Candida Species Lab Diagnosis

Course: Medical Mycology

Week 2

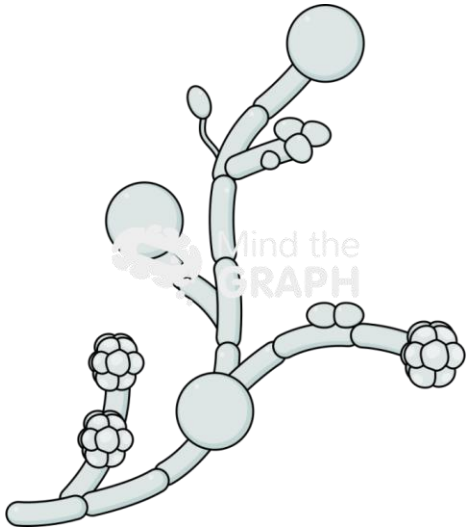
Lab Date 27/8/ 2026

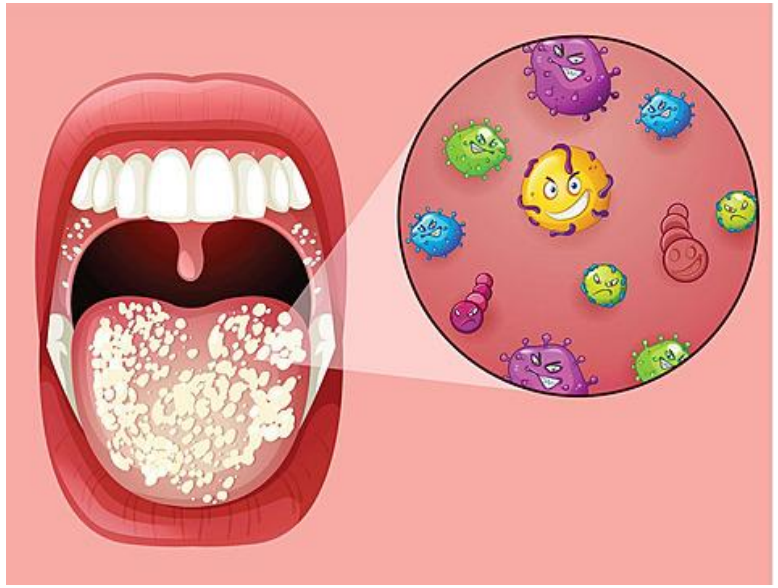
Mr. Soran Kayfi & Ms. Bana Wali

Pathogenic Scope

Candida species are opportunistic fungal pathogens residing as normal microbiota on human mucosal surfaces. Under immunocompromised conditions, they cause **thrush**, **vaginitis**, and **invasive candidiasis infections.**

Primary Pathogen: *Candida albicans* accounts for 50–70% of infections, though non-*albicans* species are emerging rapidly.





thrush

Diagnosis of Candida spp. Infections

- The diagnosis of Candida infections depends on the type of infection (e.g., superficial vs. invasive) and the clinical setting.
- ***Candida albicans***: The most prevalent and well-known species, often responsible for infections.

The common diagnostic method

- Clinical Examination.
- Laboratory Tests.
- Antifungal Susceptibility Testing.

Clinical Examination

***Oral Candidiasis*:** White patches on the tongue, inner cheeks, and throat.

Cutaneous *Candidiasis*: Red, itchy rash in warm, moist areas (e.g., groin, under breasts).

Invasive Candidiasis: Fever, chills, and organ dysfunction, particularly in immunocompromised patients.

Oral Candidiasis

Skin Candidiasis

Invasive Candidiasis

2. Laboratory Tests

A. Microscopy & Staining.

B. Culture Methods.

C. Molecular & Serological Tests.

D. Histopathology (for Tissue Infections).

A. Microscopy & Staining

- **Potassium hydroxide (KOH) wet mount:** Detects yeast cells and pseudohyphae in skin, vaginal, or oral samples. **Gram stain:** Shows Gram-positive budding yeast.
- **Calcofluor white stain: Fluorescent stain** that binds to fungal cell walls for better visualization.

Microscopy & Staining

- **KOH wet mount:** Detects **yeast cells** and **pseudohyphae** in skin, vaginal, or oral samples, it is a diagnostic tool used to identify fungal infections, particularly those caused by *Candida albicans*.

Sample Collection

- **Oral candidiasis**: Swab from the tongue, buccal mucosa, or throat.
- **Vaginal candidiasis**: Vaginal swab or discharge sample.
- **Cutaneous candidiasis**: Skin scrapings from affected areas.
- **Nail candidiasis**: Nail scrapings or clippings.

Main steps of KOH Wet Mount

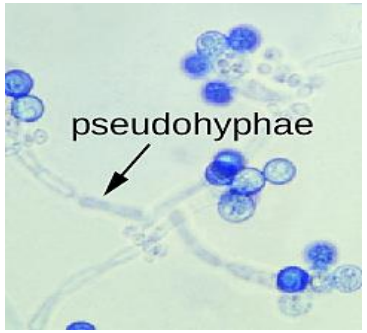
- **Preparation**: A small amount of skin scrapings, vaginal discharge, or oral swab is collected from the affected area. The sample is placed on a glass slide.
- **Addition of KOH**: A drop of 10%–20% KOH is added to the sample, let the slide sit for 5–10 minutes at room temperature to dissolve keratin and cellular debris, making fungal elements more visible.
- **Examination**: The mixture is covered with a coverslip and examined under a microscope.

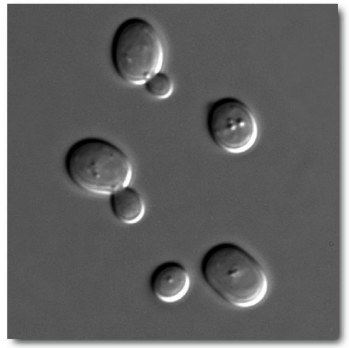
Microscopic Examination

- Use a light microscope under low (10x) and high (40x) magnification.
- Look for budding yeast cells and pseudohyphae, which are characteristic of Candida albicans.

Interpretation of Results

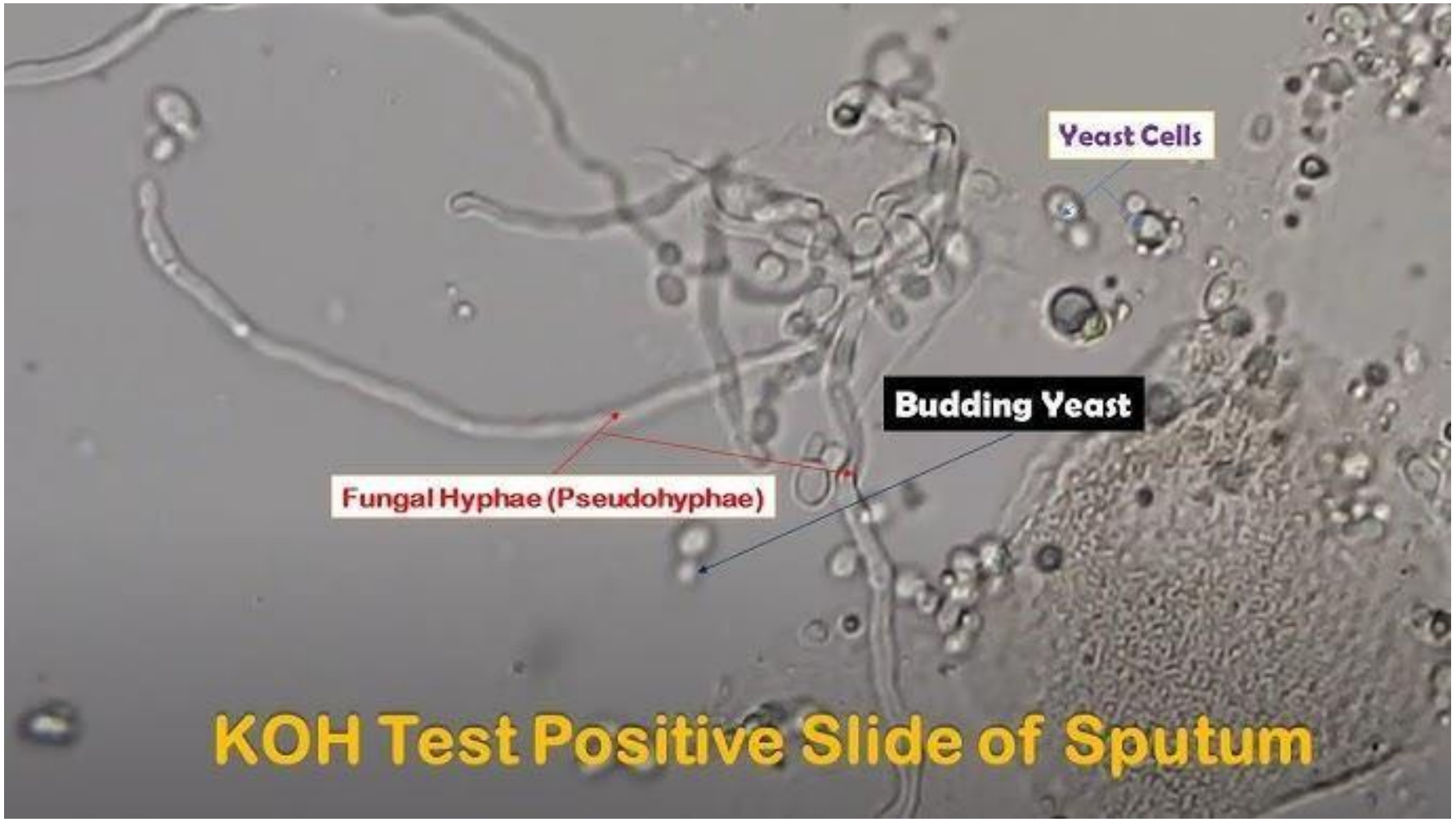
Finding	Interpretation
Budding yeast cells	Suggests *Candida* species, including *C. albicans*.
Pseudohyphae (elongated yeast cells)	Highly suggestive of *Candida albicans*.
No fungal elements	Negative result, but does not rule out infection (culture may be needed).



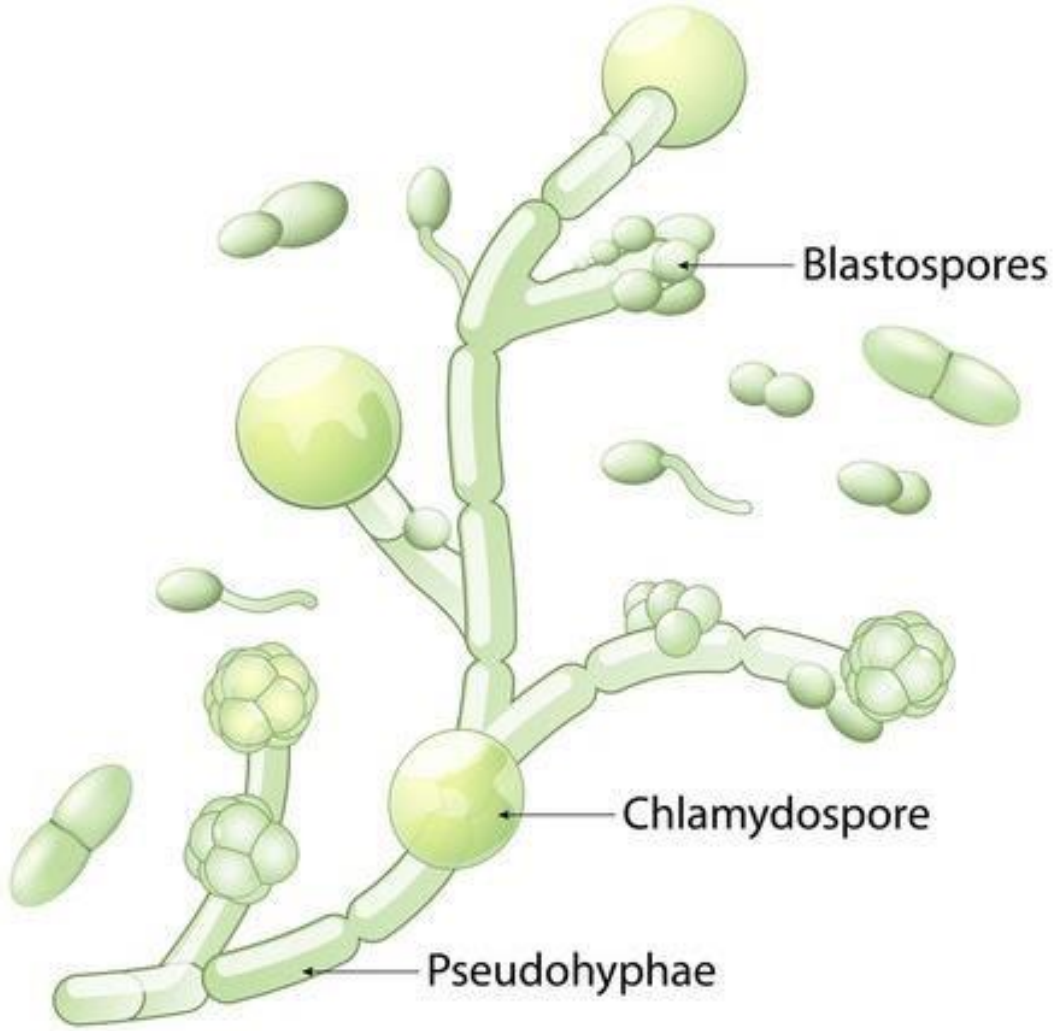


Budding yeast cells

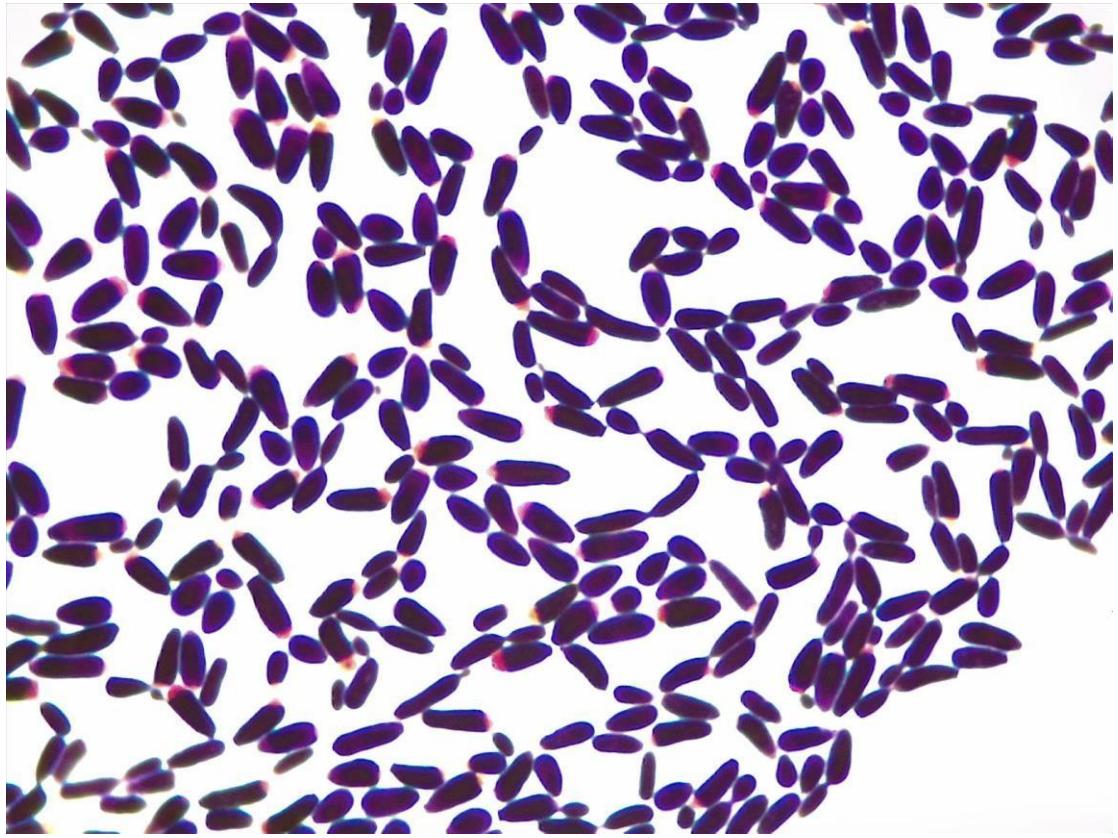
Microscopic Examination



Hyphae and sporses of *Candida albicans*

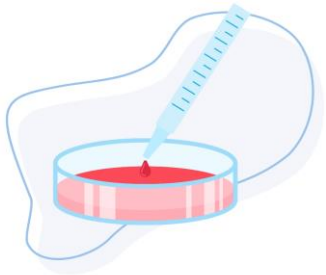


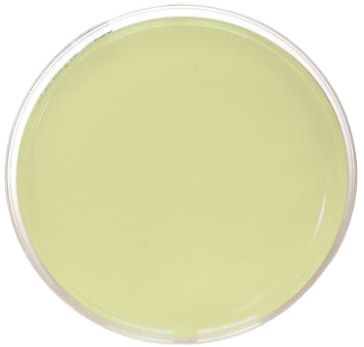
Microscopic Examination of *C. albicans using gram stain*



B. Culture Methods

1. **SDA**: Supports fungal growth; colonies appear creamy-white.
2. **CHROMagar Candida**: Differentiates Candida species by colony color.
3. **Blood Culture**: Detects Candida in bloodstream infections.





SDA

CHROMagar

Candida albicans on SDA

- SDA is a selective medium that supports the growth of fungi, including yeasts like Candida albicans.

Colony Morphology

When cultured on SDA, *Candida albicans* typically exhibits the following characteristics:

- **Colony Color**: Colonies are usually white to cream-colored.
- **Colony Texture**: The texture can be smooth or slightly wrinkled, with a moist appearance.
- **Colony Size**: Colonies can grow to a diameter of 2-5 mm within 24-48 hours at 30-37°C.

Growth Conditions

- **Temperature**: Optimal growth occurs at 30-37°C.
- **pH**: SDA has a pH range of 5.6, which is conducive for fungal growth.
- **Oxygen Requirement**: *Candida albicans* is a facultative anaerobe, meaning it can grow in both aerobic and anaerobic conditions.

Candida albicans on Chromagar

Chromagar is particularly useful in clinical microbiology for the rapid identification of Candida species, allowing for timely diagnosis and treatment of infections caused by these fungi.

Candida albicans on **Chromagar**

- Chromagar Composition: Chromagar is a **selective medium** that contains various nutrients and chromogenic substrates that allow for the differentiation of yeast species based on their metabolic activity.

The key components include:

1. **Peptones:** Provide nitrogen and essential growth factors.Chromogenic
2. **Substrates:** Allow for color development specific to certain Candida species.
3. **Agar:** Serves as a solidifying agent.

Candida albicans on Chromagar

- When Candida albicans is cultured on Chromagar, it typically produces a characteristic color change.
- A sample suspected of containing Candida albicans is streaked onto the Chromagar plate.
- **Incubation**: The plate is incubated at 35-37°C for 24-48 hours.
- **Observation**: After incubation, colonies of Candida albicans will appear as greenish-blue colonies due to the hydrolysis of the chromogenic substrate.

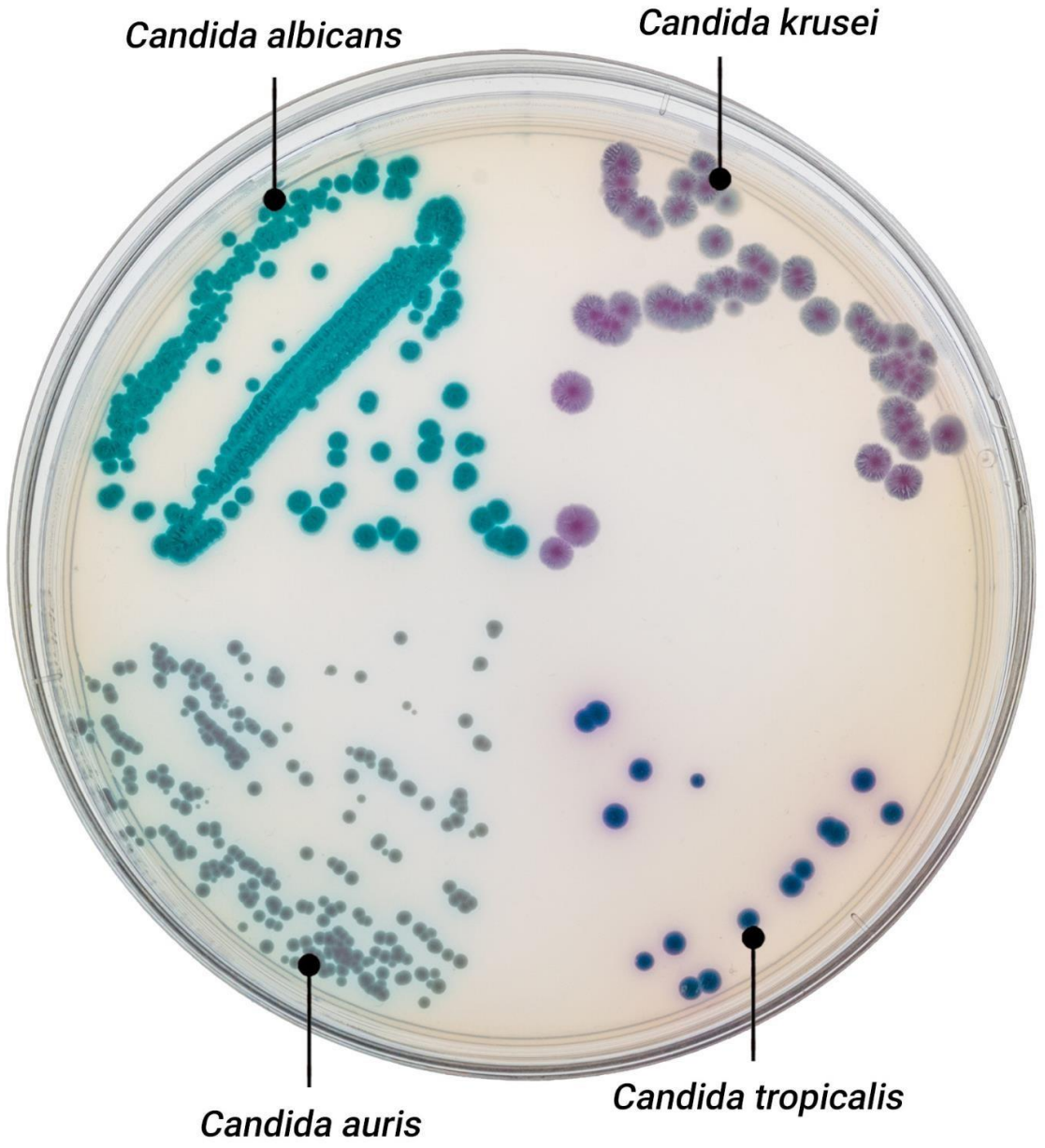
Candida albicans on Chromagar

Interpretation of Results

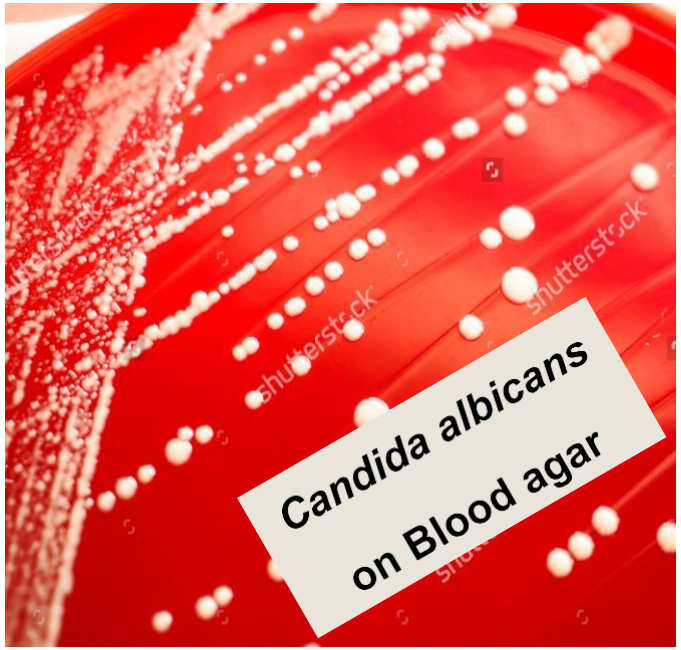
- **Greenish-blue colonies**: Indicative of *Candida albicans* presence.
- **Other colors**: Different Candida species may produce various colors, aiding in the differentiation of other species such as *Candida tropicalis* (blue colonies) and *Candida krusei* (pink colonies).

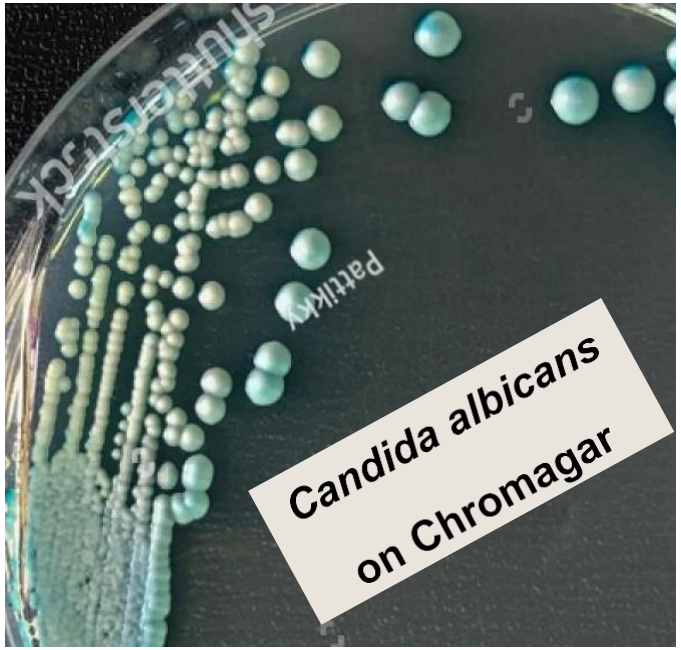
Candida albicans on Chromagar

Interpretation of Results



Candida albicans from different clinical samples





Culture and colony morphology of C. albicans.