Using Labskin to investigate the wound healing process

LabSkin
SKIN SCIENCE

OBJECTIVE

To develop methods for the reproducible wounding of Labskin and demonstrate the use of Matrix Assisted Laser Desorption Ionisation Mass Spectrometry Imaging (MALDI-MSI) to directly measure mass spectra from the tissue during the wound healing process.

METHODS

- Each Labskin sample was wounded with a scalpel blade using controlled depth penetration & assessed every 24h for 5 days.
- Samples were either formalin fixed paraffin embedded (FFPE) for histology or embedded in 20% gelatin and flash frozen ready for mass spectrometry imaging.
- FFPE tissue samples for histology were sectioned (5 µm) and stained with haematoxylin and eosin (H&E).
- Fresh frozen samples were sectioned (10 µm), sprayed with MALDI matrix and analysed for lipids.

RESULTS

The wounded model mimics the initial wound healing response through the migration of keratinocytes into the wound site immediately post wounding.

Figure 1 - Photographic image of wounding Labskin with scalpel blade

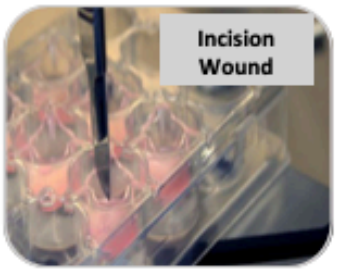
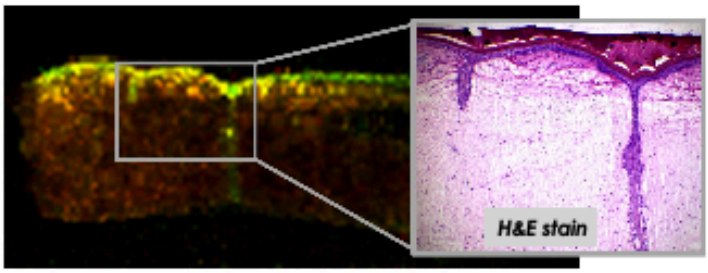


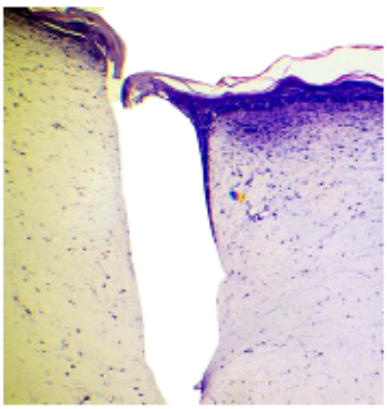
Figure 2 - MSI image and corresponding H&E image of Labskin 3 days post wounding. MSI image of two distinct ion species in the epidermis (green = m/z 721.4) and dermis (red = m/z 725.4)



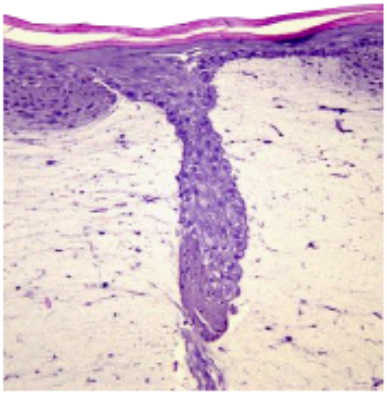
SUMMARY

With care, Labskin can be wounded in a reproducible manner. The wound healing process can be studied using a variety of techniques including MALDI-MSI. Therefore, Labskin can be used to assess the activity of ingredients and formulations in the wound healing process and benchmark against products of recognised activity.

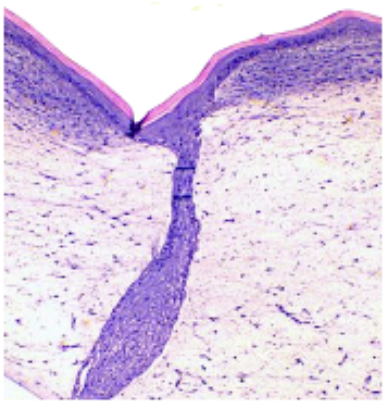
Day 0



Day 3 post-wounding



Day 5 post-wounding



Labskin can be used within the same experimental design to evaluate several endpoints including cytokine responses (i.e. IL-1a, IL-6, IL-8, PGE2, TNFa, IL-10 etc.), histological changes, wound repair and photo-reactivity in addition to skin commensal and pathogenic microorganisms.

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