

Longitudinal, multi-omic analysis of lesion development in atopic dermatitis



SCAN ME

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Research Questions

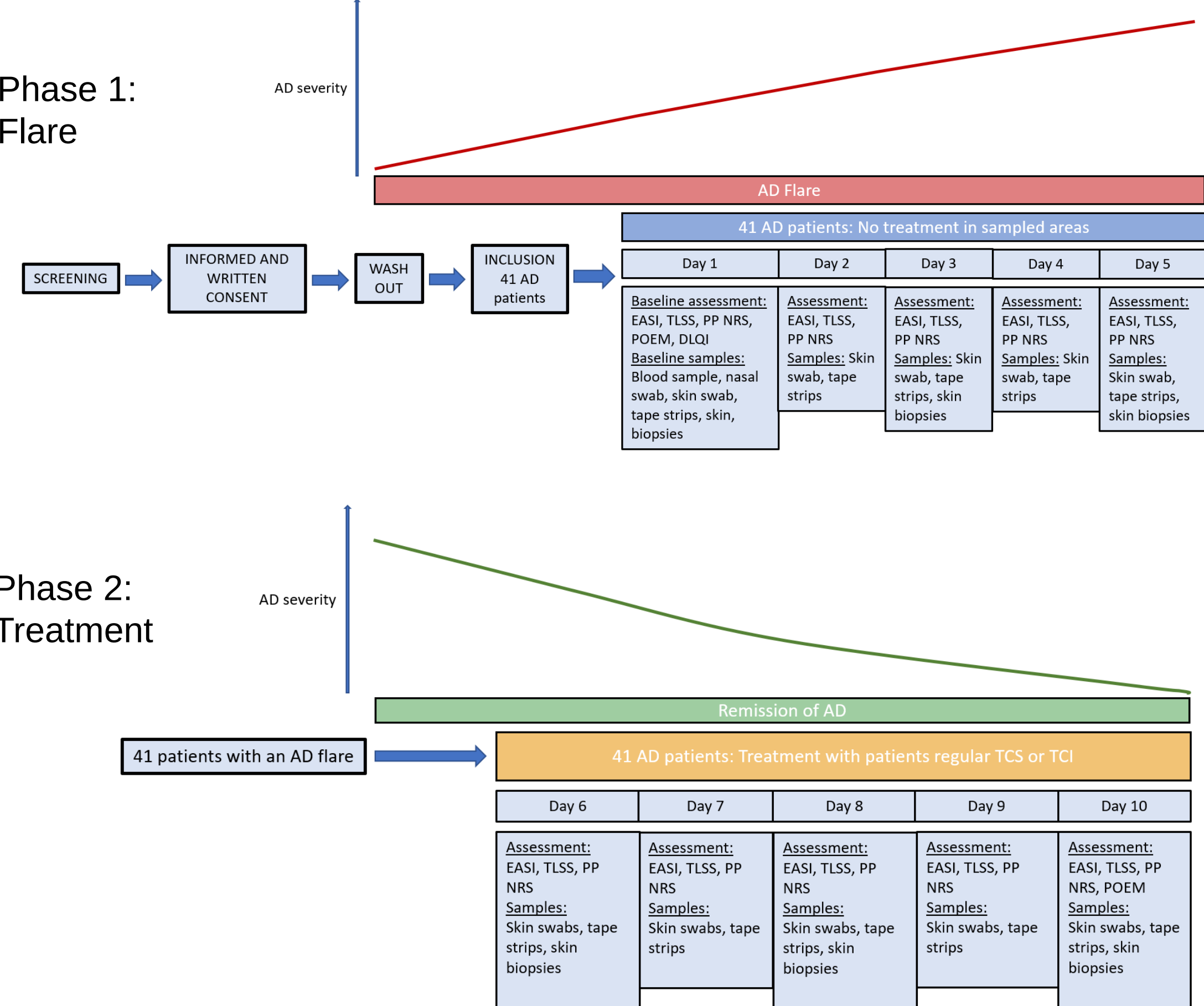
- How does bacterial community composition and human gene expression change during development and treatment of atopic dermatitis flares.
- Do changes in bacterial community composition precede inflammation during AD flare development?

Study Overview

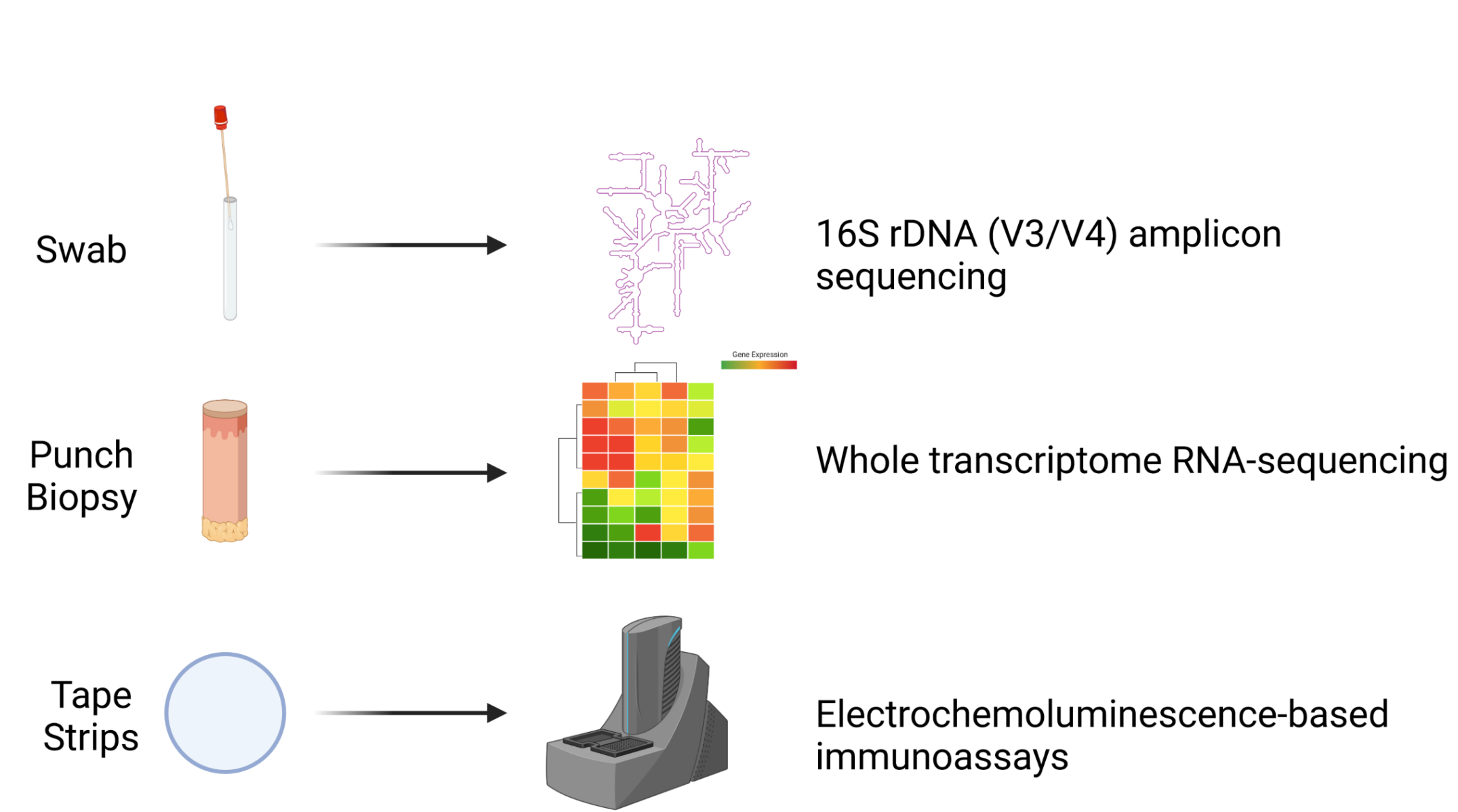
Patient Population:

41 patients with atopic dermatitis and 41 matched controls recruited from Gentofte Hospital, Copenhagen, Denmark.

Sample Collection and Treatment Timeline:



Sample Analysis:



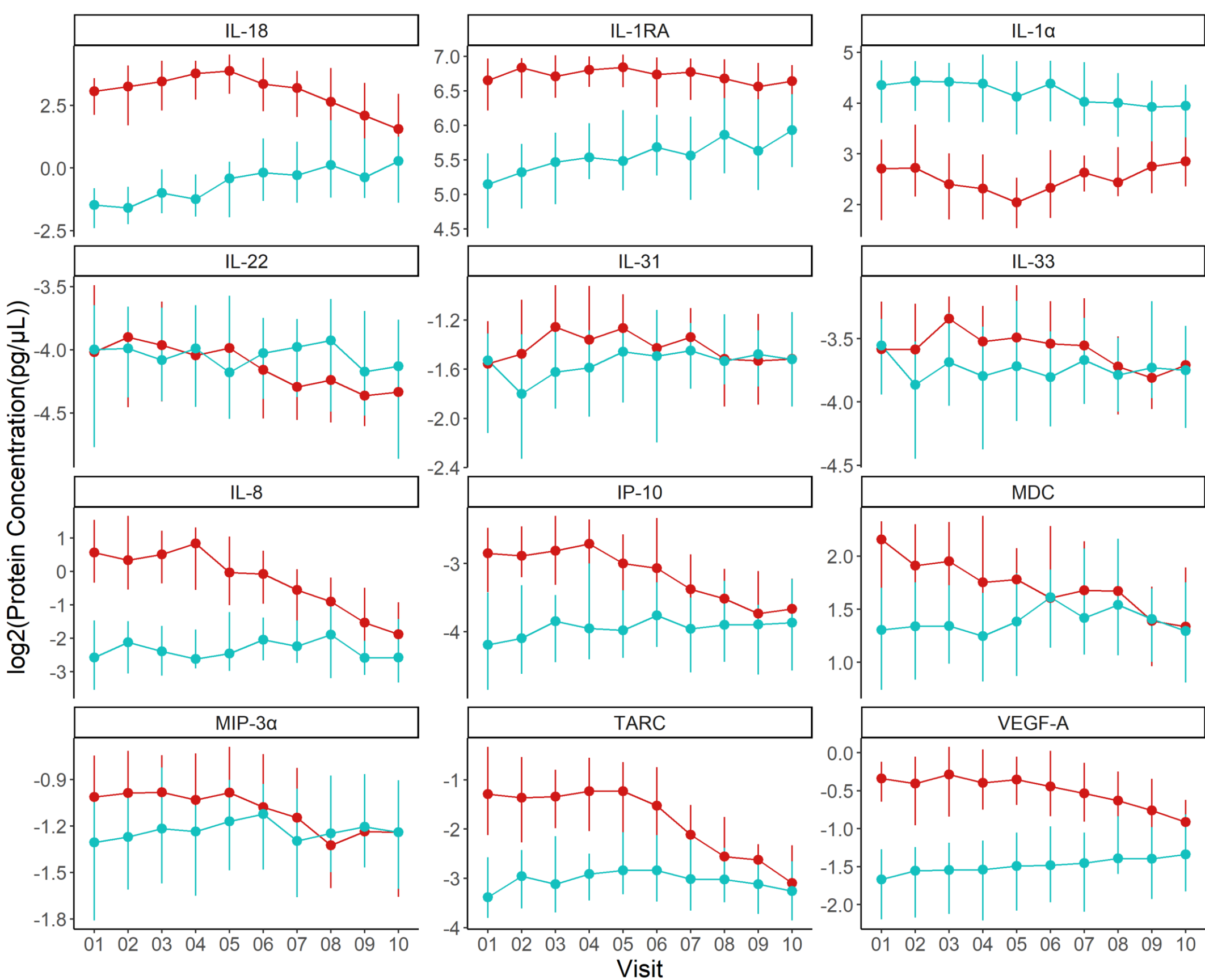
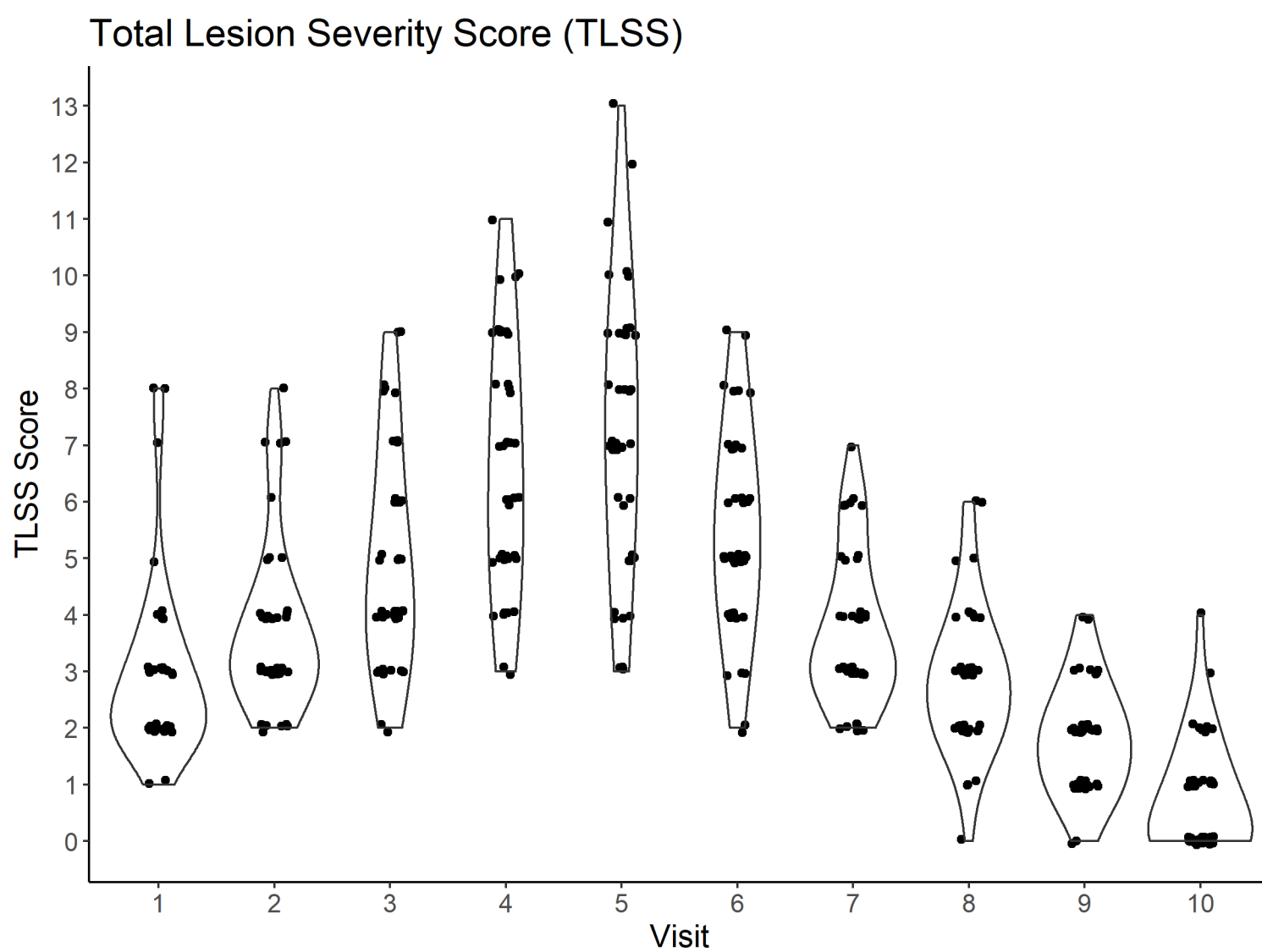
Conclusions

- Severity of flare increases following discontinuation of treatment and decreases once treatment restarts.
- Treatment reduces levels of inflammatory cytokines, such as IL-18, IL-8, IP-10, MDC, TARC, VEGF-A.
- Host gene expression in lesional skin begins to resemble non-lesional skin once treatment is resumed.
- Abundance of *Staphylococcus* species are elevated during flares. Median relative abundance returns to non-flare levels after treatment.

Results

Total Lesion Severity Score (TLSS)

- TLSS score increases from visit 1 to visit 5 after patients stop using topical treatment.
- Treatment is resumed again after visit 5. Flare severity decreases between visit 6 and visit 10 with treatment.



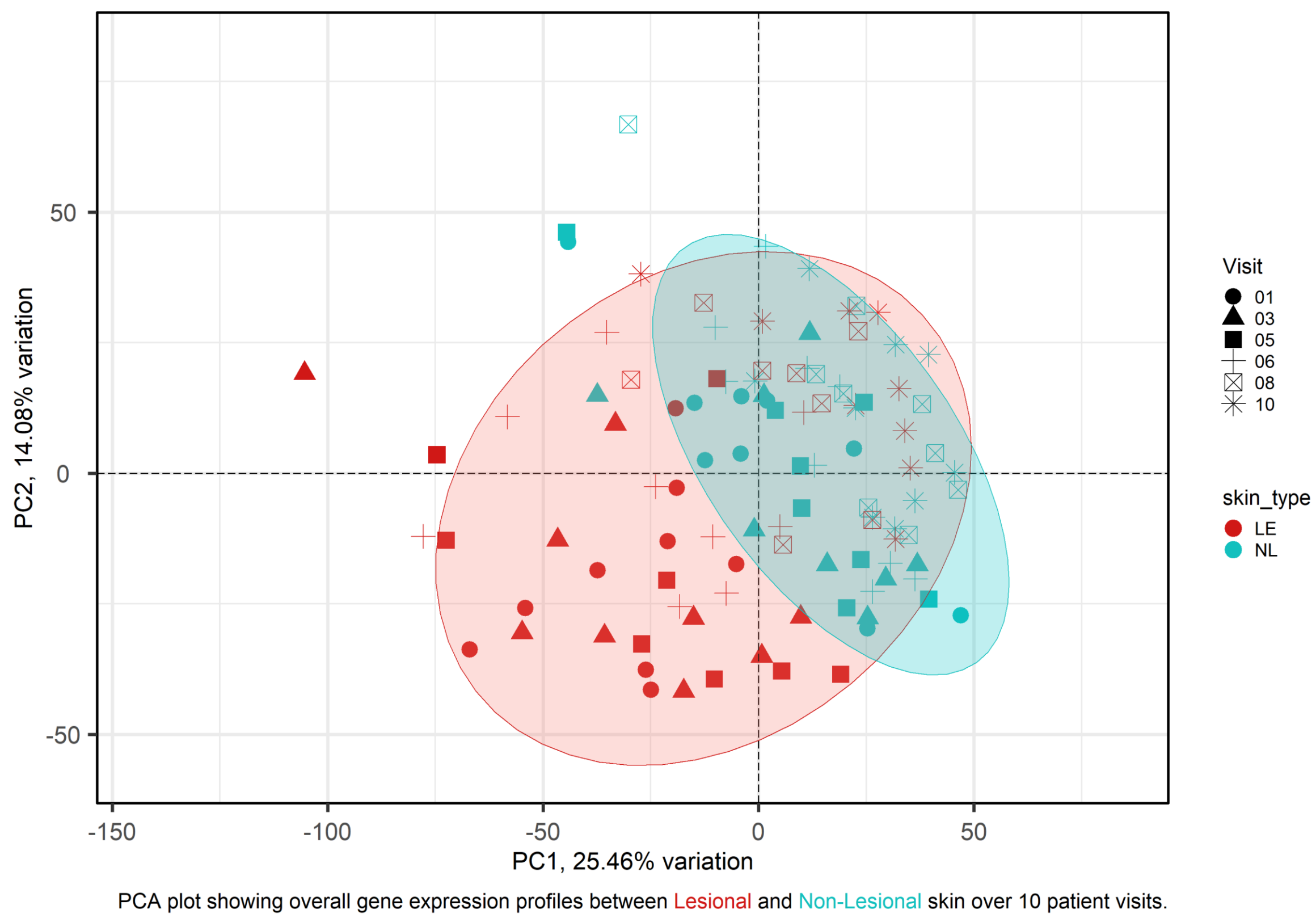
Inflammatory Cytokine Measurements

- Several inflammatory cytokines (IL-18, IL-8, IP-10, MDC, TARC, VEGF-A) show elevated levels in lesional (LE) samples following treatment interruption.
- Levels of these cytokines decrease after visit 5 when treatment is resumed.
- Measured by electrochemoluminescence immunoassay, but also reflected in RNA-sequencing data

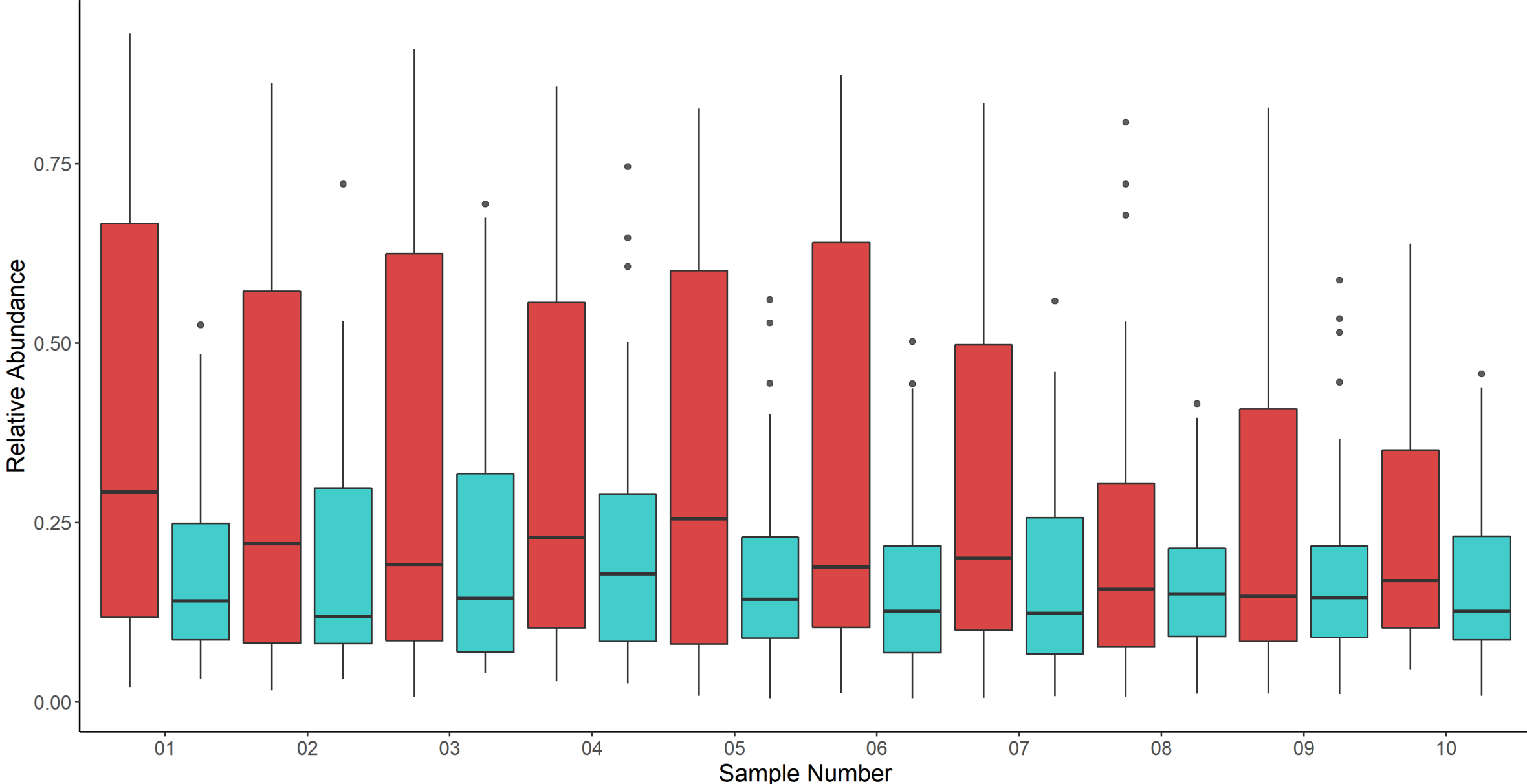
Cytokine concentrations (log2-transformed) from tape-strips using electrochemoluminescence from Lesional and Non-Lesional skin over 10 patient visits. Local treatment was initiated after day 05. Points represent the median and error bars represent the inter quartile range.

RNA-sequencing

- Principal-component analysis (PCA)
- Lesional (LE) samples prior to treatment (visit 1 to 5) group separately from non-lesional (NL) samples.
- Lesional samples begin to resemble non-lesional samples after treatment is resumed (visit 6 to 10).



Relative abundance of Staphylococcus species



16S – Staphylococcus species

- Median relative abundance of *Staphylococcus* species is elevated in lesional skin.
- Following treatment, difference in median abundance between LE and NL is reduced.