Disease caused by fungal organisms (mycosis) occurs throughout the world. There are about 100,000 species of fungi, with less than 200 of them involved in fungal infections of animals or humans.

Fungus diseases vary greatly in clinical signs, incidence and geographic distribution. Skin infections such as "ringworm," found worldwide, are the most common. Systemic (internal) fungal diseases are less common overall, but in specific localized areas a disease of this group could be the most serious and common disease seen.

Histoplasmosis and blastomycosis are common in the Ohio and Mississippi river valleys, while coccidioidomycosis is common in the desert Southwest—but any of these can be seen elsewhere. Other fungi are found throughout the country, but are more common in hot, humid environments.

The importance of fungal diseases in animals must be kept in mind. "Ringworm" usually is not serious to the animal; however, it is important to diagnose and treat it properly because the animal can be a source of human infection.

Systemic fungal diseases are not directly contagious from animals to humans, but can be fatal to the infected animal or require long and expensive treatment. Some fungi are opportunistic. They are common in the environment but infect animals or humans only under unusual circumstances.

Fungal diseases often look like other diseases, which may
result in misdiagnosis and expensive, ineffective or harmful treatment.

'Ringworm' Infections
Three fungal organisms, Microsporum canis, Microsporum gypseum, and Trichophyton mentagrophytes cause nearly all the dermatophyte infections ("ringworm") in dogs and cats.

The cat is the preferred host for Microsporum canis. This organism will easily infect dogs and people. Infections result from direct contact with infected animals or infected hairs or skin.

Microsporum gypseum normally grows in the soil. Animals develop the disease by digging or otherwise contacting the infected soil.

Many species of animals, especially wild rodents, carry Trichophyton mentagrophytes. Their burrows are seeded with the organism and many dogs and cats develop "ringworm" by contact with these rodents or their burrows.

Lesions caused by dermatophytes are confined to the skin or haircoat and appear similar regardless of which organism causes them.

Cat lesions often are so mild they go unnoticed for years. Lesions may consist of broken hairs around the face, ears or feet, or reddened, scaly skin in areas of broken hair. In severe cases, scales and crusts may accumulate and the skin becomes thickened and itchy.

Dogs More Affected
Lesions in dogs usually are more severe. The hair is broken or gone, papules (small swellings), scales, crusts, and redness are more prominent signs. As the disease spreads from one hair follicle to another, a circular pattern of skin redness develops around a healing center. This looks somewhat like a worm under the skin, resulting in the term "ringworm."

Dermatophytosis is diagnosed by finding typical skin lesions, a history suggesting exposure to the organisms or contagiousness, and laboratory evaluation. Laboratory confirmation of the disease is especially important since the lesions alone can look like so many other diseases.

The most reliable laboratory test is fungal culture. Broken hairs or scrapings from the skin are placed on appropriate culture media and allowed to grow in a dark, moist area. The fungi will usually grow within 4 to 10 days, but cultures generally are held 3 weeks before de-
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declaring them negative. The organism can be identified by staining and microscopic examination.

An ultraviolet (Black or Wood’s) light may be used to help identify some Microsporum canis infections.

Skin scrapings may be cleared of debris with sodium hydroxide and examined under a microscope for spores of fungi. Experienced personnel can identify fungal diseases with this technique, but identification of the specific organism usually is not possible.

**Treatment.** Dermatophyte treatment aims are: Cure the infected animal and prevent reinfection or infection of others.

Hair in and around the animal’s lesion should be clipped off and disposed of. Local treatment with baths, dips, creams or lotions containing antifungal agents are then prescribed. Oral medications such as griseofulvin or ketoconazole may also be used.

Treatment needs to continue 6 weeks or longer in most animals.

Isolating infected animals, cleaning and/or disinfecting the premises, and washing well after treating infected animals are important in preventing human infection and spread to other animals.

**Systemic Infections**

Three diseases generally are classified as systemic fungal infections because they can involve any or all of the body systems. They are: Blastomycosis, caused by Blastomyces dermatitidis, histoplasmosis, caused by Histoplasma capsulatum, and coccidioidomycosis, caused by Coccidioides immitis.

All these organisms are found in the soil in endemic areas. Blastomyces and Histoplasma prefer moist soil enriched with bird or bat droppings and Coccidioides prefers hot, dry, alkaline soils. All three diseases result from inhaling infective spores from soil. They all grow in the body in a noncontagious yeast form.

Many animals and humans living in endemic areas have had these diseases, developed immunity and recovered without the problem being realized. The diseases start with respiratory signs such as cough, rapid breathing, or pneumonia and fever. When these diseases become severe or chronic, the result may be weight loss, loss of appetite, inactivity and even death.

Each of the diseases has
signs more specific to that disease. Severe diarrhea is common with histoplasmosis but not with blastomycosis or coccidiodomycosis. Nodular draining skin lesions are common with blastomycosis but uncommon in the other two diseases. Coccidiodomycosis frequently affects the bones—resulting in swellings, lameness and fractures—while that is much less common with the other two diseases.

Laboratory confirmation of these diseases is needed even though the diagnosis may be suggested by history and physical findings. The most reliable finding is locating the organism in discharges or body fluids by cytology or in the tissue by biopsy. Blood tests (serology) may be helpful but are not as reliable as finding the organisms.

Treatment of animals for these diseases requires months of therapy with expensive and potentially toxic drugs. Amphotericin-B is considered the most effective treatment. It must be given intravenously and often causes kidney damage.

Ketoconazole is a newer, less toxic drug that can be given orally but has not been as effective in acute illness and is quite expensive.

It is becoming common practice to use both drugs in early treatment and then continue with ketoconazole alone after a few weeks.

Direct infection of humans from infected animals has not been reported. Humans can become infected from the same source as their animals.

Subcutaneous Types
These fungus diseases are so named because the main clinical sign is a nodule or abscess just under the skin. The organism usually is introduced into the body from bite wounds, rose thorns or other foreign bodies, or accidents. The three most common diseases in this group are: Sporotrichosis, phycomycosis and mycetoma.

Lesions of the diseases are nodules or tumor-like masses on the skin. They may have openings which drain reddish or yellowish fluid or which exude granules. Besides the skin lesions, sporotrichosis may become systemic and affect any of the organ systems. Frequently phycomycosis involves only the gastrointestinal tract of the dog, resulting in vomiting, diarrhea, and rapid weight loss.

The diseases are diagnosed by finding the causative
organisms in infected tissue. Sporotrichosis can be cured by several months of therapy with sodium iodide if the disease has not become systemic. Sodium iodide may also be used to treat the systemic disease but results are poor. Mycetoma and phycomycosis lesions can be cured if they can be surgically removed. When that is not possible, treatment usually is not successful.

With the exception of sporotrichosis, humans are not likely to get these diseases from animals. If infected material gets in a wound, any of them have the potential to cause disease.

Other Infections
A number of fungal organisms are present in the environment which can cause disease only when the animal’s immune system is compromised. Immune suppression can be a result of drug therapy with cortisone type steroids or anticancer drugs, and immunosuppressive diseases.

The most common symptoms associated with these diseases are respiratory (coughing, sneezing, nasal discharge) with cryptococcosis and Aspergillus infections, and ear infections with Candida, Pityrosporum and Aspergillus.

Some animals become severely debilitated.

The diseases are treated with various drugs but most important is to take steps to improve the animal’s general health. These diseases are not considered contagious to humans.