REPRODUCTION IN ORGANISMS

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Biology in essence is the story of life on earth. While individual organisms die without fail, species continue to live through millions of years unless threatened by natural or anthropogenic extinction. Reproduction becomes a vital process without which species cannot survive for long. Each individual leaves its progeny by asexual or sexual means. Sexual mode of reproduction enables creation of new variants, so that survival advantage is increased.

Reproduction is a biological process wherein younger ones produced are identical to their parents. This phenomenon is significant in the continuity of the species, generation after generation. Typically, reproduction is observed in all living organisms, from single-celled entities such as amoeba to multicellular entities of the most advanced forms, such as human beings. Reproduction is carried out in two modes, depending upon the participation of one or both parents.

Necessity of Reproduction

Reproduction is vital to the process of continuity of species, and as a result, sustains a balance in the ecosystem amongst different biotic components precisely. Without reproduction, a life that is thriving now would cease. Reproduction also facilitates evolution due to variations arising from the process of reproduction through the intermingling of species (as seen in sexual reproduction).

Each and every organism can live only for a certain period of time. The period from birth to the natural death of an organism represents Its life span.

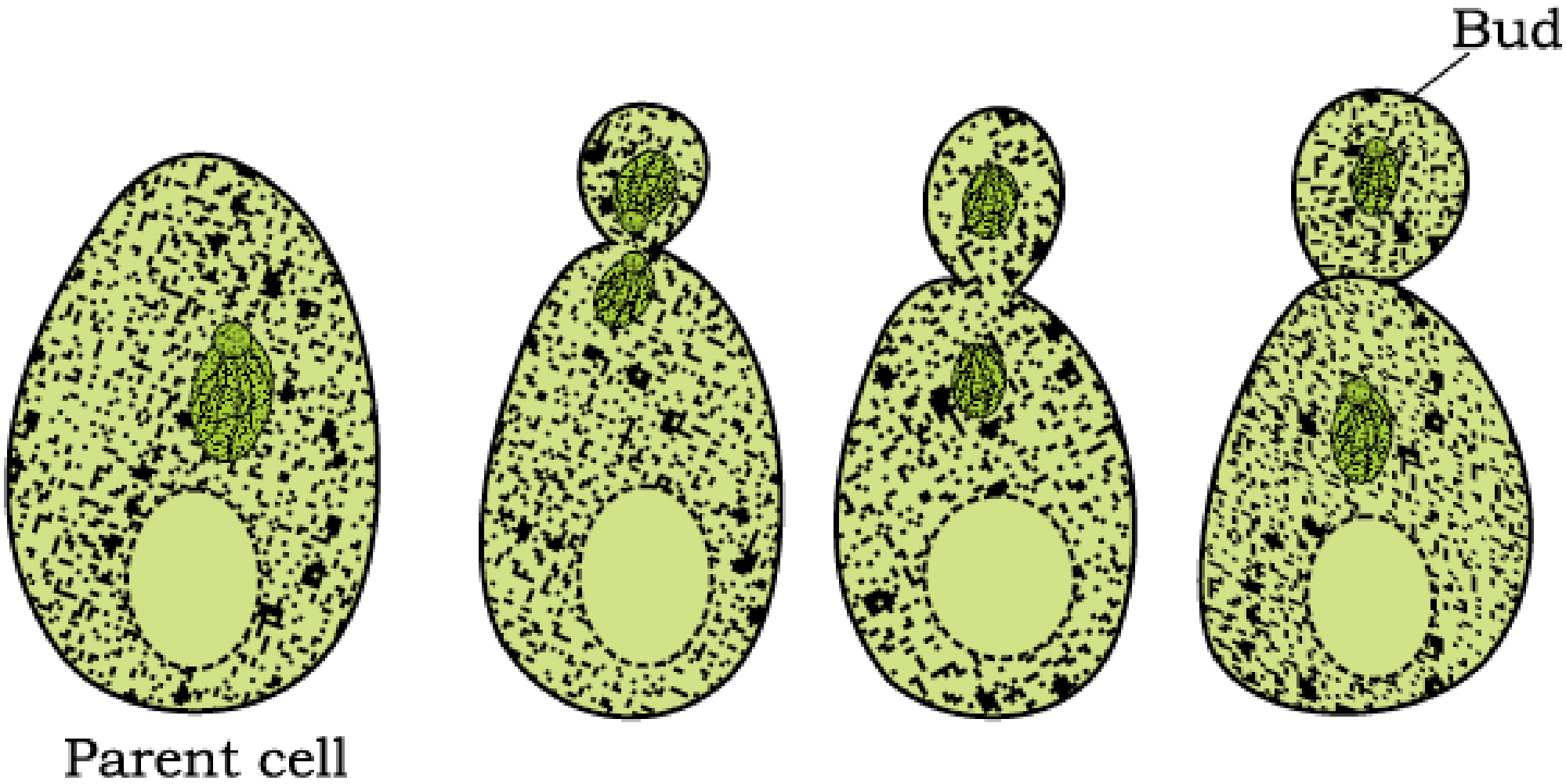
ORGANISMS	LIFE SPAN
ELEPHANT	60- 90 YEARS
HORSE	60 YEARS
DOG	20-30 YEARS
COW	20-25
CROW	15 YEARS
PARROT	140 YEARS
BUTTERFLY	1-2 WEEKS
CROCODILE	60 YEARS
TORTOISE	100-150 YEARS
BANANA TREE	25 YEARS
FRUIT FLY	2 WEEKS
RICE PLANT	3-4 MONTHS
ROSE	5-7
BANYAN TREE	200-300 YEARS

Reproduction is defined as a biological process in which an organism gives life to young ones (offspringJ similar to itself. The offspring grow and in turn produce new offspring. Thus, there is a cycle of birth, growth and death. Reproduction enables the continuity of the species, generation after generation.

There is a large diversity in the biological world and each organism has evolved its own mechanism to multiply and produce offspring. The organism habitat, its internal physiology and several other factors are collectively responsible for how it reproduces. Based on whether there is participation of one organism or two in the process of reproduction, it is of two types. When offspring is produced by a single parent with or without the involvement of gamete formation, the reproduction is asexual. When two parents (opposite sex) participate in the reproductive process and also involve fusion of male and female gametes, it is called sexual reproduction.

Asexual Reproduction

In this mode of reproduction, a new offspring is produced by the involvement or participation of single parents only. The produced offsprings are not only identical but are also the exact copies of their parent because, in this process, a single parent divides itself to reproduce its offspring.



Cell Division in Unicellular Organisms (Budding yeast)

Asexual reproduction is common among single-celled organisms, and in plants and animals With relatively simple organisms. In Protists and Monerans, the organism or the parent cell divides into two to give rise to new individuals

In these organisms cell division is itself a mode of reproduction. Many single-celled organisms reproduce by binary fission, where a cell divides into two halves and each rapidly grows into an adult (e.g. , Amoeba, Paramecium). In yeast. the division is unequal and small buds are produced that remain attached initially to the parent cell which, eventually gets separated and mature into new yeast organisms [cells).

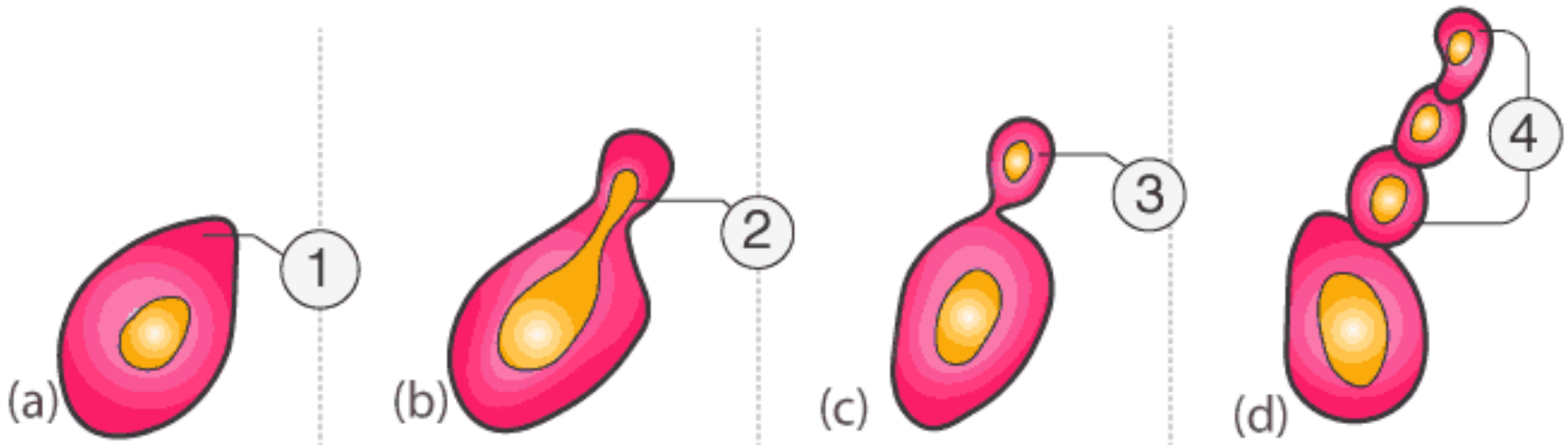
Members of the Kingdom Fungi and simple plants such as algae reproduce through special asexual reproductive structures. The most common of these structures are zoospores that usually are microscopic motile structures. Other common asexual reproductive structures are conidia (PenidUtum), buds (Hydra) and gemmules (sponge).

While in animals and other Simple organisms the term asexual is used unambiguously. in plants. the term vegetative reproduction is frequently used. In plants. The units of vegetative propagatlon such as runner,Rhizome,Offset, bulb are all capable of giving rise to new offspring. These structures are called vegetative propagules. Obviously. since the formation of these structures does not involve two parents.this process is called is asexual.

The different types of asexual reproduction are as follows.

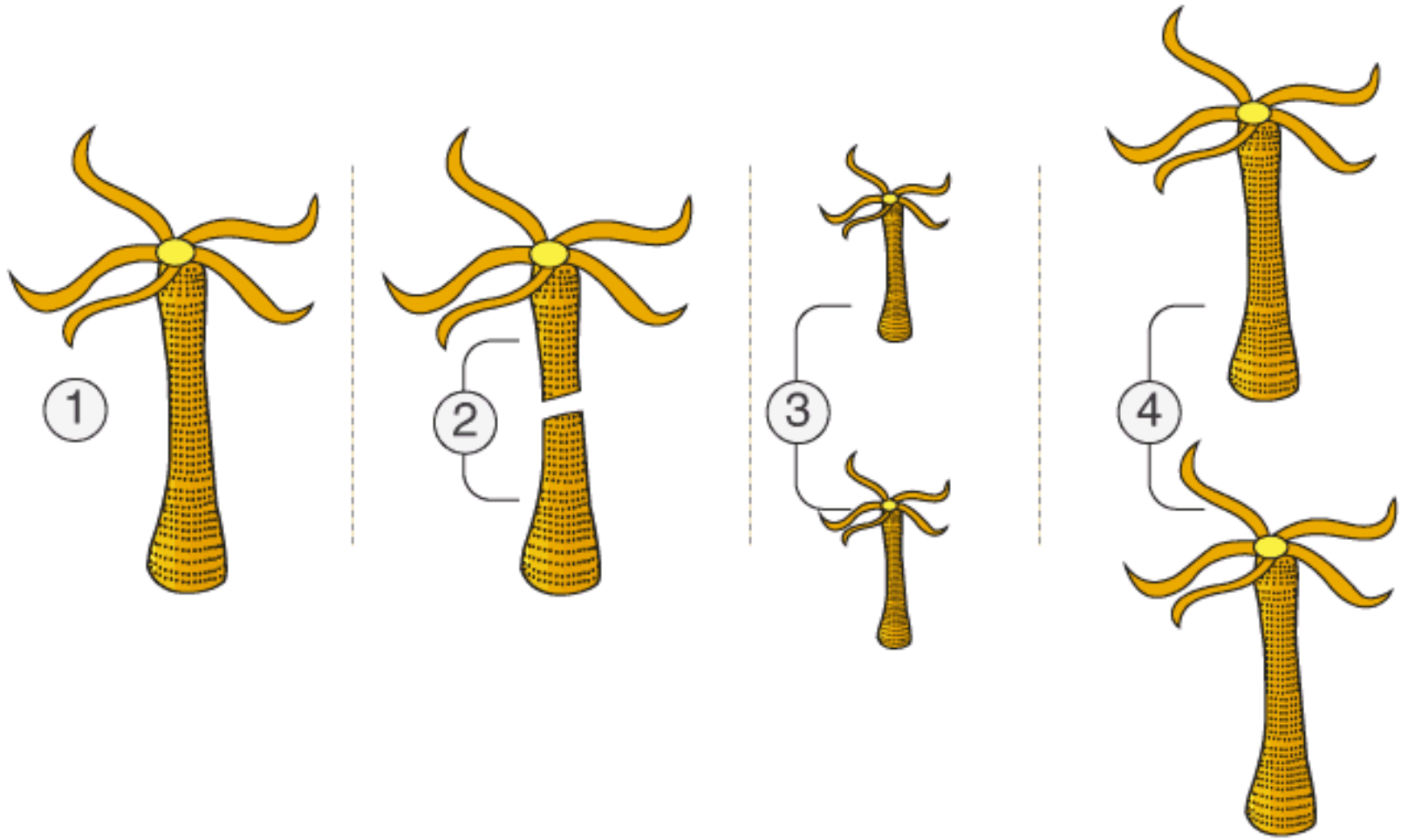
- Budding
- Fragmentation
- Binary fission
- Vegetative propagation

ASEXUAL REPRODUCTION - BUDDING



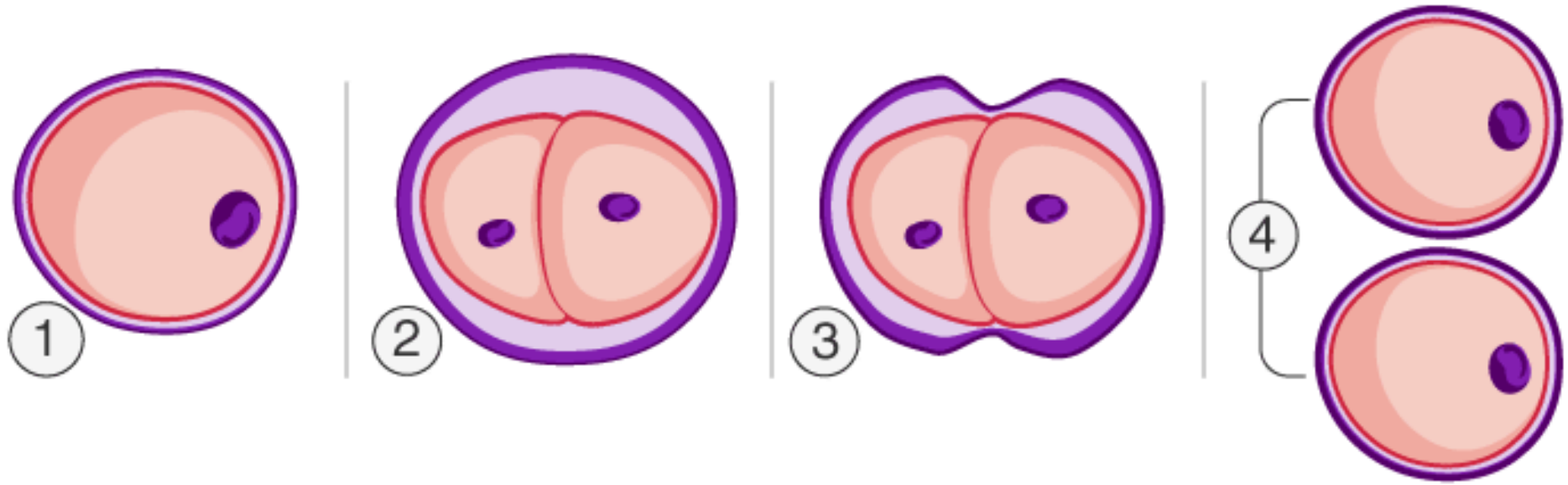
1 Yeast Cell | 2 Developing Bud | 3 New Bud | 4 Chain of buds

ASEXUAL REPRODUCTION - FRAGMENTATION



1 Adult Hydra | 2 Amputation | 3 Regeneration of Tiny Hydra | 4 Growth

BINARY FISSION



1 Parent cell | 2 DNA Duplicates | 3 Cytoplasm divides | 4 Two daughter cells

Examples of asexually reproducing organisms:

Asexual reproduction is common among:

1. Single-celled organisms, such as amoeba, bacteria, hydras, yeast cells, etc. Amoeba and bacteria reproduce by binary fission; hydras and yeast cells reproduce by budding.
2. A few plant species, including ginger, potatoes, sugarcane, agave, bryophyllum, etc., reproduce through vegetative propagation.
3. A few animal species, including starfish, black worms, etc., reproduce using fragmentation.

Advantages of Asexual Reproduction:

- It is carried out by a single individual, hence does not require finding a mate
- The process is faster compared to sexual reproduction
- Less energy is invested comparatively
- The whole process is less complicated as it involves only a single individual
- Can take place in varied environments

Sexual Reproduction

In this mode of reproduction, a new offspring is produced by the participation of two parents of the opposite sex. This type of reproduction is seen in all multicellular organisms, including birds, reptiles, dogs, cats, cattle, elephants, etc. The complete process of sexual reproduction consists of a set of events, including:

- Pre-fertilization
- Fertilization
- Post-fertilization

Advantages of Sexual Reproduction:

- The involvement of two parents results in the intermingling of genes resulting in the production of a new offspring.
- Genetically identical offspring are produced.
- Variations in species increase the chances of survival, hence the evolutionary advancements.

Thank You

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