DLAR Training Series
Investigating the Guinea Pig

Presented by:

The Division of Laboratory Animal Resources
and
The Institutional Animal Care and Use Committee

Wayne State University

TRAINING SESSION OBJECTIVES

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

- Confidently and safely handle and restrain guinea pigs
- Determine the sex of guinea pigs
- 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 guinea pig under ketamine/xylazine anesthesia
- Humanely euthanize a guinea pig and provide an assurance of death (i.e., creation of an "open thoracotomy," removal of a vital organ)

Division of Laboratory Animal Resources

Guinea Pig 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 helpful tips or "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. Handling and Restraint Techniques

A. Introduce your hand into the cage in a quiet, non-threatening manner. Gently grasp the pig over the back and shoulders, slipping your fingers under the front legs.

B. As you lift the pig off the cage bottom, slide your other hand under its hindquarters to support its weight. Too vigorous a grasp over the thorax may injure the thoracic cavity and a pig may harm himself struggling if not adequately supported.

II. Ear Tagging

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

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

III. Injection Techniques

A. IM- small volumes (0.3 ml per site), split sites if necessary, avoid sciatic nerve path. May utilize quadriceps (posterior thigh) or lumbar muscles (approximately 1” lateral to the spine and 1” caudal to last rib)
B. SQ- larger volumes (5 – 10 ml) given into “space” created by tenting skin over nape of neck or back
C. IP- Invert animal by gently grasping animal over the thorax and hindquarters, presenting the animal’s abdomen to the injector with the head tilted slightly toward the floor. Insure that a needle of sufficient length is utilized to enter the peritoneal cavity (i.e., 1”); enter the needle off the midline approximately 1/3 the distance from the pubis to the umbillicus. Watch for aspirate; discard contaminated solutions.
D. IV- saphenous veins – suggest 24 or 25g needle (see comments V. A., Blood Collection)

IV. Parenteral Anesthesia

A. An eight hour (or overnight) fast is recommended prior to anesthetizing guinea pigs to prevent regurgitation/aspiration of stomach or cheek pouch contents. The anesthetic combination of ketamine and xylazine is commonly used in the guinea pig as it provides good depth of anesthesia with muscle relaxation and accompanying analgesia which extends into the recovery period. Accepted ranges are 40-100mg/kg ketamine and 4-13mg/kg xylazine. Use a dose of 44mg/kg ketamine and 5mg/kg xylazine. The concentration of ketamine is 100 mg/ml; xylazine 20mg/ml. IP is the preferred route for this combination as IM administration has been implicated in muscle necrosis.

Example:

0.35 kg (weight) X 44mg/kg (dose) = 15.4 mg divided by 100mg/ml (concentration) = 0.154 ml ketamine

and

0.35 kg (weight) X 5 mg/kg (dose) = 1.75 mg divided by 20 mg/ml (concentration) = .087 ml xylazine

A. Remember to apply a bland, sterile ophthalmic base ointment to corneas for animals utilized in survival procedures as ketamine temporarily suppresses the blink reflex, leading 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 site in guinea pigs and can be prone to hematoma formation. The pig may be sedated or wrapped in a towel and the area over the vessel clipped and prepped with alcohol. The restrainer may facilitate vessel dilation and stability of the leg by grasping the loose skin just in front of or just behind the leg as it meets the body. After clipping fur from the area, 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 20g needle is utilized to simply puncture the vessel. A pasteur pipette or capillary tubes may be used 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. Jugular vein/anterior vena cava (either side may be utilized but vessels on the right are often more accessible). Place the anesthetized animal in dorsal recumbancy and locate the area of the thoracic inlet (dorsal to the junction of the uppermost portion of the sternum and the first rib). Insert a 22 to 25 gauge, 5/8 to 1" needle at a 30 to 45 degree angle, maintaining gentle aspiration pressure upon entry. Direct the needle toward the midline of the thorax to a depth of 10 to 16 mm until blood appears in the hub of the needle; the sample may be collected in accordance with accepted volume guidelines (attached). Apply gentle pressure to the site for 45 seconds to prevent hematoma formation.

C. 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.

D. Infraorbital sinus- not a preferred route, should be used only when absolutely necessary. Place a hematocrit tune at the medial canthus of the eye beside the globe of the anesthetized animal. While rotating the tube, apply sufficient pressure to insert the tube through the membrane until it begins to fill with blood. Apply gentle pressure to the site at the conclusion of the collection for 45 to 60 seconds to facilitate hemostasis.

E. Toe nail clip- used for small samples (up to 0.1 ml) using a hematocrit tube.

VI. Necropsy (ask if interested)

GUINEA PIG

Cavia porcellus

Normal Physiological Data:

- Body temperature 101-104F (average 101.5)
- Heart rate 240-400/minute
- Respiratory rate 80-150/minute
- Life span 6-8 years
- Urine is thick and creamy white, heavily crystallized
- Adult body weight 600-1000 grams
- Liver has six lobes
- Reproduction:
  - Spontaneous ovulators (10 hours after the beginning of estrus), cycle every 2-3 weeks
  - Breeding weight- 500 grams or 3 months of age
  - Mating determined by vaginal plug, can palpate 14-21 days
  - Gestation 60-70 days, litter size 2-5 piglets
  - Offspring are precocious (born well-developed with fur, teeth, and eyes open; can run within hours of birth)
- Housing
  - Best to keep on direct bedding
  - Cannot climb, will jump short distances. Cage may not require top if sides 10" high

- Feed and water ad lib
- Unable to synthesize their own vitamin C and must obtain it from a guinea pig diet supplemented appropriately

TYPICAL BEHAVIORAL SIGNS OF ILLNESS, PAIN OR DISTRESS

- Guarding (protecting the painful area)
- Vocalizing (especially when the animal moves or the painful area is palpated)
- Licking, biting, scratching, or shaking a particular area (guinea pigs virtually NEVER bite unless sick or in pain)
- Restlessness, such as pacing and repeatedly lying down and getting up again
- Lack of mobility (with joint, colic, or gut pain)
- Failure to groom, causing an unkempt appearance
- Abnormal resting postures in which the animal appears to be sleeping or is "hunched up"
- Failure to show normal patterns of inquisitiveness

Sally O. Walshaw, VMS

OBSERVATIONS	RATIONALE / AMPLIFICATION
Behavior in its own cage	Animal should be active, curious, able to use all four legs
Physical condition	Animal's weight should be proportional to age and sex and documented as normal, obese, or emaciated
Hair Coat	A ruffled coat may indicate illness.
Rate and pattern of breathing	Breathing should appear effortless and the rate should be the same as other animals in the group. Sneezing or noisy breathing are abnormal signs
Nose and eyes	Discharge from the nose or eyes is abnormal.
Skin color (footpads, ears, lips)	Pink color of non-pigmented skin indicates good circulation and red blood cell count. Abnormal findings would include skin of a bluish or yellowish cast, or very pale
Skin condition	Lesions, abrasions, or edema are examples of abnormal findings
Cage condition observations	Do food and water levels appear to match peer cages? Are normal fecal pellets present?