# Early immune and bacterial changes in atopic dermatitis during UVB therapy

**On January 31st, 2022, Astrid Haaskjold Lossius at the Department of Dermatology, Oslo University Hospital, defended her thesis titled Atopic dermatitis, ultraviolet B treatment, and the IL-1 family of cytokines for the degree of PhD the University of Oslo. Opponents were Liv Eidsmo, University of Copenhagen, Silke Appel, University of Bergen, and Kjetil Wessel Andressen, University of Oslo.**

Atopic dermatitis is a chronic inflammatory skin disease, characterized by dry skin, severe itch, and eczematous skin lesions. Immune dysfunction, altered skin barrier and less bacterial diversity of the skin contribute to the disease process, but how these factors interact is largely not known. More knowledge regarding the disease mechanisms is necessary to develop more targeted therapy.

In this thesis, some of the effects of phototherapy on eczematous skin, as well as some central aspects of the immunological processes involved, were addressed. Adult patients with atopic dermatitis were examined before, after a week and after 6–8 weeks of phototherapy (I). Disease activity was registered using validated scoring tools, skin biopsies were taken for gene expression analysis and immunohistochemistry (I), and bacterial swabs analyzed by 16S rRNA gene sequencing (II).

The results showed that phototherapy was efficient, both in terms of objective and patient-oriented measures. After one week of treatment, significant changes in the gene expression of eczematous skin were observed, and several of the genes with altered expression were related to inflammatory processes (I). No significant changes in the bacterial diversity of the skin were observed at this early time point (II). However, after 6–8 weeks of treatment, the bacterial diversity approached that of non-lesional skin.

In a separate study, human, rat and mouse models were compared, demonstrating that the rat may be a better model for mechanistic studies of complex immune interactions in humans (III).

The results identify possible new treatment targets for atopic dermatitis, and indicate that the immune alterations are primary events, rather than secondary to the bacterial alterations.

### *LIST OF PAPERS*


I. Lossius AH, Berents TL, Sætre F, et al. Early transcriptional changes after UVB treatment in atopic dermatitis include inverse regulation of IL-36γ and IL-37. Exp Dermatol 2021; 30: 249–61.
II. Lossius AH, Sundnes O, Ingham AC, et al. Shifts in the skin microbiota after UVB treatment in adult atopic dermatitis. Dermatology 2021; 22; 1–12.
III. Szymanska M, Lossius AH, Marciniak K, et al. IL-33-deficient rats to study function in model with human-like features. Manuscript.


Astrid Lossius, the doctoral candidate, in the middle, with her four supervisors Guttorm Haraldsen, Jan-Øivind Holm, Olav Sundnes and Teresa Løvold Berents.