**Medical mycology (L.2)**

Mycosis: Any fungal disease. Tend to be chronic because fungi grow slowly.

**Opportunistic mycoses:** Caused by organisms that are generally harmless unless individual has weakened defenses:

 -AIDS and cancer patients

- Individuals treated with broad spectrum antibiotics

 -Very old or very young individuals (newborns)

 Examples:

-**Aspergillosis**: Inhalation of Aspergillus spores.

- **Candidiasi**s or Yeast Infections: Caused mainly by Candida albicans. Part of normal mouth, esophagus, and vaginal flora.

 **Mycoses are classified into the following categories:**

**1. Systemic mycoses**: Systemic fungi Attack the deep tissues and organ systems; often create symptoms that resemble other diseases. Usually caused by fungi that live in the soil and are inhaled of spores. Not contagious. Examples:

**Histoplasmosis** (Histoplasma capsulatum): Initial infection in lungs. Later spreads through blood to most organs.

**Coccidiomycosis** (Coccidioides immites): Resembles tuberculosis.

**Two categories of systemic disease.**

**A- Those caused by truly pathogenic fungi** with the ability to cause disease in the normal human host when the inoculum is of sufficient size. Histoplasma capsulatum Blastomyces dermatitidis Coccidioides immitis Paracoccidioides brasiliensis

**B. Opportunistic fungi, low virulence organisms**, require the patient's defenses to be lowered before the infection is established. Aspergillus sp. Candida albicans Cryptococcus neoformans

**2-Cutaneous mycoses**: Fungal infections of the skin, hair, and nails.

Secrete keratinase, an enzyme that degrades keratin. Infection is transmitted by direct contact or contact with infected hair (hair salon) or cells (nail files, shower floors (Examples:

 -Ringworm (Tinea capitis and T. corporis)

- Athlete’s foot (Tinea pedis)

 -Jock itch (Tinea cruris)

**4- Subcutaneous mycoses:** Fungal infections beneath the skin. Caused by saprophytic fungi that live in soil or on vegetation. Infection occurs by implantation of spores or mycelial fragments into a skin wound. Can spread to lymph vessels.

**5- Superficial mycoses:** involve outermost layers of skin and its appendages [ nails or hair] ( Dermatophytosis.

**Epidermis** is divided into the following 5 sublayers or strata:

Stratum corneum,Stratum lucidum, Stratum granulosum, Stratum spinosum and Stratum germinativum (also called "stratum basale").



**Superficial Fungal Infections**

Skin Infections , do not penetrate deeper tissues , limited to Stratum corneum. No inflammation. there is no cellular response from the host. Essentially no pathological changes are elicited. Involve

1-Malassisa infection or Pityriasis (Tinea ) vericolor

2- Black Piedra

3- White piedra

4-Tinea nigra

**1-Malassisa infection or Pityriasis (Tinea) vericolor**

-MALASSEZIA FURFUR (Lipophilic yeast) Saprophytes on skin’s lipid secretions

-Malassezia furfur is the causative agent of Pityriasis versicolor, Pityriasis folliculitis and it has recently been implicated as a causative agent of seborrhoeic dermatitis and dandruff.

-M. furfur is a lipophilic yeast living on the skin as part of the normal flora.

**Clinical manifestations**

**1- Pityriasis versicolor:**

-Pityriasis versicolor: This is a chronic, superficial fungal disease of the skin characterised by well-demarcated white, pink, beige, or brownish lesions.

-The colour varies according to the normal pigmentation of the patient, exposure of the area to sunlight, and the severity of the disease

-Lesions occur on the trunk, shoulders and arms, rarely on the neck and face, and fluorescent a pale greenish colour under Wood's ultra-violet light.

-Young adults are affected most often, but the disease may occur in childhood and old age.

**2. Pityriasis folliculitis**

-It is a skin disease especially prevalent in young men. Itching is normal. The usual seat is the back with a possible association of the front of the chest.

**3-Seborrhoeic dermatitis and dandruff**

Seborrhoeic dermatitis is a common, harmless, itchy, red skin and scaling rash affecting the face, scalp eyebrows, ears and upper trunk. It particularly affects the -gland-rich areas of skin (.Sebaceous glands secrete the oily, waxy substance called sebum.

**4. Fungaemia**

They are rare and occur in premature infants or immunocompromised fed by intravenously

**Transmission**

The fungus exists as a free living saprophyte and probably spread from one to another by exposure to patient's scales. Lack of personal hygiene facilitates development of skin lesions

**Laboratory diagnosis**

**1- Clinical material**

 Skin scrapings from patients with superficial lesions, blood from patients with suspected fungaemia.

**2. Direct Microscopy:**

Skin scrapings taken from patients with Pityriasis versicolor stain rapidly when mounted in 10% KOH, glycerol and Parker ink solution and show characteristic clusters of thick-walled round, budding yeast-like cells and short angular hyphal forms up to 8μm in diameter (ave. 4μm diam.) and by the presence of short pieces of thick septate hyphae.

The yeast cell and hyphae also stain by gram technique. short hyphae, yeast cells = dimorphic.

These microscopic features are diagnostic for Malassezia furfur and culture preparations are usually not necessary.

**3. Culture:** Culture is only necessary in cases of suspected fungaemia. M. furfur is a lipophilic yeast, therefore in vitro growth must be stimulated by natural oils or other fatty substances. The most common method used is to overlay Sabouraud's dextrose agar containing cycloheximide (actidione) with olive oil or alternatively to use a more specialized media like Dixon's agar which contains glycerol mono-oleate (a suitable substrate for growth)..

**4-Serology:**

There are currently no commercially available serological procedures for the diagnosis of Malassezia infections.

**Treatment**

1-use a topical imidazole in a solution

2-Ketoconazole shampoo has proven to be very effective

3-In severe cases with extensive lesions, or in cases with lesions resistant to topical treatment ,oral therapy with either or itraconazole