Standard Operating Procedures for Management of Ulcerative Dermatitis in Mice

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1.0 Purpose:

1.1 This SOP authorizes and outlines objective scoring and various treatment options of mice with ulcerative dermatitis by veterinary staff, investigative personnel and animal care technicians and provides criteria for determining euthanasia in severe intractable cases of ulcerative dermatitis.

2.0 Background

2.1 Ulcerative dermatitis (UD) is a common idiopathic non-infectious skin condition in mice that is characterized by hair loss, skin redness and itching that rapidly progresses to excoriation and ulceration of the skin as a result of self-trauma.[1] Due to the potential discomfort and pain associated with this condition and its high prevalence, UD is considered one of the most important welfare issues in lab mice.[1,2]

3.0 Etiology & Risk Factors

3.1 While the exact etiology of UD is still unknown, recent literature suggests it may be a type I hypersensitivity response.[3,4] The condition has been associated with various other pathological processes.[5-7] Risk factors for the development of UD include:

- C57BL/6 genetic background
- Increasing age – median age of onset is approximately 15 months[8]
- Sex – earlier onset and higher prevalence in females[9]
- High-fat diet consumption
- Changes in humidity

Investigators planning studies using C57BL/6-background mice, especially aging studies, should anticipate that UD lesions may develop in approximately 20% of mice[8,10] and may require pharmacologic treatment or euthanasia.

Experimental Confounds

Known sequelae of UD that may impact the animal's experimental value include[1,11]:

- Systemic changes in cytokines and inflammatory cell populations
- Lymphadenopathy
- Splenomegaly
- Abnormal activity and nesting behavior
- Reactive amyloidosis
- Secondary bacterial infection

4.0 Materials:

4.1 Primary drugs used:

- Vetericyn Plus Ophthalmic Gel® (Hypochlorous Acid (0.010%)
- Triple antibiotic ointment (bacitracin zinc, neomycin sulfate, polymyxin B sulfate) +/- pramoxine

4.2: Secondary drugs that could be used if refractory or if case is moderate to severe:

- Green Clay (montmorillonite)
- Lidocaine 4% Cream
- Dakin® Solution diluted (0.005% sodium hypochlorite)
- Chlorhexidine 2% ointment or solution
- Carprofen 5-20 mg/kg SQ or PO in drinking water
- Enrofloxacin 5-10 mg/kg SQ or PO in drinking water

4.0 Procedures:

4.1 Identification and Treatments

4.1.1 Common Clinical signs: Alopecia, pruritus, ulceration, crusting and exudation of the skin. Common location of lesions are the dorsum, cervical area, between the scapulae, and head. Chronic conditions can cause ulcerated areas, scarring and contracture of the skin that leads to restriction of movement.

4.1.2 Treatment options (See Appendix 1): (early treatment of mild cases has been shown to be more effective)

- **Trimming of rear toenails** every 10-14 days. This has been shown to be very effective in the treatment of mild UD.[2] A restraint device is strongly recommended to help facilitate proper handling of the mice for the nail trim.
- **Topical treatment options:** Based on Appendix 1 below, IVS, PI staff or veterinary staff will initiate topical treatment.
- **Housing:** Separating affected animals can prevent worsening of clinical signs due to aggressive behavior of cage mates.

4.2 Notification

Personnel identifying the condition must notify the principal investigator (or his/her designee) prior to initiating treatment, unless prior approval for treatment has been given. All animals identified with UD must be entered on the OCV Animal Health database for case tracking.

4.3 Flagging, Documentation and Scoring

Flag the cage with a green CVS vet card. A score should be given to each UD case and documented in the treatment section: (1) Mild; (2) Moderate (3) Severe. See Appendix 1 for details on scoring.

4.5 Resolution of Case

Affected animals that have been assessed and treated and have improved clinical signs where there is no active inflammation (hair loss may still be present) can be resolved and treatment stopped. Resolution

of a case can be initiated by trained PI staff, animal care staff or Campus Vet Services (CVS) staff. The green card should be placed behind the cage card for the life of the animal to indicate prior history and possible recurrence of the UD.

4.6 Criteria for Euthanasia

- Severe UD with score of 3 that has not resolved or improved after 7-14 days with treatment,
- Presence of lesions which impair normal functions such as eating or drinking, locomotion.
- Depression, lethargy, loss of body condition

4.7 Campus Veterinary Service Care

- All affected animals will be examined by CVS staff within 4 days of notification of the issue unless the case is resolved or is euthanized before the indicated time period.
- CVS staff will make a clinical plan for each case if there is no resolution after 7 days of treatment.
- CVS staff will be in communication with animal care staff and PI personnel to ensure adequate medical care and meet the needs of the research project.

Appendix 1.

Scoring/Treatment Ulcerative Dermatitis Cases*

1 **Mild**	• Lesion size less than 1 cm refers to the largest diameter of the lesion in any direction. Lesions at 1 cm or above consider cumulative size. • Single or Multiple small superficial dry crust(s) (≤ 2 mm diameter) • Mild cases are the most likely to respond to treatment. • Prognosis: Good		• Trim nails only • Recheck in 3-5 days for worsening condition • If close to parturition, do not disturb until at least 3-5 days post pupping
2 **Moderate**	• Erosion or ulcer <1cm^2 cumulative size • Lesion on the face ≤3mm diameter • Prognosis: Fair		• Trim nails • Apply Vetericyn or 3abx with pain daily for 3-7 days • If close to parturition, do not disturb until at least 3-5 days post pupping
3 **Severe**	• Large (up to 2cm^2 cumulative) ulcers • Facial lesions ≥3mm diameter • Prognosis: Poor		• Contact CVS staff immediately • Apply Vetericyn • Carprofen SID • Topical treatment • Euthanasia required if treatment not elected

Reference 2,8,9,12-14

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Revision History

Version	Change	Date Replaced
1	Added Vetericyn	6/27/18
2	Refined treatment options, added systemics	3/7/20
3	Updated appendix 1 with specific treatment options for each score and the directive to not treat pregnant mice with a score of 1-2	6/3/22
4	Updated appendix 1 with more succinct treatment options added more references and lidocaine	3/30/26
5	Deleted maropitant treatment and minor grammar edits	5/2/26