

NDA research grant 2025 update report

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Project: Understanding the Pathogenesis of flares in Atopic Dermatitis: The Role of Skin Resident Immune Cells

Aim: To understand the pathogenesis of flares in atopic dermatitis by examining the skin resident immune cells using spatial transcriptomics.

Background: Atopic dermatitis is a chronic inflammatory skin disease affecting up to 20% of children and up to 10% of adults in affluent countries. The disease is often accompanied by recurrent flares. Patients suffering has significantly decreased quality of life. The pathophysiology is centered around pro-inflammatory type 2 cytokine signaling, mainly IL-4 and IL-13. Recent evidence suggests that the skin harbors a molecular “scar”, which can trigger flare-ups during treatment and upon treatment cessation. Skin resident immune cells are thought to be pivotal in this inflammatory “memory”.

Project status: The generous grant from the NDA has enabled: 1) travel to Karolinska Institutet, Stockholm, Sweden, where yours truly had the pleasure of joining Liv Eidsmo, an expert in tissue-resident-memory t cells (TRM), and her group. This research stay granted valuable insights into the biology of TRM, enabling the fine-tuning of the coming experiment on CosMx spatial molecular imager. The grant has subsequently enabled 2) pivotal insights for add-in probes, that are expected to gain better precision and confidence when isolating skin resident immune cells from the spatial transcriptomic data. Furthermore, the grant has enabled 3) strengthening of our Nordic collaboration.

Thus far, we have collected skin punch biopsies from AD patients at week 0, 2 and 12, as well as samples from healthy controls, constructed tissue-micro-arrays and chosen special add-in probes to run with the pre-existing 6000-plex target panel. The experiment is expected to run in the autumn of 2026, and downstream analysis are expected to continue through the spring of 2027.

Currently, a pilot study of CosMx is being analyzed and we are training the downstream analysis as well as the biological interpretation with this method. At the moment, we are preparing to publish our results from the pilot study and expect the work of 2027 to be focused on the second CosMx experiment, analysis and preparation for publishing our results of this study, in order to address the aim of the project with a temporal insight as well.