

Examples of Fungal Diseases

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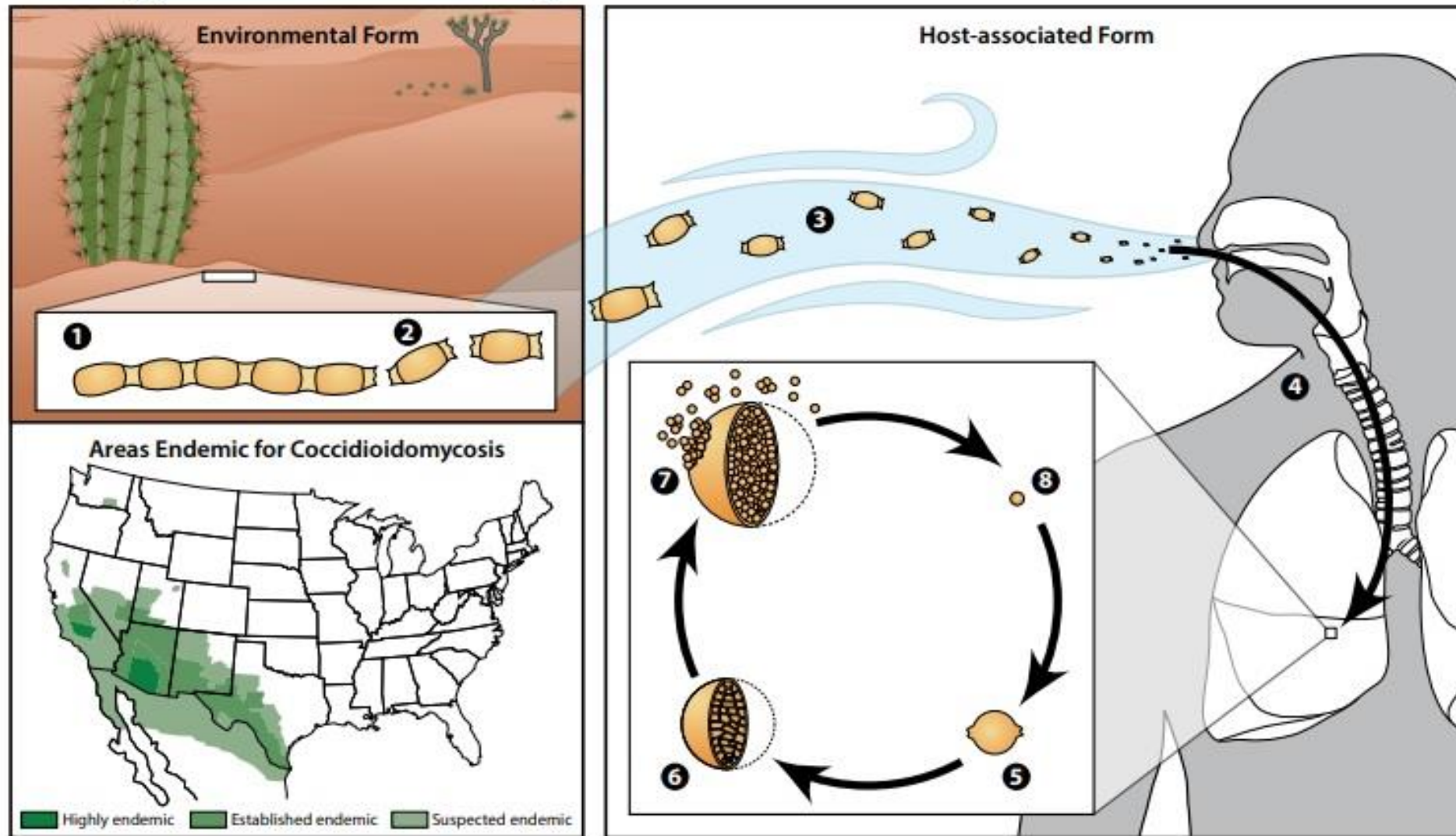
1. Coccidioidomycosis

- Also called → San Joaquin Valley Fever
- Caused by fungi belonging to **Deuteromycetes**
- Primary invader
- Dimorphic specie
- Spores inhalation in relatively high dose causes infection



- Primarily occurs in dry areas
- Vast majority of individuals are unaware of the infection → undergo spontaneous cure
- Mostly common in dark males
- **Common spp: *Coccidioides immitis***

Biology of Coccidioidomycosis

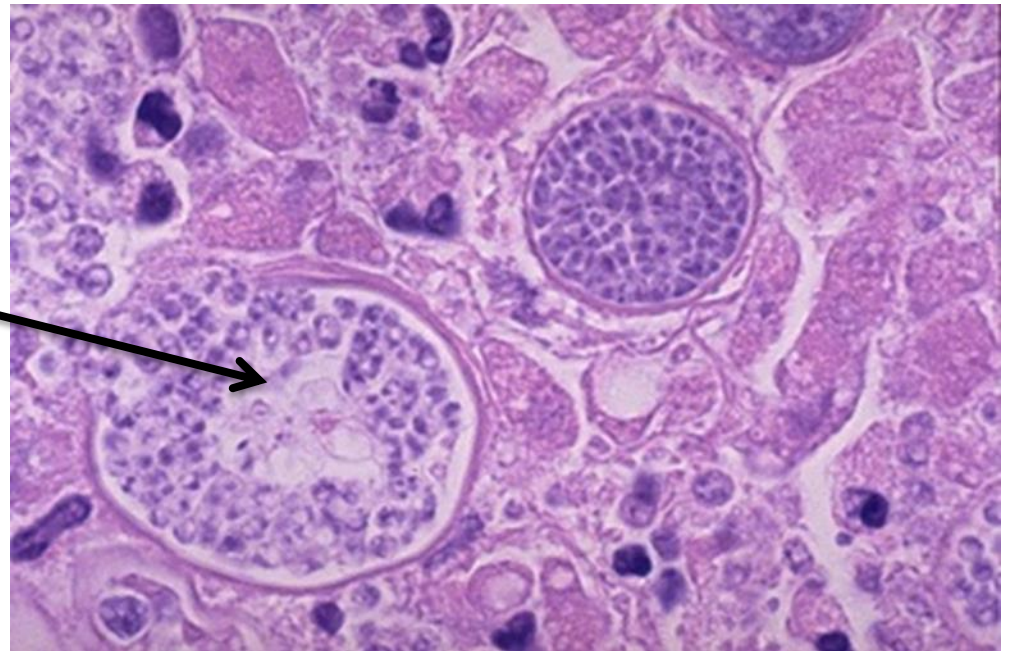


In the environment, *Coccidioides spp.* exists as a mold (1) with septate hyphae. The hyphae fragment into arthroconidia (2), which measure only 2-4 μm in diameter and are easily aerosolized when disturbed (3). Arthroconidia are inhaled by a susceptible host (4) and settle into the lungs. The new environment signals a morphologic change, and the arthroconidia become spherules (5). Spherules divide internally until they are filled with endospores (6). When a spherule ruptures (7) the endospores are released and disseminate within surrounding tissue. Endospores are then able to develop into new spherules (6) and repeat the cycle.

Symptoms

- ranges from mild to severe
- Mild: Disseminated fungal spores in blood or lymph causes lesion of skin, subcutaneous tissues
- Severe: like pneumonia or tuberculosis i.e. nodule formation in lungs

Ruptured nodule releasing numerous spores



2. Candidiosis

- Also belong to deuteromycetes
- Yeast like cells but pseudo mycelia are also produced (due to extensive budding)
- Normal flora of :
 - Mouth
 - Intestinal tract
 - Vagina
- Opportunistic pathogen due to:
 - Malnutrition
 - Unhygienic conditions
 - Predisposed to disease
 - Prolonged antibiotic therapy



Candida growth on media plate

- *Candida albicans* → most common pathogen

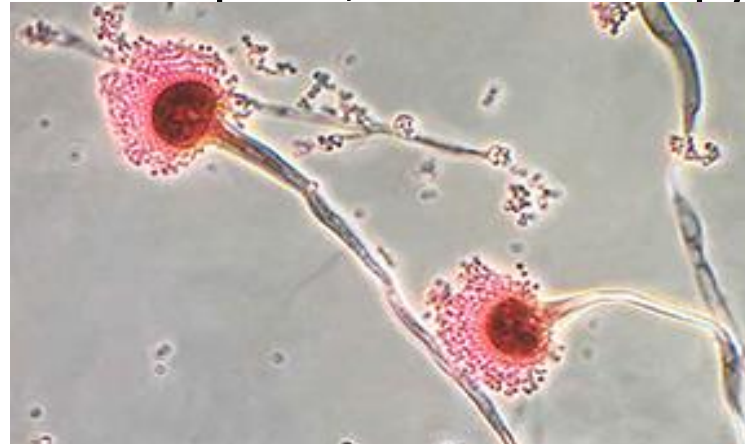
Lesions type:

- Disease of mucus membrane
 - Soft grey white lesions are formed
 - Enlarge to become patches
-
- Infection of
 - Skin , Fingers, Nails
 - Mouth, Digestive tract
 - Vagina
 - Internal vesra
 - Bones
 - Brain



3. Aspergillosis

- found growing on dead leaves, stored grain, compost piles, or in other decaying vegetation.
- Rarely occurs in healthy individuals but attack individuals with immuno-compromised condition
- ***Pulmonary aspergillosis*** → invasive type (*A. flavus*)
- serious infection with pneumonia
- can spread to other parts of the body
- occurs in people with a weakened immune system due to cancer, AIDS, leukemia, an organ transplant, chemotherapy, or other conditions.



Disease

ASPERGILLOSIS

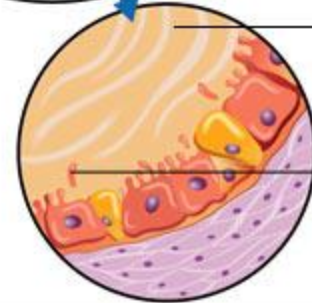
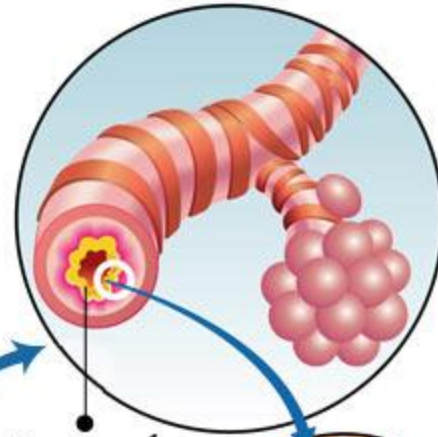
*Aspergillus
Fumigatus*

Lungs

Irritated
Airway

Excess
Mucus

Damaged
Cilia



SIGNS AND SYMPTOMS OF ASPERGILLOSIS



Pain in Chest

Vision Difficulties



Headaches



Blood in Urine



Pneumonia



Blood in Sputum



Anorexia

Mycotoxin: Aflatoxin

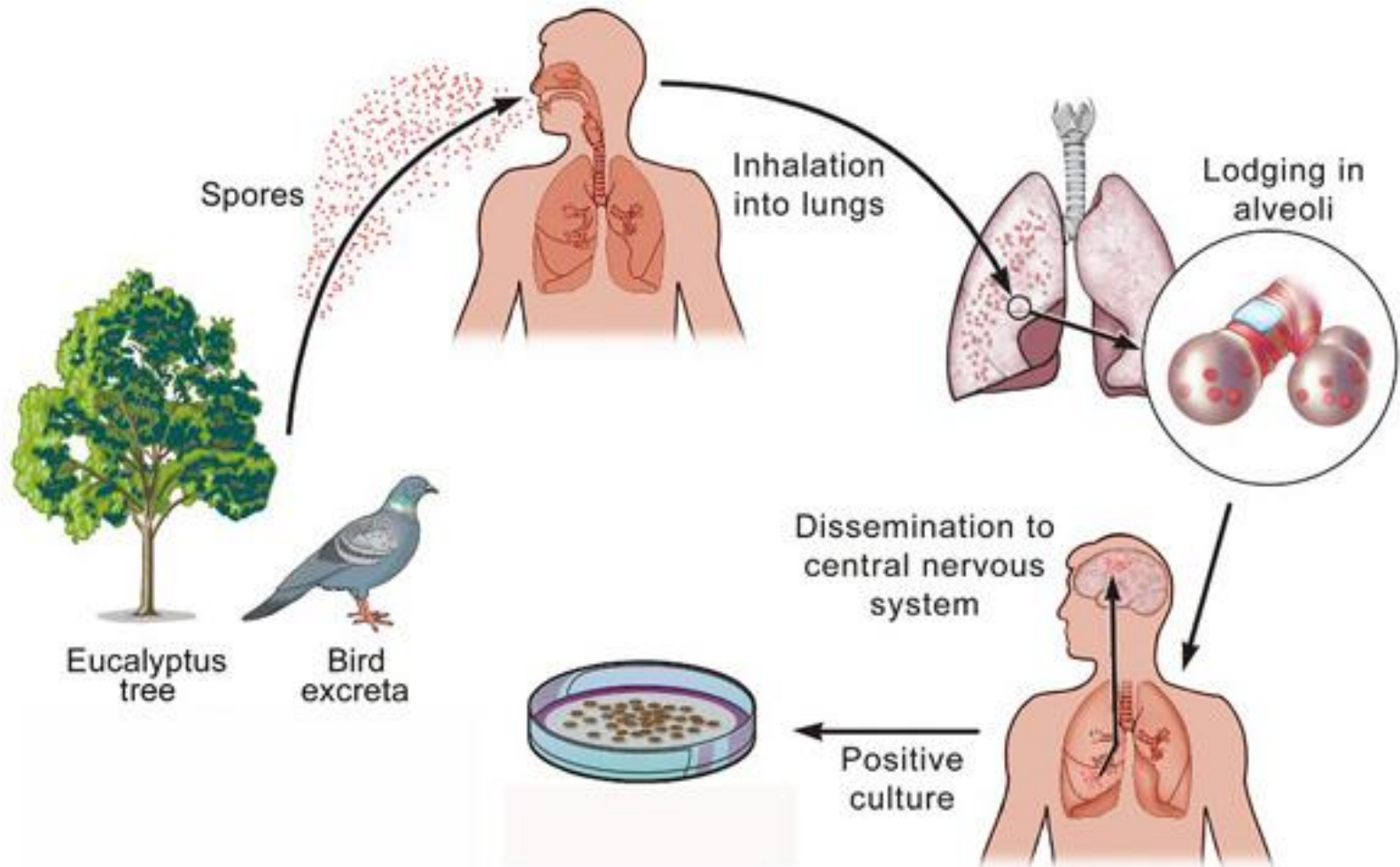
- Produced in food → entering plants before harvesting where they grow mycelia and produce mycotoxins that are eaten up
- Aflatoxin → produced by *Aspergillus flavus* and *A. parasiticus*
- (1960) 100,000 turkey people died
- Found on food (peanuts, cottonseed , cereals, wheat, corn etc)
- B & G most common types (AFB1 most common among all)
- AFM1 less toxic but transferred from mother milk to new born baby
- Causes:
 - Genomic mutations, chromosomal abnormalities,
 - developmental abnormalities,
 - Immune system
 - Cancer
 - (liver cancer most prominent in humans)

4. Cryptococcal infection

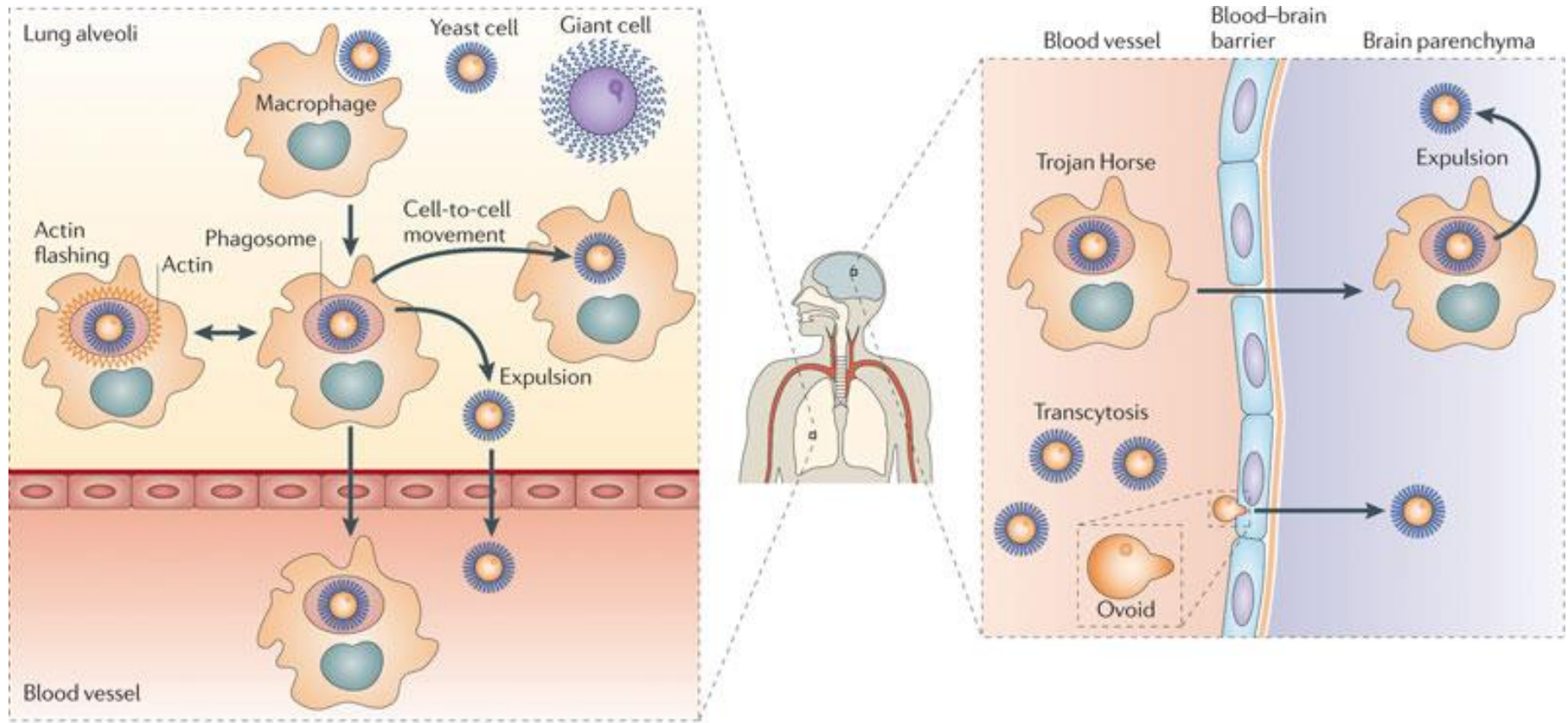
- Type of yeast (single celled) completely enclosed by acidic capsule
- cryptococcal meningitis and cryptococcal pneumonia
- Common species: [Cryptococcus neoformans](#). and [C. gattii](#)
- HIV /AIDS
- Risk in:
 - Steroids and immunosuppressive medications
 - Solid organ transplantation
 - Heart, lung, or liver diseases
 - Diabetes
 - Pregnancy



Found in soil and birds droppings
Inhalation of spores can cause disease



Entrerance of cryptococcus via macrophages to brain

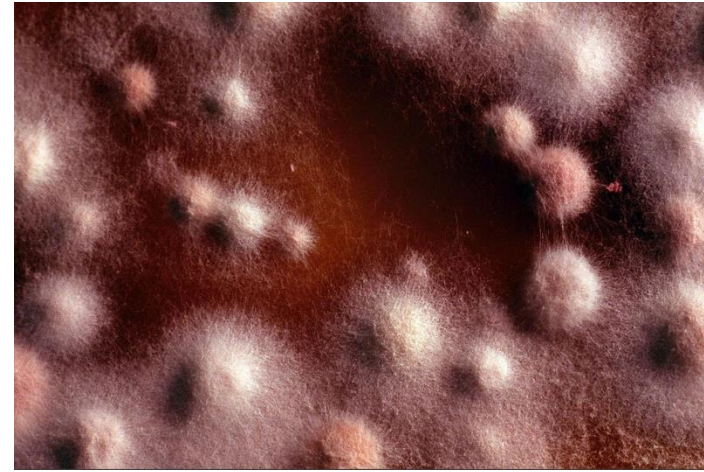


Symptoms

- pneumonia-like illness
- Shortness of breath
- cough
- fever *C. neoformans*
- Inflammation of the brain and meninges, which is called meningo encephalitis.
- disseminate to the skin, eyes, bones, and joints.



5. Dermatophytes



- skin, hair, and nail infections.
- ringworm" or "tinea."
- live on moist areas of the skin, on environmental surfaces, and on household items such as clothing, towels, and bedding.
- common types are *Trichophyton rubrum* and *Trichophyton tonsurans* (people to people)
- *Microsporum canis* (animal to people)
- 4 and 14 days incubation time

Symptoms



Ring worm



Athlete foot

- affect the skin on almost any area of the body
- scalp, legs, arms, feet groin, and nails.
- Itchy
- Redness
- Scaling & cracking of the skin
- ring-shaped rash
- If the infection involves the scalp or beard, hair may fall out. Infected nails become discolored, thick, and may possibly crumble. More serious infections may lead to an abscess or cellulitis.