

**Tishk International University-**  
**Nursing**  
**Nosocomial Infection and Medical**  
**mycology**  
**lec 10**

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## **Nosocomial infection**

- Infections are considered nosocomial if they first appear 48 hrs or more after hospital admission without proven prior incubation or after a period of discharge.
- This also includes occupational infections among staff of the facility and patient companions.

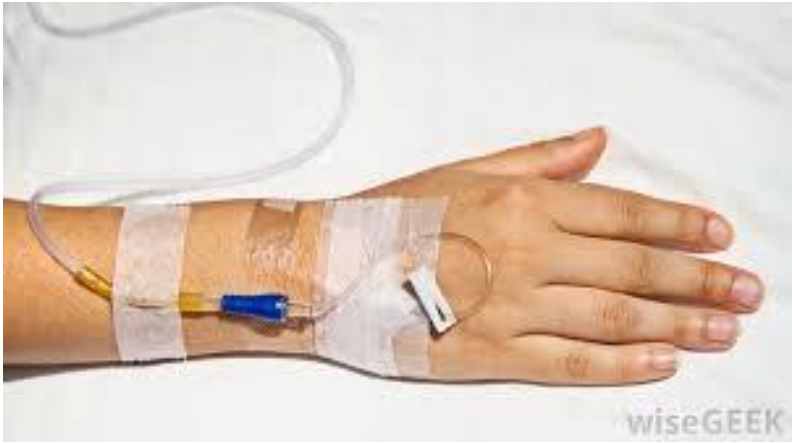
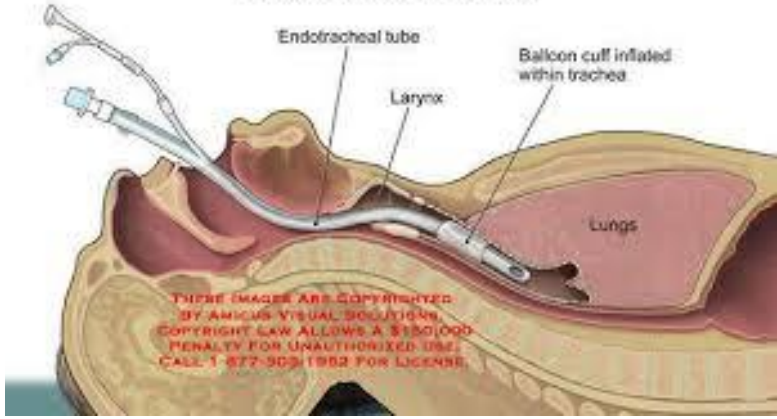
## **Common type of nosocomial infection**

- urinary tract infections (UTIs)
- surgical site infections
- gastroenteritis
- meningitis
- pneumonia

## **Risk factors for hospital acquired infections**

- *Certain invasive medical procedures*, such as intubation, urinary catheters and intravenous lines (drips) increase the risk of hospital.
- Patients who have had surgical procedures are obviously at risk of wound sepsis.
- Patients with burns are also at risk of infection of the burn wound, and great care is taken to keep the wounds as clean as possible while they heal.
- *Poor hospital organization*, which may include factors such as contaminated water and air conditioning systems, staff shortages, poor hospital layout e.g. beds too close to each other, and staff failing to follow hygiene and safety precautions such as hand-washing and adequate sterilization of equipment.

**Endotracheal intubation**



## **The symptoms for these infections may include:**

- discharge from a wound
- fever
- cough, shortness of breathing
- burning with urination or difficulty urinating
- headache
- nausea, vomiting, diarrhea

People who develop new symptoms during their stay may also experience pain and irritation at the infection site. Many will experience visible symptoms.

- **Mycology:** is the study of fungi and their multiple functions in nature.
- Fungi are eukaryotic organisms that do not contain chlorophyll, but have cell walls, budding ( unicellular), filamentous structures, and produce spores.

### **MEDICAL MYCOLOGY: disease cause by fungus**

There are four types of mycotic diseases:

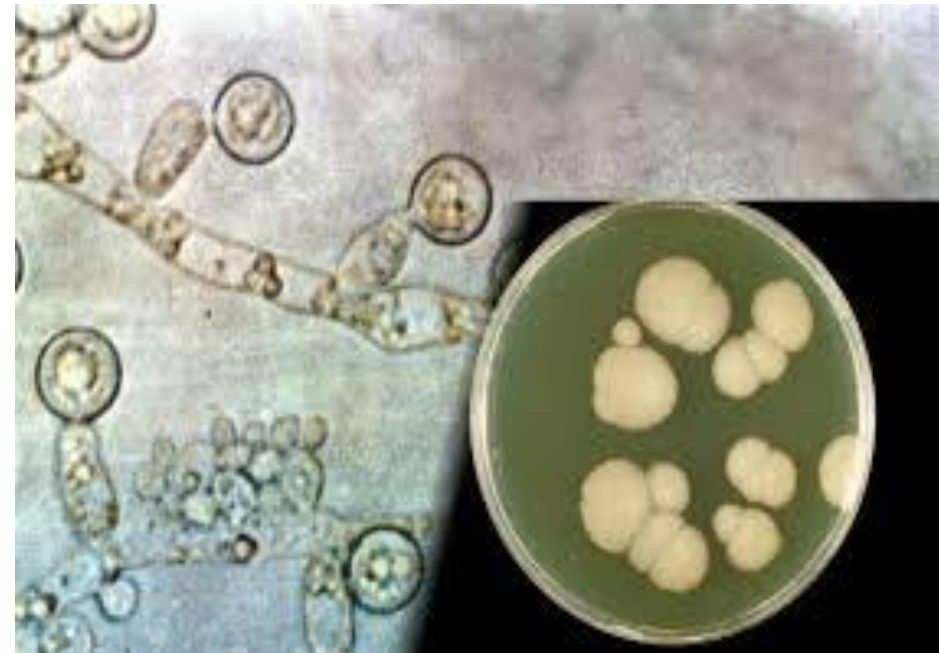
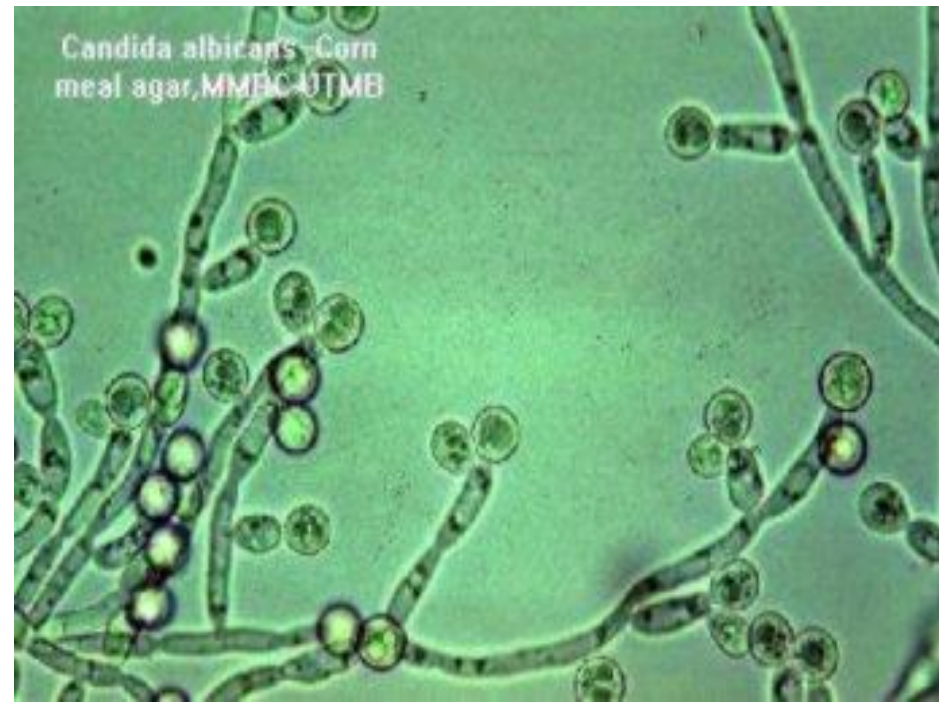
1. Hypersensitivity - an allergic reaction to molds and spores. Indoor air pollution
2. Mycotoxicoses - poisoning of human and animals by feeds and food products contaminated by fungi which produce toxins .
3. Mycetismus- the ingestion of pre-formed toxin (mushroom poisoning).
4. Infection: pathogenic fungi which cause infections. Most common pathogenic fungi do not produce toxins.

- **CANDIDIASIS (*Candida albicans*)**
- There are many species of the *Candida* that cause disease. The infections caused by all species of *Candida* are called candidiasis.
- Although this discussion is limited to *Candida albicans* it is important in clinical practice to specify *Candida* because drug resistance and treatment varies with species.
- *Candida albicans* is an endogenous organism. It can be found in 40-80% of normal human beings. It is present in the mouth, gut, and vagina.



# Oral Candidiasis

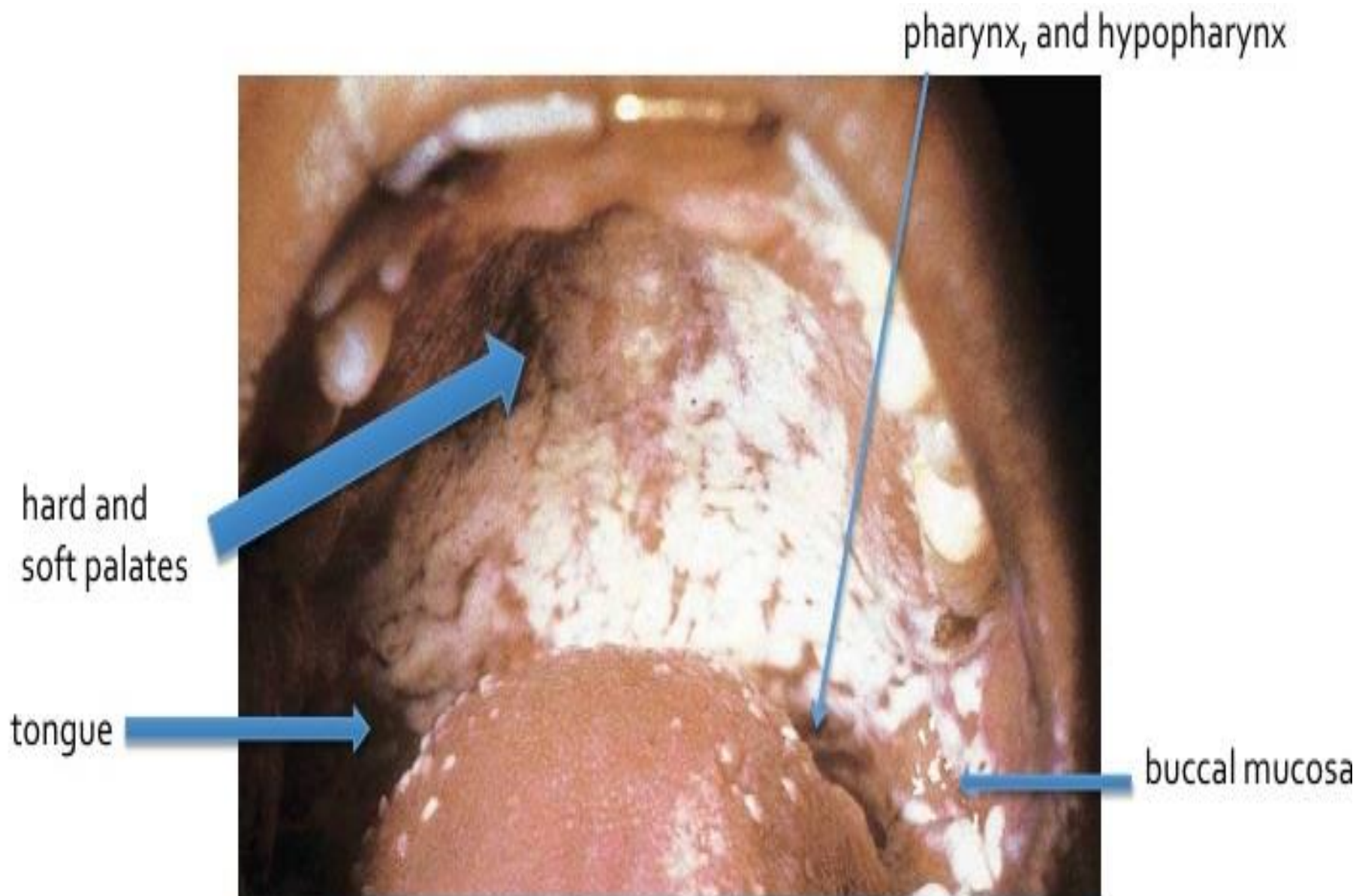
- Also known as moniliasis Or thrush or candidosis
- Caused by the infection with yeast like fungus ***Candida albician***.
- Other causative organism may be ***Candida tropicalis***, ***Candida Krusei*** ***Candida Glabrata*** and ***Candida parapsilosis***





# Pathogenesis

The pathogenesis is not fully understood , but a number of predisposing factors have the capacity to convert Candida from the normal commensal flora (saprophytic stage) to a pathogenic organism (parasitic stage) Seen in children and in adults of all ages.



**Figure 121-8** Oral candidiasis (thrush). (Courtesy of Dr. Stephen Raffanti.)

# Symptoms of Oral Candidiasis

-creamy white bumps on the tongue, inner cheeks, gums, or tonsils.

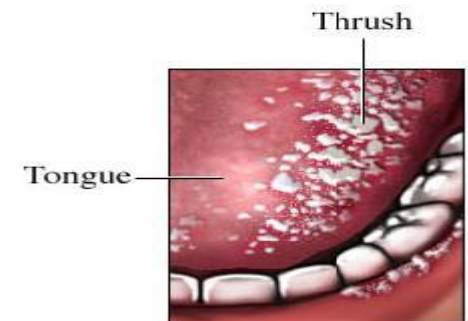


-slight bleeding when the bumps are scraped.

-pain at the site of the bumps.

-dry, cracked skin at the corners of the mouth.

-difficulty swallowing.



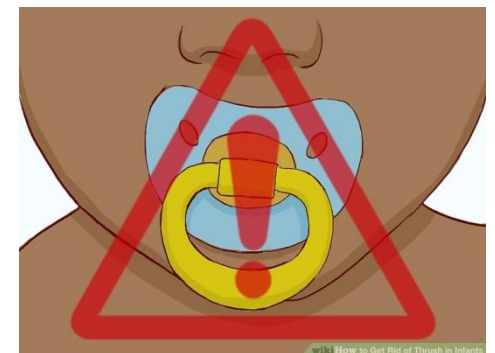
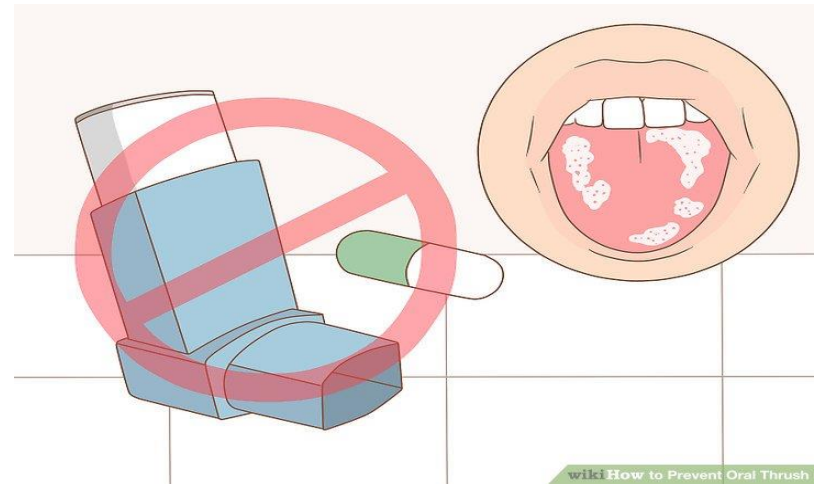
# Who is at risk ?

- 1- New born babies
- 2- Adults with diabetes or metabolic disorders
- 3- Denture users
- 4- People undergoing antibiotics or chemotherapy treatment
- 5- Drug users
- 6- People with poor nutrition
- 7- People with immune deficiency



# Prevention

- Good oral hygiene
- Don't smoke
- If some one has an underlying medical condition associated with thrush, such as diabetes, do best to keep it under control.
- Rinse out mouth after using a corticosteroid inhaler.
- chlorhexidine (CHX) mouthwash



- **DIAGNOSIS**

1. Wet Mount
2. Dermal Hypersensitivity
3. Direct fluorescent microscopy
- 4- Serology
- 5- Culture and biopsy
- 7- Molecular

- **TREATMENT**

- One of the first chemotherapeutic agents (oral iodides) was an anti-mycotic used in 1903,
- Development of anti-fungal agents.



- **Systemic mycosis:**
- **CRYPTOCOCCOSIS (Cryptococcus neoformans)**
- Cryptococcus is a genus of fungus. These fungi grow in culture as yeasts.
- The name Cryptococcus is used when referring to the yeast states of the fungi.
- Cryptococcosis manifests itself most commonly as meningitis but in recent years many pulmonary infections have been recognized.
- Infection may be sub acute or chronic. The highly fatal meningoencephalitis is caused by *C. neoformans*

The patients symptoms may begin with **vision problems, lethargy and headache, which then progress to delirium, nuchal rigidity leading to coma and death; unless the physician is thinking about cryptococcus and does a spinal tap for diagnosis and institutes aggressive anti-mycotic therapy.**

The CSF is examined for its characteristic chemistry , evidence of the organism measured by the visual demonstration of the organism.

(India Ink preparation) or by a serologic assay for the antigen of *C. neoformans* tests are use for identification. Death usually occurs due to cerebral edema and increased intracranial pressure. The ecological niche of ***C. neoformans* is pigeon and chicken droppings.**



- In addition to causing meningitis, *C. neoformans* may also infect lungs and skin. There has been an increase in the recognition of pulmonary infection.

# Route of cryptococcal meningoencephalitis

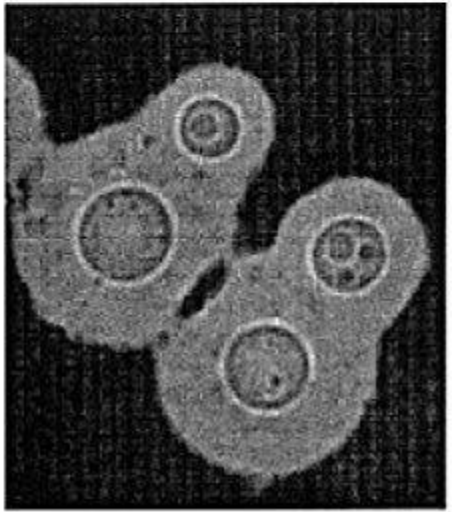
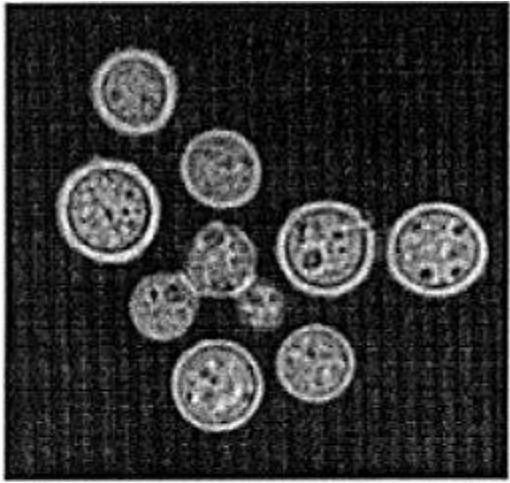
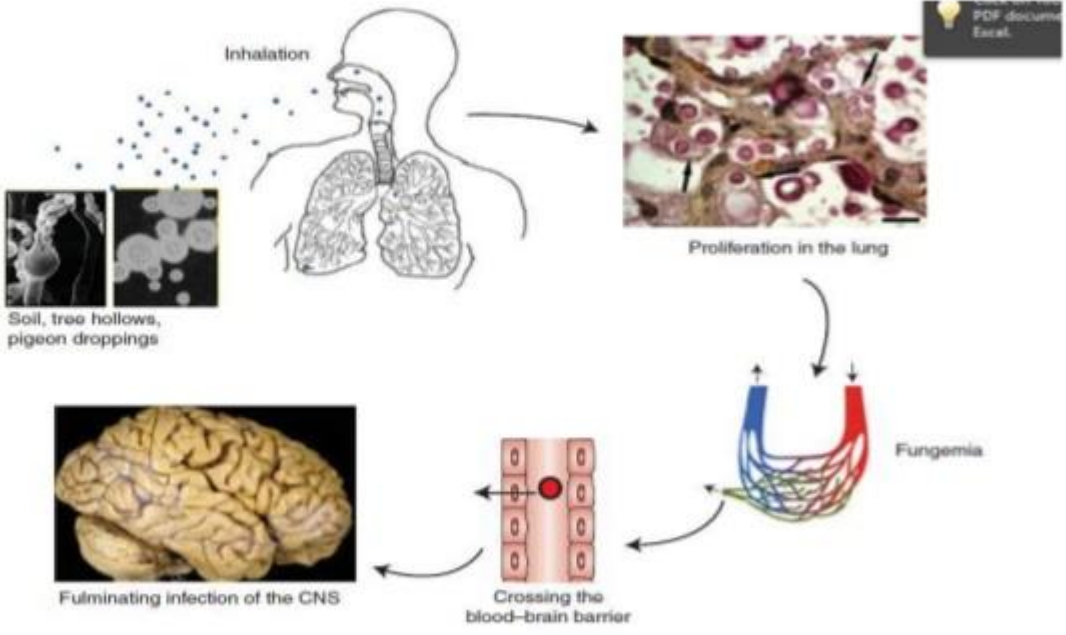


Figure 1. Route of cryptococcal meningoencephalitis. Airborne cryptococcal cells are inhaled by the host and proliferate in the lung before they hematogenously disseminate to the brain.

## • SUPERFICIAL MYCOSES

- The superficial (cutaneous) mycoses are usually confined to the outer layers of skin, hair, and nails, and do not invade living tissues. These fungi are called dermatophytes. Dermatophytes, or more properly, keratinophilic fungi, produce extracellular enzymes (keratinases) which are capable of hydrolyzing keratin.
- **Tinea means "ringworm" or "moth-like". Dermatologists use the term to refer to a variety of lesions of the skin or scalp.**

-Tinea corporis – small lesions occurring anywhere on the body.

-Tinea pedis – "athlete's foot." Infection of toe webs and soles of feet.



Tinea pedis  
(athlete's foot)



Tinea corporis  
(ringworm)

- *Tinea unguium* (onychomycosis) – nails. Clipped and used for culture. Infection usually lifelong.
- *Tinea capitis* – Fungus infection of the hair. Frequently found in children.
- *Tinea cruris* – “jock itch.” Infection of the groin,
- *Tinea barbae* – ringworm of the bearded areas of the face and neck.
- *Tinea versicolor* – Characterized by a blotchy discoloration of skin which may itch.

