

PATHOGENIC MICROORGANISMS

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Lecture 6

Fungal Diseases

- **Fungal infections** are any disease or condition you get from a fungus. They usually affect skin, hair, nails or mucous membranes(**superficial or mucocutaneous**), underneath skin (**subcutaneous**) or inside other organs of the body — like lungs, brain or heart (**deep infection**). The higher risk of fungal infections occurred in a weakened immune system.

Some common fungi you can get infections from include:

* **Dermatophytes.** are a group of fungi that specifically infect and cause diseases in the skin, hair, and nails. They are a common cause of superficial fungal infections known as dermatophytoses or Tinea infections. Dermatophytes thrive in keratinized tissues, utilizing keratin (a protein found in skin, hair, and nails) as a nutrient source.

Types of Dermatophyte Infections

Ringworm is a common skin infection that is caused by a fungus. It's called "ringworm" because it can cause a **circular rash** (shaped like a ring) that is usually red and itchy. The fungi that cause this infection can live on skin, surfaces, and on household items such as clothing, towels, and bedding.

- **Ringworm** goes by many names. The medical terms are “Tinea” or “Dermatophytosis.”
- Other names for ringworm are based on its location on the body such as :-

Ringworm of the body (*Tinea corporis*):

is a superficial fungal skin infection of the body often appears as patches caused by dermatophytes. *Tinea corporis* can be found worldwide. It is specifically defined by the location of the lesions that may involve the trunk, neck, arms, and legs.

Ringworm of the scalp (*Tinea capitis*):

Tinea capitis often starts as isolated scaling in the scalp that develops into itchy, scaly bald patches. It's most common on children. Hair around the affected area may break or fall off, and bald patches may develop.

Ringworm of the beard (*Tinea barbae*):

Tinea barbae affects your cheeks, chin, and upper neck and can cause bald patches. This may look like acne, folliculitis or another skin condition.

*Athlete's foot : *Tinea pedis* is a ringworm infection of the foot. It's frequently seen in people who walk barefoot in public places where the infection can spread, such as locker rooms, showers, and swimming pools.

*This starts as dry scaly skin between toes that may spread to sole and heel then leads to symptoms like itching, stinging, burning.

A- *Tinea capitis*

B- *Tinea corporis*

C- *Tinea pedis*

D- *Tinea barbae*

(A)



(B)



(C)



(D)



- **Candida.** is a common and opportunistic fungal pathogen known for causing a range of infections in humans. It is a type of yeast that normally lives on mucosal surfaces and skin without causing harm but can become pathogenic under certain conditions.
- **Environmental fungi:** that live in soil or water. Such as *Histoplasma*, *Coccidioides*, *Blastomyces* and *Aspergillus*.

Morphology

It can exist in two forms:

- **Yeast Form:** Single cells that can reproduce by budding.
- **Hyphal Form:** Elongated, filamentous structures that can invade tissues.

Infections Caused by *Candida albicans*

1- Oral Candidiasis (Thrush)

- **Location:** Mouth and throat.
- **Symptoms:** White patches on the tongue, inner cheeks, gums, and throat, soreness, and difficulty swallowing.

2- Vaginal Candidiasis (Yeast Infection)

- **Location:** Vaginal area.
- **Symptoms:** Itching, burning, discharge (often thick and white), and redness.

3- Cutaneous Candidiasis

- **Location:** Skin folds (e.g., under breasts, in the groin).
- **Symptoms:** Red, itchy, and inflamed skin, sometimes with pustules or scaling.

4- Invasive Candidiasis

- **Location:** Systemic infection affecting blood, organs, or tissues.
- **Symptoms:** Can vary widely depending on the site of infection but may include fever, chills, and symptoms related to the affected organs. It can be life-threatening, particularly in immunocompromised individuals.

5- Chronic Mucocutaneous Candidiasis

- **Location:** Long-term infection affecting mucous membranes and skin.
- **Symptoms:** Persistent oral and/or genital infections that may be difficult to treat.

Oral Candidiasis





Vaginal Candidiasis

Ringworm fungi are very contagious and can spread to humans in four ways:

1- Human to human: You can get the infection if you come in contact with a person who has ringworm or if you share personal items, such as combs or towels.

2- Animal to human: You can get ringworm after touching an affected animal or even items the animal has come in contact with. Cats and dogs are common source, but other animals, such as farm animals, can spread fungi as well.

- **Object to human:** You may get the infection if you come in contact with an object or surface that has it, such as a telephone or the floor of a public shower. These fungi thrive in damp environments.
- **Soil to human:** Humans and animals can get ringworm after direct contact with soil that is carrying the fungi.

Transmission Routes

1- Endogenous Transmission: this is the most common route of infection. occur when the balance of normal flora is disrupted, allowing Candida to overgrow. Factors contributing to endogenous infections include:

- **Antibiotic Use:** Disruption of normal bacterial flora can allow Candida to proliferate.
- **Immunocompromised State:** Individuals with weakened immune systems (e.g., due to HIV/AIDS, cancer.
- **Chronic Diseases:** Conditions like diabetes can increase susceptibility to Candida infections.
- **Hormonal Changes:** Pregnancy and hormonal therapies can predispose individuals to vaginal candidiasis.

2- Direct Contact: Candida can be spread through direct contact with infected skin or mucosal surfaces. This can occur through touching affected areas or through contact with contaminated objects or surfaces.

- **Examples:**

- **Skin Infections:** Touching an infected area and then touching other parts of the body.
- **Vaginal Infections:** Direct sexual contact with an individual who has a vaginal yeast infection.

3- Person-to-Person Transmission: while *Candida albicans* is less commonly spread from person to person compared to other pathogens, it can still be transmitted. In this way transmission may occur through direct contact or via contaminated personal items such as towels or shared clothing.

- **Examples:**

- **Healthcare Settings:** In healthcare settings, *Candida* can be transmitted via contaminated medical equipment or surfaces, particularly in patients with indwelling devices like catheters.

4- Environmental Sources: Candida can also be found in the environment, including in soil, plants, and in some household surfaces. While environmental transmission is less common, exposure to contaminated surfaces or items might contribute to infection, particularly in people with weakened immune systems.

Diagnosis

- 1- Clinical Examination:** Identifying characteristic symptoms, such as the appearance of white patches in oral thrush or itching in vaginal infections.
- 2- Microscopic Examination:** Samples (e.g., oral swabs, vaginal swabs) can be examined under a microscope after being treated with potassium hydroxide (KOH) to reveal yeast cells and pseudohyphae.
- 3- Culture:** Cultures from affected areas can confirm the diagnosis and determine the specific strain of *Candida*.
- 4- Blood Tests:** For systemic infections, blood cultures and serological tests may be used to identify *Candida* in the bloodstream.

Treatment

- Antifungal creams, liquids or sprays These are used to treat fungal infections of the skin, scalp and nails. They include:-
- the azoles such as econazole, ketoconazole and miconazole.
- Nystatin: Often used for oral thrush.

The image features two symmetrical floral sprigs flanking the central text. Each sprig has several green leaves and a cluster of small, dark purple flowers. The background is a light gray and white checkerboard pattern.

Thank
You