

**LPM-604 (Unit-III)**

**Strains and Breeding of Laboratory animals**

**Date: 02.11.2020**

**Dr. R. R. K. Sinha**

# Strains and Breeding of Laboratory animals

**Mice:** The common strains are **Swiss Albino, Kausali, NIN, CBA, C-57, Bulb-S, CH-3** etc. **Swiss Albino** is most popular.

## **Rat:**

- ❖ The rat has blocky body with comparatively rough hair, long pointed snout, prominent long ears and sharp teeth.
- ❖ The body length is around 14-16cm, tail is 16-20cm.
- ❖ Adult weight 100-250gm.
- ❖ The common strains are- **Wister, Sprague, Dawley, Charles Foster and Long Evans.**

## **Hamster:**

- ❖ **Syrian and Chinese** are two popular strains.
- ❖ They have chunky body with short legs, a fluffy tail, loose skin with dense, short and soft fur.
- ❖ The front legs have four toes whereas hind legs possess five toes.

- ❖ Adult hamster is 16cm in length and weigh 90-125gm.
- ❖ The Chinese hamster are only 9cm in length weighing 55gm. Hence also known as Dwarf hamster.
- ❖ Chinese hamster have dorsally grey colour with black strip in the centre.
- ❖ Syrian hamster are golden brown dorsally with little black ventrally.

### Guinea Pig:

- ❖ **Peruvian, English and Abyssinian** are popular strains.
- ❖ They are short rodents without tail. Head is blunt and rectangular. The neck is thick and so short merged with body.
- ❖ The hind legs are longer than forelegs.
- ❖ The weight of male is 800-1600gm and in females 700-1300gm.

## Transgenic Fly: -

This is a new fruit fly developed by L. S. Shashidhara and Poonam Bhandari at Centre for Cellular and Molecular Biology (CCMB) at Hyderabad through genetic engineering in 2000.

## Mice and Rat:

Nature: - Prolific breeder

Puberty: - 4 to 6 weeks

Mating: - 8 to 9 weeks, early mating reduces fertility.

Estrous duration: - 4 to 5 days.

Gestation period: - 20 to 22 days.

Birth weight of young ones: - 1 to 1.5gm

Litter size: - 10 to 12

Weaning weight: - 10 to 12gm and age 21 days.

## Detection of successful mating:

Presence of sperm in vagina smear or copulatory plug (solidified semen) in vagina.

Lee boot effect: -

When large group of females are housed together they go into anestrus by due pseudopregnancy which is known as lee boot effect.

Whitten effect: -

When such females are housed again with male, within 72 hours they will exhibit regular estrus, which is called as Whitten effect.

## Hamster:

Puberty: - 4 to 6 weeks.

Mating age: - 8 to 12 weeks.

Weight at mating: - Syrian- 80 to 90gm

Chinese- 35 to 40gm

Estrus duration: - 4 to 5 days.

Mating: - Hand mating is followed.

Gestation period: - 16 to 18 days.

Litter size: - 5 to 7

Weaning age: - 20 to 25 days and weight 15gm.

Male and female housed in separate quarters, brought together only at the time of mating and separated again immediately after mating, otherwise female may cause serious injuries to tail and testes of male.

Estrus sign: - Stringy, translucent mucus is extruded initially turning into creamy white discharge in later period with odour. Well receptive female exhibits typical lordosis posture (Crouching with hind quarters raised). Mating takes usually on 4<sup>th</sup> day.

### Guinea Pig:

Puberty: - 4 to 5 weeks.

Mating age: - 9 to 11 weeks.

Weight at mating: - Male- 900 to 1500 gm

Female- 700 to 1300gm.

Estrous sign: - Hip swaying, mounting activity, unsteady movements.

Mating: - Polygamous

Farrowing: - Communal i.e., group of females farrows in common pen.

Gestation: - 60 to 75 days.

Birth weight: - 45 to 50gm.

Litter size: - 5 to 6.

Weaning weight: - 160 to 230gm.

As per utility of animals and facilities available breeding methods is recommended.

1. **Monogamy:** - Involves pairing of single male and female. Method is useful for inbreeding of stocks and usually pair is kept for life long.
2. **Polygamy or Harem method:** - This consists of keeping together one male and more than one females in one cage. Normal male to female ratio recommended is 1:2-6 (Mice & Rat), 1:10 (Guinea Pig), 1:7 (Hamster).
3. **Continuous mating:** - Mating occurs immediately or within few hours after parturition. In inbred mice in monogamous mating males are not separated and mating is continuous.

4. **Discontinuous mating:** - Female is separated from male sometime before parturition, to avoid post-partum mating. Mating is advocated after lactation i.e. During post lactation oestrous.

### Breeding systems: -

- 1) Inbreeding
- 2) Out breeding
- 3) **F1 generation breeding:** - To reduce the biological diversity in out bred animals and check the inbred drawbacks, it is better to select F1 (first filial) generation of progeny have more homozygosity for breeding than two heterogenous parents. F1 generation also has hybrid vigour due to optimum heterozygoes state and have equal homozygosity. Hence can be very well used to conduct biological & immunological research.

## Selection of laboratory animals for breeding:

- Animals selected for breeding should have good parental record like production, progeny, litter size and mothering ability.
- Animals must be physically fit and healthy.
- Animals which is bigger in litter be preferred.
- If litter consists more males and less female, the whole litter should be rejected.
- Animals exhibiting vices must be rejected.
- There should not be any discharge form ear, nose and eyes.
- The animal to be selected should be alert, vigorous, clean and off standard size.