VIDEO LECTURE NO. **B1MICP1U4.2**

STRUCTURE AND REPRODUCTION OF RHIZOPUS, PENICILLIUM , ASPERGILLUS , YEAST , AGARICUS

VOLUME-4 STUCTURE AND REPRODUCTION OF YEAST

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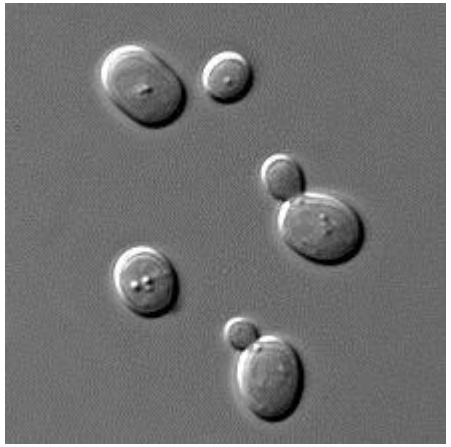
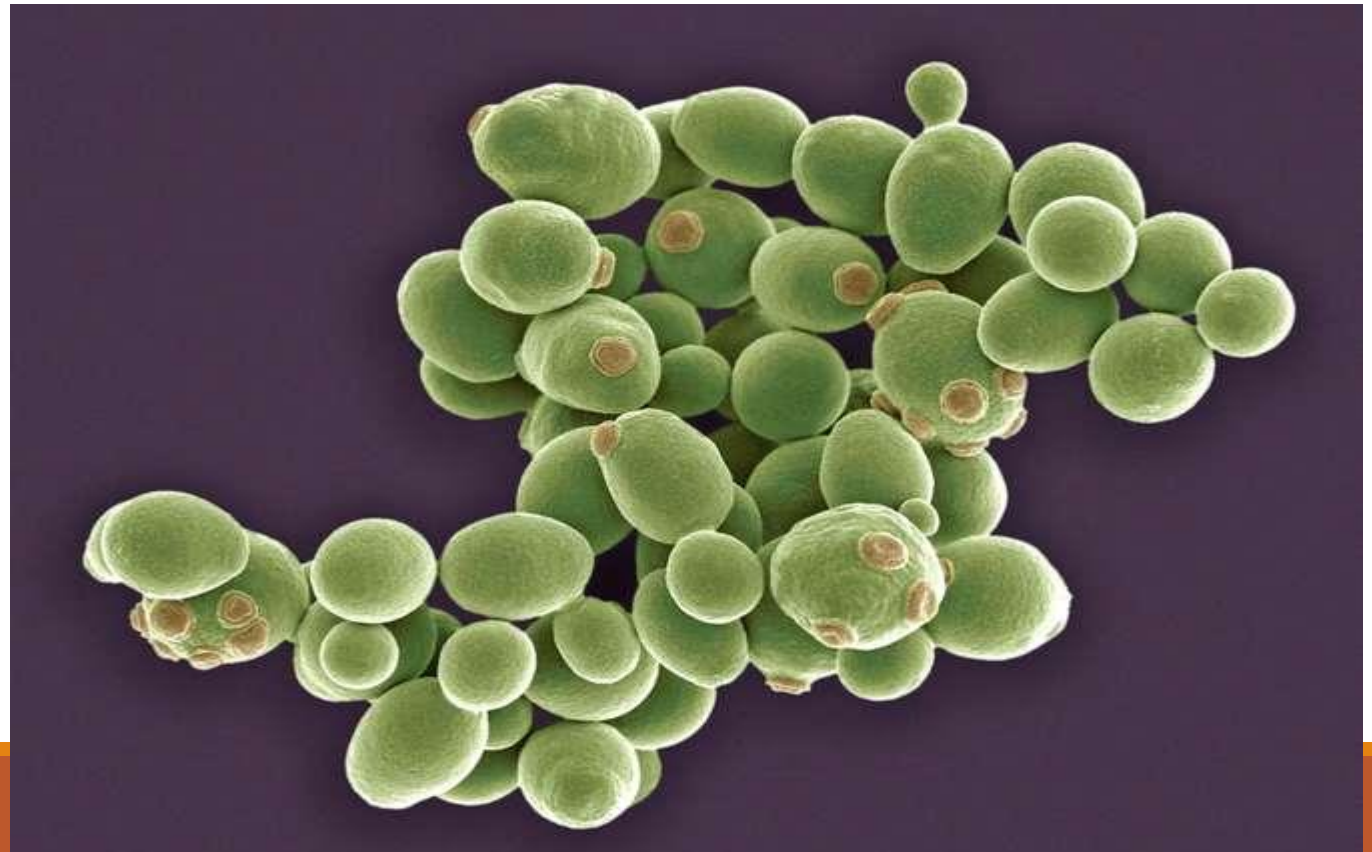
Yeasts are non mycelial Ascomycetes that form no fruiting bodies.
Their usual and dominant growth form is a uni-cell which may be globose, ellipsoidal or shortly cylindrical in form.
They have the ability to ferment certain sugars.
They are of 2 types – Non spore forming yeast=ASPOROGENOUS YEASTS
and spore forming Yeasts= Ascosporogenous Yeasts(True yeasts)





Structure of Yeast

Thallus- The thallus is non mycelial . It is not made up of hyphae . It consists of a single minute oval or spherical cell. In size it ranges from 2-8 µ in diameter and 3-15 µ in length. Appears hyaline in colour it consists tiny mass of protoplast surrounded by a cell wall.

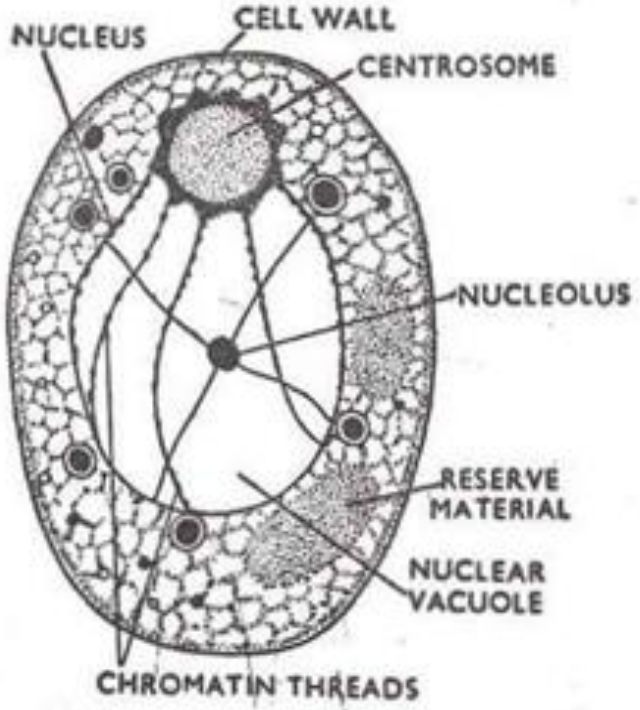


Fig. 214. Diagrammatic representation of parts of a yeast cell.

The Cell Wall – It is thin , delicate, firm and chitinuous in nature ,made up of 2 polysaccharides namely glucans and mannan in combination with some protein , lipid and chitin. There is no cellulose. The Saccharomyces *cerevisiae* has 2 layers of Cell Wall. Outer and Inner layer

The Protoplast- mainly consists of cytoplasm ,surrounding a minute nucleus. It is cytoplasm differentiated in 2 portions –outer and Inner portion. Outer portion is a thin , cytoplasmic membrane (ectoplasm). And the Inner portion is dense or granular. It is endoplasm.

Endoplasm contains a single nucleus , ribosomes and mitochondria . A large vacuole occupying much more space of endoplasm. Vacuole contains a solution of volutin which is a complex material of RNA, lipoprotein and poly phosphates.
Reserve food material are found in the form of glycogen oil globules and protein particles.
The nucleus has nuclear membrane and nuclear membrane has pores.

Two types of reproduction occurs in yeast

Asexual reproduction

Sexual reproduction

1.Asexual reproduction

By Budding and Fission

2. Sexual reproduction

By Plasmogamy , Karyogamy, meiosis division

Asexual reproduction

Budding cell of Yeast

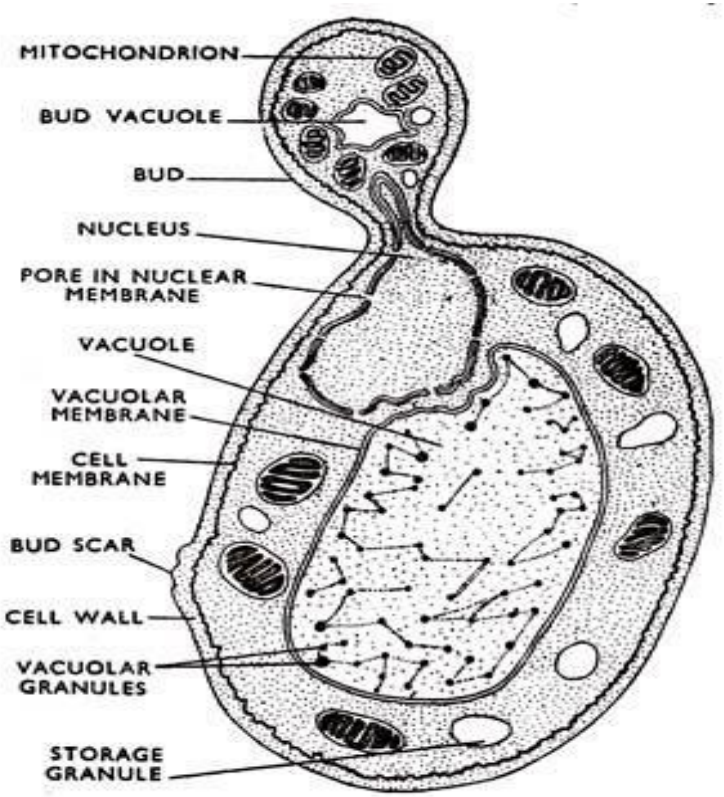


Fig. 215. *Saccharomyces cerevisiae*. Sectional view of a budding cell.

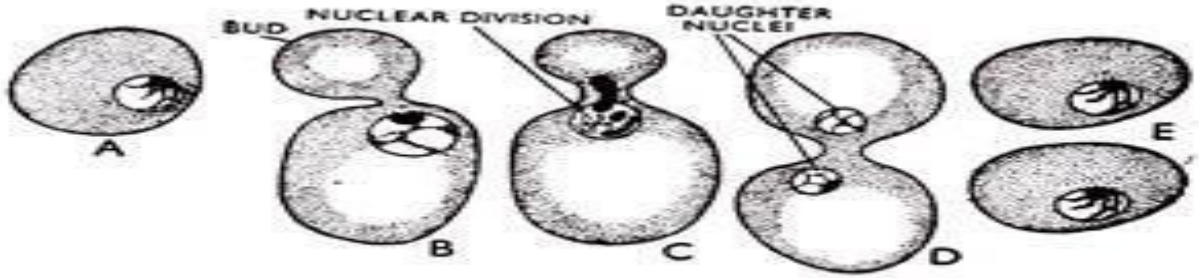


Fig. 218. *Saccharomyces cerevisiae*. Stages in cell multiplication by budding.

At the commencement of budding a small portion of the cell wall, usually near the end, softens.

The nucleus of the mother cell, divides mitotically.

One of the two daughter nuclei migrates into the enlarging bud .

The bud grows until it attains the size of the mother cell.

The daughter cell then becomes separated from the mother cell and the process may be repeated .

The bud separates from the parent cell leaving a bud scar.

The daughter cell also starts producing bud before being abstracted from the mother cell and the process may be repeated giving rise to chains or groups of yeast cells.

A large number of buds are developed without being detached from one another resulting in the formation of branched or unbranched chains of cells constituting the pseudo-mycelium.

FISSION IN YEAST

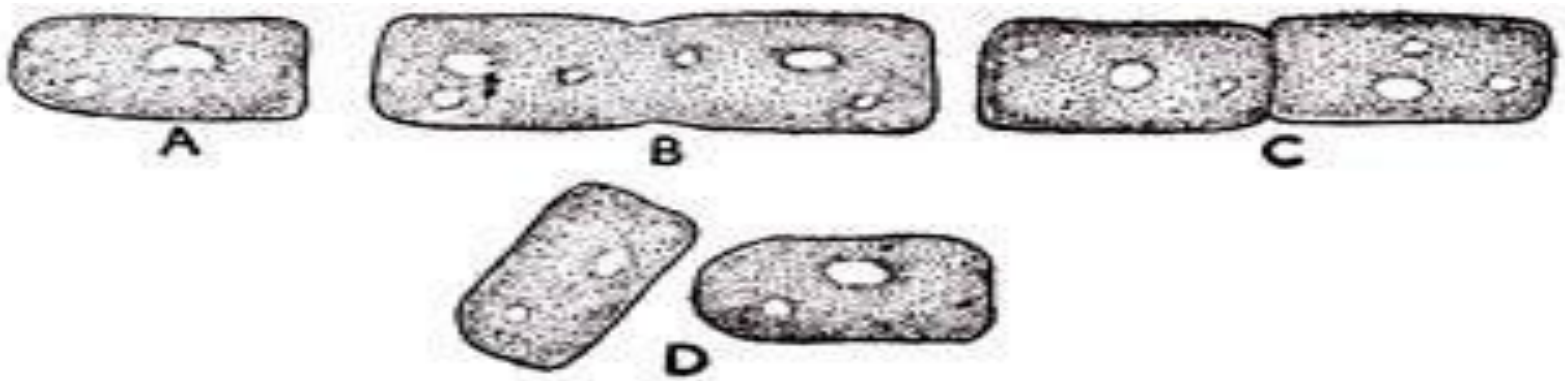


Fig. 217. *Schizosaccharomyces octosporus*. Stages in cell multiplication by fission.

During reproduction of fission yeasts (Schizosaccharomyces) the parent cell elongates ,the nucleus divides into two daughter nuclei, and gradually a transverse partition wall is laid down somewhat near the middle starting from periphery to the center dividing the mother cell into two daughter cells .

SEXUAL REPRODUCTION

During sexual reproduction two cells come in contact.

A beak-like protuberance develops from each conjugating cell at the point of contact.
A continuous passage is developed by the dissolution of intervening walls at the point of contact where the two nuclei migrate.
The passage between the two cells enlarges forming a conjugation tube, where karyogamy takes place.
Gradually the two cells along with the conjugation tube form the zygote cell.

The zygote cell ultimately develops into an ascus. The diploid zygotic nucleus undergoes three divisions, of which the first one is meiotic, producing eight haploid nuclei.

Each nucleus with cytoplasm develops into an ascospore and the ascus contains eight ascospores . The ascospores liberate by the breaking down of the ascus wall. They now behave as somatic cells.

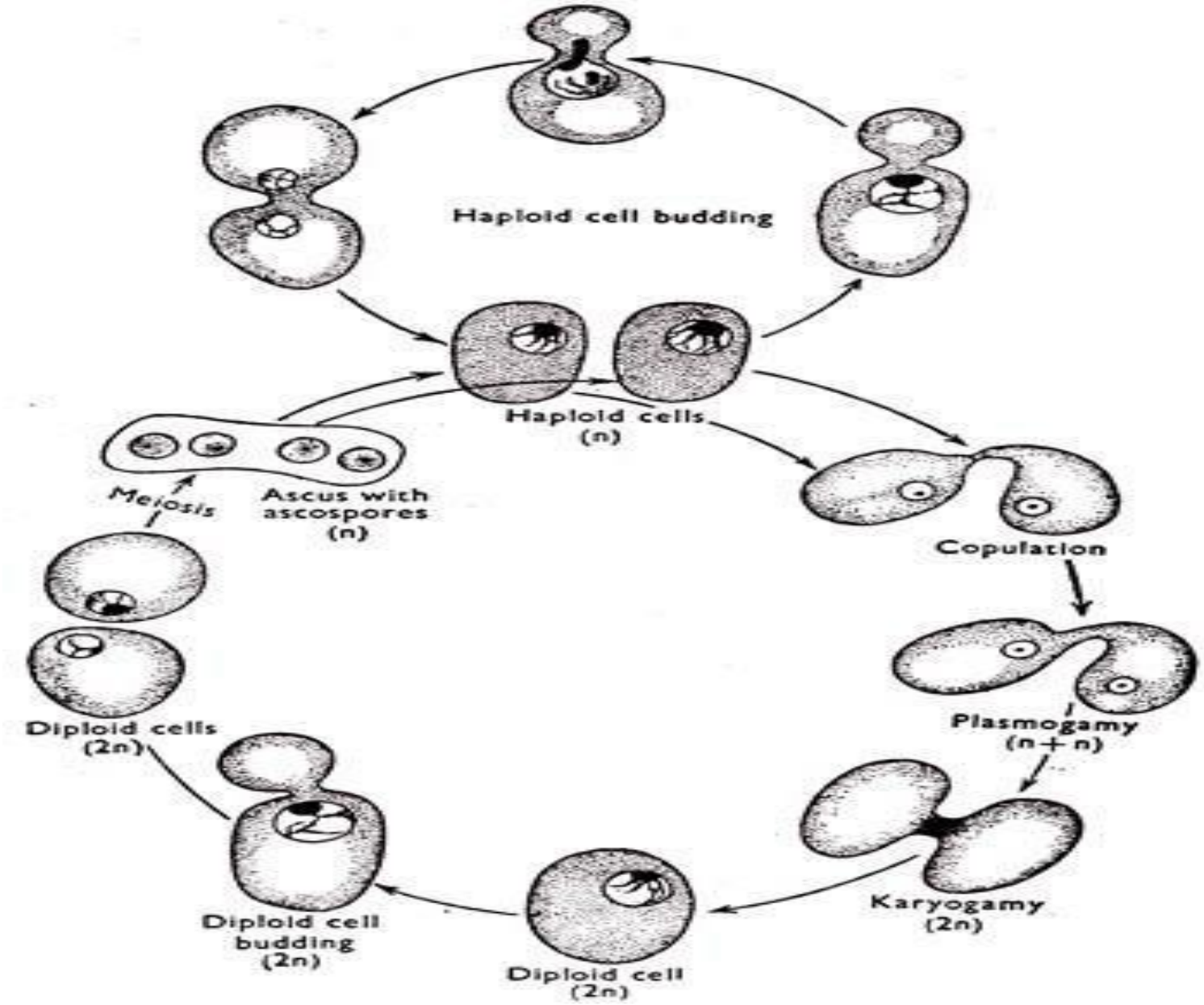


Fig. 222. Haplo-diplobiontic life cycle of *Saccharomyces cerevisiae*.

REFERENCES

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