Examining psoriatic lesions using the Mindera dermal biomarker patch
Background

• Skin disease diagnosis remains predicted on subjective visual examination, followed by biopsy and histology

• In inflammatory diseases, biopsy is not typically performed, particularly for diseases such as psoriasis and atopic dermatitis

• Scientific understanding of the skin at a genomic and transcriptomic level continues to outpace our ability to clinically leverage this data

• The wealth of molecular information currently available and the pace at which new data can be acquired suggests methods that allow for minimally invasive biomarker collection in the skin could dramatically alter our understanding of skin disease and positively impact treatment paradigms
Background: Scalable Transcriptomics with the Mindera Platform

- Simple 5-minute application
- No pain, no scar
- Excellent clinical safety profile
- ~7,000 RNA transcripts extracted per patch
- IP protected (claims issued)
- FDA Registered Class I device

- Machine Learning matches biomarkers with health outcomes
- Use skin’s current RNA signature to personalize skin care decisions
Methods

• Dermal biomarker patches (DBP) were used according to the manufacturer’s instructions

• Lesional vs. Non-lesional psoriasis study
  - Patients with a confirmed psoriasis diagnosis were recruited (N=66) and DBP applied to lesional and non-lesional skin
  - Samples were analyzed by RNA-Seq methods to determine phenotypic differences between lesional and non-lesional skin

• Phenotypic drug response study
  - Patients with a confirmed psoriasis diagnosis were recruited (N=10) and DBP applied prior to initial biologic treatment; 5 patients started anti-IL-17 biologics and 5 started anti-IL-23 biologics
  - PASI measured at baseline and at 12 weeks; response was defined as a PASI75 response
Lesional vs. Non-lesional Psoriasis Study Results

- Lesional vs. non-lesional skin sampled using Mindera patches in 66 patients and compared to punch biopsy.
- Mindera patches and punch biopsy yielded equivalent biomarker data.
- 30 highest variance genes selected & unsupervised clustering performed.
- Excellent discrimination between lesional and non-lesional skin in same patient.
- Signature recapitulates known transcriptomic differences in psoriasis.
Patients enrolled who were starting biologic treatment for psoriasis (N=10)

Analysis performed on those patients who achieved PASI75 at 12 weeks after biologic initiation (5 anti-IL17 & 5 anti-IL23)

Differentially expressed genes determined by comparison to non-lesional skin transcriptome

Biomarker sets were identified that distinguish anti-IL17 response from anti-IL23 response

Two different biomarker sets were identified within the anti-IL17 data (14 gene and 17 gene sets)
Comparing Biomarkers Sets from IL-17 and IL-23 patients

Some overlap between biomarker sets (~18%), but largely unique biomarkers define responders to each drug class
Conclusions

• There is a need for an efficient way to molecular assess the skin, particularly in inflammatory diseases where punch biopsy is not part of the standard of care.

• Dermal Biomarker Patch technology allows for minimally invasive extraction of the transcriptome from psoriatic skin lesions.

• Non-overlapping biomarker sets can be identified that delineate responders to different biologic classes.

• Further analysis and machine learning training with greater numbers of patients could result in classifiers that can distinguish biologic responders from non-responders with high accuracy.
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