

Mice (laboratory mouse)

1. The most commonly used species

According to a report in *Science* (288: 248-57) in 2000, the number of experimental mice used worldwide has exceeded 25,000,000 every year, which is twice as many as in the 1980s, and accounts for 90% of all mammals used for scientific purposes above. It is the most commonly used species today and has the largest number of strains and ethnic groups.

The reason why mice are widely used for scientific purposes is not only because they are the most suitable experimental animal model among the commonly experimental animals today, but also because they are the most important genetic engineering animal model. Therefore, in the following 10 years, other mice have been used for scientific purposes. Usage should continue to increase at a rate of 10-20% per year.

2. Do not use two names to refer to it.

Experimental mice originate from the genus House Mouse (*Mus*). Due to the mass breeding process in the early 20th century, at least two species (*M. musculus* and *M. domesticus*) were used. Many of the laboratory mice used today cannot be traced back to their original origin, so the International Committee on Standardized Genetic Nomenclature for Mice recommends that all mice be used for scientific purposes unless the species used is known, do not use the binomial method, but directly use the name of the mouse strain or group, or directly call it a laboratory mouse.

3. Growth of mice

The weight of mice at birth is about 1.0-2.0 gm, and the growth rate varies slightly depending on the group or strain. The weight of adult mice also varies depending on the group or strain (experimental mice, experimental rats and Syrian Table of basic growth and reproductive traits of hamsters, Figure 1).

Figure 1 shows the growth of MF-1 and NMRI mice bred in the animal center of our school. MF-1 is a random bred stock mouse, and the NMRI mouse is an inbreeding strain with continuous brother-sister mating until the 16th generation. However, before the breeding process is completed, the next generation is continued in the random bred stock manner. The reproductive capacity of both groups is good, and the size of adult mice is larger than that of other closely related strains. Like all mice, male mice are larger than female mice.

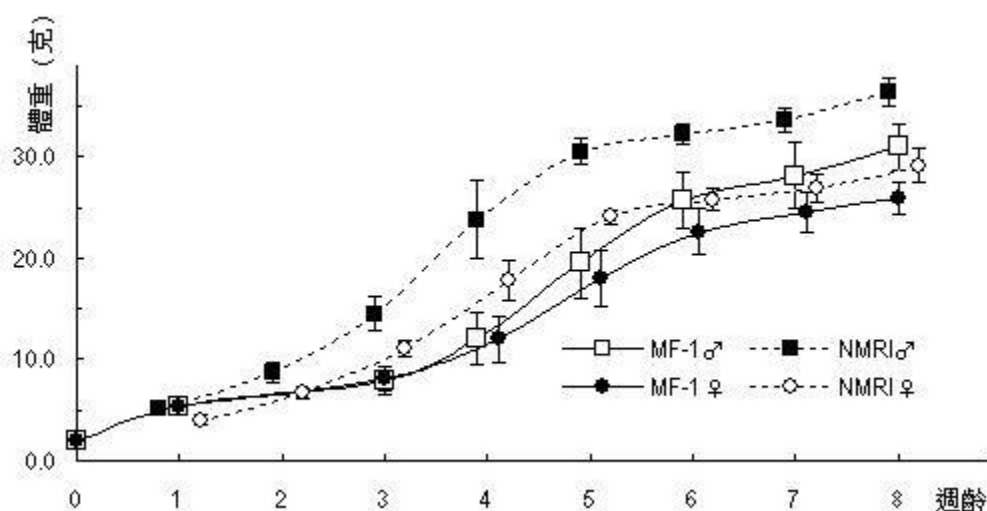


Figure 1. Weight gain (mean \pm std) of MF-1 and NMRI mice.

(Vertical axis means grams and horizontal axis means weeks of age.)

The data of MF-1 mice are obtained from 6 litters of mice, with the number of litters per litter being 11-14. The breeding mice are bred with a permanent monogamy of one male and one female. These MF-1 mice are all female. The 3rd to 5th litters produced by breeding mice. Before weaning (to 3 weeks old), only the whole litter was weighed, and after weaning, each litter was weighed; during the breeding and measurement period, the feed was PMI Laboratory Rodent Diet 5001 ad libitum; the drinking water was RO water. The breeding cage is a shoebox type cage with a filter cover (micro-isolator). For NMRI mice, data were obtained from 5 female and 5 male mice. Starting from 1 week of age, one female and one male mouse belonging to fifth parity were weighed continuously until they were 8 weeks old. During the measurement period, PMI Laboratory Autoclavable Rodent Diet 5010 was used as feed; high-temperature sterilized RO water was used as drinking water and IVC (individual ventilated cage) was used in the breeding cage.

4. Mice Aggression and Breeding

The internationally standardized method of raising experimental mice is the method currently used by the Animal Center of our school. When raising animals of the genus House Mouse, one should first understand their behavioral characteristics. The following takes the behavioral characteristics of 2 male mice as an example.

A. Inter-male aggression is one of the behavioral characteristics of male mice. House mice are social animals and mostly form small groups in the wild. This is similar to macaques (*Macaca* sp.). One male rat is the "dominant male (α -male)" and leads the

harmony of the group. There are many female rats in the group. As the concubines of α -male rats, other male mice (subordinates) may leave the group after growing up; or they may challenge α -male rats at the "right time" in order to replace them (see Bruce effect). Therefore, when male mice are raised in dense groups in breeding cages, male mice often fight after reaching sexual maturity, and often fight until only one remains alive. Furthermore, when a sexually mature male rat is raised alone in a breeding cage or in a breeding cage with a female rat, if it is raised with other male rats, it will also become ferocious.

B. Male rats used for breeding, unless they are kept with female rats, will also engage in infanticide if they encounter newborn rats (neonate) immediately after copulation. If rats do not mate within 3 weeks, this brutal infanticide behavior will turn into paternal behavior (paternal behavior) of "protection" when seeing newborn offspring 3 weeks after mating. This behavioral characteristic has been described as selfish selection in natural selection. It has also been used to explain similar behavior in chimpanzee communities; that is, when a female chimpanzee takes her nursing baby to a new group, the male chimpanzee of the new group will first kill her son, and then the female chimpanzee will be accepted by the new ethnic group. Therefore, when raising experimental mice, the above-mentioned aggressive behavioral characteristics of male mice should be taken into consideration from experimental design to feeding management to avoid inhumane results due to ignorance.

5. Mice at weaning age are very active

Another mouse problem that often occurs in the animal center of our school is that when opening the cage of mice that are about to be weaned, these mice that are about 3 weeks old jump all over the floor. Because the records are not clear, it is not known whether all the mice have escaped or if mice were captured. This can also be regarded as a behavioral characteristic of mice. When they reach the age of weaning, they like to jump very much and want to explore the environment outside the "nest". Therefore, colleagues and students should pay special attention to this.