The ancestor of the pet or laboratory mouse is the house mouse. Mice (*Mus musculus*) are not the most popular pets. They do, however, have a variety of coat colors and patterns that are of interest to breeders, and they can be maintained in a very small space. Unfortunately, their smell (feces, urine) is unacceptable to many people.

Pet mice generally are quite tame, although they will bite quickly if mishandled. Housing systems similar to those used for gerbils and hamsters are used, and a variety of diets are available commercially.

**Fast Breeders**
Mice breed rapidly, and once they reach sexual maturity (4 to 8 weeks of age), they can produce a new litter every 3 to 4 weeks. The number of new babies soon can overwhelm the inexperienced owner.

The most common pet mouse is the white or "Swiss," an outbred mouse. Because of the extensive use of mice in research, numerous inbred strains have been developed. An inbred strain is produced by 20 generations of brother to sister mating, and results in animals that have essentially the same genetic makeup.

**Respiratory Ills**
Several organisms can cause respiratory disease in mice: *Mycoplasma pulmonis*, Sendai virus, Pneumonia Virus of Mice, *Pasteurella pneumotropica*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, and *Bordetella bronchiseptica*.
Infection with Sendai virus is the most common. Certain inbred strains are particularly susceptible to Sendai virus, and sickness and death rates can be high. Some affected animals will not show clinical signs; others will exhibit respiratory chattering or clicking sounds, labored breathing, and cyanosis (blue color). Some animals will walk continuously in circles and/or develop a head tilt due to middle and inner ear infections.

Diagnosis often requires evaluation of clinical signs, cultures, serological tests, and pathology. Systemic antibiotics can be of benefit when there is a colony outbreak; however, therapy alone usually will not eliminate the causative organisms. A vaccine that protects against Sendai virus is available commercially.

Chlorination and/or acidification of the water supply is especially helpful in the control of Pseudomonas.

It is very difficult to prevent exposure to the agents of respiratory disease in the pet environment. In the laboratory, the development of physical barriers—for example, isolator cages, isolator racks, barrier buildings, filter top and microisolator cages, cesarian rederivation—have been successful. The use of filter top cages and/or microisolator cages can help in the maintenance of pet animals.

**Barbers and Fighters**

A number of different skin conditions are seen in mice. Mice will chew on the hair of cagemates (barbering) during establishment of social groups, and affected mice will have patchy or generalized hair loss. Isolation of the "barber" (the fully haired animal in a cage containing several animals with hair loss) will eliminate the condition. The condition is seen fairly commonly in certain strains of mice, for example C57BL and C3H, but usually is rare in white mice.

Mice, especially males of certain strains, fight frequently. Bite wounds, generally on the tail and tail head, are seen.

The wounds can become contaminated with bacteria—for example, group G *Streptococcus* and *Staphylococcus aureus*—and high death rates can result. *Staphylococcus* can also cause abscesses of the face, and preputial gland infections which are seen as swellings on the posterior ventral abdomen.

Animals that fight should be separated, and mice should
be placed in cages together at weaning rather than later in life.

**Mouse pox** (ectromelia), caused by a pox virus, is not commonly seen in the United States. However, several outbreaks have occurred in research colonies in the past few years. The disease is extremely serious, and high death rates can occur. Affected animals become lethargic, go off feed, lose weight, develop skin papules or pustules, and may lose their limbs, feet, and tails or die suddenly without lesions.

Diagnosis is based on serological testing and histopathologic and electron microscopic evaluation of affected tissues. The skin lesions require differentiation from fight wounds, trauma, and bacterial and fungal infections.

Treatment is not recommended, and affected animals should be euthanized to prevent spread of the disease to other mice. Prevention is based on quarantine and serologic testing, especially for animals coming from outside the United States.

**Mites and Mice**

Mice are very commonly infected with a variety of mites (*Myobia musculi, Myocoptes musculinus, Myocoptes rombutsi, Radfordia affinis, Ornithonyssus bacoti*) that can cause severe irritation and inflammation due to self-trauma and hair loss. Repeated use of any of a number of insecticides is generally effective in controlling these parasites. Lice (*Polyplax*) are rare, and lesions generally minimal.

Intestinal disease can be caused by several different infectious agents. Mouse hepatitis virus is widespread and a cause of diarrheal disease and high death rates in young mice prior to weaning.

Certain inbred strains of mice are particularly susceptible. Older mice may die, but usually no clinical signs or only mild diarrhea or stunted growth is seen. Reovirus Type 3 can cause diarrhea and an oily hair coat in mice around 10 to 14 days of age.

A specific strain of the bacterium *Citrobacter freundii* causes a severe disease in suckling and newly weaned animals called colonic hyperplasia.

Affected animals are debilitated and have ruffled hair coats and arched backs, and diarrhea may or may not be present. Death can occur 3 to 5 days after initial signs. Sulfonamides have been used with some success, and other
antibiotics may be beneficial. The condition often resolves spontaneously as the animals become older.

**Internal Parasites**
Mice can be infested with pinworms (*Syphacia obvelata, Aspiculuris tetraptera*) and tape-worms (*Hymenolepis nana* and *Hymenolepis diminuta*). These parasites rarely cause clinical disease. *Hymenolepis nana* can have a direct life cycle—that is, no intermediate host required—and can directly infest man.

The protozoans *Spironucleus muris* and *Giardia muris* are capable of causing high death rates in mice between 3 and 5 weeks of age when other stress is present. Affected animals become lethargic, have hunched posture, do not gain weight, develop sticky stools, and have gas- and fluid-filled intestines due to the presence of large numbers of parasites. Dimetridazole is effective in reducing the death rate.

**Toxins, Tumors, Defects**
Low doses of streptomycin and procaine have caused deaths in mice. Exposure to low levels of chloroform causes high death rates, especially in some strains of male mice, for example C3H. The two most common types of tumors in mice are lymphomas (leukemia) and mammary gland tumors. Viruses are responsible for many of these tumors. Enlarged lymph nodes, enlarged spleen, and general lethargy and debilitation are seen with leukemia.

Mammary gland tumors occur on the abdomen, chest, and back, as normal mammary gland tissue has extensive distribution in the mouse. Metastasis (spread to other organs) of mammary gland tumors is not very frequent. The virus is transmitted to nursing young in the milk.

Because of the numerous strains of inbred mice that have been developed, a variety of genetic defects are seen commonly in pet mice, for example, hydrocephalus, hydrenephrosis (kidney disease), and missing limbs and eyes. This fact is important to remember when evaluating health problems in mice and other rodents.

**Further Reading**
*The Mouse in Biomedical Research.* Edited by H.L. Foster and others. Academic Press, Order Department, Orlando, FL 32887-0015. Volume I, $65.00; Volume IV, $90.00.