1.0 Purpose:
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 Etiology: The cause of ulcerative dermatitis syndrome is unknown but is likely multifactorial with an epigenetic component. Risk factors include high fat diet and certain genotypes such as E or P selectin and inducible nitric oxide synthase knockouts. Ulcerative dermatitis may be spontaneous or may occur secondary to a break in the skin, such as fight wounds or ear tags. There is no definitive cure for ulcerative dermatitis but mild cases can be managed with long-term therapeutic intervention.

2.2 Incidence: Ulcerative dermatitis is common in C57BL/6 mice or strains with C57BL/6 background. Most genetically modified mice have C57BL/6 as part of their genetic background.

2.3 Potential impact on Research: Mice with ulcerative dermatitis develop focal dermal ulcers with a mixed inflammatory cell infiltrate consisting of neutrophils, macrophages, mast cells, and occasional lymphocytes. [1,2]. Acute and chronic dermal inflammation and secondary bacterial infections directly alter immune system parameters and behavior and indirectly alter mobility, reproductive capacity, food intake, and multiple other physiological indices. Long-term treatment with antibiotics, steroids and dietary alterations can also change physiological indices and research results.

3.0 Procedures:

3.1 Identification

3.1.1 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, scaring and contracture of the skin that leads to restriction of movement.

3.2 Notification
Personnel identifying the condition must notify the principle 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.

3.3 Flagging of Cage:
The cage should be flagged with a WSU Campus Vet Services Card: (see picture of card below) with the ASAF/PI, animal ID, date flagged, mark UD on the card, mark if the PI has been notified, initials of person setting up the case.
3.4 Documentation and Scoring:

3.4.1 To initiate treatment documentation, use the back side of the green CVS card. The card provides enough space to document 1 week of daily treatment. Once the case exceeds one week, the CVS staff will assess treatment efficacy and develop a follow up care plan if needed or will resolve the case. If further treatment is necessary, the documentation will move to a CVS paper medical record. When the case has resolved, either returned to normal limits, euthanasia or transferred to long term care, write the date on the front of the card.

3.4.2 A number 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.

3.5 Treatment options: (early treatment of mild cases have been shown to be more effective)

3.5.1 Trimming of rear toenails every 10-14 days. This has been shown to be very effective in the treatment of mild UD. A restraint device can be made to help facilitate proper handling of the mice for the nail trim (Adams, S. C., et. al PLOS 2016). CVS can provide restraining devices, please call and order at 5-6246. The use of suture scissors or small pediatric tail trimmers are recommended. Please contact CVS 5-6246 for trimming devices.

Fig 1. Diagram of restraint device used for toenail trim. A 50mL conical tube was modified by the following changes. Cutouts were made along the rim of the tube to allow seating of the mouse knee against the edge and were lightly melted to remove sharp edges. The tip of the tube was removed and lightly melted to ensure air passage as well as facilitate decontamination between uses. Approximate dimensions are shown in millimeters.
3.5.2 Topical treatment options:

3.5.2.1 Please contact CVS at 509-335-6246 if you need to order any of the supplies listed below.

3.5.2.2 Emergency and after-hours veterinary care: 509-330-1871 http://www.campusvet.wsu.edu/

3.5.2.3 **Triple antibiotic ointment +/- pramoxine (3 +/- P):** apply with cotton tip applicator, tongue depressor or gloved finger, once daily for 1-7 days. If lesions improving after daily treatment, then can reduce to 2-3 x per week.

3.5.2.4 **Silver sulfadiazine (SS) ointment:** apply with cotton tip applicator, tongue depressor or gloved finger, once daily for 1-7 days. If lesions improving after daily treatment, then can reduce to 2-3 x per week.

3.5.2.5 **Dilute chlorhexidine solution or ointment (CS or CO):** apply with cotton tip applicator, tongue depressor or gloved finger, once daily for 1-7 days. If lesions improving after daily treatment, then can reduce to 2-3 x per week.

3.5.2.6 **Green clay (GC) (montmorillonite) {3}:** Mix clay with water until forms a thick paste, let stand for 5 minutes. Clean the affected area with dilute chlorhexidine and let dry. Apply clay poultice to a thickness of 5mm every 3-4 days

3.5.2.7 **Tri Calm® (TC) (Aluminum Acetate 0.2%):** apply with cotton tip applicator, tongue depressor or gloved finger, once daily for 1-7 days. If lesions improving after daily treatment, then can reduce to 2-3 x per week.

3.5.2.8 All topical treatments must be noted on the Vet Card with the initials of the person, date, and treatment abbreviations as listed above in bold.

3.5.3 Fatty Acid Oral Supplement: The addition of Omega 3 fatty acids has been shown to be efficacious in the treatment of UD (Derma 3 or Welactin similar products).

3.5.4 Housing: Separating affected animals can prevent worsening of clinical signs due to aggressive behavior of cage mates.

3.6 Resolution of Case

Affected animals that have been assessed and treated and have improvement of 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 the CVS staff. Resolution date should be noted on the Vet Treatment Card or paper record. 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. If the animal is euthanized place the date of euthanasia on the card and place the card in the Index Card Holder in the room marked “CVS Cases”.

3.7 Criteria for Euthanasia

3.7.1 Severe UD with score of 3 that has not resolved or improved after 10-14 days with treatment,

3.7.2 Presence of lesions which impair normal functions such as eating or drinking, locomotion.

3.7.3 Depression, lethargy, loss of body condition

3.7.4 Every effort will be made to contact the PI and staff when animals have reached the criteria for euthanasia before the animal is euthanized.
4.0 Campus Veterinary Service (CVS)

4.1 All affected animals will be examined by CVS within 4 days of notification of the issue unless the case is resolved or is euthanized before the indicated time period.

4.2 CVS staff will make a clinical plan for each case if there is no resolution after 7 days of treatment.

4.3 CVS staff will be in communication with animal care staff and PI personnel to insure adequate medical care and meet the needs of the research project.

Appendix 1.
Scoring Ulcerative Dermatitis Cases*

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mild</td>
<td>Excoriations and/or punctuate crust(s) ($\leq 2$ mm$^*$)</td>
</tr>
<tr>
<td></td>
<td>Any ulcerative lesion $\leq 5$ mm$^*$ in diameter on the body but not on face or extremities.</td>
</tr>
<tr>
<td></td>
<td>Lesion is not characterized by scratching.</td>
</tr>
<tr>
<td></td>
<td>Mild cases are the most likely to respond to treatment and may resolve naturally</td>
</tr>
<tr>
<td>2 Moderate</td>
<td>A single ulcerative lesion from 0.5 to 1.5 cm$^*$ in diameter.</td>
</tr>
<tr>
<td></td>
<td>Any lesion $&lt; 3$ mm$^*$ involving the face or extremities.</td>
</tr>
<tr>
<td></td>
<td>Any lesion that is continually scratched.</td>
</tr>
<tr>
<td>3 Severe</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td></td>
</tr>
</tbody>
</table>
| - Any ulcerative lesion > 1.5 cm** in diameter.  
- Multiple ulcerative lesions that add up to > 1.5 cm** in length  
- Ulcerative lesion > 3 mm** on face |

* Animal has at least one of the criteria in each category. The animal does not have to meet all the criteria.

** Measure the longest diameter of the largest lesion identified

References:

2. Kastenmayer RJ, Fain MA, Perdue KA. 2006. A retrospective study of idiopathic ulcerative dermatitis in mice with a C57BL/6 background. JAALAS. 45:8-12.  

Approved – 6.27.2018  
Replaces version – 8.28.2015