reasons. e.g. *Spirogyra*.
- These fragments grow into new individuals.

ASEXUAL REPRODUCTION

Fragmentation :



Fragmentation in spirogyra

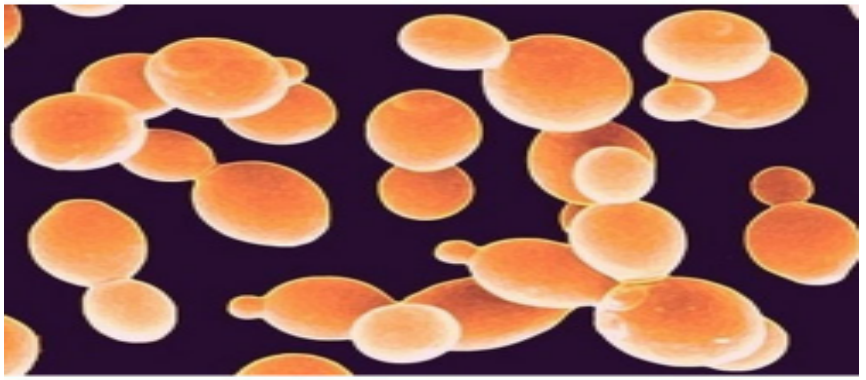
ASEXUAL REPRODUCTION

Budding :

- It is the most common method of asexual reproduction in unicellular *Yeast (Saccharomyces cerevisiae)*
- Usually it takes place during favourable conditions by producing one or more outgrowths (buds).
- These buds on seperation develop into new individual.

ASEXUAL REPRODUCTION

Budding :



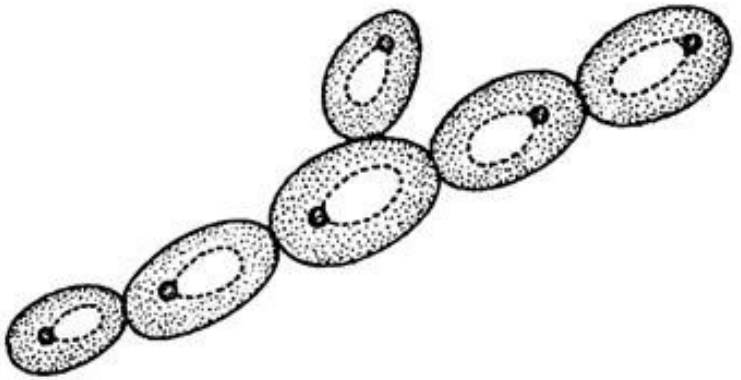


Fig. 4.38 : Pseudomycelium of *S. cerevisiae*

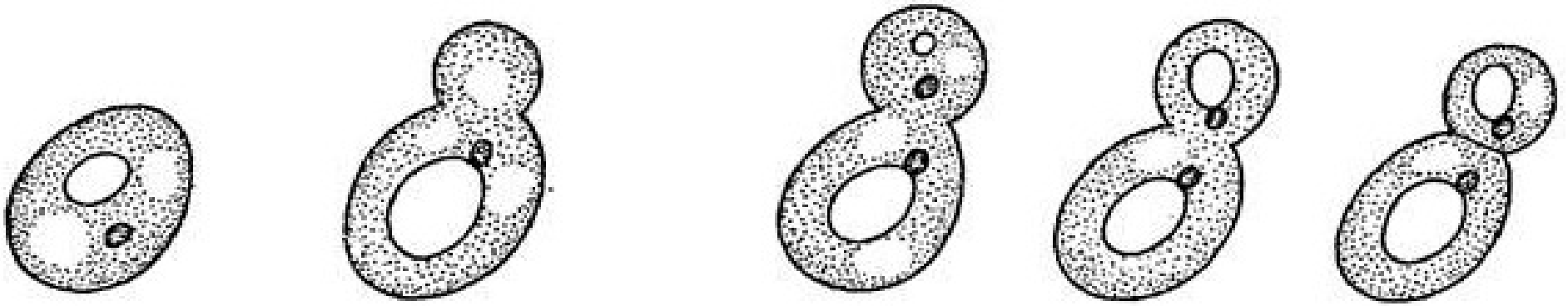


Fig. 4.37 : *Saccharomyces cerevisiae* : A-D. Stages of budding

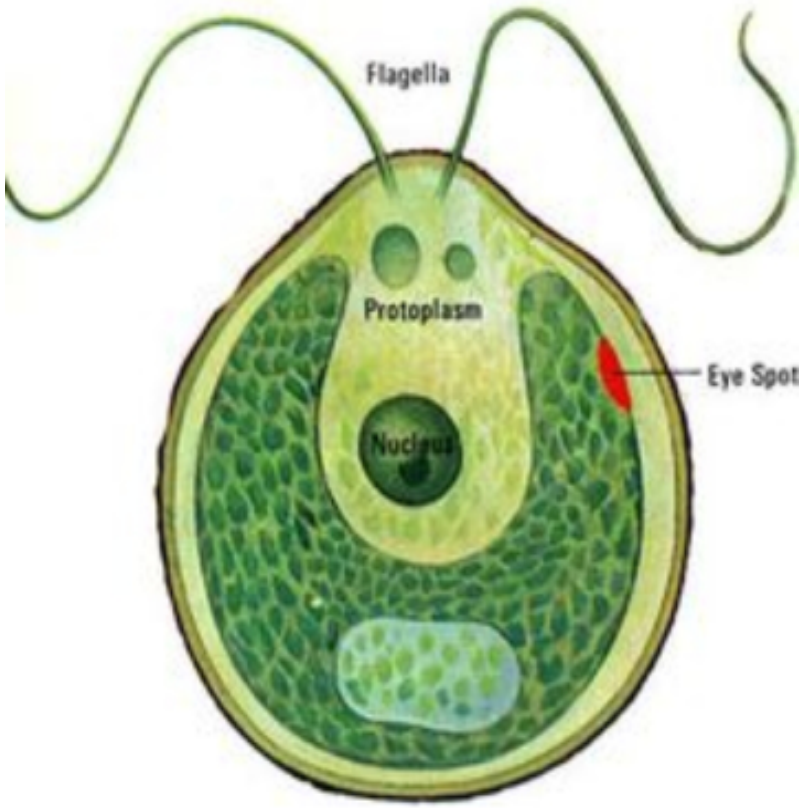
ASEXUAL REPRODUCTION

Spore formation :

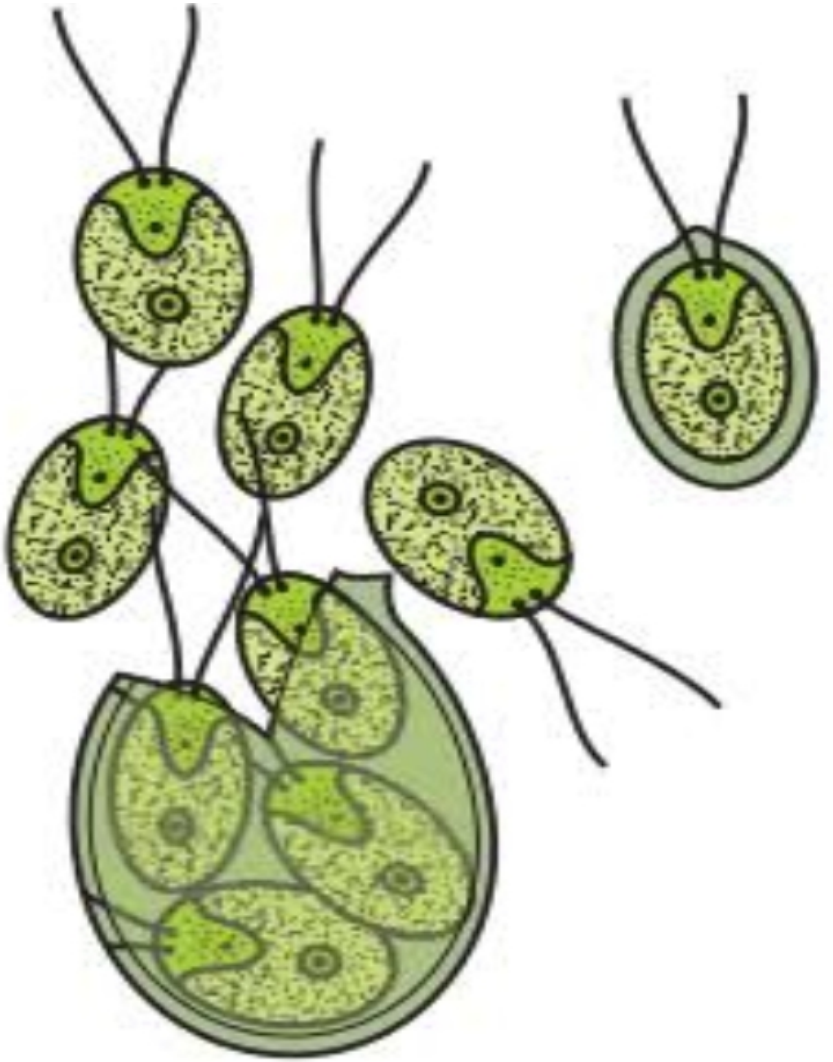
- In *Chlamydomonas* asexual reproduction occurs by flagellated, motile zoospores which can grow independently into new individuals.

ASEXUAL REPRODUCTION

Spore formation :



chlamydomonas



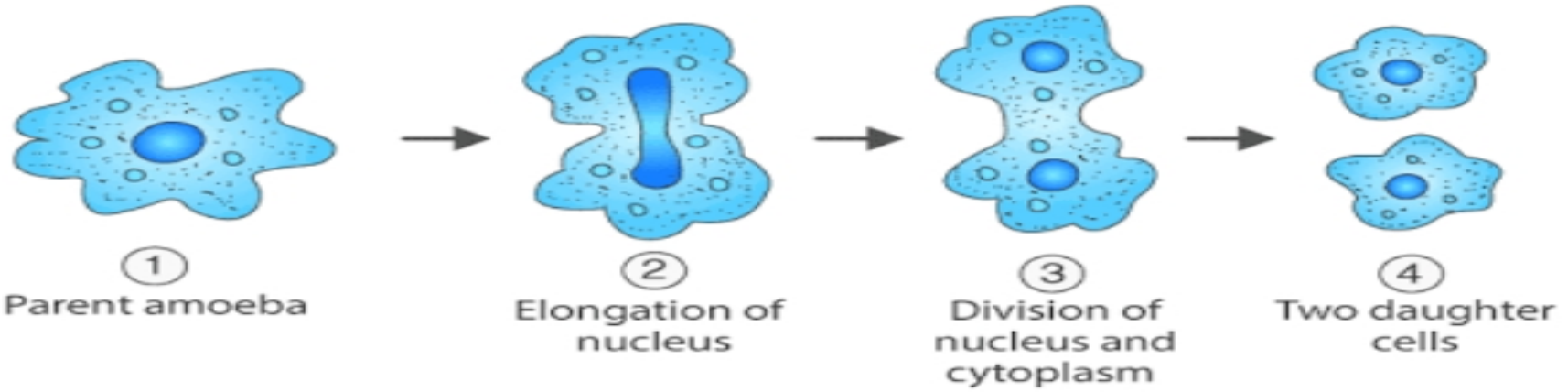
ASEXUAL REPRODUCTION

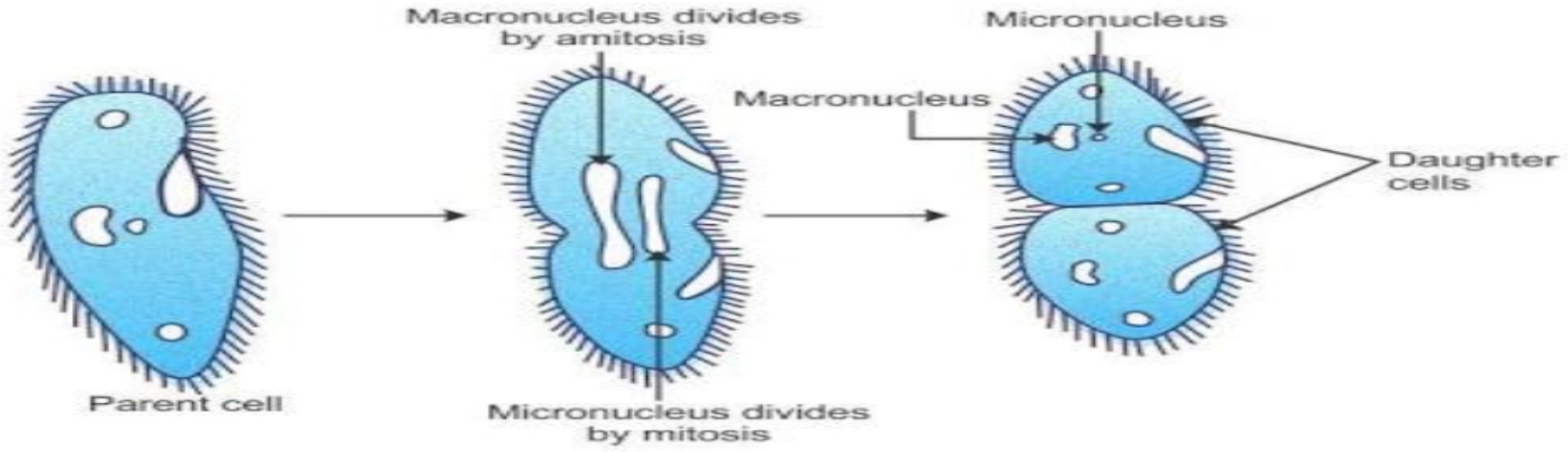
Binary Fission :

- In *Amoeba*, *Paramoecium*, etc. asexual reproduction occurs by dividing the unicellular single body into two new individuals.

ASEXUAL REPRODUCTION

Binary Fission :

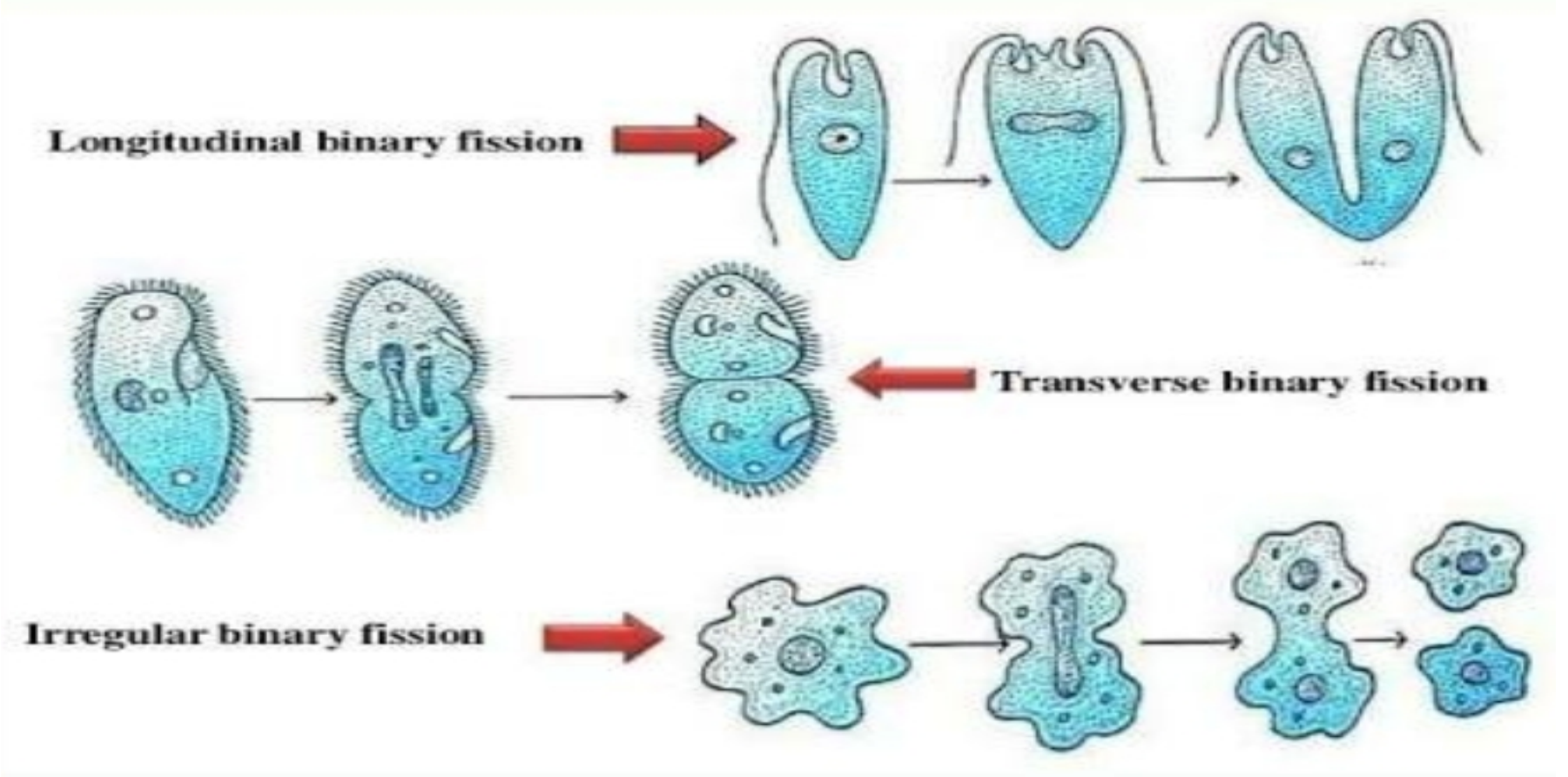




Transverse Binary Fission in *Paramoecium*

ASEXUAL REPRODUCTION

Binary Fission :



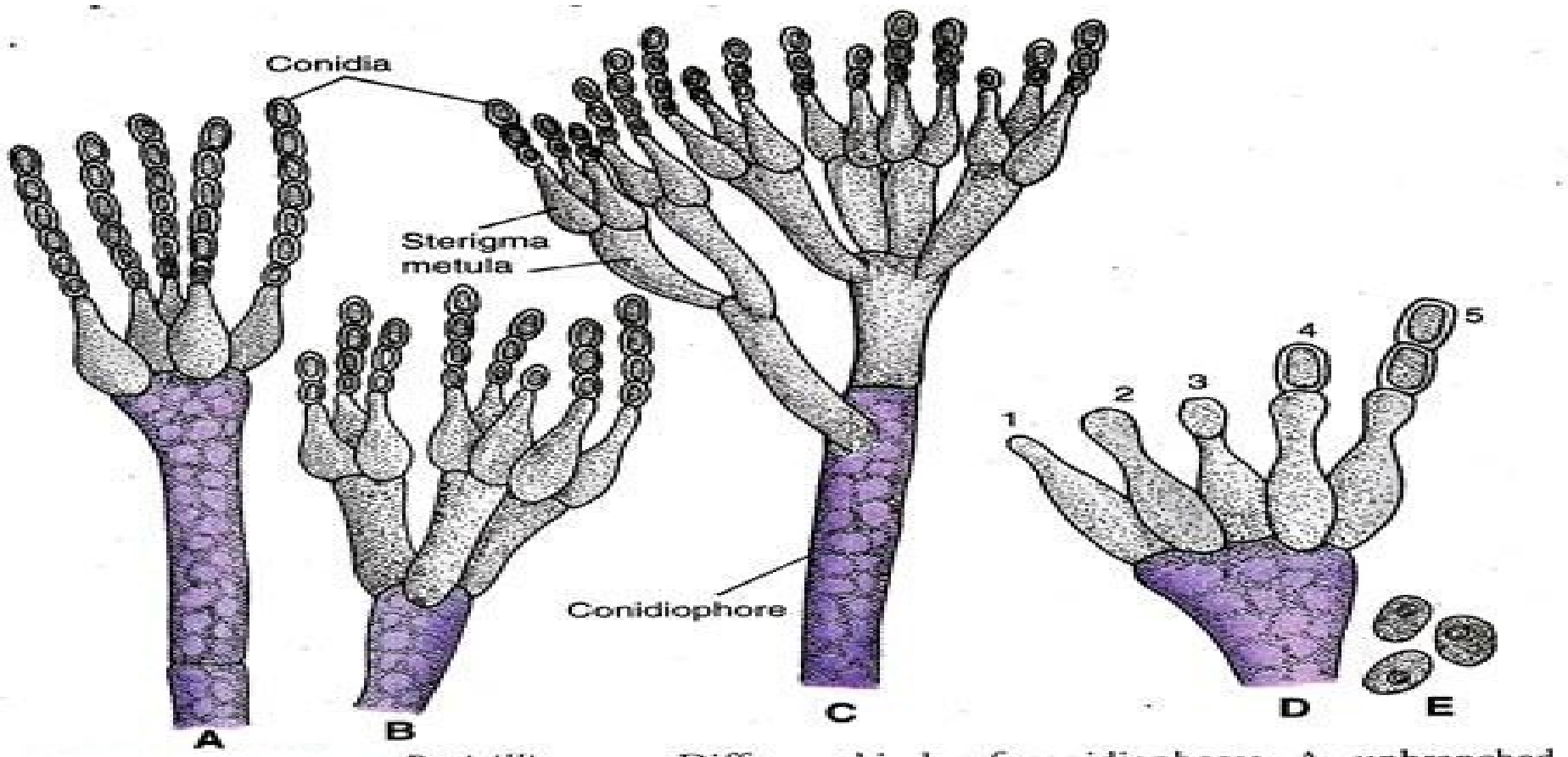
ASEXUAL REPRODUCTION

Conidia formation :

- A chain of non motile spores in fungi is known as conidia.
- *Penicillium*, *Aspergillus*, etc. reproduce by conidia.

ASEXUAL REPRODUCTION

Conidia formation :



Penicillium sp. Different kinds of conidiophores. A, unbranched conidiophore; B–C, branched conidiophores; D_{1-5}, stages showing abstriction of conidia; E, mature conidia.

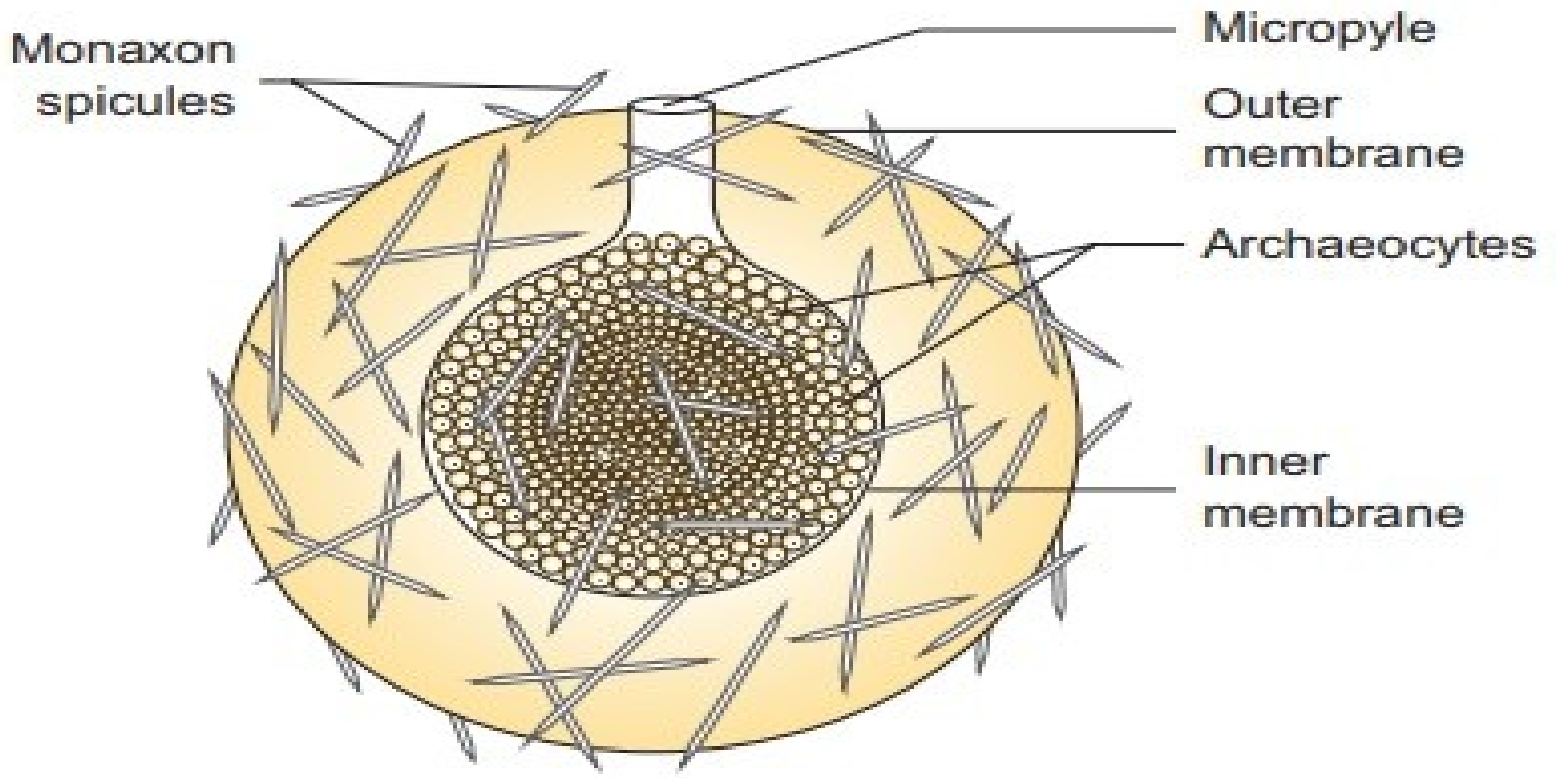
ASEXUAL REPRODUCTION

Gemmules formation :

- Gemmules are internal buds found in sponges and are involved in asexual reproduction. It is an asexually reproduced mass of cells, that is capable of developing into a new organism i.e., an adult *sponge*.

ASEXUAL REPRODUCTION

Gemmules formation :



Gemmule in sponges

ASEXUAL REPRODUCTION

Vegetative Reproduction :

- Plants reproduce asexually through their vegetative parts.
- Hence, the new plants formed are genetically identical to their parents.
- There are also few methods which would not occur naturally in the plants.
- Agriculture and horticulture exploit vegetative reproduction in order to multiply fresh stocks of plants.

ASEXUAL REPRODUCTION

Artificial methods are used to propagate desired varieties according to human requirements.

Vegetative Reproduction :

- The various methods are as follows :
- 1 - Cutting
- 2 - Grafting
- 3 - Tissue Culture

ASEXUAL REPRODUCTION

Vegetative Reproduction :

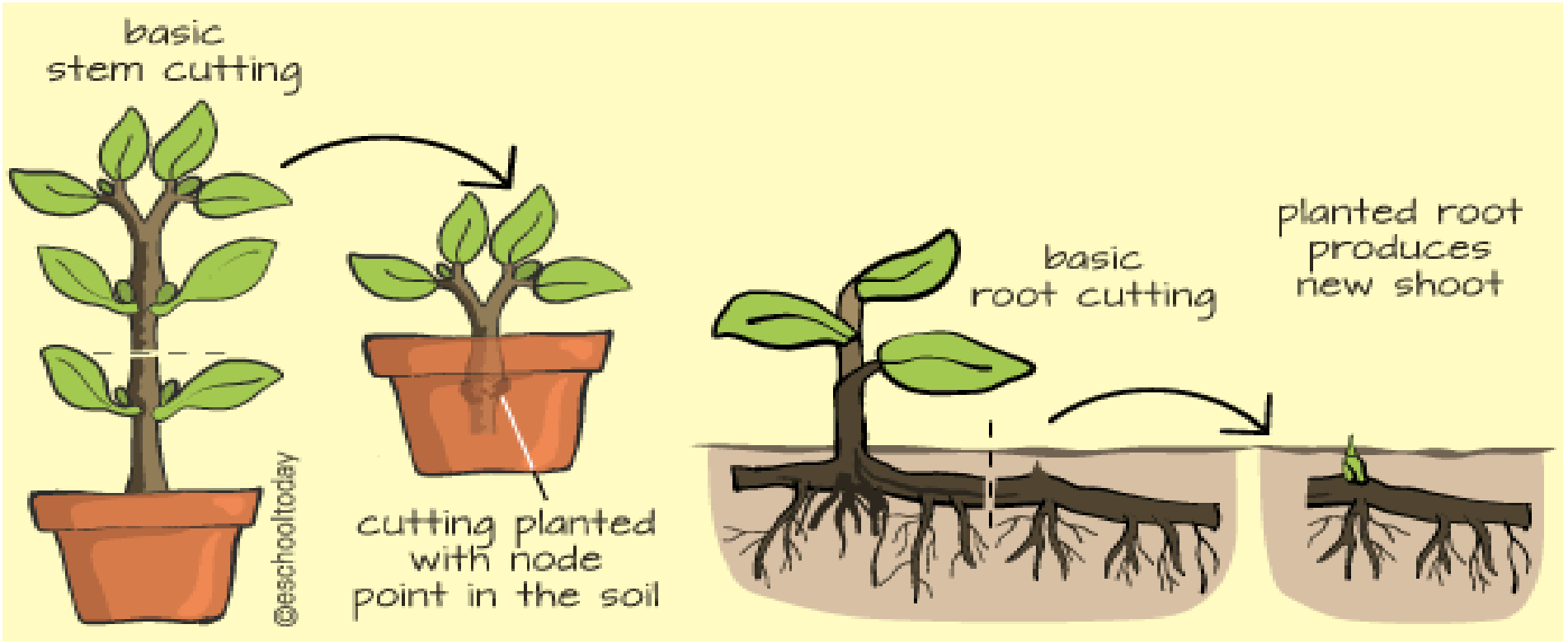
Cutting :

- The small piece of any vegetative part of a plant having one or more buds is used for propagation viz.
- Stem cutting - e.g. *Rose*, Bougainvillea;
- leaf cutting - e.g. *Sansvieria*;
- root cutting e.g. *Blackberry.*

ASEXUAL REPRODUCTION

Vegetative Reproduction :

Cutting :



ASEXUAL REPRODUCTION

Vegetative Reproduction :

Cutting :

ASEXUAL REPRODUCTION

Vegetative Reproduction :

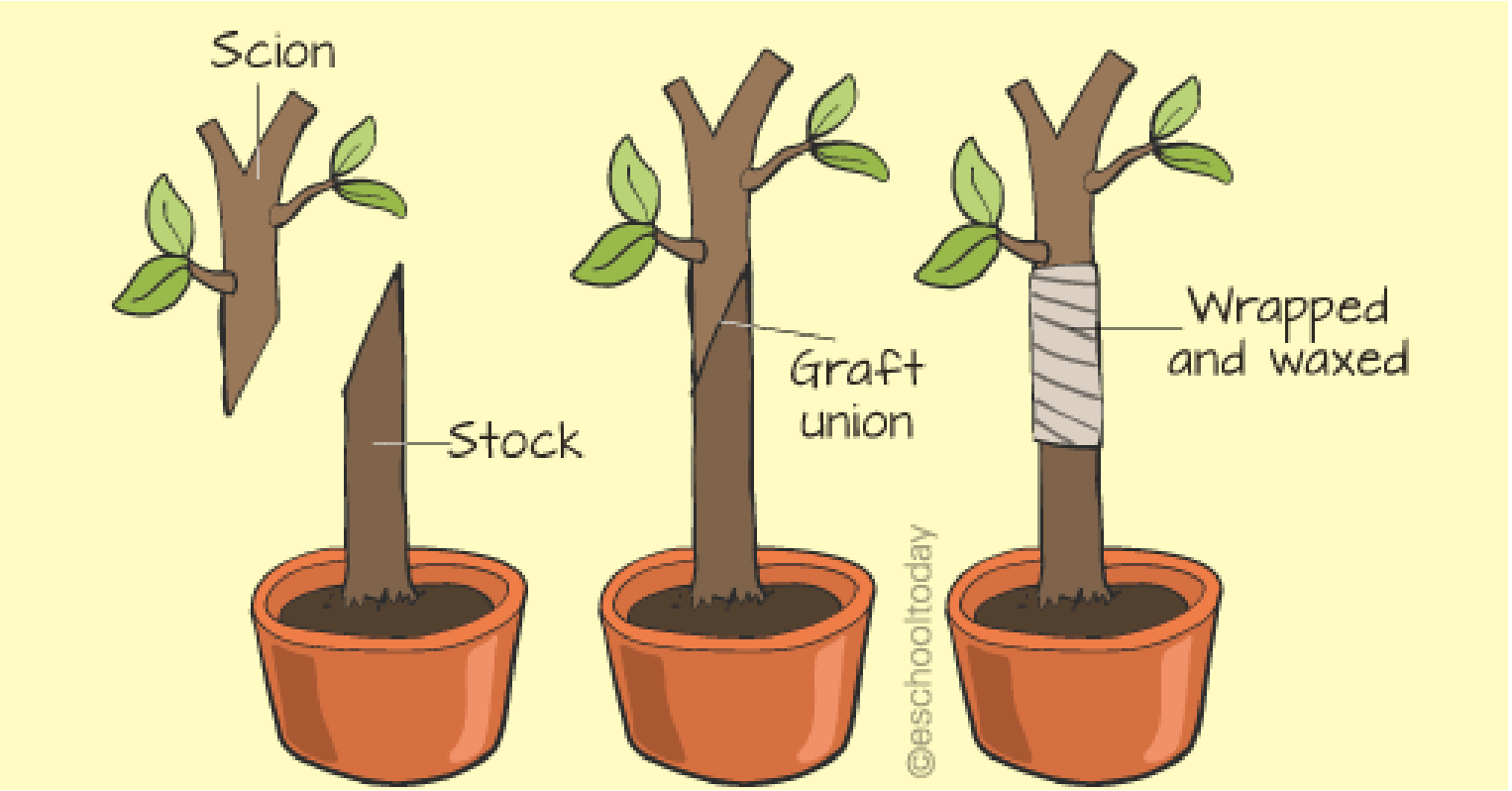
Grafting :

- Here parts of two plants are joined in such a way that they grow as one plant.
- In this method, part of the stem containing more than one bud (Scion) is joined onto a rooted plant called stock, is called grafting.
- Whereas budding is also called bud grafting in which only one bud is joined on the stock,
- e.g. *Apple, Pear, Rose,* etc.

ASEXUAL REPRODUCTION

Vegetative Reproduction :

Grafting :



ASEXUAL REPRODUCTION

Vegetative Reproduction :

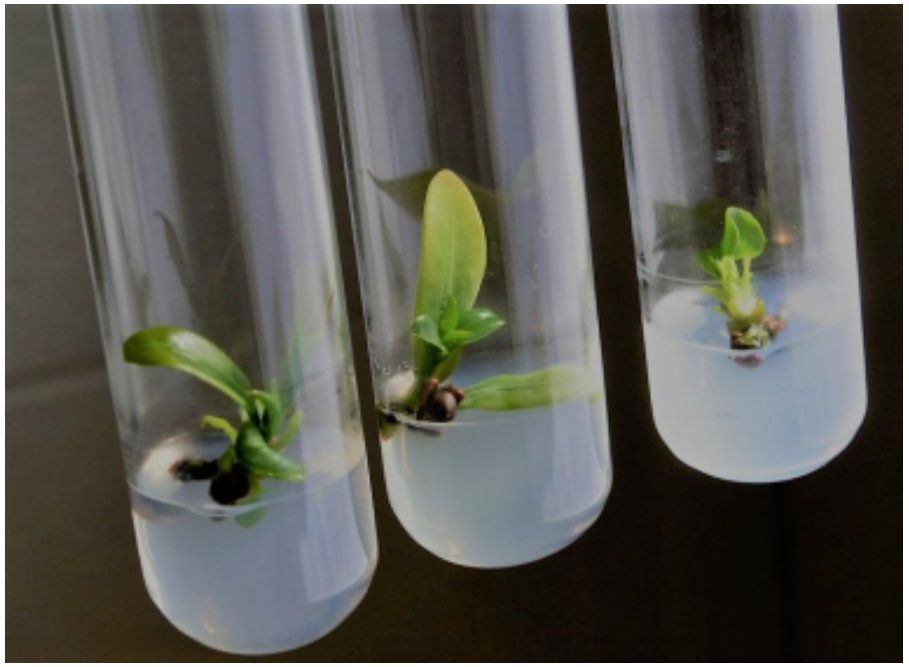
Tissue culture :

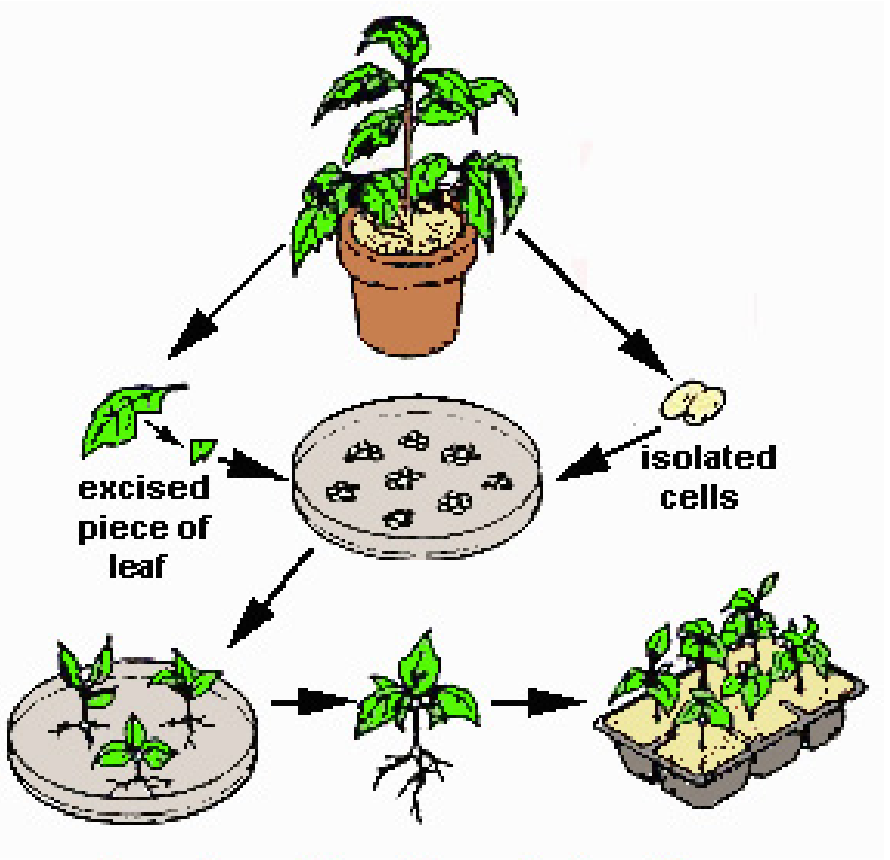
- It is a method by which a small amount of plant tissue is carefully grown to give many plantlets.
- Micropropagation method is also used now a days.

ASEXUAL REPRODUCTION

Vegetative Reproduction :

Tissue culture :



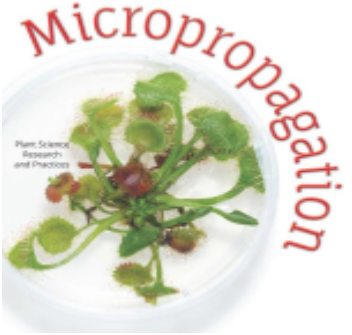


Overview of the Tissue Culture Process

ASEXUAL REPRODUCTION

Vegetative Reproduction :

Tissue culture :



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