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DEPARTMENT: MEDICINE AND SURGERY

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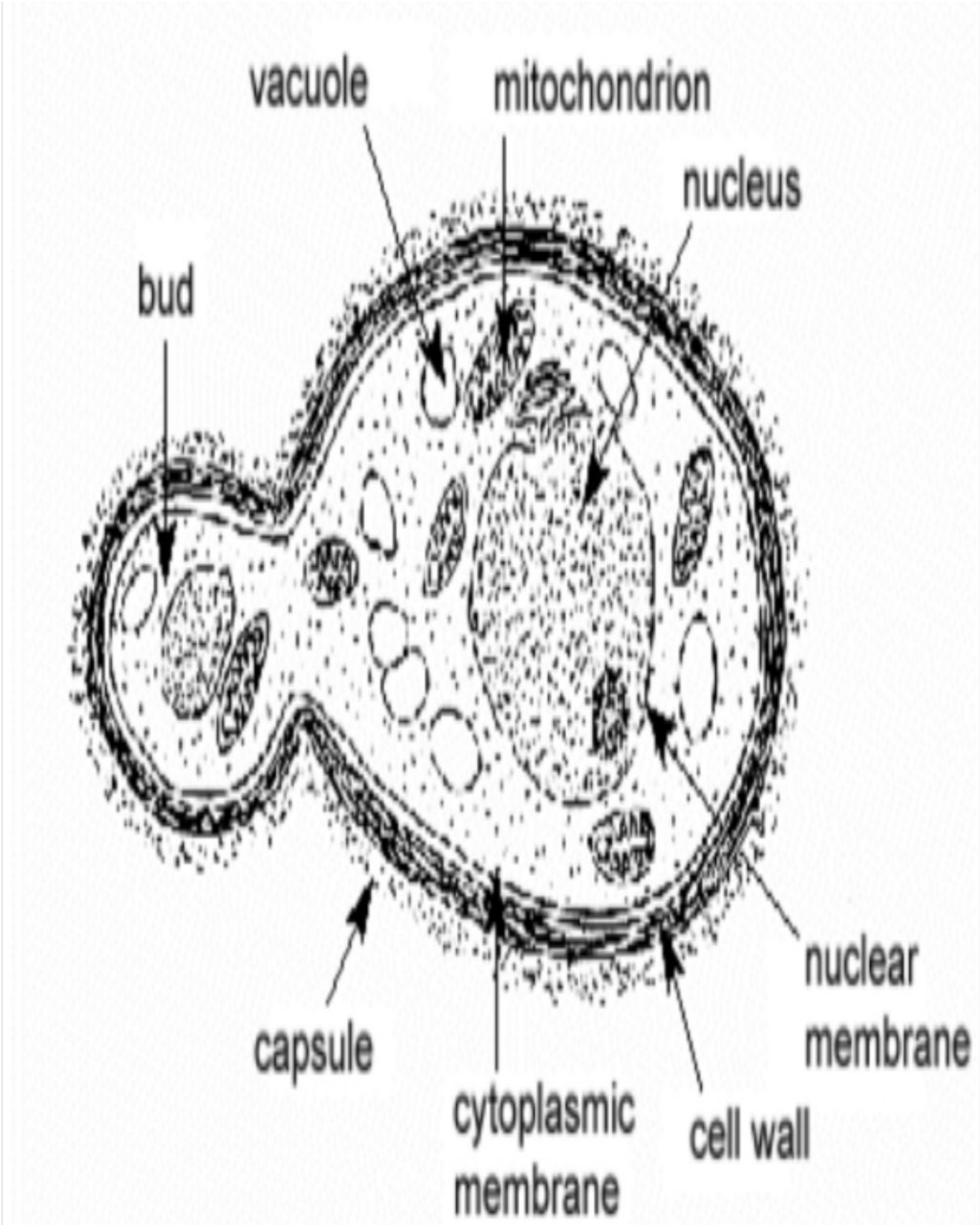
LEVEL: 100

Assignment

1. How are fungi important to man?

- Fungi are very important to the entire terrestrial ecosystem in material cycling and to man.
- Fungi are responsible for the mediation of decay of organic matter.
- Fungi e.g. yeast (Saccharomyces cerevisiae) are important in food industry while mushrooms are eaten by many human societies.
- Species e.g. Penicillium notatum produce important antibiotics.
- Many fungi species mediate the spoilage of wood, food, clothes and paper.
- Many are plants pathogens causing blight and smuts in cereals (Helminthosporium maydis and Ustilago zeac respiration).
- Some fungi are parasites to some certain horrible obnoxious (offensive, unbearable) pests e.g. house flies, grasshoppers and therefore constitute important biological control agents in regard to such pests.
- Medical and veterinary mycology deals with fungal diseases and infections in human beings and animals. Skin diseases e.g. ringworm and dermatitis are caused by fungal agents.


vacuole
mitochondrion
nucleus
bud
capsule
cytoplasmic membrane
cell wall
nuclear membrane

2. Illustrate the cell structure of a unicellular fungus with a well labelled diagram.

Brewer's yeast is one of the best known e.g. of unicellular forms in fungi (Bread yeast, Saccharomyces cerevisiae, (Bakers' yeast) - causes bread to rise by releasing CO_2 which gets trapped in the dough). The cell structure is very simple, though the organism is one of the more advanced fungal forms from the point of view of its spore-producing structures. Yeast cells are found on exposed sugary fluids e.g. palm wine and sugary fruits where fermentation processes are mediated. Cell exists in diploid/ haploid states. Under favourable environmental conditions, in both states, they multiply rapidly by simple mitotic cell divisions- budding involving nuclear division and division of the cytoplasm in such a way that one segment of the constricted cytoplasm is smaller than the others. Diploid cell arise from haploid cells by process of plasmogamy and karyogamy (some kind of fertilization). A diploid cell may undergo meiosis under certain conditions to produce 4 haploid spores- ascospores (contained in simple structure- an ascus).

3. Outline the sexual reproduction in a typical filamentous form of fungi.

Sexual reproduction occurs when two mating types of hypae grow in the same medium. Chemical interaction in the two mating types of hypae includes growth are delimited by a wall such that many nuclei are isolated in what is called a gametangium. The two gametangia fuse (plasmogamy) and a zygote is formed which may undergo prolonged dormancy or resting stage. The nuclei in the zygotes fuse in twos and undergo meiosis independently. The zygote germinates under favourable conditions to produce a fruiting which at maturity liberates the haploid spores. Relatives of Rhizopus in similar circumstances are many. Mucor spp are a group which lack rhizoids. The genus Pilobolus is usually found growing on cow/ horse dung. Species called black mould belong to Apergillus; the spores are many in the air and germinate readily on exposed food and fruits; while some species of Aspergillus e.g. A. Niger and A. fumigatus cause certain lung diseases (aspergilloses) in man and other animals, some are used in food processing. The hypae are coenocytic and the nuclei are haploid. A multinucleate foot cell is delimited on the coenocytic horizontal hypha in favourable environments. A vertical hypha (conidiophore) with a modified tip carrying bottle-shaped sterigma (pl. sterigmata) produces haploid spores called clonidine (sing: conidium) is produced by the foot cell which is easily dispersed by air. Penicillium, another filamentous, conidia- producing form. The hypae are septate and the conidia are produced on the vertical conidiophores with characteristic branching patterns. Apart from the species that produces antibiotics, other species of Penicillium cause considerable damage to ripening fruits while other species are used in food

processing. Sexual reproduction is rare in Aspergillus and Penicillium, though it occurs. Plasmogamy and karyogamy are involved. These processes lead to meiosis and production of spores (ascospores) in special structures (asci; sing: ascus) which are in turn contained in a fruiting body which may be completely closed (cleistothecium) as in red bread mould (Neurospora crassa) or disc- shaped (apothecium) as in Peziza sp. The haploid phase (mycelia phase) is the dominant generation in both Aspergillus and Penicillium.

4. How do Bryophytes adapt to their environment?

- They have definite structures for water and nutrient absorption from the soil; therefore the plant body is divided into two (an aerial portion and a subterranean portion). The subterranean portion is the rhizoid and is not a true root as the case of land plants that are advanced.
- The aerial portion being exposed to the atmosphere demands some modifications that prevents excessive loss of water through the body surface (I.e. desiccation)
- Some other modifications that permit elimination of excess water from the plant body and not only exchange of gasses between the internal parts of the plant and the atmosphere therefore openings are available on the aerial parts of the plant.

5. Describe with illustration the following terminologies

- Eustele: the vascular bundles are discrete, concentric collateral bundles of xylem and phloem.
- Atactostele: the vascular bundles are scattered
- Siphonostele: In more advanced vascular systems e.g. stems of ferns and higher vascular plants, the stele is a cylindrical enclosing a parenchymatous pith.
- Dictyostele: In siphonostele, vascular supply to leaves is associated with a leaf gaps and the conducting cylinder is dissected one.

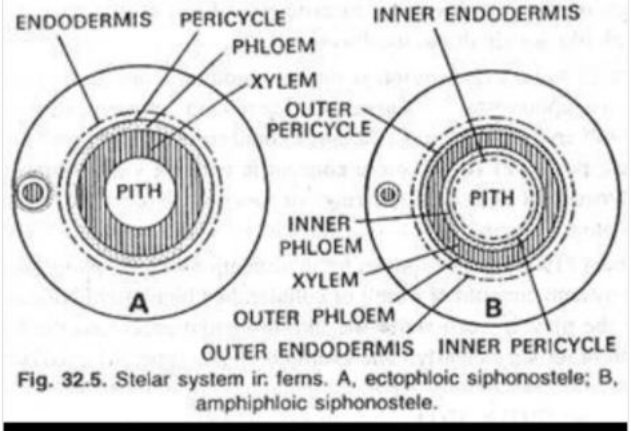
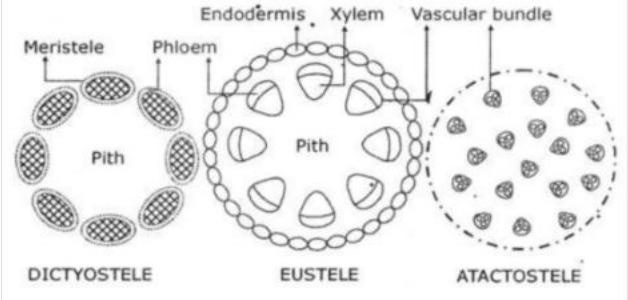


Fig. 32.5. Stelar system in ferns. A, ectophloic siphonostele; B, amphiphloic siphonostele.



6. Illustrate the life cycle of a primitive vascular plant