

1. PURPOSE

The intent of this Standard Operating Procedure (SOP) is to describe common treatments used in the Rodent Veterinary Care Program and provides a support tool for the veterinary care staff when treating the most frequent rodent medical conditions.

2. RESPONSIBILITY

Veterinarian, veterinary care staff.

3. GENERAL CONSIDERATIONS

- 3.1. Document all observations and treatments.
- 3.2. Prior to establishing any treatment plan, the principal investigator's (PI) approval must be given.
 - 3.2.1. Common treatments can be pre-approved with the Veterinary Care Information Sheet.
 - 3.2.2. If a treatment is not listed in the Veterinary Care Information Sheet or if emergency euthanasia is required, the PI staff must be contacted before starting the treatment or performing euthanasia. If no PI staff is available, seek veterinarian approval.
- 3.3. Refer to [Annex 1](#). Each medical case can be subject to individual differences. This SOP should not replace the veterinarian evaluation and should only be used as a general overview of the most common treatments. All medical conditions that differ from the ones described or fail to improve after treatment must be discussed with a veterinarian.
- 3.4. Always evaluate the possible pain that can accompany the clinical condition. Refer to Rodent Analgesia SOP for Pain Grimace Scale.
- 3.5. In cases where the PI or their research staff are in disagreement with the treatment plan, the veterinarian has the authority and the responsibility to make determinations concerning animal wellbeing. This includes removing an animal from a study, test, or teaching activity, and using appropriate treatment or control measures, including euthanasia if indicated, following diagnosis of an animal disease or injury.

4. REFERENCES

- 4.1. Canadian Council on Animal Care. CCAC guidelines on euthanasia of animals used in science (2010). www.ccac.ca/Documents/Standards/Guidelines/Euthanasia.pdf
- 4.2. Carpenter JW. Exotic Animal Formulary 4th Edition. 2013. Elsevier. Missouri.
- 4.3. Pritchett-Corning KR et al. Handbook of Clinical Signs in Rodents and Rabbits 2nd Edition. 2011. Charles River Laboratories
- 4.4. Bryant Volpe C et al. Efficacy of Treatments for Murine Dystocia. 2015. CALAS poster presentation.
- 4.5. Hrapkiewicz K and Medina L. Clinical laboratory animal medicine: An introduction. 3rd Edition. 2007. Blackwell Publishing, Iowa.

SOP REVISION HISTORY

DATE	NEW VERSION
2022.07.11	3. MATERIALS 3.1. Veterinary Care Kit
2022.07.11	5. FREQUENT RODENT MEDICAL CONDITIONS AND TREATMENTS Annex 1 Frequent rodent medical conditions and treatments
2022.07.11	6. RODENT DRUG FORMULARY
2022.07.11	7. DRUG PREPARATION INSTRUCTIONS
2023.03.07	2. RESPONSIBILITY Veterinarian, veterinary care staff.
2023.07.06	3.1. Document all observations and treatments.

Annex 1 - Frequent rodent medical conditions and treatments

Diagnosis	Clinical Signs	Treatment	Clinical Endpoint
Abdominal Distention	Marked abdominal distension present in an animal that is not pregnant.	Palpate abdomen to determine possible presence masses. Assess general condition. If the animal is doing otherwise well with no other clinical signs, monitor 1-2x/week.	If animal is showing any signs of distress (lethargy, hunched, weight loss, BCS < 2, dehydration, respiratory distress), or if an abdominal mass is palpable, euthanasia is recommended.
Conjunctivitis	Closed or partially closed eyelid(s), redness of the ocular or the periocular tissues and/or presence of ocular discharge.	<ul style="list-style-type: none"> • Cut front and hind nails 1x week. • Can be treated with application of antibiotic ophthalmic ointment to the affected eye 1-3 times per day for 5-7 days. • If no improvement after a week, daily treatment can be changed to an antibiotic ophthalmic ointment containing a corticosteroid, for 5-7 days. Perform a fluorescein test to rule out corneal ulceration prior to starting treatment with a steroid. • If condition does not resolve, consider isolating agent with culture swab. 	
Corneal Ulceration	Corneal ulceration confirmed with fluorescein staining	<ul style="list-style-type: none"> • Contact research staff to determine if animal is valuable. • Administer systemic analgesics • Consider application of antibiotic ophthalmic ointment to the affected eye 1-3 times per day for 5-7 days. • Consider surgical enucleation 	
Dehydration	Animal often less active, hunched, and will have a persistent skin fold lasting > 2 seconds.	<ul style="list-style-type: none"> • Verify the water bottle or water valve. • Administer 10 ml/kg of isotonic saline subcutaneously. For weanlings, administer 5 ml/kg subcutaneously. • Provide wet food. • Monitor animal daily until condition has resolved. 	If animal does not improve despite treatment, BCS < 2, or shows signs of lethargy, euthanasia is recommended.

Diagnosis	Clinical Signs	Treatment	Clinical Endpoint
Dystocia	Normally, pups are delivered every 30 minutes. If retained pups are present and no pups have been delivered within 1 hour, the animal is in dystocia. The animal will usually be hunched and/or in poor general condition.	<ul style="list-style-type: none"> • If pups are more valuable than female, the female can be euthanized for a caesarean section and pups can be fostered to another available lactating female. Note that in most cases, pup survival is poor. • If female is in good condition following dystocia but still has retained pups, systemic antibiotics can be administered for 5-10 days with daily monitoring. • If female recovers and no more retained pups are palpable, and if she is invaluable to the breeding program, female may be bred again in 3-4 weeks. 	If animal is hunched and weak, and has been in dystocia for an unknown amount of time, euthanasia is recommended.
Ear Tag Ulceration	Skin ulceration on the ear caused by the presence of an ear tag.	<ul style="list-style-type: none"> • Cut nails of hind paws • Clean area with disinfectant solution, e.g., chlorhexidine 0.2%. • Consider removing the tag with hemostatic forceps or pliers, if possible. • If not possible, apply 1-2 drops of local anesthetic around ear tag and wait a few minutes. Incise the ear to remove ear tag. • Consider administering systemic anti-inflammatory for 3 days to help reduce the associated inflammation and pain. • Monitor a few days later to evaluate the progression of the condition. 	
Fighting Lesions (Minor)	Seen mostly in male mice. Usually fighting wounds are seen on the rump, base of tail, tail, penis, and sometimes on the limbs.	<p>Minor:</p> <ul style="list-style-type: none"> • Add extra environmental enrichment, e.g., Envirodri® or aspen shavings. • If needed, treat wounds topically. • Monitor for the next few days for new lesions. • If fresh lesions are seen, despite treatments and interventions, separate dominant animal. • Once lesions are dry and healing, monitor as needed until wounds have completely healed. 	

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Fighting Lesions (Severe)		Severe: <ul style="list-style-type: none"> • Separate dominant animal if easily identifiable (animal with no wounds) or most wounded animals. • Treat wounds topically. • Consider administering systemic anti-inflammatory for up to 3 days to help reduce the associated inflammation and pain. • Add extra environmental enrichment, e.g., Envirodri®, aspen shavings. • Monitor for the next few days for new lesions and readminister analgesia as needed. Once lesions are dry and healing, monitor as needed until wounds have completely healed	If wounds have exposed the muscle or have penetrated a body cavity or if there is presence of serious hemorrhage, infection, lameness, loss of limb function, severe lesions to the penis and/or enlarged bladder, euthanasia is recommended.
Flooded Cage	Animals are wet from leaky water bottle or malfunctioning valve.	<ul style="list-style-type: none"> • Place animals into a clean and dry cage and provide extra nesting material and environmental enrichment. • Assess the animal's general condition (hydration, mobility, swollen extremities, etc.) • If animals are wet or dirty from the flood, clean and dry fur. • Place the cage on a heating pad or under heat lamp. Provide a water source. • Monitor for a few hours • Recheck the next day 	If animals are dehydrated, weak, and hypothermic, euthanasia is recommended.
Head Tilt	Head is tilted to one side. If severe, animal can spin in circles in the cage or when picked up by the tail.	<ul style="list-style-type: none"> • If minor, can monitor progression and general condition of the animal. • Wet food or dry food pellets in the cage can be provided. • Consider administering systemic antibiotics and analgesics. • If the problem is recurring, and not associated with the strain or experiment, contact the veterinarian. 	If animal is continuously spinning and normal behavior is compromised, or is in poor general condition (thin, BC <2, dehydrated, etc.), euthanasia is recommended.

Diagnosis	Clinical Signs	Treatment	Clinical Endpoint
Hydrocephaly	Dome-shaped head with possible ataxia and lethargy.	<ul style="list-style-type: none"> This condition cannot be treated, and results in a rapid decline and death. If widespread in particular colony, may be transferred through the breeders: if of concern to the lab, recommend changing breeders. 	In all cases, prompt euthanasia is recommended.
Malocclusion	Misaligned incisor teeth that do not wear down normally and overgrow.	<ul style="list-style-type: none"> Contact the lab to recommend not using animal as breeder and ask if they wish for animals to be treated. Cut teeth weekly or bi-monthly If needed, give wet food daily until BCS = 3 and saline subcutaneously. 	If teeth have penetrated soft tissues and/or BCS < 2, euthanasia is recommended.
Mass	Mass on various parts of the body. Can be spontaneous, strain-related, or induced experimentally.	<ul style="list-style-type: none"> Assess the animal's general condition: (hydration, mobility, etc.) Measure mass with caliper Inspect mass for ulceration, infection, necrosis. Monitor tumor size on a regular basis (1x/week). 	<p>If mass is ulcerated, infected, necrotic, or impairs normal functions (eating, moving) or if the mass exceeds guidelines, euthanasia is recommended.</p> <p>For rodent cancer models: Refer to SOP 415 and Tumor Volume Chart for mass dimensions.</p>
Microphthalmia or Anophthalmia	An animal with a missing eye or with an eye smaller than normal. Can be unilateral or bilateral.	<ul style="list-style-type: none"> This is a congenital condition related to some strains, e.g., C57Bl/6. Treatment is not necessary. 	
Ocular Opacity	White, opaque spot on eye (corneal opacity) or in eye (lens opacity or cataracts).	<ul style="list-style-type: none"> If eye/eyelids are not swollen and there is no discharge, monitor 1x/month for conjunctivitis, skin ulcerations around affected eye or corneal ulcerations. 	If corneal ulceration is present, euthanasia or enucleation is recommended
Pododermatitis	The animal's hind paws are red, can be swollen and ulcerated. The treatment will only decrease the rate of pododermatitis progression.	<p>When the condition has just started, and the paw is not ulcerated, consider one or more of the following:</p> <ul style="list-style-type: none"> Change the bedding from corncob to cotton bedding Change the bedding 2x a week Apply a protective balm or antibiotic ointment to lesions daily Consider administering systemic anti-inflammatory to help reduce the associated inflammation and pain. Monitor animals every 2-3 weeks. 	When lesion(s) progresses to an ulceration and bleed, euthanasia is recommended.

Diagnosis	Clinical Signs	Treatment	Clinical Endpoint
<p>Preputial gland swelling or abscess</p>	<p>Preputial glands are accessory glands of the reproductive system of the male mouse and play a role in reproduction and dominance behavior</p> <p>Inflammation and infection of these glands can lead to abscess formation.</p>	<ul style="list-style-type: none"> • If abscess is small monitor 1x/week. May remain small after having been lanced (fibrosis/scar tissue). • If abscess is mature, clean area with skin disinfectant and lance, extracting as much exudate as possible • Clean abscess pocket and surrounding area with sterile saline or chlorhexidine solution (wound flush). • If possible, fill abscess pocket with antibiotic ointment. 	
<p>Prolapsed penis</p>	<p>Swelling and redness of the prepuce (balanoposthitis) and prolapse of the penis (paraphimosis). The exteriorized penis will be red and swollen.</p>	<ul style="list-style-type: none"> • Examine the area for preputial gland abscesses, bite wounds, and entrapped debris in prepuce. • Simple inflammation can often be treated with daily application of triple antibiotic ointment with corticosteroid for 5-7days • Consider administering systemic anti-inflammatory for up to 3 days to help reduce the associated inflammation and pain. • Breeding males should be separated from females until the condition is resolved. 	<p>Euthanasia is recommended for animals that are unable to urinate with enlarged bladder as urethral obstruction is likely.</p>
<p>Rectal Prolapse</p>	<p>The distal portion of the rectum is prolapsed exterior to the body presenting as a small red mass at the anus. The rectal tissue may bleed or become dry and necrotic.</p>	<ul style="list-style-type: none"> • Small rectal prolapses may be treated with application of triple antibiotic ointment with corticosteroid. for 5-7days • The rectum can be reduced manually with a probe and a small amount of tissue glue can be applied to temporarily maintain the rectum in place and prevent further prolapsing when passing feces. • If unable to reduce, monitor for signs of lesions and tissue necrosis. • Consider administering systemic anti-inflammatory to help reduce the associated inflammation and pain. • Consider providing wet food to increase hydration and reduce straining 	<p>If prolapse is large, bleeding and/or necrotic, euthanasia is recommended.</p>
<p>Sebaceous Cyst</p>		<ul style="list-style-type: none"> • If cyst is small, monitor. • If cyst is mature, clean area with skin disinfectant and lance, extracting as much exudate as possible • Clean abscess pocket and surrounding area with sterile saline or chlorhexidine solution (wound flush). 	

Diagnosis	Clinical Signs	Treatment	Clinical Endpoint
Seizures	Often induced by cage or animal manipulation. The animals can freeze, fall over, and lie on their sides while paddling the legs.	<ul style="list-style-type: none"> • Handle with care and as little as possible • Place cages in a low-traffic areas in the room. • Monitor general health of the animal (1-2x/month or as needed) 	If animal's general condition is deteriorating, euthanasia is recommended.
Skin Ulceration	Flaky, bloody, skin lesions typically start around the ears and between the shoulder blades.	<ul style="list-style-type: none"> • Cut nails of hindpaws once a week • Apply topical treatment such as antibiotic ointment, spray bandage, or green clay paste to a thickness of 5mm once or daily (as needed) • Monitor 1x a week until condition has resolved 	If lesion is not improving or worsening, or if lesion is covering a large portion of the animal's body, euthanasia is recommended.
Small pups or runt	Small litter compared to age-matched animals of same strain, or one animal smaller than littermates (runt).	<ul style="list-style-type: none"> • Assess the general condition of the animal(s): malocclusion, hydrocephaly, dehydration, etc. • Assess the general condition of the mother • If otherwise active with no other observable conditions and if no other litters are present in the cage, keep the animal(s) with mother until 4 weeks of age • If animals are less than 3 weeks of age, start on daily puppy milk and wet food treatment • If animals are weaned, start on daily wet food treatment • Monitor progression 1-2x/week 	If poor general condition (weak, dehydrated), recommend euthanasia.
Thin		<ul style="list-style-type: none"> • Asses the animal's general condition: (BCS, presence of masses, malocclusion, hydration, mobility). • Start wet food daily. • Monitor animal weekly or more if needed • Measuring the weight can be used to objectively evaluate additional weight gain/loss 	If animal is severely debilitated, has a BCS < 2 and/or weight loss >20% original weight, euthanasia is recommended
Vaginal Prolapse	The vaginal or uterine mucosa wall protruding from vaginal area. The tissue may bleed or become dry and necrotic.	<ul style="list-style-type: none"> • Small prolapses may be treated with application of triple antibiotic ointment with corticosteroid for 2-3 days. • The mucosa can be reduced manually with a probe and a small amount of tissue glue can be applied to temporarily maintain it in place. • Consider administering systemic anti-inflammatory to help reduce the associated inflammation and pain. • Monitor for signs of lesions and tissue necrosis. • Female breeding mice with prolapses should not be bred again. 	If prolapse is large, bleeding and/or necrotic, euthanasia is recommended.