SYSTEMIC MYCOSES

These are rare but very serious infections that can invade deeper tissues. Most are dimorphic displaying yeast-like characteristics at 37 degrees C and mold-like characteristics at 25 degrees C.

1. Coccidioidomycosis (San Joaquin Valley Fever)
   
   Etiologic agent – *Coccidioides immitis* - fungus is found in the soil of the California central valley. Arthrospores are inhaled. Symptoms include mild fever, chest pain, coughing and weight loss. Most recover in a few weeks. However, sometimes the disease persists as a progressive tuberculosis-like illness. The organisms can invade tissues where thick-walled bag-like structures known as spherules can be found. Spherules are filled with spores. Most individuals living in endemic areas (SW U.S.) possess antibodies made in response to exposure to the fungus. Amphotericin B and imidazoles can be used for treatment purposes.

2. Histoplasmosis
   
   Etiologic agent – *Histoplasma capsulatum* - upon initial examination this can resemble tuberculosis as X-rays can reveal a similar type lung involvement. This can spread systemically to include the blood, lymph, lymph nodes, spleen and organs. Within the U.S. the disease is most commonly found in areas around the Mississippi and Ohio rivers. Spores can be inhaled by coming into close contact with bat guano and chicken manure droppings, as they can be a source of the fungus.

3. Blastomycosis
   
   Etiologic agent – *Blastomyces dermatitidis* - the disease begins in the lungs and can initially mimic the symptoms of bacterial pneumonia. The infection can spread rapidly and cause skin ulceration and generalized tissue destruction. The fungus is concentrated in the U.S. around the Mississippi and Ohio river valleys as is the etiologic agent which causes histoplasmosis.
4. Cryptococcosis
Etiologic agent – *Cryptococcus neoformans* - the fungus is free living in the soil and can oftentimes be transmitted by inhaling contaminated dried pigeon feces. In tissues, the yeast-like cells can be observed in polysaccharide capsules. As is typical of these systemic fungal organisms, *Cryptococcus*, is usually nonpathogenic. However, in compromised individuals such as in AIDS patients, the organism can proliferate in CNS fluids and cause severe chronic and sometimes fatal meningitis.

5. Mucormycosis
Etiologic agent – *Rhizopus spp.* or *Mucor spp.* - these opportunistic fungi oftentimes are seen in compromised individuals who suffer from diseases such as diabetes or leukemia. Those using immunosuppressant drugs are also susceptible. Infection can involve the sinuses, brain or lungs.

6. Aspergillosis
Etiologic agent – *Aspergillus niger* or *Aspergillus nodulans* - compromised individuals who suffer from lung diseases or cancer can suffer from infections following the inhalation of spores. Lung complications can include the coughing up of blood. This can lead to severe or fatal hemorrhaging. Other organs including the kidneys or liver may become involved. *Aspergillus* can also infect the outer ear canal and cause an otomycosis. This can be acquired by swimming in contaminated water.

Note: *Aspergillus flavus*, found in moldy hay and peanuts, produces Aflatoxin. Aflatoxin is a natural mutagen and carcinogen which can cause hepatomas and liver damage.