MSS System
Fungal and Parasitic Infections

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Dermatophytosis

- **Dermatophytes**: fungi that invade keratinized tissue and usually causes skin, hair and nail infections called **dermatophytosis** (commonly known as **ringworm**)
- They are mainly caused by ***Trichophyton, Epidermophyton*** and ***Microsporum***.
- Ringworm is **very contagious** and called so as it forms **ring-like lesions** (**eruption, erythema or induration**) with central **scaly** area
- Lesions of dermatophytosis are **unsightly, itchy** & persistent but they **do not invade** other tissues or cause severe diseases, but damage caused by such lesions can lead to **secondary infections**.

Dermatophytosis

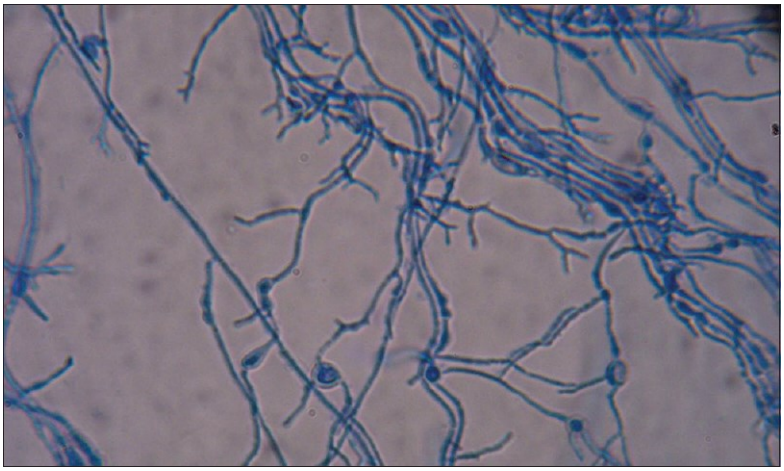
- Dermatophytosis (ringworm) can occur in different body parts and called accordingly such as:
  - **Tinea cruris** (jock itch): affects the **groin area**
  - **Tinea unguium** (onychomycosis): affects **fingernails & toenails** and causes their hardening & discoloration
  - **Tinea capitis**: affects the **scalp** and leaves circular patterns of **baldness**
  - **Tinea barbae** (Barber's itch): affects facial hair (**beard**)
  - **Tinea pedis (athlete's foot)**: affects the **feet**. The fungi invades the skin **between toes** and causes dry scaly lesions (sometimes blistering occurs)
  - **Tinea corporis** (body ringworm): affects the arms, legs, and trunk (in areas other than mentioned above)

Dermatophytosis

- Human-to-human transmission usually requires **close contact** with an infected subject or his detached skin or hair
- The great majority of dermatophyte infections pass through an **inflammatory stage** to **spontaneous healing**
- Most clinical and experimental evidence points to the importance of **cell-mediated Immunity**
- Delayed **hypersensitivity** responses **may occur**

Dermatophytosis

- Diagnosis:
  - The goal is to **distinguish** dermatophytosis from **other causes** of skin inflammation.
    - Infections caused by bacteria, other fungi, and non-infectious disorders (psoriasis, contact dermatitis) may have similar features.
  - **KOH mounts** of skin scrapings and infected hairs demonstrate **hyphae**.
  - Some species **fluoresce** by a **U.V. lamp**.
  - **Culture** is used when KOH preparations are negative



Dermatophytosis

- Prevention and treatment:
  - **No vaccines** are available
  - Prevention by **avoiding contact**
  - **Many** local skin infections **resolve spontaneously** without chemotherapy.
  - Treatment mainly by **topical azole** (miconazole, clotrimazole) and **allylamine** (tolnaftate, terbinafine) antifungals
  - **Tinea unguium and Tinea capitis** may require **systemic (oral) antifungals** such as griseofulvin, itraconazole and terbinafine (for weeks to months)

Tick Paralysis

- **Ticks** are ectoparasites that attach to the skin causing **local effect** (mild inflammation at bite site) or **systemic effect** (when hard bodied ticks attach to the back of the neck near the base of the skull & feed for several days).
- Ticks release **anticoagulants** (to prevent clotting & allow the tick to feed on it) & and some release **toxins** which cause **tick paralysis** mainly in children.
- Toxins cause fever & paralysis of limbs, respiration, speech & swallowing muscles which can lead to death by cardiac or respiratory arrest.
- Ticks must be removed to prevent permanent damage

Scabies

- Caused by itch **mite *Sarcoptes scabiei***.
- Causes itching & widespread lesions. **Scratching lesions** will cause them to bleed →**secondary bacterial infection**.
- Spread by **close contact & also sexually**.
- Treatment: **Permethrin** cream (insecticide) or **malathion** solution
- **Disinfection** of the linen & **strict isolation** are important **preventive** measures

Pediculosis (Lice infestation)

- To stay alive, lice must remain on their host for almost all their lives, they glue their eggs (nits) to fibers (clothing) or hair.
- 2 varieties of louse ***Pediculus humanus*** infest humans: one lives on the **body** & on clothing in temperate climates, the other lives on **hair**.
- Another variety clings to skin more tightly & causes more itching especially in **pubic area**.
- Results in **reddened areas** at bites sites, **dermatitis**, **itching** & due to lymph exudates from the lice
- **Secondary fungal infections** may occur.
- Transmitted by **close contact**
- Treatment: **permethrin** and **malathion**
- Prevention focus on sanitary conditions and **good hygiene**

Leishmaniasis

- Leishmaniasis is a parasitic disease caused by several species of the intracellular protozoan genus *Leishmania*.
- Leishmaniasis is prevalent worldwide including southeast Asia, Indo-Pakistan, Mediterranean, north and central Africa, and south and central America.
- Mainly transmitted by the several species of blood-feeding sandflies (i.e. *Phlebotomus*)
- Common causative agents:

	Old World	New World
Cutaneous	***L. tropica, L.major,*** *L. aethiopica*	*L. mexicana and L. peruviana*
Mucocutaneous	***L. aethiopica***	*L. braziliensis*
Visceral	***L. donovani,*** *L. infantum*	*L. chagasi*

Leishmaniasis

- Classification: 2 classifications
  - According to clinical manifestation:
    - Cutaneous leishmaniasis: affects skin
    - Mucocutaneous leishmaniasis : affects skin and mucous membranes
    - Visceral leishmaniasis : systemic infection
  - According to geographical distribution:
    - Old World leishmaniasis:
      - Africa, Asia, the Middle East, the Mediterranean, and India
    - New World leishmaniasis
      - Central and South America

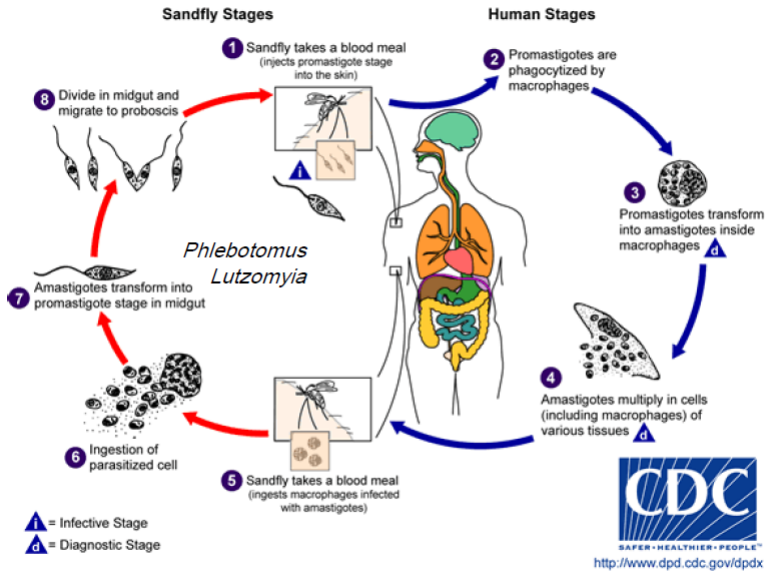
Leishmaniasis

- Life cycle:

  Leishmania can present in two forms:

  – Promastigote:
    - Extracellular growth
    - Long flagellum (motile)
    - Large 14 -20 microns
    - Found in the alimentary tract (gut) of sandflies

  – Amastigote :
    - Intracellular growth
    - Non-motile form
    - Small 2-5 microns
    - Found in the mononuclear phagocytes and circulatory systems of humans

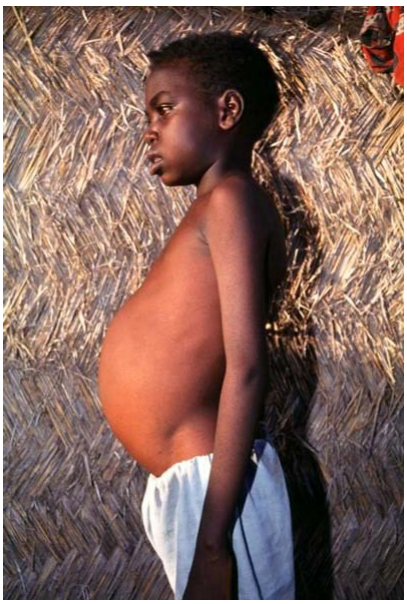


Leishmaniasis

- Clinical manifestation:
  - Cutaneous leishmaniasis:
    - The organism multiplies locally at the bite site producing a **papule** 1-2 weeks after the bite
    - The papule gradually grows to form a relatively painless **ulcer** whose center encrusts with time
    - The ulcer heals in 2-10 months, even if untreated but leaves a scar
    - The disease may disseminate especially in immunocompromised patients
  - Mucocutaneous leishmaniasis:
    - Initial symptoms are similar to those of cutaneous leishmaniasis
    - But then the organism can metastasize and the lesions spread to mucosal tissues (especially oral, pharyngeal and nasal) leading to their destruction and sever deformity

Leishmaniasis

- Clinical manifestation:
  - Visceral leishmaniasis:
    - The organisms are eliminated from the bite site but they multiply in the mononuclear **phagocytes** of spleen, liver, lymph nodes and bone marrow (RES)
    - After 1-4 months, **fever** occurs accompanied by **chills** and **sweating**
    - The **spleen and liver** progressively become **enlarged**
    - With progression of the diseases, skin develops **hyperpigmented** granulomatous areas
    - If untreated, visceral leishmaniasis is usually **fatal**



Leishmaniasis

- Diagnosis:
  - **Thin smear** from infected tissues (staining with **Giemsa stain**): diagnosis by direct visualization of the **amastigotes**
  - Serologic tests: detection of anti-leishmanial antibodies by immuno-fluorescence assays
  - PCR: species-specific
- Prevention:
  - **No vaccine** is available
  - Mainly by **vector (sandflies) control** and avoidance:
    - Insecticides
    - Insect repellents
    - Bed nets and window screen

Leishmaniasis

- Treatment: (**depends on geographical area and disease form**)
  - Pentavalent antimony compounds: for all forms (especially visceral) but serious side effects
  - Liposomal amphotericin B: for antimony-resistant mucocutaneous and visceral leishmaniasis
  - Pentamidine: for visceral form
  - Paromomycin : alone for cutaneous form, in combination for visceral
  - Miltefosine: newer alternative, for all forms, expensive