DLAR TRAINING SERIES

INVESTIGATING THE HAMSTER AND GERBIL

PRESENTED BY:

THE DIVISION OF LABORATORY ANIMAL RESOURCES

AND
THE INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

WAYNE STATE UNIVERSITY

HAMSTERS

Types

- Golden or Syrian hamster – Mesocricetus auratus
- Chinese or striped-back – Cricetulus griseus

Syrian Hamster

- Origin- small group of animals captured in Syria

Description

- Chunky body, short tail, large amount of loose skin
- Different strains and color mutations exist
- Adult weight 90 – 175 gms
- Nocturnal, will hibernate (for 2 – 3 days) at temperatures below 48 degrees F, heart and respiratory rate decreased

Uses

- Dental research
- Reproduction studies
- Parasitic diseases
- Vascular physiology studies
- High tolerance for radiation

Anatomy

- Cheek pouches (study microcirculation)
- Hip glands
- Stomach- two halves: glandular (pyloric) and non-glandular (forestomach or cardiac)
- Intestines- long colon for water conservation
- Male has large testicles
- Sex by ano-genital distance, also- female has blunt rear end outline, male has elongated rear outline with tail laying on top of testicles

Physiological data

- Body temp 99 degrees F
- Heart rate 275 – 425 beats per minute
- Respiratory rate 33 – 127 breaths per minute
- Life span is 2 – 3 years
- Urine is cream colored with heavy crystals
- Reproduction: sexually mature at 6 weeks, hamsters are polyestrus and cycle every 4 days. First day of estrus is marked by a slight, stringy translucent discharge which becomes opaque after spontaneous ovulation. Gestation is brief: 16 days

GERBILS

TRAINING SESSION OBJECTIVES

At the completion of this laboratory, participants should be able to:

- Confidently and safely handle and restrain gerbils
- Determine the sex of gerbils
- Be familiar with the appearance of a normal, healthy animal and be able to recognize common signs of injury, distress, or illness
- Apply methods to identify individual animals
- Know how to obtain a blood sample
- Know how to administer a SQ, IM, IP, and IV injection
- Know what appearance to expect from a gerbil under ketamine/xylazine anesthesia.
- Humanely euthanize a gerbil via IP pentobarbital overdose or carbon dioxide exposure and provide an assurance of death (i.e., creation of an "open thoracotomy", removal of a vital organ).

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GERBIL HANDOUT

Use this outline to guide you through the variety of hands-on techniques offered to review and refresh skills and interests. Comments offered after each technique listed are "keep in minds" for each procedure. If we haven't listed a particular technique of interest to you, don't hesitate to ask for a demonstration- it's your wet lab!

I. Restraint Techniques

A. Grasp near the base of tail to gently lift gerbil out of cage. Grasping too near the tip of the tail could cause degloving, exposing the caudal vertebrae.

B. To restrain, apply pressure to the dorsal region of the gerbil while grasping the skin at the nape of the neck. This will allow you to restrain the gerbil with one hand and inject with the other.

II. Ear Tagging

A. Tag close to head, “numbers up” for greater visibility.

B. Unless you ear tag routinely, you may find it easier to work in pairs; one tagger, one restrainer.

III. Injection Techniques

A. IM- small volumes, split sites if necessary, avoid sciatic nerve path

B. SQ- larger volumes

C. IP- tilt head towards floor, use caudal quadrant off midline. Watch syringe hub for aspirate, discard any contaminated solutions.

D. IV- utilize saphenous veins located in lateral hock area. Prone to hematoma formation.

IV. Parenteral Anesthesia

A. The anesthetic combination of ketamine and xylazine is commonly used in the gerbil as it provides good depth of anesthesia with muscle relaxation which extends into the recovery period. Recommended dose of ketamine/xylazine in the gerbil is 50 mg/kg and 2 mg/kg IP, respectively.

B. To calculate your dose, use the formula: weight times dose, divided by concentration equals volume in ml’s. Example: 0.065 kg (weight) X 50 mg/kg ketamine (dose) = 3.25 mg divided by 100 mg/ml (concentration) = 0.032 ml ketamine.

C. Remember to utilize a bland, sterile ophthalmic base ointment in survival procedures as ketamine temporarily suppresses the blink reflex which can lead to corneal drying and scarification.

V. Blood Collection

A. Saphenous vein- a tortuous vessel which courses over the lateral aspect of the hock joint is the only visible collection site in gerbils and can be prone to hematoma formation. The gerbil may be sedated or manually restrained and the area over the vessel clipped and prepped with alcohol. The restrainer may facillitate vessel dilation and stability of the leg by grasping the loose skin just in front of or behind the leg as it meets the body. A light coating of sterile ophthalmic ointment is used over the vessel to cause blood to “well” on the skin instead of dispersing; a 22g or 23g needle is utilized to simply puncture the vessel. Capillary tubes may be employed to collect blood as it wells at the site of needle entry. Be sure to apply gentle pressure to the site for approximately 45 seconds after collection has been completed to assure hemostasis.

B. Cardiac puncture- approximate 45 degree needle entry at sternum. Immediately begin and maintain gentle aspiration pressure. Balance and stabilize needle placement once puncture has been achieved. This is a terminal procedure which must be accomplished under general anesthesia and followed by an assurance of death.

VI. Necropsy (ask if interested)

GERBIL- Meriones unguiculatus

Origin- Mongolia and northern China

Description

- Also called "jirds" or sand rats
- Adults weigh 60 – 115 grams (males larger than females)
- Colors- agouti, black, gray, white, piebald

Uses

- Stroke research- easy to produce cerebral ischemia
- Epilepsy- spontaneous seizures precipitated by novel environment or startling
- Auditory studies- hearing curve similar to man
- Lipid metabolism and heart disease- high serum cholesterol levels

Anatomy

- Sex by anogenital distance
- Males have dark scrotum
- Ventral midline sebaceous gland- covered by stiff orange hairs
- Adrenal glands large in relation to total body weight

Physiologic Data

- Life span 2 – 4 years
- Body temp 99 degrees F
- Heart rate 360/minute
- Respiratory rate 90/minute

- Reproduction- polyestrus (every 4 – 6 days), spontaneous ovulators, gestation 24 days, Wean at 3 weeks, sexually mature at 10 weeks
- Antibiotic associated clostridial enterotoxemia is well documented in the gerbil, use extreme caution with gram positive spectrum antibiotics. Direct toxicity is caused with streptomycin use and is therefore contraindicated.
- Foot stomping is a method of communication signaling annoyance or aggression
- Mix adult animals carefully- severe fighting may result