Treatment of Ulcerative Dermatitis at a Transgenic Mouse Facility in Leeds

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Ulcerative dermatitis

- A skin disorder found in rodents; symptoms include alopecia and skin irritation often leading to destruction of the epidermis.

- Primary cause unknown and maybe multifactorial but suggestions include:
  - Genetic factors
  - Allergies
  - Ectoparasite hypersensitivity

- Lesions are pruritic and condition is exacerbated by excessive grooming and scratching, often in an obsessive compulsive manner.

- Prognosis is often poor due to the repeated scratching of the area, poor response to treatment and secondary complications due to bacterial infections.

- Commonly affected areas:
  - Neck
  - Shoulders
  - Ears
  - Back

Figure 1. - A 16 week old CD1 male suffering from UD

Early Methods Tried

- Removal of food hoppers – Occasional improvement

- Wound powder – Occasional improvement

- Changing of bedding – No improvement

- Bathing of area – No improvement

- The use of mouse jackets – No improvement

The Itch Scratch Cycle

A documentary about humans suffering from pruritis, introduced me to the itch/scratch cycle.

The documentary featured patients who had nothing wrong with them medically but were caught in the cycle demonstrated by the diagram below, often itching the affected area in an obsessive compulsive manner.

Figure 2. – The Itch/Scratch cycle

In one case the doctor advised the patient to wear thick gloves at times when he was prone to scratching, to reduce the damage he could do with his fingernails.

Although we could not put gloves on the mice, we could trim their toenails, in an attempt to reduce the damage done by repeated scratching.

Toenail Trimming

A **simple, cost effective** and **fast** technique that any competent technician can be trained to do.

- Two technicians needed, one to restrain animal, one to trim toenails;

- Mouse is scruffed securely and held in a way to allow access to hind limbs;

- Second technician holds paw carefully but firmly to keep it still and also to gently splay the toes. Toenails can then be carefully trimmed using scissors (see photos).

It is only necessary to trim the sharp, hooked tip of each nail. Trimming is **only required once** but can be repeated if needed.
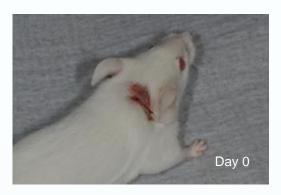

| Toenails prior to trimming | Trimming method | Toenails after trimming |

Figure 3. - Trimming method

First example:
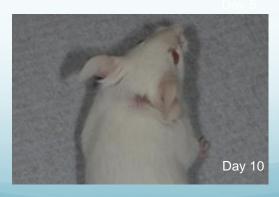Mouse 1 - CD1 female, 8 weeks old.

Figure 4. - First toenail trimming example

Toenail Trimming Results

Below is a picture grid showing the improvement of mice with UD in the toenail trimming group over an 8 day period.
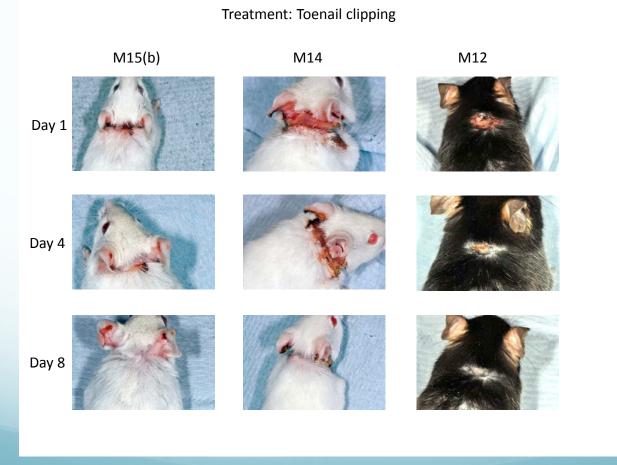

Figure 6. – Toenail trimming results

Further Study Development

To further develop the study, and to increase the ability to compare data, we introduced 2 new treatment groups to the UD study.

Each mouse presenting symptoms would now be filtered into one of 3 treatment groups.

- Toenail trimming (as already described)

- Topical application of Fuciderm (an anti-biotic and anti-inflammatory gel)

- IP injection of Cerenia (a synthetic protein thought to inhibit the 'itch' reflex)
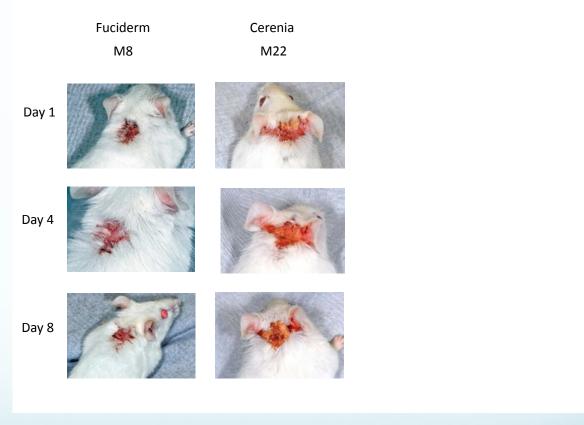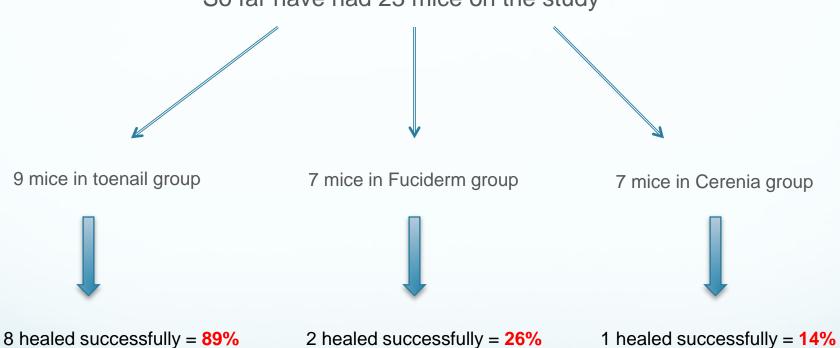
Alternative Treatment Results

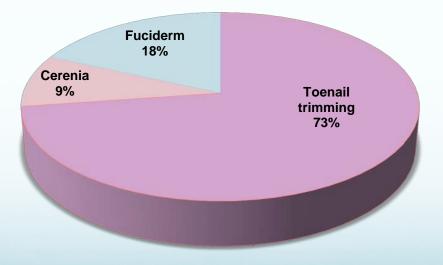Figure 8. – Fuciderm and Cerenia results

Early Analysis

So far have had 23 mice on the study

9 mice in toenail group

7 mice in Fuciderm group

7 mice in Cerenia group

8 healed successfully = **89%**

2 healed successfully = **26%**

1 healed successfully = **14%**

Early Analysis

The results gathered so far are further demonstrated by the graph below.

Figure 9. – Chart to show the treatment given when primary treatment led to successful healing

Findings and Future Plans

Clear positive effect on the health and wellbeing of mice reducing pain, discomfort and stress.

The treatment implements the principles of **Refinement** as well as **Reduction** as fewer animals need to be culled and replaced.
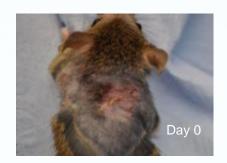
Reduced risk of losing valuable scientific animals in a study.

The treatment is also:
- Free
- Simple to teach
- Quick
- None invasive
- Easy to implement at other facilities

Continued data collection to build a solid statistical evidence on the benefits of toenail trimming over other treatments.
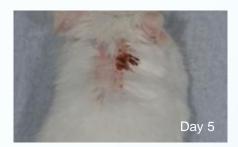
Day 0

Day 0

Day 0

Day 0

Day 1

Day 1

Day 1

Day 5

Day 14

Day 8

Day 14

Day 14

Thank You!