BRUCELLOSIS
In animals, this disease is also known as Bang’s disease or contagious abortion. In humans, it is referred to as Mediterranean fever or undulant fever. Brucellosis is caused by infection with bacteria within the genus Brucella including Brucella abortus, B. canis, B. melitensis, B. ovis, and B.suis. Animals most frequently infected include cattle, sheep, goats, pigs, and dogs. It is unlikely that animals raised for use in research will harbor the disease. Symptoms in animals include abortion, infertility, and testicular abnormalities. Infected animals may also not display any signs of illness. Transmission to humans in a laboratory setting is by the direct contact of broken skin or the mucous membranes (such as eyes or mouth) with infected animal birth products (aborted fetuses, fetal fluid and membranes, and secretions), blood, or urine. The bacteria can also be transmitted through inhalation of aerosols. Symptoms usually develop in humans within one-two months of infection.

Clinical signs in humans may include fever, headaches, nausea, weight loss, orchitis (inflammation of testicles), painful joints, and swollen lymph nodes. The chronic (undulant) form may present as acute and intermittent attacks of illness and fever. Without treatment, these symptoms may persist either continuously or intermittently for years. The treatment of infected humans involves the prolonged administration of antibiotics. Transmission of Brucella can be prevented through utilization of good personal hygiene and strict sanitization methods, and by wearing personal protective equipment especially when working with pregnant host species or their birth products. Birth products should be disposed of promptly and carefully. Contaminated surfaces should be appropriately disinfected.

Additional information regarding brucellosis can be found at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm

Capnocytophaga canimorsus and C. cynodegmi
The bacteria Capnocytophaga canimorsus, can frequently be isolated from the mouth of dogs and cats where it causes no disease. However in humans, a severe infection can occur if the organism is introduced into tissues such as during an animal bite or when the animal’s saliva contacts a pre-existing open wound. Clinical signs usually develop within approximately 5 days and initially consist of tissue swelling, pain, drainage from the site, and inflamed lymph nodes. Without treatment, these signs may progress to fever, vomiting, diarrhea, abdominal pain, malaise, difficulty breathing, mental impairment and headache. The disease can be fatal. Individuals with impaired immune systems, those who have had a splenectomy, and those who abuse alcohol are at increased risk of
developing a severe or fatal disease. Infected individuals are frequently treated with antibiotics.

Transmission of the disease is decreased by wearing personal protective equipment including gloves when handling dogs or cats. In addition, all dog or cat bite wounds should be evaluated by medical personnel.

Additional information regarding the recommended treatment of animal bites that occur at the University of Michigan is available at:  
http://www.oseh.umich.edu/bitescratchprotocol.pdf

Additional information regarding Capnocytophaga canimorsus can be found at:  
http://www.cdc.gov/ncidod/eid/vol12no02/05-0783.htm

**Cat-Scratch Fever**

*Bartonella henselae*, a disease-causing bacterium, has been directly associated with cat-scratch fever. This organism has been demonstrated to produce chronic, asymptomatic infection, especially in younger cats, for at least 2 months, and possibly for as many as 17 months. The organism has been isolated from fleas that fed on infected cats, and fleas have been shown to be capable of transmitting the organism between cats. This finding suggests that fleas could serve as a vehicle in zoonotic transmission. A recent prevalence survey indicated that approximately 49% of pet and pound/shelter animals have blood cultures positive for this organism. Of patients with the disease, 75% report having been bitten or scratched by a cat, and over 90% report a history of exposure to a cat. The disease begins with introduction of the organism into the skin (bite or scratch) of an extremity, usually a hand or forearm. A small bump appears at the site of inoculation several days later, and is followed by blister and scab formation. The lesion resolves within a few days to a week. Several weeks later, regional lymph node swelling occurs, and can persist for months. Pus formation and rupture of the lymph node sometimes occurs. Cat-scratch fever can progress to a severe systemic or recurrent infection that is life-threatening in immunocompromised people.

The use of proper cat-handling techniques, protective clothing, and thorough cleansing of wounds should minimize the likelihood of personnel exposure to the organism of cat-scratch fever.

Additional information regarding toxoplasmosis can be found at:  
http://www.cdc.gov/healthypets/diseases/catscratch.htm
GIARDIASIS
Numerous mammals including dogs, cats, nonhuman primates, pigs, sheep, and goats, can all be natural hosts for giardia, a protozoa. Additional laboratory animals (i.e. rabbits, mice) can become infected with Giardia. However, due to the strictly controlled environment in which the animals are raised, natural infection is unlikely. Infected animals may not show any signs of illness or may exhibit diarrhea, weight loss, vomiting, or anorexia. Management of infected animals includes sanitation of the environment, prompt removal of feces, and treatment with antiparasitic agents. Giardia infection is transmitted to humans when a person ingests infected fecal material such as when a fecally contaminated glove or piece of equipment contacts a human’s mucous membranes. Infected humans may develop diarrhea, a loss of appetite, abdominal cramps, vomiting, fever, and chills. These signs appear approximately 7-10 days after infection. Infection is diagnosed by testing of a stool sample and is treated with antiparasitic agents as well as through supportive care. The practice of good personal hygiene, such as hand washing after handling animals and their environment, the use of personal protective equipment, and effective environmental sanitation are most important in preventing disease transmission to personnel.

Additional information regarding Giardia can be found at: http://www.cdc.gov/Ncidod/dpd/parasites/giardiasis/factsht_giardia.htm

Hookworms
Hookworms are zoonotic parasites that infect dogs and cats. There are many different species of hookworms and they usually thrive in tropical climates where it is hot and humid. The eggs of these parasites are shed in the feces of infected animals and contaminate the soil where the animal has defecated. After 1-2 days the eggs will hatch in the environment and the larvae will molt into their infectious state in 4-7 days. Humans typically become infected when unprotected skin is exposed to soil contaminated with the infectious larvae.

In humans, hookworm infection is localized to the skin. The hookworm enters the skin of a human and causes a reaction that is red, itchy and painful. Slender red tracts appear in the skin where the larvae have been and these tracks move day to day as the parasite moves through the epidermis.

In dogs and cats hookworm infection can create dermatitis and redness where the larva enters the skin. Unlike people, animals can also present with anemia, weakness, anorexia, dark reddish-brown diarrhea, and wasting. Younger animals are typically at higher risk for severe infections.
Wearing shoe covers and avoiding skin contact with infected soil or feces is the best prevention of hookworm. Prompt disposal of feces will ensure the eggs won’t have time to develop into the infectious larval state. Having a routine deworming protocol in place for all dogs and cats will also prevent hookworm infections in both animals and people. If an animal is suspected of having a parasite infection, stool samples are typically taken to confirm hookworm larvae or eggs are present in the feces.

More information regarding hookworm infection can be found at: http://www.cdc.gov/parasites/zoonotichookworm/

LEPTOSPIROSIS
A spirochete bacteria, *Leptospira interrogans* can infect a wide range of laboratory animal species including mice, rats, hamsters, guinea pigs, gerbils, dogs, cats, pigs, sheep, hamsters, and nonhuman primates. However, infection is highly unlikely in animals specifically bred and raised for use in research. Infection can result in varying symptoms across species. Mice and rats may be asymptomatic, while dogs may exhibit kidney and liver disease and sheep may experience reproductive failure. Nonhuman primates may exhibit blood clotting abnormalities or abortion. Transmission to humans may occur if the individual’s abraded skin or mucous membranes come in contact with the urine or tissues of infected animals or equipment contaminated with these substances. It is also possible for humans to contract the disease through inhalation of fine particles of contaminated fluids that may be generated during high-power washing of contaminated equipment. Symptoms in humans may include fever, chills, weakness, pain, and headache. The severe form of the disease results in impaired kidney and liver function, as well as mental status changes, and possible death. The best methods of control are good sanitation with appropriate animal waste control and appropriate use of personal protective equipment when handling animals.

Additional information regarding Leptospirosis can be found at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm

Methicillin-Resistant Staphylococcus aureus (MRSA)
Recently MRSA has become more prevalent in both animals and humans in both the clinical and surgical setting. MRSA is a type of Staph bacteria that is resistant to a certain class of antibiotics called beta lactams, which include methicillin, penicillin, and amoxicillin. Staph organisms are found naturally on the skin of most people. MRSA is an opportunistic pathogen meaning it colonizes more easily when there is low immune resistance to disease. Therefore, MRSA is typically seen in the hospital setting where it can be easily spread from patient to patient.
MRSA has been reported in dogs, cats, pigs, horses, cows, and many other species. In animals MRSA enters and colonizes in open wounds. Abscesses, dermatitis, post-operative infections, and catheter implant sites are common sites for MRSA infections. Cats and dogs are usually colonized from MRSA strains found in humans.

There is growing concern that MRSA can be transmitted from animals to people. There have been reports of people developing MRSA who have worked in close contact with dogs and cats that are harboring the bacteria. MRSA colonization does not necessarily lead to infection, but it can predispose people to other opportunistic pathogens. Clinical signs in humans typically present as skin infections. Infected areas appear as pustules or boils that may be mistaken for spider bites. The bumps are red, swollen painful and pus may also be seen draining from the site. Signs of a more severe MRSA infection vary from blood steam infections to pneumonia and can lead to potentially life threatening situations. Historically these severe infections are seen in people that have undergone surgery in the hospital, and they are not common in the regular laboratory setting.

MRSA infection can occur in any geographic setting, and can appear anywhere in the body. The biggest risk factor in contracting MRSA is accidental exposure of an open cut or wound when handling infected animals. Therefore it is important to practice good hygiene, such as frequent hand washing, when working closely with laboratory animals. Gloves should be worn at all times, and any breaks in the skin should be covered whenever handling laboratory animals. Appropriate disinfection protocols should be followed if an animal is suspected of having MRSA.

For more tips on MRSA prevention and the symptoms seen with a MRSA infection please refer to: http://www.cdc.gov/mrsa/

PASTEURELLOSIS
Pasteurellosis is caused by infection with the bacteria in the genus, Pasteurella. The lab animal reservoir for pasteurellosis is cats, dogs, rabbits, guinea pigs, and pigs. Infected dogs and cats rarely display signs of infection. However, in rabbits signs may include respiratory illness, nasal discharge, ear infections, abscesses, and genital infections. A large percentage of rabbits (30%-90%) in conventional colonies may be carriers although infection is very rare in rabbits bred for research. This disease is transmitted to humans through bite wounds or rarely through the air (aerosol transmission).

Of significant importance, Pasteurella spp. is commonly isolated from the site of dog and cat bites. Reported signs in humans include redness and painful

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swelling at the site of the bite as well as enlarged lymph nodes. These signs usually appear 24 hours after the bite and may be treated with antibiotics. All dog or cat bite wounds should be evaluated by medical personnel.

Additional information regarding the recommended treatment of animal bites that occur at the University of Michigan is available at: http://www.oseh.umich.edu/pdf/BiteScratchProtocol.pdf

Additional information regarding Pasteurellosis can be found at: http://www.vetmed.lsu.edu/animal_bites.htm (2nd link)

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**Plague (Yersinia pestis)**

Plague is caused by a bacterium called *Yersinia pestis* that can cause disease in rats, rabbits, and cats. While antibiotics have decreased the incidence of plague in society, if left untreated the disease can cause severe illness and potentially death. Plague has been found in wild rodents and rabbits in the western United States.

Plague is transmitted primarily through bites of fleas infected with the bacterium. Fleas found on animals can bite the animal or human handling the animal and simultaneously transfer the bacterium into the blood stream. People typically show symptoms 2-6 days after receiving a bite from an infected flea. The most common form of disease is called bubonic plague, and usually presents as a fever with chills, and enlarged, painful lymph nodes. The plague can also be transmitted directly from animal to person by breathing in air droplets contaminated with Yersinia pestis. Although this route of transmission is less common it results in a more severe form of the disease. People that contract this form of the disease, called pneumonic plague, develop life threatening symptoms extremely quickly. Clinical signs are similar to bubonic plague but also include labored and increased breathing with a cough that becomes progressive with blood stained sputum.

Cats infected with *Yersinia pestis* will develop the bubonic form of the plague. Plague in cats is characterized by fever, lethargy, and enlarged lymph nodes. As the disease progresses, abscesses, lesions, and ulcers may develop on the affected lymph nodes, and signs of vomiting, diarrhea, and weight loss may be present. Dogs that contract the disease are typically asymptomatic and show no clinical symptoms. Rodents harboring disease can have mild to severe infections or have no symptoms at all.

Flea control programs are important for the control and prevention of plague in dogs and cats. Appropriate precautions should be taken around animals suspected of plague. PPE should include gloves, and face mask or shield to
protect from air born droplets, eye protection, and protective gowns. For more information regarding plague prevention and signs please consult: http://www.cdc.gov/ncidod/dvbid/plague/index.htm

RINGWORM (DERMATOPHTYOTOSIS)
Ringworm can be found in the following lab animal species: dogs, cats, guinea pigs, nonhuman primates, sheep, and goats. The causative organism is a fungus, not a worm that may infect fur/hair, skin, and nails. The organism can persist in the environment for extended periods of time. Infected animals may not exhibit any signs of infection or may develop areas of alopecia (hair loss) and erythema (redness/inflammation). Lesions may or may not be itchy. The rate of infection is typically low in rodents, dogs, cats and rabbits raised for use in research. Ringworm can be transmitted to humans by direct contact with infected areas of skin or through contact with a contaminated object. Lesions in humans may appear as flat, spreading, ring-shaped lesions in the skin and often appear within 10-14 days of the exposure. As the lesions increase in diameter, the center often returns to a normal appearance. However, skin lesions may develop different appearances and can only be definitively diagnosed through culture or laboratory examination of the skin. Transmission of an infection can be prevented through use of appropriate personal protective equipment including gloves and protective clothing and through appropriate environmental sanitation. Infected humans are frequently treated with a topical antifungal ointment for a prolonged period. If the lesions are extensive then oral fungicides may also be used.

Additional information regarding ringworm infection can be found at: http://www.cdc.gov/healthypets/diseases/ringworm.htm http://www.nlm.nih.gov/medlineplus/ency/article/001439.htm

Toxocariasis (Round worm infection)
Toxoplasmosis is a zoonotic parasitic infection caused by the roundworms that inhabit the GI tracts of dogs (Toxocara canis) and cats (Toxocara catii). Roundworms are found worldwide in the soil. Dogs and cats become infected with round worms by ingesting the parasitic eggs from the soil or contaminated feces. Humans typically get round worms from accidental ingestion of soil contaminated with feces containing round worm eggs.

Young dogs and cats usually present with the more severe symptoms of roundworm infection. In puppies symptoms include poor growth, and an enlarged abdomen. Sometimes diarrhea, constipation, vomiting, coughing, and nasal discharge may be present. If severe, puppies can die suddenly from parasite obstruction. Kittens are less severely affected by roundworms and can even be asymptomatic. If the infection is more severe, abdominal distension, a
roughened hair coat, diarrhea, and dehydration may be seen. It is common practice to place puppies and kittens on a deworming medication in the first few months of life to prevent roundworm infection.

Toxoplasmosis infection in many species, including humans, is common, but manifestation of the clinical disease is rare. It is estimated that 14% of the U.S. population has been exposed to toxocara. There are two major forms of toxocara infection in humans; the visceral form and the ocular form. The visceral form of toxoplasmosis occurs when the round worm larvae migrate through the organs of the individual causing tissue destruction. A high parasite load or a recurrent infection will likely cause this form of toxoplasmosis. This form of the disease can be asymptomatic in humans or it can cause a series of symptoms consisting of fever, weakness, and enteric signs. Visceral toxoplasmosis can persist for months, and if left untreated can become severe resulting in heart complications, neurological signs, and pneumonia. The ocular form is more common and occurs when the larvae of the round worm migrate through the eye causing inflammation and other eye problems. This form can cause sudden and permanent blindness. Typically only one eye is affected at a time.

If animals are suspect for roundworms, feces should be removed before the eggs develop into their infectious state. Roundworm eggs usually have to develop for 1-2 weeks in the environment before they become infectious to animals and humans. Therefore if feces are removed in a timely manner infection can be more easily prevented. Hand washing and good hygiene should be practiced. Implementing good deworming protocols, especially in puppies and kittens, will also aid in the prevention of roundworm infection.

For more information regarding toxoplasmosis and round worm infection in animals consult: [http://www.cdc.gov/parasites/toxocariasis/](http://www.cdc.gov/parasites/toxocariasis/)

**TOXOPLASMOSIS**

*Toxoplasma gondii* is an intracellular coccidian protozoa. Nearly all warm-blooded animals may become infected with the agent although cats are the only animals that can shed infective materials. Adult cats are generally asymptomatic, but young or immunocompromised cats may have vomiting, diarrhea, difficulty breathing, a loss of appetite, eye lesions, and abdominal pain.

A large percentage of the human population has been exposed to the agent. Transmission to humans in a animal research setting, is by ingestion of infective materials from sources contaminated with cat feces (i.e. litter boxes). Diagnosis is made through a series of blood tests. In most healthy humans, the infection results either in no signs of illness or in a mild flu-like illness. In these cases, treatment is rarely necessary. More severe signs may include fever, swollen lymph nodes, pneumonia, and rashes. Immunosuppressed persons may
develop a more severe, life-threatening form of the disease requiring aggressive treatment. Infections of pregnant women may lead to birth defects including blindness, severe neurologic disease, and mental retardation of the infant.

Pregnant women or immunocompromised individuals should avoid contact with or wear gloves when handling cat feces or soil. Cat litter and feces should be disposed of promptly and gloves should be worn when handling potentially infective material.

Additional information regarding toxoplasmosis can be found at: http://www.cdc.gov/toxoplasmosis/

If you have had an exposure, illness symptoms, and need medical attention please refer to the information in the Bite Scratch Protocol.

Contact the UCUCA Office at 763-8028

References:


CDC Dogs http://www.cdc.gov/healthypets/animals/dogs.htm
CDC Cats http://www.cdc.gov/healthypets/animals/cats.htm