

LABORATORY ANIMAL  
PRODUCTION AND  
MANAGEMENT  
BY

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# Laboratory Mouse

(*Mus musculus*)

small size, high  
fecundity, resembles  
man, readily adapt cage  
life, cheapest, easily available .

Sub family: Murinae

Family :Muridae

Suborder: Myomorpha

Order: Rodentia

# ALBINO MICE



# Uses

- ◆ Bioassay
- ◆ Toxicity Test
- ◆ Screening of New compounds
- ◆ Used in Microbiology, Viro/Radiology
- ◆ For Cancer Research
- ◆ Behavioural research

# Physiological Norms and development stages

- ◆ Omnivorous, Lab mice are smaller than wild, total inbred strains-100-200
- ◆ Life span 1.5 -2.5 yrs., Birth wt.1 gm
- ◆ Litter size Inversely proportion to birth wt.
- ◆ When born,it is Hairless,with closed eyes, active, after 3 days hair starts to grow,10<sup>th</sup> day-ext auditory meatus open,13<sup>th</sup>-eyes open, eat solid food, learn to drink water

# Breeding Cycle

- ◆ Sexually mature at 3wks. Gest. Period is 17-22 days. (21d). Mating age 21 d
- ◆ Females come into estrus at every 4 d & receptive for 12 hours.
- ◆ If met by unf. male-Pseudo pregnancy immi. after delivery comes into estrus
- ◆ A male mouse can meet 2-3 females in one night. but may become infertile through exhaustion
- ◆ Bruce Effect : A female mouse mated by one male, may fail to become pregnant by that mate, if exposed to another male within 24 hrs. Breeding performance is influenced by day light.
- ◆ For better efficiency, 12-16 hrs illumination is required.

## Behavior

Mouse is timid, gentle, easily handled, photophobic, gregarious, active at night, determined escaper. Males are fighter, females seldom fight.

- ◆ Presence of man –inhibit the activity. Don't tolerate being singly caged. when two mice are housed together-may attack each other.
- ◆ Determined escaper- mice, when escape from the cage-don't often returned to cage. Mice are sensitive to noise

# Identification

- ◆ Clipping or slitting the ear.
- ◆ Unpigmented ears can be tattooed.
- ◆ Painting of the tail with a marker pen containing waterproof ink

# Different sizes of shoe box



# Housing

- ◆ Racks: Cages on racks with tiers. lowest tier-35 cm above the ground.
- ◆ Upper tier-at 150 cm height.
- ◆ Metal racks are preferred.
- ◆ Economical system to accommodate max. No. of cages in minimum floor area.
- ◆ Cages Weld wire mesh(GI) made up of polypropylene or polycarbonate material
- ◆ Water bottle and feeder on the floor(lid)

# Housing and Caging



# Housing

- ◆ Mice may be housed in shoe box type cage (molded PVC cage)
- ◆ Can be accommodated in cage of 22.5 X 10 cm., for 3 mice.
- ◆ 3 parts : Molded box, grill, Water bottle.
- ◆ Bedding: mice don't tolerate wet bedding. Saw dust is the best choice. wood shaving, paddy husk, dried wood chips
- ◆ Nesting Material: wood wool, paper shaving, paper towel.
- ◆ Temp: 20-25 degree Celsius. R.H. 45-65%. Chanes per house 12-15 changes.

# Feeding

- ◆ Mice prefer cereals, seeds & many type of stored food stuff.
- ◆ A heavily lactating female may ingest her own body wt. of food & water in 24 hrs. It gives enormous burden on dige.system.

- ◆ Protein                    20-25%  
Fat                            4-6%  
Carbohydrate    55-65%  
Fiber                        Less than 5%

Water Requirement : same weight of water as of food.

Acidification of Bottle – to prevent bact., fungal & algal proliferation & prevent deposition of Ca matter from tap water

2 lit of water + 2 ml of HCl

# Breeding

- ◆ Mice breed readily all the year.
- ◆ More prolific ,if they are kept in groups
- ◆ Youngs laid in single nest.Suckeling is indisriminate.
- ◆ 8-10 litters.
- ◆ Breeding life is 9 months.
- ◆ Male should retire after 6 months b/c by this time he gets obase.
- ◆ Weaning -18-21 days.

# Salient Features

- ◆ Age of puberty 6-8 Wks
- ◆ Pregnancy 21 days
- ◆ 1<sup>st</sup> litter born when female is 9-12 wks old.
- ◆ 2<sup>nd</sup> mating –when female 8 wks old.
- ◆ 1 male:2 female ideal ratio.
- ◆ Mice eat youngs- dietary. Well fed & handled never eat youngs.
- ◆ Mice don't breed after 1 Yr age.



# Common Diseases

- ◆ Infantile Diarrhoea (V), Salmonellosis (B)  
Tyzzer's Disease (Unknown), Mouse  
Hepatitis, Lymphocytic Chorio Meningitis;  
Mouse typhoid, Epidemic disease. -terrible  
mortality, zoonotic
- ◆ Ectoparasites -  
Arthropod, bedbugs, mites, lice (*Polyplex  
serrata*) pinworm, *Taenia taeniaeformis*,  
Adult worm in cats - thru excreta - saw  
dust - mice  
Respi. disease Pneumonia & catarrh
- ◆ Mites - Treatment - Benzyl Benzoate
- ◆ Euthanasia - Sod. Pento barbitone, ether  
or CO<sub>2</sub>



# LABORATORY RAT

- ◆ Developed from wild brown or Norwegian rats. 3 types;
  1. Wister Albino: tail length is less than body length, long ears, wide head.
  2. Sprague Dolly: rapidly growing, more prolific, tail equal to body length, longer narrower head
  3. Long Evans rat: smaller than these 2 groupes. black hood over the head, black at the back of the neck, black line down the back.

# Albino Rat





# Classification Albino Rat)

## Rattus norvegicus

Subfamily : Murinae

Family : Muridae

Suborder : Myomorpha

Order : Rodentia





# General Description

- ◆ Color: Light agouti to black
- ◆ Eyes black, adult wt. 500gms. Albino has pink eyes.
- ◆ Omnivorous, Exp. feeder, more intelligent, -used in behavioral studies
- ◆ Birth wt: 5 gms, weaning wt 35-50 gms, weaning age-21 d,
- ◆ Quiet, easily handled, less photophobic, if a rat escape from cage- don't return to same cage, female with litter tolerate their mate but not other male,
- ◆ Badly handled rats results in nutri. defi. (vit A)— attack handler a deep bite.

# Dev.stages

- ◆ Use next to mice (10-15%)
- ◆ Toxicity and nutritional studies
- ◆ Behavioral, cancer research
- ◆ Life span 3 yrs, max. mortality is due to chronic respiratory diseases
- ◆ Newly born rat with closed eyes, ears & no erupted teeth, scarlet in color, suckle mother after 1<sup>st</sup> hour. Body hairs—4<sup>th</sup> day, eyes & ears open on 13<sup>th</sup> day. Animal well covered with fur—14<sup>th</sup> day, begin to wander out. Start eating solid food, nibble fecal pellets

# Breeding Cycle

- ◆ Sexually mature at 6-7 wks of age.
- ◆ Female has 1<sup>st</sup> estrus cycle 6-7 wks age. It lasts for about 12 hrs. & recur at every 4-5 days.
- ◆ Postpartem estrus is common.
- ◆ Female receptive at estrus but vigorous & experienced male forcibly met a female that is not in heat & become pregnant.
- ◆ Pseudo pregnancy is much rarer.

# Housing and Caging

- ◆ caged in Larger type of shoe box.
- ◆ 900 sq.cm for a breeding pair, 1080 sq.cm. for a female rat with litters.
- ◆ 1 male +6 female need 1650 sq.cm.
- ◆ If more rats in one cage, It affects growth. Heat tolerance mach. is poor
- ◆ Rats have sweat glands in pads while mice has in the tail. Vasodilatation of tail cause dissipation of heat.
- ◆ Rats have enormous salivary glands. During Overcrowding, --profuse salivation-- causes cooling.

# Behaviour

- ◆ Les sensitive to noise. 12-16 hrs light is recommended. Ventillation is an imp. factor in rats as it is prone to CRD.
- ◆ RH if falls below 45% & the temp is low than outbreak of ringing tail is common.
- ◆ Optimum Humidity= 50-65%

# Vaginal Plug

- ◆ For abt. 24 hrs after mating, vagina is filled with plug of coagulated ejaculum, 3 mm in diam. at the open end of vagina, seen by naked eye.
- ◆ It may stay for 48 hrs. but after that it shrinks, turn color durin 2<sup>nd</sup> 24 hrs becoming a curly grey,
- ◆ In rats plug is fall out after few hrs.
- ◆ Vaginal smear can also be prepared.

# Disease

- ◆ CRD
- ◆ Leptospirosis
- ◆ Middle ear disease-*Mycoplasma pulmonis*
- ◆ Viral Pneumonia
- ◆ Pinworm
- ◆ Scabies of ears



# Rabbit

- ◆ Cl:Mammalia,Ord:Lagomorpha,Fam:Leporidae,Oryctolagus cuniculus
- ◆ Also known as '**Cinderella**' of livestock .
- ◆ Preferred for meat due to short Gen.Interval(6 months) & speedy Wt.gain
- ◆ Also produce wool. German Angora-800 gm /yr.)
- ◆ Male rabbit: Buck, Female: Doe, Bunny: young ones, kindling: Act of giving birth
- ◆ Breeds: (1)Fancy (2)Fur (3) Meat

# Breeds

- ◆ Fancy:  
Angora, Dutch, English, Harlequin, Lop,  
Tan, Silver.
- ◆ Fur: Angora, Siberia, Havana, Nubian, C  
hifex
- ◆ Broiler: Grey Giant, White Giant,  
Soviet, Newziland whiteChinchila,

# Rabbit





# Breeds

- ◆ Fancy:

Angora, Dutch, English, Polish  
Harlequin, Himalaya, Lop, Silver, Tan,

- ◆ Fur:

Angora, Argenti, Chifox, Siberian, Rex,

- ◆ Meat (Broiler rabbit):

New Zealand White, Grey giant,  
white giant, Soviet chinchilla



# Physiological Norms

- ◆ Gestation period : 31-32 days
- ◆ Litter size 6-7
- ◆ Rectal Temp: 39.5 degree Celc.
- ◆ Respiration rate:50 / min
- ◆ Life span: 6-7 yrs
- ◆ Reproductive Life span: 3-4 yrs

# Housing

- ◆ Backyard Rabbitry: 1 buck+6-7 does kept in temp.house along with resi.building.
- ◆ Small Scale Rabbitry : 50-60 No-fed Conc. and green.
- ◆ Large Scale Commercial Rabbitry:200 and above.
- ◆ House of Rabbit= Hutch

# Hutch

- ◆ Small (2.5-4 Kg) 100(L)X 80(W) X 55 cm(H)
- ◆ Medium (4.5Kg) 125(L)X 80 X 60
- ◆ Large (5.5 Kg ) 145 X 80 X 65