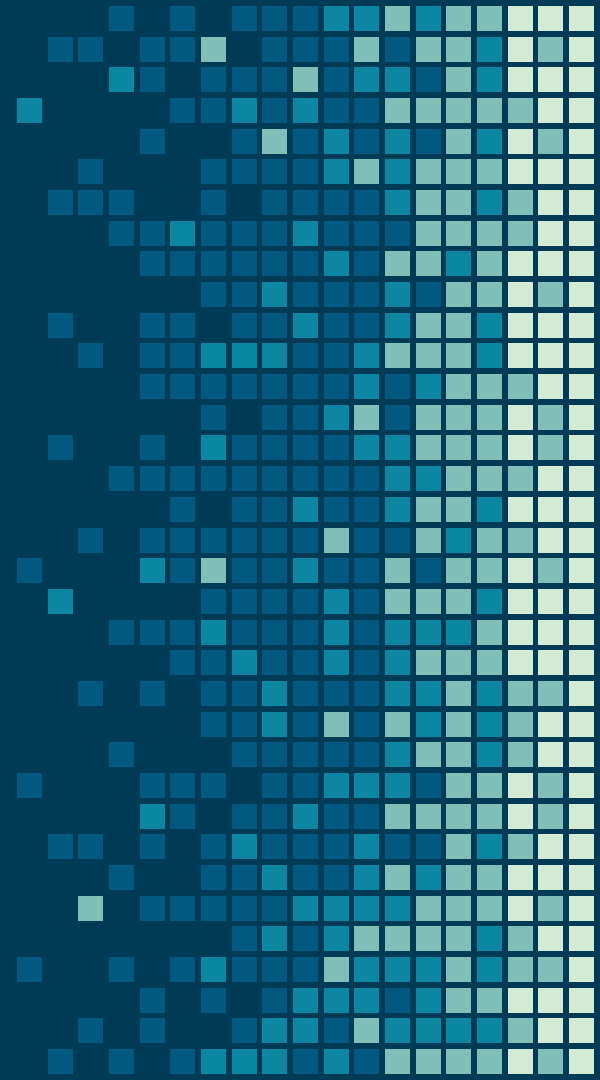
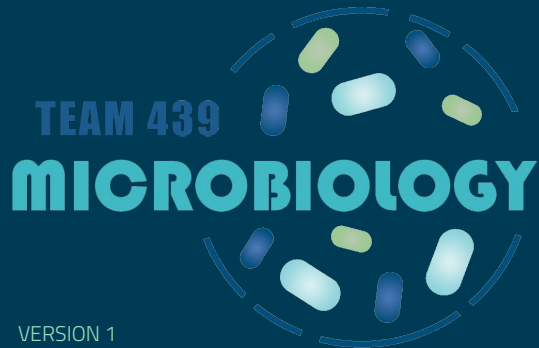


Fungi & Their Pathogenesis



Objectives

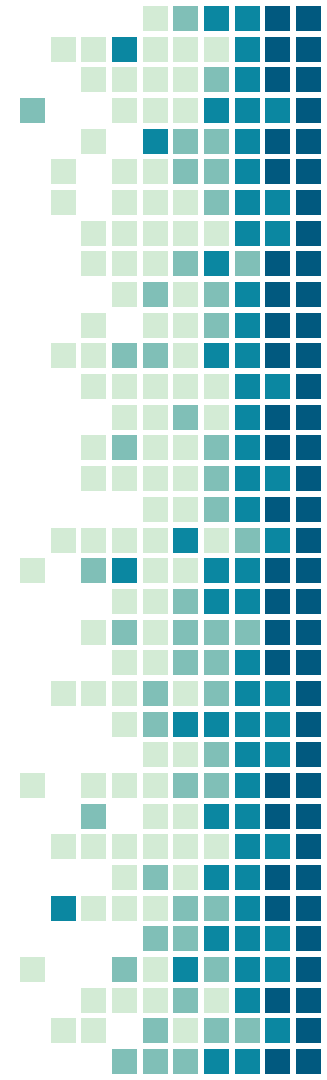
- ❖ To describe the general characteristics of fungi and recognize a fungus from all other living organisms
- ❖ To establish familiarity with the terminology needed by medical students
- ❖ To know certain fundamental facts about classification reproduction and identification of fungi

Colour index:

- **Red: Important .**
- Grey: Extra info & explanation.
- **Purple: Only in girl's slides.**
- **Green: Only in boy's slides.**
-

Any future corrections
will be in the editing
file, so please check it
frequently.

Scan the code
Or click [here](#)



What is Mycology?

- ❖ **Mycology:** Study of fungi Kingdom myceteae (Kingdom fungi).
- ❖ **Medical mycology:** Study of medically important fungi & the mycotic diseases.
- ❖ **Mycoses:** A disease caused by a fungus.

KINGDOM	CHARACTERISTIC	EXAMPLE
Monera	Prokaryocyte	Bacteria Actinomycetes
Protista	Eukaryocyte	Protozoa
Fungi	Eukaryocyte	Fungi
Plantae	Eukaryocyte	Plants, Moss
Animalia	Eukaryocyte	Arthropods Mammals Man

What is fungus? (Characteristics)

- 1 Eukaryotic organisms**
They have true nucleus.
- 2 Heterotrophic** (can't make own food)
Saprobic, Symbiotic, Parasitic
- 3 Do not have chlorophyll**
(Achlorophyllous)
- 4 Surrounded by rigid cell wall**
Cell wall made up of chitin & complex carbohydrates (Mannan, Glucan)
- 5 Cell Membrane**
(Sterol, ergosterol)

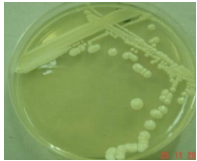
Distinguishing Features

- Saprobic**
Feed on dead tissues or organic waste (Decomposers) (They live in the soil)
- Symbiotic**
Mutually beneficial relationship between a fungus & another organism. (Without causing harm to each other)
- Parasitic**
Feeding on living tissue of a host. (They cause harm to the host)

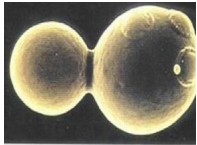
Note 438: Mannan, glucan, and ergosterol are targets of antifungals

Morphology

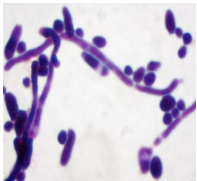
Yeast (unicellular organisms)



Colony morphology
(Culture).



Budding yeast cells
(They replicate by budding)



In Clinical samples budding yeast cells +/- Pseudohyphae (Some yeast cells produce pseudohyphae, they look like filamentous but they aren't)

(Pseudohyphae is a bud but it failed to separate/detach)

هو عبارة عن bud بالأصل لكنه ماقدر ينفصل فيطول ويصير شكله كذا تحت المايكروسكوب

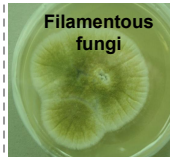
Examples: *Candida albicans*,
Saccharomyces cerevisiae

Filamentous Fungi (Hyphae, Mycelium)

Hyphae (main structure), multicellular filamentous structures, constituted by tubular cells with cell walls.

-Hypha: (plural hyphae): Is a long, branching filamentous cell. Hyphae are the **main mode** of vegetative growth.

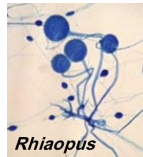
-Mycelium: The intertwined mass of hyphae that forms the fungal colony.



Filamentous fungi



Penicillium,



Rhizopus

Examples: *Aspergillus*,
Penicillium, *Rhizopus* (عفن الخبز)

Dimorphic (Yeast & Filamentous)

It has two forms depending on **environmental factors:**

يتحول بين الاثنين حسب الظروف المحيطة فيه

1-Yeast form:

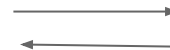
Parasitic form, tissue form,
cultured at 37°C

2-Filamentous form:

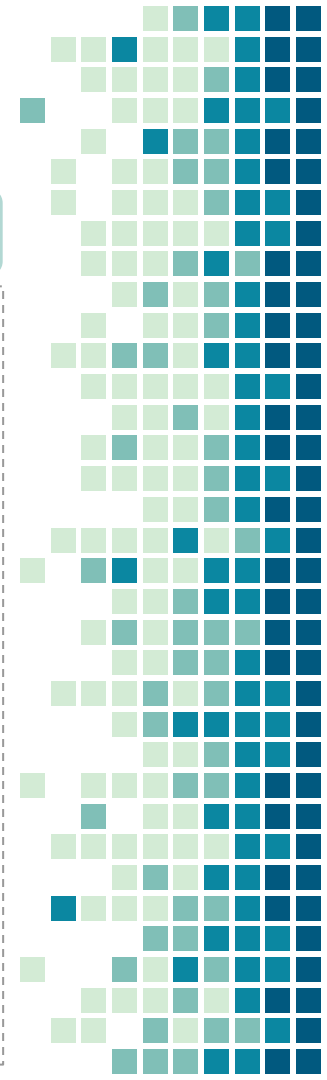
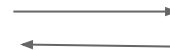
saprophytic form, cultured at
25°C

(The **temperature** is one of the main characteristics to change the morphology of dimorphic)

Mold
Form



Yeast
Form

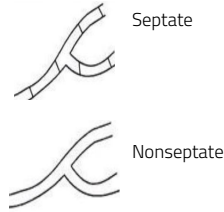


Filamentous Fungi, contd..

Conidia/ Spore (singular = conidium): Asexual spores borne externally on hyphae or on a conidiophore.

Septa: are cross-walls that divide hyphae into segments (**Septate hypha**).

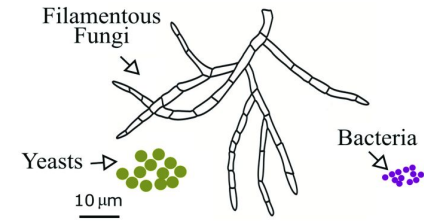
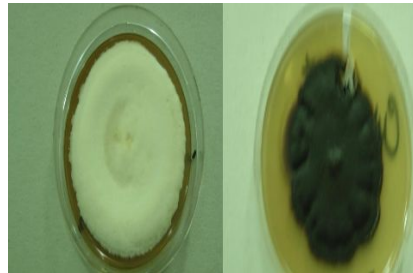
- If there is no cross walls, the hyphae are considered to be (**Non-septate**).



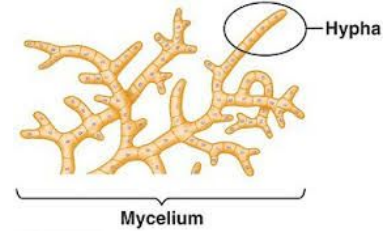
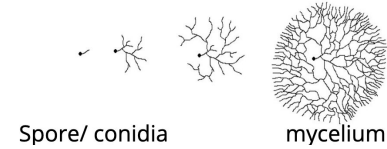
Note: Different filamentous fungi have different culture colors, whereas yeast usually has a white creamy color

Moniliaceous mold: Hyaline or lightly pigmented conidia or hyphae, colorless.

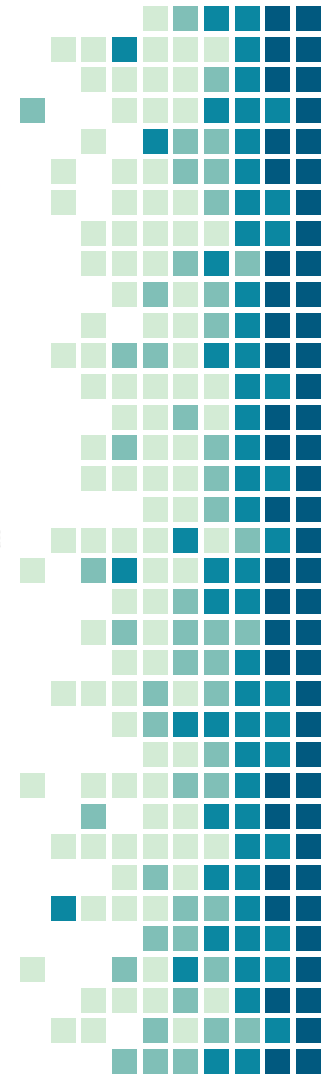
Dematiaceous mold: Are pigmented, Because of the pigment, the colonies appear dark, brown or black.



Hyphal growth from spore

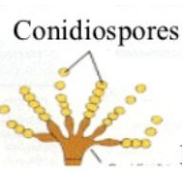
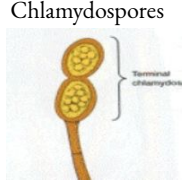
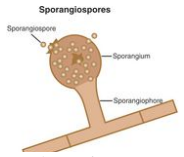


Conidia



Reproduction in Fungi

Asexual (only mitotic cell division)	Somatic: 1- Yeast by budding. 2- Molds by hyphal fragmentation.
	Spore forming: (Names are NOT important according to boys) a) sporangiospores in sporangia. b) chlamydospores in/on hyphae. c) Conidia (conidium) on hypha or on conidiophores.
Sexual	Fusion, mitosis, and meiosis.



Spores:

Small airborne particles by which fungi reproduce.

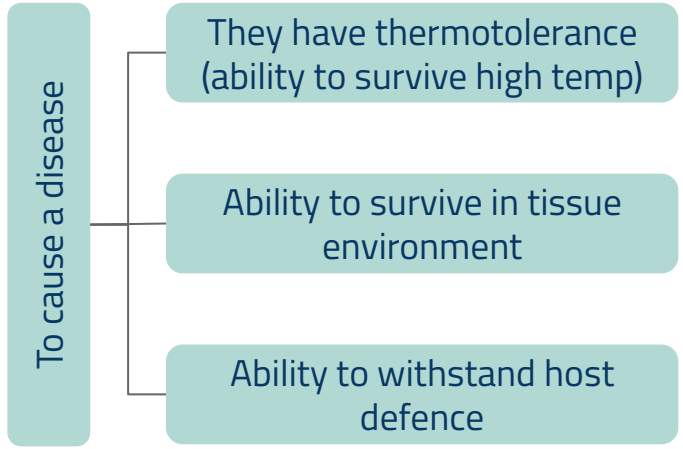
They are produced by mitosis and readily disseminate in the air.

It is difficult to identify yeast by its morphology only, so a chemical test is usually done. But filamentous fungi can be easily identified according to its morphology, so it is rare that a chemical test is required.

Fungi are all around us, widely distributed in Nature (air, water, soil, decaying organic debris)

They can cause many diseases to humans. Such as:

- 1- Superficial infections
- 2- Some causes allergic reactions
- 3- Few cause invasive infections



MCQs

1- Fungi have a cell wall that is made of:

- A- Achlorophyllous.
- B- Phospholipids.
- C- Sterol & ergosterol.
- D- Glucan bilayer

2- What is FALSE about fungi?

- A- Eukaryotic cells
- B- Do not have achlorophyllous
- C- Do have achlorophyllous
- D- They are heterotrophic

3- An example of yeast is:

- A- Aspergillus
- B- Penicillium.
- C- Rhizopus
- D- Candida albicans

4- Yeast form is:

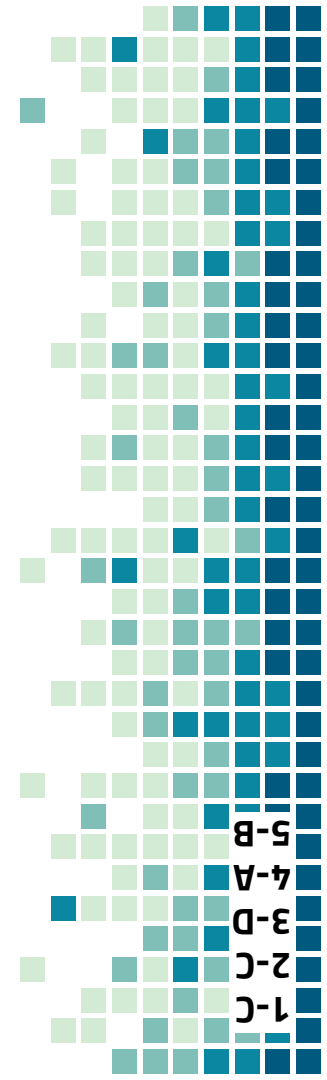
- A- Parasitic form, cultured at 37°C
- B- Parasitic form, cultured at 25°C
- C- Saprophytic form, cultured at 37°C
- D- Saprophytic form, cultured at 25°C

5- An example of somatic asexual reproduction in fungi is:

- A- sporangiospores in sporangia.
- B- Molds by hyphal fragmentation.
- C- chlamydospores in/on hyphae.
- D- Fusion, mitosis, and meiosis.

SAQ: What are the three things that helps fungi to cause a disease?

Slide 6



8-5
7-4
6-3
5-2
4-1

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