**Gerbil**

There are over 100 species of gerbils recognized. They originate from Africa and Asia, and are sometimes called desert rats. All species are adapted to dry habitats. Gerbils have been used in research since the 1950s, but are no longer common. The species used is usually the Mongolian gerbil, *Meriones unguiculatus*. These are hardy and easy to keep, with few diseases. Mongolian gerbils are typically 110–135 mm long, with a tail approximately 95–120 long. Adult gerbils weigh about 60–130 g, and males are larger than females. The most common coat colours are agouti with a cream belly, black or spotted. Note: the ‘spotted’ gene is dominant and lethal if homozygous, so spotted gerbils should not be mated with each other to reduce in utero mortality of affected pups. Gerbils are used in a variety of research areas, including stroke research and studies into seizures. Seizure-prone and seizure-resistant strains of gerbils have been developed.

**Behaviour**

In the wild gerbils are crepuscular, but in the laboratory most gerbils are diurnal. They are easy to handle, since they are generally docile and rarely bite unless provoked. They are active, and when approached they will resist being caught. They exhibit exploratory behaviour in new surroundings, and if loose they do not hide but show curiosity and interest in the environment. Gerbils are social animals and should be group housed in compatible groups. This may be a breeding pair with offspring, or a same-sex group. They identify other individuals using smell. Stable groups may be established by putting animals together at weaning, or by 7–8 weeks. Normal social behaviour will then be seen, in which animals wrestle and groom each other. Unfamiliar adults caged together will be aggressive, so when introducing unfamiliar gerbils it may be necessary to use a perforated divider in the tank to allow them to become familiar with each other’s scent for 5–7 days before mixing them. If aggression is seen, animals should be separated. Aggression may sometimes occur suddenly in previously stable groups.

Gerbils may sit on their haunches to feed or observe their surroundings, and may stand on their toes using their tails for support. They rarely climb.

**Housing**

Gerbils need access to a burrow system to dig tunnels. If this is not provided, normal behavioural development can be impaired and they may exhibit abnormal stereotypic behaviours. They should be provided with a dark nest chamber, accessed via a tunnel, to give the animals an opportunity to burrow. They should also be given material to gnaw, such as wood sticks or straw. Gerbils will also make use of sand baths if provided. Housing designed for hamsters or mice may not be suitable.

Gerbils can gnaw through plastic hamster and mouse cages, and plastic can cause problems if ingested. They need cages made from suitably strong material to resist attempts to escape. They prefer solid floors to mesh, and need at least 2 cm depth of bedding for nest building. Sawdust or shavings made from pine should not be used, as the fur tends to become matted with these materials. Gerbils need at least 15 cm space between the top of the bedding and the roof of the cage, as they like to sit erect. Gerbils produce very little urine to conserve body fluids, and their faecal pellets are small and hard. They are very clean and have minimal odour.

**Feeding**

Gerbils have a simple stomach, and the caecum and colon are not especially well developed. They are omnivorous, hoarding rodents, able to survive on a variety of foodstuffs including fresh and dried plant matter, seeds, tubers, bulbs, roots, seeds and insects depending on availability. Eating is spread throughout the day and night. In the wild they gather and store food in the summer to last them through the winter, which enables them to thrive in dry habitats. During winter gerbils may stay underground, living on their food stores.

Gerbils are coprophagic. Standard rodent diets with 22% protein are adequate, but a dietary fat level below 4% is recommended, to prevent obesity and high blood cholesterol. Obesity can lead to infertility in females due to fat deposition around the genital tract. Supplementary food may be put onto the floor for young gerbils until they become used to hoppers. Pellets can also be soaked.

**Water**

Gerbils can survive with very little drinking water, although older males and reproducing females need more than younger animals. They produce very concentrated urine, and are resistant to water loss. Nonetheless, plentiful drinking water should be provided in bottles or automated systems.

**Environment**

Gerbils can tolerate a wide range of environmental conditions. At high temperatures they can regulate their body temperature by behavioural means if given the opportunity to burrow. They should be kept between 20 and 24◦C, with humidity between 35 and 55%: at higher humidity they develop matted fur.

**Breeding**

In the wild, gerbils live in groups consisting of a breeding pair and several generations of offspring, and breeding is suppressed in the mature offspring. Gerbils breed all year round in the laboratory, but are less-efficient breeders than other rodents. If a long-time partner dies, the remaining partner may not breed again. Puberty occurs from 6 weeks of age, and they are usually bred from 9–12 weeks. Successful breeding can be achieved by pairing a male and female between 60 and 90 days of age, and never separating them: if they are separated then reintroduced, they may fight. An alternative system is a harem system, with two or more females grouped with a single male. Oestrus occurs in the female every 4–6 days. Gestation lasts 24–26 days, unless the female is mated at the post-partum oestrus. In this case, lactation prolongs the gestation period to 27–48 days, resulting in an interbirth interval of 29–35 days. To avoid post-partum mating the male can be removed at parturition, but the separation should be for less than 2 weeks. Three to seven pups are born, weighing 2.5 g, and the male assists in nest building and caring for the pups. Neonatal mortality is high, up to 20%.

Pups are born blind, deaf and hairless. Hair appears from 5 to 7 days, ears open at 12–14 days, teeth erupt from 10 to 16 days and eyes open from 16 to 20 days. Pups begin to eat solid food from 16 days, and weaning takes place when pups weigh 14–18 g, at 21 days or more.

**Handling**

Gerbils may be restrained using techniques as for mouse and small rats. They readily run into a tube, or may be picked up in cupped hands. Great care must be taken if lifting by the tail: the body must be supported immediately, and if the tip of the tail is held the skin may slip off.

**Pain and stress recognition**

Healthy gerbils are inquisitive and active. If unwell, gerbils may show weight loss, piloerection, scruffy coat, and a hunched posture. Stress may cause ocular discharges and diarrhoea. Changes in behaviour, such as increased aggression or depression, increased respiratory rate, or constipation may also be seen.

**Common diseases and health monitoring**

Gerbils suffer from relatively few clinical diseases. They can develop Tyzzers disease, which is a fatal enteric infection. They can carry lymphocytic choriomeningitis and Sendai viruses. Between 20 and 50% of gerbils may exhibit seizures. These may be triggered by fear, handling or a new environment. Seizures may be mild or severe, and animals may occasionally die. Should a seizure occur, the gerbil should be left in a warm, dark, quiet place to recover. Frequent handling from an early age will reduce the frequency of seizures.

**Biological data and useful reference data**

Adult weight (g) Male 80–130

Female 60–100

Diploid number 44

Food intake 5–8 g/100 g body weight

Water intake 4–7 ml/100 g body weight

Natural lifespan (years) 3–4

Rectal temperature (◦C) 37–38.5

Heart rate/min 360

Blood volume (ml/kg) 66–78

Respiratory rate/min 90

**Haematological data**

Red blood cells 8–9\*

(×106/mm3)

PCV (%) 43–49

Hb (g/dl) 12.6–16.2

White blood cells 7–15

(×103/mm3)

Neutrophils (%) 5–34

Lymphocytes (%) 60–95

Platelets (×103/mm3) 400–600

**Breeding data**

Puberty 6 weeks

Vaginal opening 41 days (28 g)

Age to breed male 70–85 days

Age to breed female 65–85 days

Gestation (days) 24–26 (27–48 if lactating)

Litter size 3–7 (average 4.5)

Birth weight (g) 2.5–3.5 (depends on litter size)

Weaning age (days) 21–24

Oestrous cycle (days) 4–5

Post-partum oestrus Fertile

**Biochemical data**

Serum protein (g/dl) 4.3–12.5

Albumin (g/dl) 1.8–5.5

Globulin (g/dl) 1.2–6

Glucose (mg/dl) 50–135

Blood urea nitrogen 17–27

(mg/dl)

Creatinine (mg/dl) 0.6–1.4

Cholesterol (mg/dl) 90–150

\*High levels of reticulocytes, stippled red blood cells and polychromatic cells.

**Further Reading**

For more information, see

* Wolfensohn and Lloyd (2013). Handbook of Laboratory Animal Management and Welfare, Wiley-Blackwell
* Hubrecht and Kirkwood (eds) (2010). UFAW Handbook on the Care and Management of Laboratory and Other Research Animals, 8th Edition. Wiley-Blackwell