ZOONOTIC DISEASE DESCRIPTIONS

(for complete descriptions of symptoms,
see Health Sciences Library, Library Resources, E-Books, eMedicine)

Rodents

SALMONELLA is a commensal organism of animals including cattle, sheep, pigs, rats, hamsters, guinea pigs and birds; the organism is found in the feces of animals. Over 90 percent of all reptiles harbor Salmonella. Animals may be asymptomatic, but may transmit the infection to humans. Typical signs of human infection include watery diarrhea, abdominal pain and a low-grade fever. Care must be taken to prevent dehydration. This organism is a common source of bacterial food poisoning.

YERSINIOSIS (pseudotuberculosis; Yersinia enterocolitica) is ubiquitious and is found in dust, soil, water, and milk. Infections are commonly seen in humans, birds, rodents, rabbits, guinea pigs, mice, cats, sheep, swine and goats. Direct contact with the organism, or contact with fecal contaminated food/water may cause infection in humans. Human cases have been attributed to pets – particularly sick puppies and kittens. In addition, the pharynx of pigs may be heavily colonized with this organism. Signs of infection include acute watery diarrhea, fever, headache, anorexia, vomiting, post-infection arthritis, hepatosplenic abscesses, osteomyelitis and septicemia. In some instances, the disease may be confused with appendicitis.

TUBERCULOSIS (Mycobacterium species) can be transmitted to humans from infected animals or tissues via an aerosol route. In addition, exposure to bedding from infected animals, droplets from coughing animals, and aerosolization of the organism during cleaning procedures may place individuals at risk. Infected individuals may experience cough, sputum production and hemoptysis; individuals may be asymptomatic for extended periods of time (for example, years). Some individuals may also experience anorexia, weight loss, fever, fatigue, chills and cachexia. Skin lesions (ulcers) may also occur.

COLIBACILLOSIS (Colibacteriosis, white scours, gut edema of swine) is a disease which causes severe diarrhea and dehydration in newborn calves. E. coli is the causative agent. It can also cause serious disease in suckling pigs and is characterized by watery diarrhea that can progress to fatal dehydration. This is an acute disease with a sudden onset; animals may appear uncoordinated and experience edema of the stomach and/or eyelids. Some strains may infect fowl and cause Hjarre's disease. Adult fowl experience granulatomous lesions in the liver, cecum, spleen, bone marrow, and lungs. Humans infected may have watery diarrhea, abdominal pain, vomiting and dehydration. Enteroinvasive strains may cause bloody mucoid diarrhea.

STAPHYLOCOCCOSIS (staphylococcal alimentary toxicosis; staphylococcal gasteroenteritis) has a main reservoir in humans, although infected cows, fowl and dogs may infect humans. Approximately one-third of healthy humans harbor staphylococci in their nasopharynx and on their skin. Sneezing, coughing and spitting can all infect food. Food may also be contaminated via food handling by an infected person. Milk from infected cows can also infect humans, as can infected eggs. Humans with

staphylococcus infections experience nausea, vomiting, abdominal pains and diarrhea. Toxic shock syndrome in women is caused by this agent.

PSITTACOSIS is caused by an obligate intracellular pathogen (Chlamydia psittaci) that is primarily passed to humans via contact with infected birds; ovine strains may infect pregnant women. The agent is passed to humans mainly by inhalation of dry feces, or via direct contact with feces or respiratory secretions. The organism is particularly hardy and may survive outside of a host for several months. The incubation period is one to two weeks; fever, chills, myalgia, headache, anorexia and coughing are typical symptoms. Pneumonitis may also occur. Toxic/septic forms of the disease characterized by hepatosplenomegaly, hepatitis, meningioencephalitis and cardiac involvement may occur. Ovine infections of pregnant women are particularly dangerous – these are life threatening. They may cause late abortion, neonatal death and disseminated intravascular coagulation in the mother.

PLAGUE (plague, pest, Black Death, pestilential fever) is endemic to wild rodents in the southwestern United States. Reservoirs include the domestic rat (Rattus rattus) and the urban rat (Rattus norvegicus). Human infections often result from contact with infected fleas or rodents. Dogs and cats can serve as passive transporters of infected fleas. Human infections from non-rodent species are often the result of contact with infected tissues, scratches, bites or handling of infected animals. Exposure to respiratory secretions from infected cats or contamination of mucous membranes or skin wounds may also result in human infection. Incubation in humans is two to six days; Bubonic plague is the most common form of the disease in humans and is characterized by fever, and swollen, tender lymph nodes. Pneumonic plague is a systemic disease involving the lungs – mortality is high (50 percent). Disseminated intravascular coagulation may occur resulting in areas of skin necrosis.

LEPTOSPIROSIS (Weil's disease, hemorrhagic jaundice, canicola fever) is caused by pathogenic leptospires belonging to the species Leptospira interrogans. The natural reservoirs in humans are dependant on serovar: L. canicola (dogs), L. pomona (swine) and L. icterohaemorrhagiae (rats). Rats, mice, field moles, guinea pigs, rabbits, hamsters, reptiles, livestock and dogs may all serve as reservoirs. Rats and mice are common hosts of L. ballum. Mouse infections are often asymptomatic and lifelong. Rodents can shed infectious organisms throughout their lifetime in the absence of clinical signs of disease. The only clue to infection may be clinical disease in individuals handling animals.

LYME DISEASE is caused by a spirochete (Borellia burghdorffi) and is transmitted by ixodid ticks, mainly Ixodes dammini. White-tailed deer are the main host, but the ticks also parasitize dogs, horses and humans. Larvae feed on rodents, particularly mice. The nymph stage is the stage primarily responsible for parasite transmission to humans. Birds are a reservoir of infection. Characteristic physical sign of infection includes the appearance of a bullseye rash which develops in the area of the tick bite (seen in 60 percent to 80 percent of infected individuals). Flu-like symptoms are also common. Some patients may have cardiac involvement (atrioventricular block, cardiomyopathy, heart failure, myocarditis, pancarditis), neurological symptoms (meningitis, neuropathy, encephalopathy) or arthritis, which is the most common sequelae (found in 60 percent of infected individuals). Disease may be latent for several years.

CAMPHYLOBACTER can be isolated from dogs, cats, hamsters, rabbits, swine, sheep and birds. Infection after contact with sick animals is well described. Transmission is believed to be due to fecal-oral transfer, as well as via ingestion of contaminated food and water. The infectious agent is shed for at least six weeks after infection. Symptoms include an acute gastrointestinal illness, diarrhea, abdominal pain and fever. While the disease is normally self-limiting, septicemia and arthritis have also been described.

RAT BITE FEVER is due to infection with pasteurella, which is found in the oral cavity and upper respiratory tract of rabbits, rodents, dogs, cats, mice, birds, and swine. Both dogs and cats may be silent carriers of the disease. Human infection is due to infection of wounds caused by bites or scratches. Animal to animal transmission may be the result of ingestion and/or inhalation. Local inflammation at the site of injury may lead to abscess formation and systemic involvement.

HANTAVIRUSES cause a serious illness in humans characterized by fever, myalgia, headache and respiratory failure. Gastrointestinal illness, hemorrhagic disease and renal involvement may also occur. Rodents are the primary reservoir of the disease; the fatality rate in humans is greater than 50 percent. While laboratory rats have been a source of infection in other countries, there have been no cases of Hantavirus infection associated with laboratory mice or rats in the United States. The main route of transmission is via aerosolization, as large amounts of virus can be isolated from feces, urine, and saliva. Because there is virus in the saliva, it may be possible to transmit the virus via a bite. Humans may also become infected when infected bedding is disturbed, or when the virus comes in contact with broken skin, or via the conjunctivae. It may also be possible to become infected via ingestion of contaminated food or water. In Europe, Hantavirus has been isolated from immunocytomas and ascites tumors, which can transfer infection to uninfected animals.

LYMPHOCYTIC CHORIOMENINGITIS VIRUS (LCMV) is a common infection of wild mice. Asymptomatic infections may occur in both mice and hamsters, which may be infected at birth. Animals may shed virus for life and is excreted in saliva, urine and feces. Human infections occur via contaminated food and dust, as well as via handling of contaminated tissues. Humans may present with flu-like symptoms. In severe cases, meningitis, paralysis or coma may result.

GIARDIA infections of humans are often asymptomatic. Humans are a reservoir for the disease, although dogs may serve as a zoonotic source of infection. Persons may be infected via fecal contamination of water or food, or person-person contact. Some individuals may develop clinical disease characterized by greasy diarrhea, cramps, abdominal cramping, flatulence and lassitude.

TETANUS (Clostridium tetanii) is transmitted through puncture or crushing breaks in the skin. Infection with tetanus is of concern with bites from any animal, or from injuries that may result from working around animals. Mortality from tetanus is 70 percent (untreated) and is characterized by muscle spasms in the back, neck and jaw. Vaccination is effective in preventing the disease; booster shots should be given every ten years, or if there is an acute injury.

DERMATOPHYTOSIS is caused by an obligate parasite localized from lesions of infected hosts. It is a natural disease of sheep, goats, rabbits, lizards and humans. Humans may become infected following contact with infected animals. Arthropod vectors may transmit the disease between animals, although objects that have had contact with lesions may also transmit the pathogen to a new host.

TULAREMIA is transmitted by handling tissues of infected animals, although human infections due to cat bites/scratches have been reported. Rabbits are a major reservoir of the organism. Biting insects, inhalation and ingestion are additional means of transmission. Fever, headache and nausea occur acutely, with development of a local lesion that then ulcerates. Regional lymph nodes become enlarged and tender. In instances of cases transmitted via infected blood or inhalation, pleuropulmonary disease may occur. Ingestion of infected meat or water may cause an enteric form of the disease characterized by enteritis, stupor and delirium. In all forms of the disease splenic enlargement may occur, as well as non-specific rashes, myalgia and prostration. The pulmonary and enteric forms of the disease may carry a case fatality rate of 5 percent to 10 percent.

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Amphibians

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AVIAN INFLUENZA is also known as bird flu, avian influenza A, or H5N1. Avian influenza represents a group of viruses. The information outlined is specific for H5N1, the avian influenza virus of most interest to public health officials. Bird flu is caused by an infection with avian influenza virus and is very contagious among wild birds and can also infect and kill some domesticated birds such as chickens, ducks, and turkeys. Bird flu does not usually infect humans, but several cases of human infection have been reported since 1997. Infected birds shed flu virus in their saliva, nasal secretions, and feces. Susceptible birds become infected when they come in contact with these secretions. It is thought that most human cases of bird flu have resulted from contact with infected poultry or their secretions. Person to person transmission is extremely rare. Symptoms of infection in humans are fever, cough, sore throat, muscle aches, pneumonia, eye infections, and severe respiratory distress. The death rate has been reported to be approximately 50%.

Goats/Sheep/Pigs

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BRUCELLOSIS causes serious disease in cattle, sheep, dogs, and swine. The most common source of lab infection is due to the use of random source dogs. Ingestion of unpasteurized milk or handling of infected fetuses, fluids, membranes or urine may be responsible for human infections. Lymphadenopathy, splenomegaly, fever, chills, headache, orchitis, weakness, weight loss and nausea are typical symptoms. There is a chronic form of the disease that may relapse and remit over a period of years. Antibiotics cure approximately 80 percent of the cases; fatality of untreated cases is below 2 percent.

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TRICHINELLA SPIRALIS is an intestinal nematode found in swine, dogs, cats, rats and other animals. Pigs are normally infected following feeding on uncooked scraps or infected rats. Infection of humans occurs.

Q FEVER is the disease caused by Coxiella burnetii. Animals infected include sheep and goats, although dogs, cats, and chickens may also be infected. Lab infections have been traced to infected (asymptomatic) ewes. The organism is shed in urine, feces, milk and birth products of sheep and goats. C. burnetti is resistant to drying and may persist in the environment for long periods of time. Transmission may occur via an aerosol route, or by contact with infected tissues, particularly amniotic and fetal tissues. Ingestion and contamination of laundry may also be responsible for disease transmission. The organism has an incubation period of two weeks to one month. Many cases are asymptomatic, but fatality rates may be up to 60 percent. Febrile illness or subacute endocarditis (which may be complicated in persons with preexisting valvular disease) may result. Half of infected individuals have pulmonary involvement. Other symptoms include severe frontal headache with accompanying retro-orbital pain, sweating, myalgia and nausea.

CONTAGIOUS ECTHYMA is found in goats and sheep. Transmission occurs by direct contact with virus which is found on the muzzle, eyelids, oral cavity, feet and external genitalia. Humans develop large painful nodules usually on their hands which resolve in one to two months.

LISTERIA has been isolated from fish, birds, swine, ruminants, guinea pigs, gerbils and rabbits. The main reservoir of the organism is water, mud, forage and silage. In humans, it is largely the result of contamination of ingestion of contaminated food. Neonatal transmission is possible. Frequently human cases are asymptomatic. Fever, headache, nausea, vomiting, endocarditis, meningitis, conjunctivitis, and metritis with abortion may also be associated with infection. Granulomatous lesions and abscesses of the liver and other organs, as well as focal necrosis of the placenta may also occur. Fatality rates of 20 percent may occur.

Dogs and Cats

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RABIES causes a disease that is almost invariably fatal. Transmission to humans occurs via transmission of virus in the saliva via bite, scratch or abrasion. Tissues and fluids from infected animals may also transmit the disease. Aerosol transmission may also occur when animals shed virus in the feces. Typical hosts in the United States include bats, foxes, nonhuman primates, raccoons, skunks, cattle, cats and dogs. Bites from any of these animals require immediate medical attention, usually involving administration of passive vaccination. Once symptoms occur, the disease is normally fatal. Symptoms include an inability to drink (hydrophobia), muscle spasms and extreme excitability. Convulsions may follow.

TOXACARA CANIS / TOXACARA CATI are the causative agents of visceral larval migrans. T. canis is frequently latent in female dogs and reactivated during pregnancy. Offspring are infected via the placenta and milk. Infection of humans usually occurs in children who ingest eggs from the soil or sand contaminated with animal feces. Infection does not occur via direct contact with infected animals, as there is an external development period of three to four weeks that is required of the eggs. Once developed to the infective stage, the eggs remain infective for years. Once in the human, larvae may induce fever, coughing, wheezing, hepatomegaly, splenomegal and lymphadenopathy. Eosinophilic granules may form in regions where larvae have lodged, particularly the lungs, liver, eyes and brain. The lungs and liver are the most common sites.

CUTANEOUS LARVAL MIGRANS is due to Ancylostoma braziliense and A. caninum, the dog and cat hookworms. Humans become infected by skin contact with larvae, soil to skin contact, or contamination of animal feces. At the site of larvae entry, small, pruritic erythematous papules are common. The site of the migrating larvae is indicated by serpiginous eruptions in the area of the migration. The lesions may become severely pruritic, vesiculate and become secondarily infected. In the absence of treatment, the larvae will eventually die.

TOXOPLASMOSIS is a common asymptomatic infection of humans. Domestic cats are a major source of human infection (both in the home and laboratory). Rats, mice, guinea pigs, hamsters, rabbits, dogs, and sheep have all been shown to be intermediate hosts of the organism, although there have been no reports of human infections from these sources. Human infection occurs via a fecal-oral route, consumption of infected flesh, or transplacentally. Clinical infections in humans are usually observed in older or immunosuppressed/immunocompromised individuals. Congenital infections may result and is associated with severe neuropathological changes. Pregnant women should not have contact with litter

boxes. Clinical signs include fever, skin lesions, malaose, myalgia, pneumonia, cervical lymphadenopathy, myocarditis, meningoencephalitis, and chorioretinitis.

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