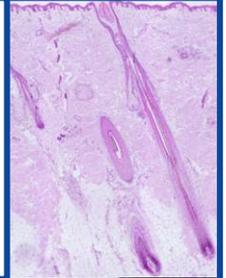


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Atopic Dermatitis



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Founder & CEO:
Prof. Dr. Ralf Paus

Monasterium Laboratory
Skin & Hair Research Solutions GmbH

Mendelstr. 17, 48149 Münster, Germany
Phone: +49 (0) 251 93264-458
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www.monasteriumlab.com

For inquiries, please contact:

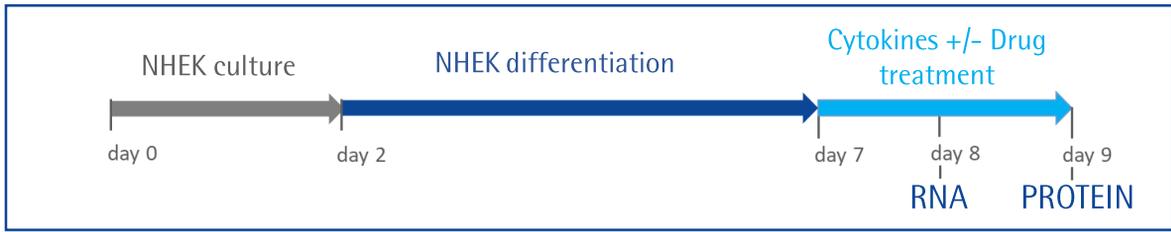
Acting CEO:
Dr. Marta Bertolini (PhD)

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+ 49 (0)251 93263-080

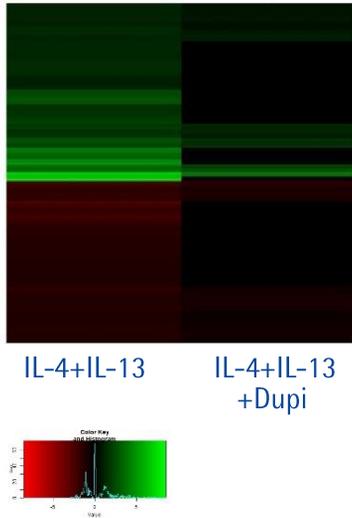
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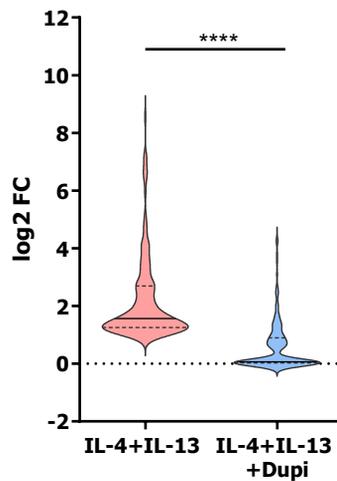
Modeling atopic dermatitis-like responses in primary epidermal keratinocytes *in vitro*



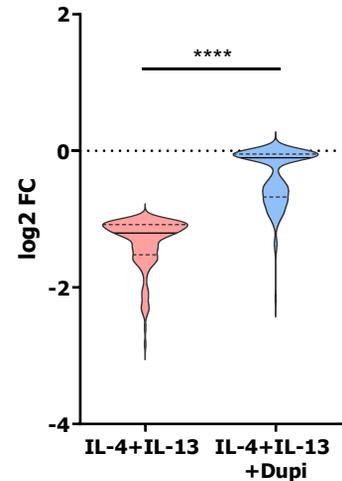
Study Example: Dupilumab (Dupi) inhibits transcriptional changes induced by IL-4+IL-13



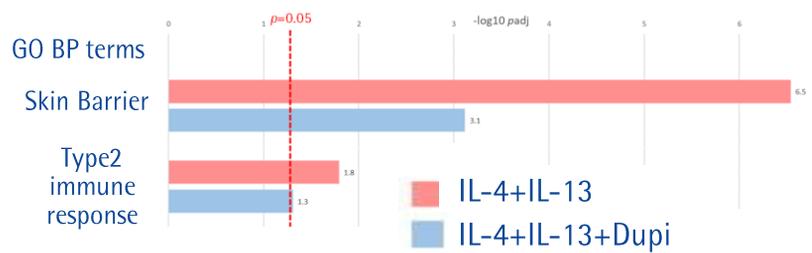
IL-4 + IL-13 top markers UP



IL-4 + IL-13 top markers DOWN

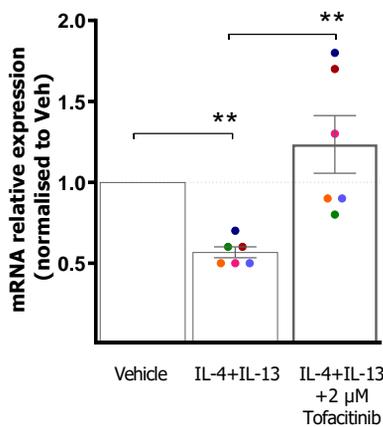


Gene expression analysis can be complemented by protein analysis (Western blot, FACS, immunocytochemistry)

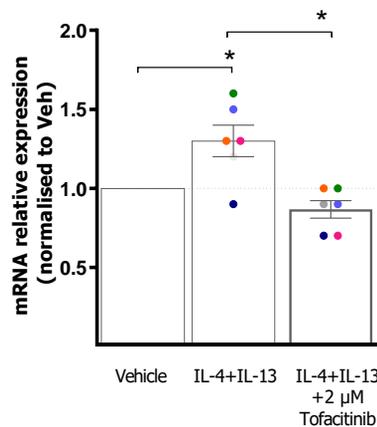


Study Example: Tofacitinib counteracts transcriptional changes on atopic dermatitis associated parameters

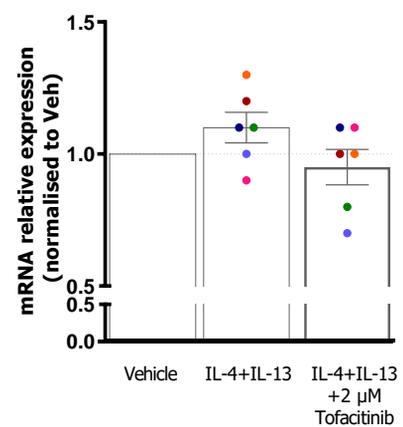
FLG



IL1A



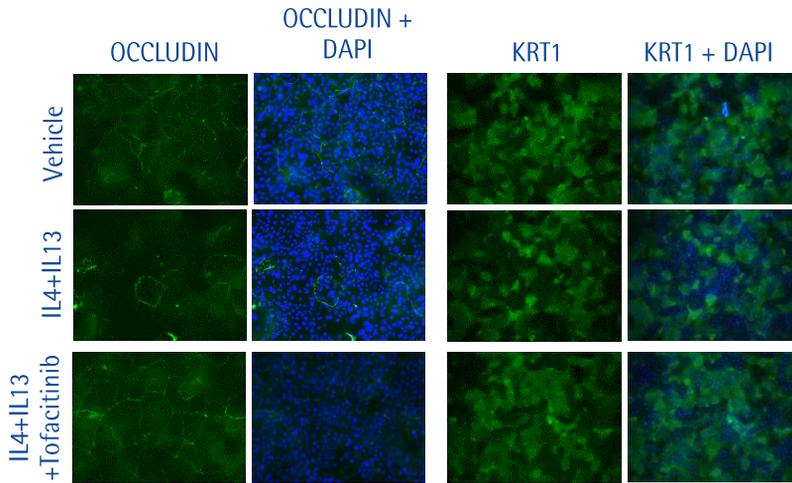
TSLP



FLG: Filaggrin, TSLP: thymic stromal lymphopoietin.

Modeling atopic dermatitis-like responses in primary epidermal keratinocytes *in vitro*

Study Example: Tofacitinib inhibits skin barrier impairment induced by IL-4+IL-13

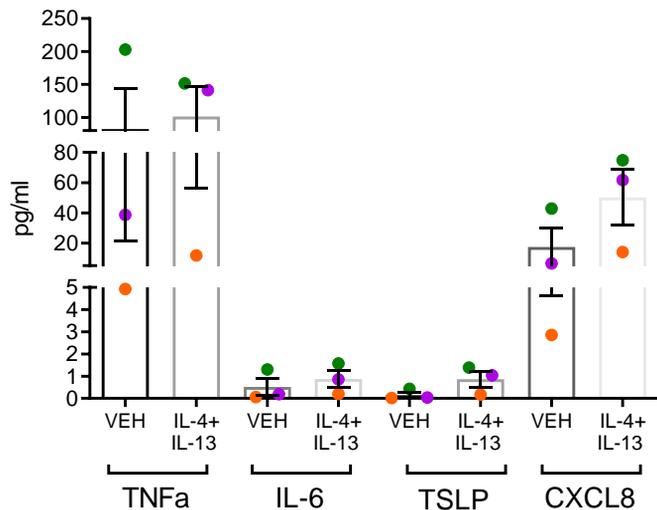


IL-4+IL-13 stimulation also induces the release of cytokines and chemokines by primary epidermal keratinocytes

Gene and protein expression analysis on keratinocytes can be complemented by measurements of cytokine/chemokine release into the medium

Tofa: Tofacitinib, i.e. JAK signaling inhibitor

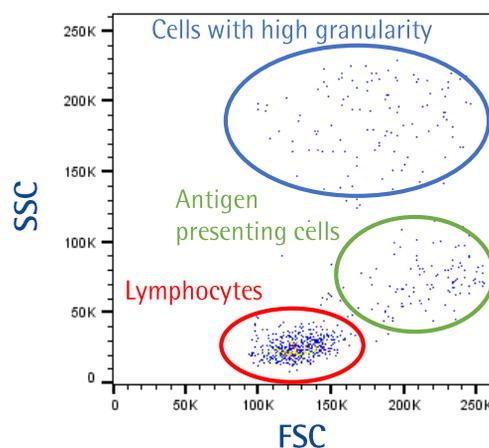
Our models can be utilized also to identify new pathways involved in atopic dermatitis as well as investigating modes of action



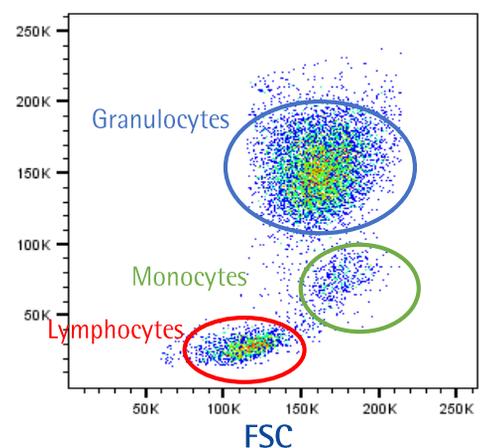
In vitro studies on immune cells isolated from skin or blood also available

Blood and skin from HEALTHY INDIVIDUALS and atopic dermatitis PATIENTS

FACS analysis of CD45+ cells from human skin



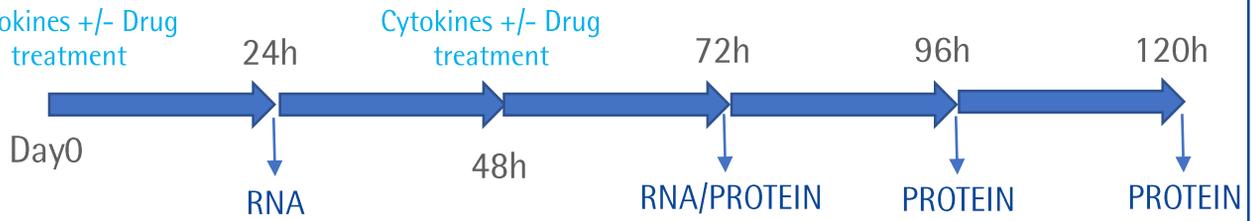
FACS analysis of CD45+ cells from human whole blood



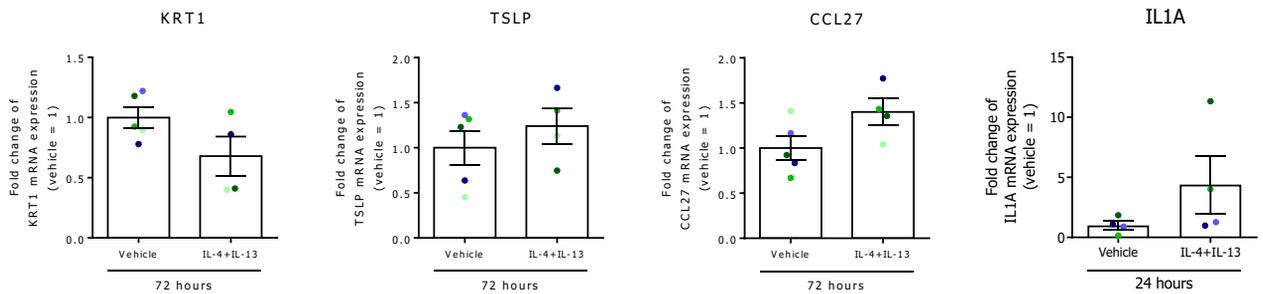
Modeling atopic dermatitis-like responses in human HEALTHY skin *ex vivo*

Skin punches isolation
start *ex vivo* culture

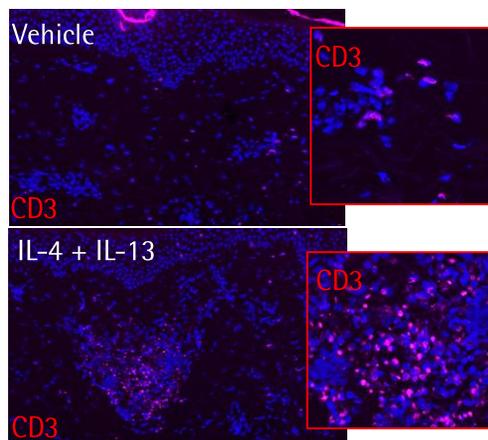
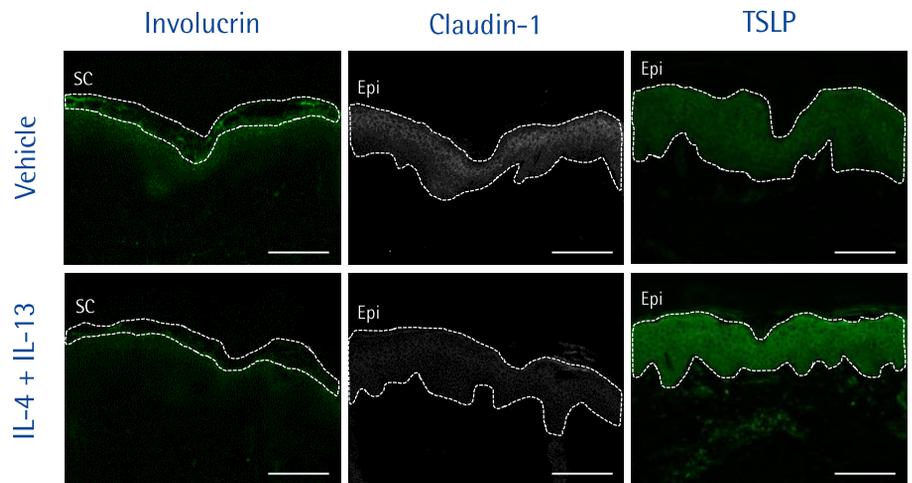
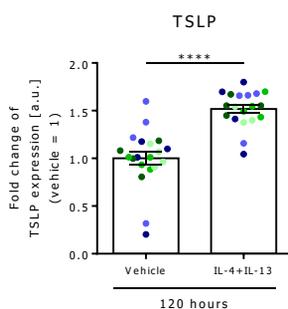
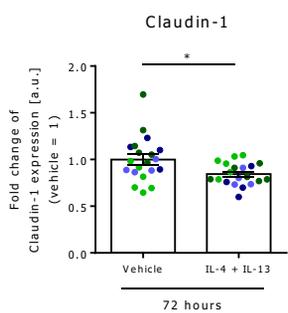
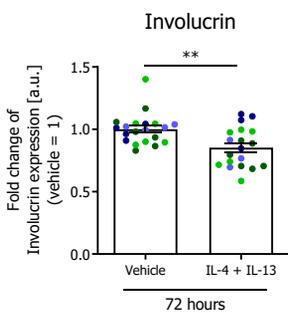
Cytokines +/- Drug
treatment



IL-4+IL-13 stimulation induces gene expression changes associated with skin barrier impairment and pro-inflammatory responses



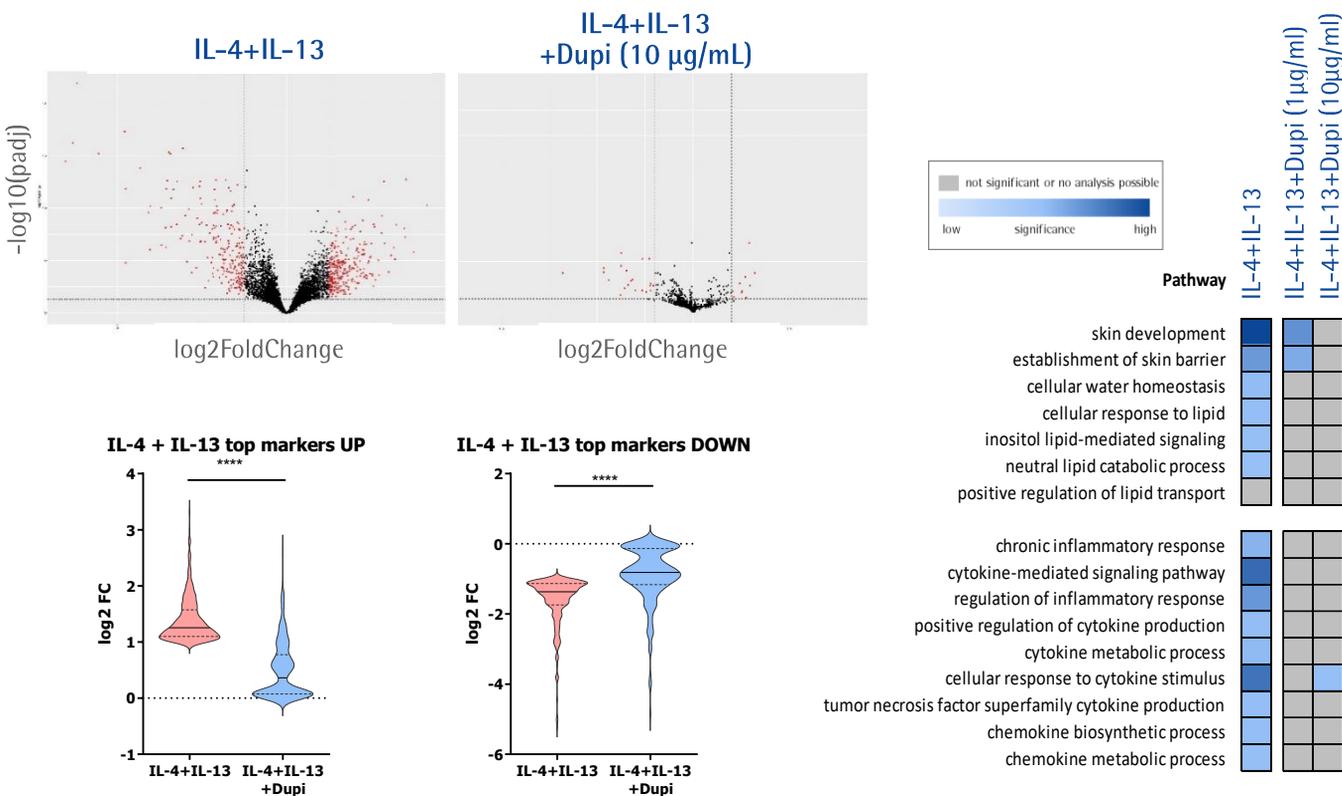
IL-4+IL-13 stimulation impairs skin barrier, induces pro-inflammatory responses, and expansion of resident cells



Resident skin immune cells still present and responsive to cytokine cocktail!

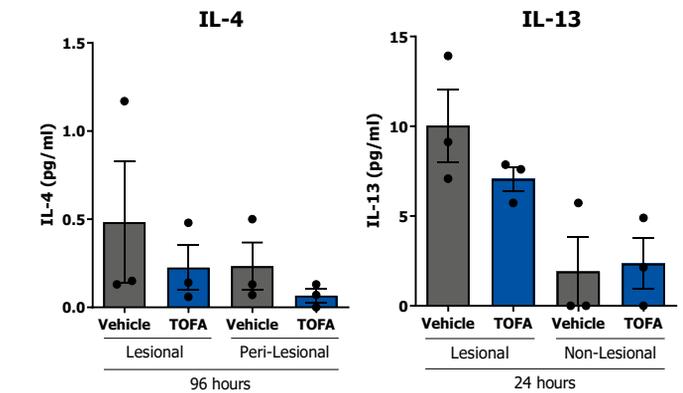
Modeling atopic dermatitis-like responses in human HEALTHY skin *ex vivo*

Study Example: Dupilumab (Dupi) inhibits transcriptional changes induced by IL-4+IL-13



Investigating the effect of a drug on lesional skin from atopic dermatitis patients *ex vivo*

Study Example: Tofacitinib reduces cytokine release, up-regulates skin barrier-associated markers, and ameliorates phenotype in lesional skin from selected patients

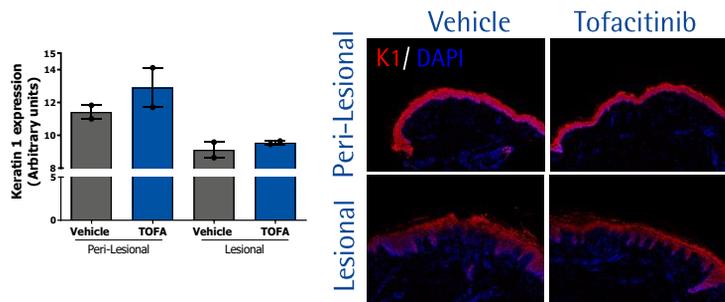


Pathway analysis in response to tofacitinib treatment

GO BP	Term ID	P _{adj}	$-\log_{10}(P_{adj})$
immune response	GO:0006955	5.765 × 10 ⁻¹³	12.75
biological process involved in interspecies interaction between...	GO:0044119	6.717 × 10 ⁻¹³	12.67
defense response to other organism	GO:009542	9.580 × 10 ⁻¹³	12.52
response to external biotic stimulus	GO:0051707	5.566 × 10 ⁻¹²	11.75
defense response	GO:0043207	5.727 × 10 ⁻¹²	11.74
response to biotic stimulus	GO:0006952	6.882 × 10 ⁻¹²	11.66
immune system process	GO:0002376	3.063 × 10 ⁻¹¹	11.51
innate immune response	GO:0045087	7.563 × 10 ⁻¹¹	11.42
response to stress	GO:0006950	4.801 × 10 ⁻⁹	9.32
response to external stimulus	GO:0006905	4.952 × 10 ⁻⁹	9.30
cellular response to chemical stimulus	GO:0070887	3.683 × 10 ⁻⁷	6.43
response to cytokine	GO:0034097	1.434 × 10 ⁻⁶	5.84
cellular response to cytokine stimulus	GO:0071345	1.552 × 10 ⁻⁶	5.81
response to organic substance	GO:0010033	2.887 × 10 ⁻⁶	5.54
cytokine-mediated signaling pathway	GO:0019221	5.672 × 10 ⁻⁶	5.25
cellular response to organic substance	GO:0071310	1.578 × 10 ⁻⁵	4.80
leukocyte activation involved in immune response	GO:0002366	5.664 × 10 ⁻⁵	4.25
cell activation involved in immune response	GO:0002263	6.387 × 10 ⁻⁵	4.19

KEGG	Term ID	P _{adj}	$-\log_{10}(P_{adj})$
JAK-STAT signaling pathway	KEGG:04630	3.776 × 10 ⁻⁴	3.42

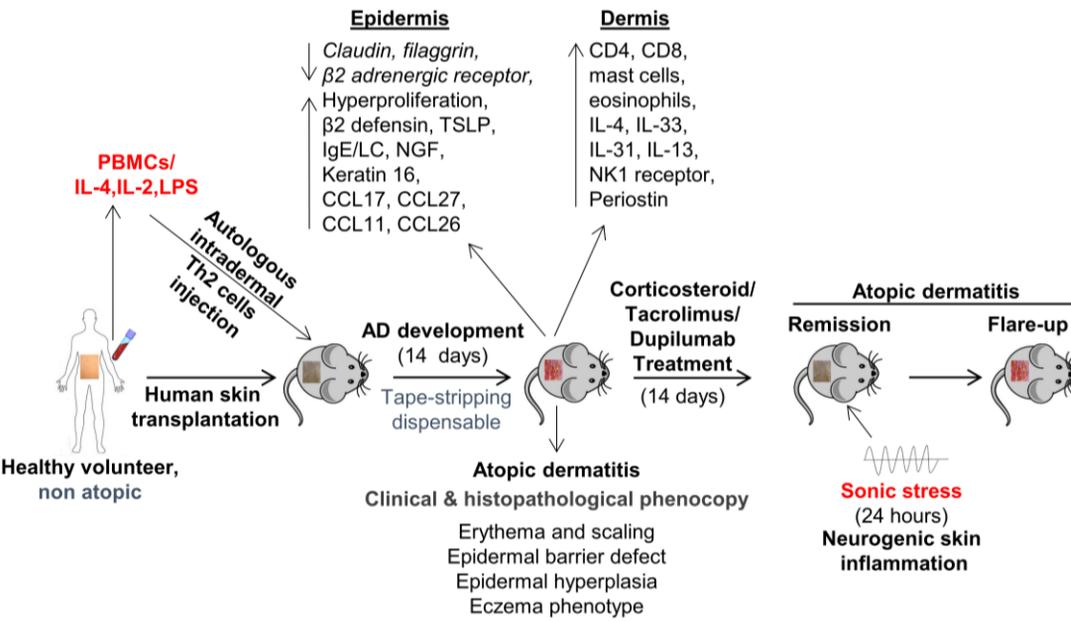
REACTOME	Term ID	P _{adj}	$-\log_{10}(P_{adj})$
Interferon Signaling	REACR-HSA-91...	1.828 × 10 ⁻⁵	4.74
Immune System	REACR-HSA-16...	1.830 × 10 ⁻⁵	4.74
Interferon alpha/beta signaling	REACR-HSA-90...	3.252 × 10 ⁻⁵	4.49
Cytokine Signaling in Immune system	REACR-HSA-12...	9.744 × 10 ⁻⁵	4.01
Metal sequestration by antimicrobial proteins	REACR-HSA-67...	3.315 × 10 ⁻⁴	3.48
Interleukin-4 and Interleukin-13 signaling	REACR-HSA-67...	4.005 × 10 ⁻⁴	3.39
Growth hormone receptor signaling	REACR-HSA-98...	9.164 × 10 ⁻³	2.04
Diseases associated with O-glycosylation of proteins	REACR-HSA-39...	2.495 × 10 ⁻²	1.60



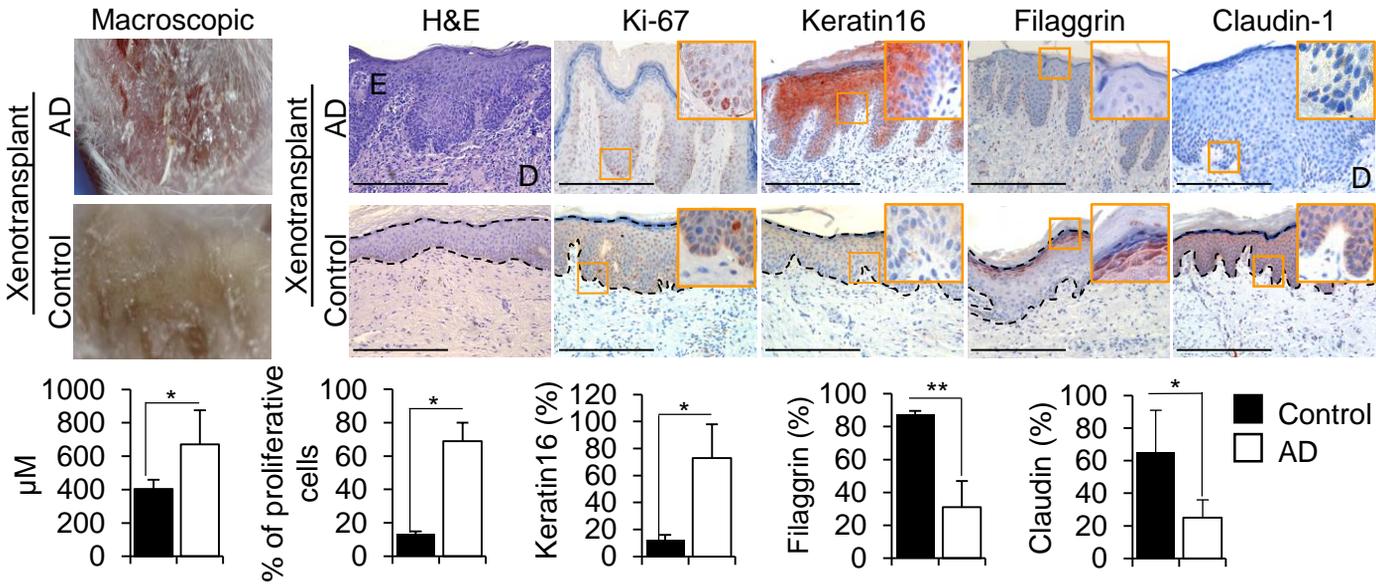
Investigating the effect of a drug on inhibiting atopic dermatitis-like phenotype *in vivo*: Humanized mouse model

Selection of our publications:
 Gilhar et al., *Exp Dermatol.* 2021; Keren et al., *Allergy* 2023

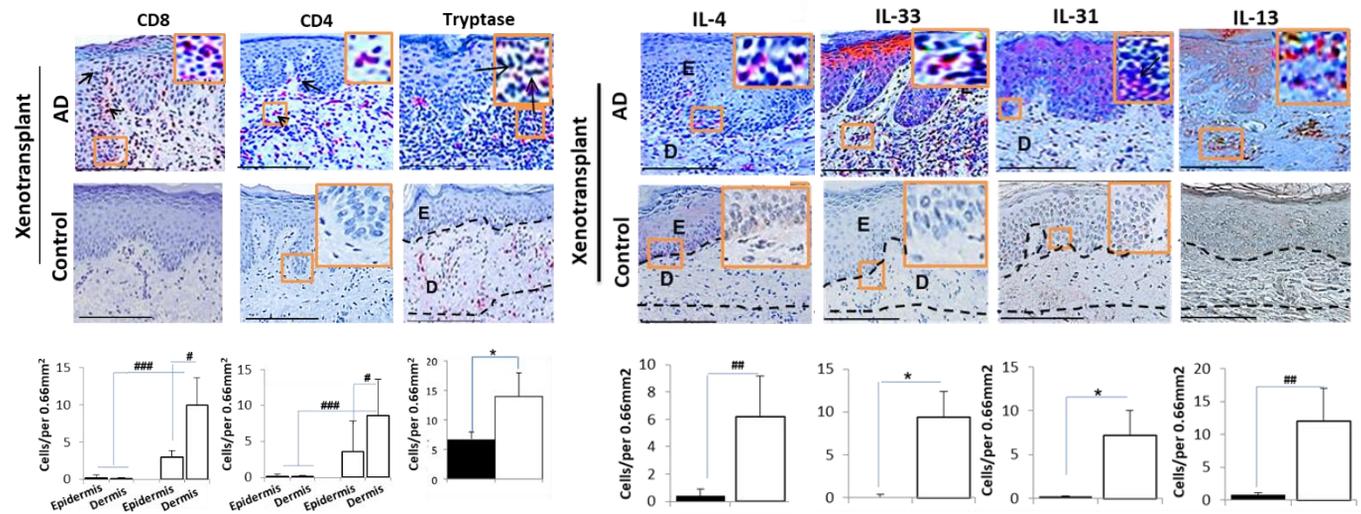
Experimental setup and read-out parameters can be customized



Epidermal barrier impairment

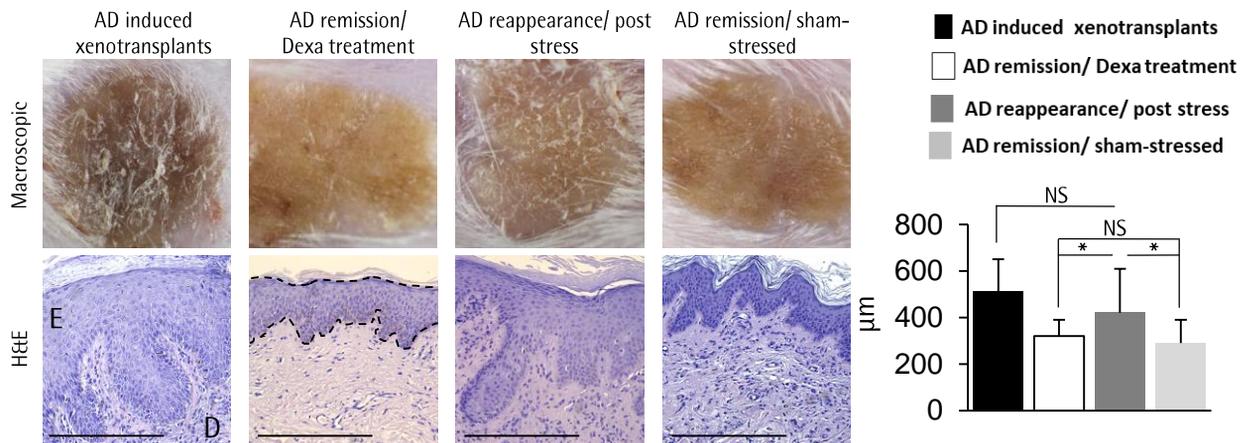


Atopic dermatitis-like immune phenotype and response

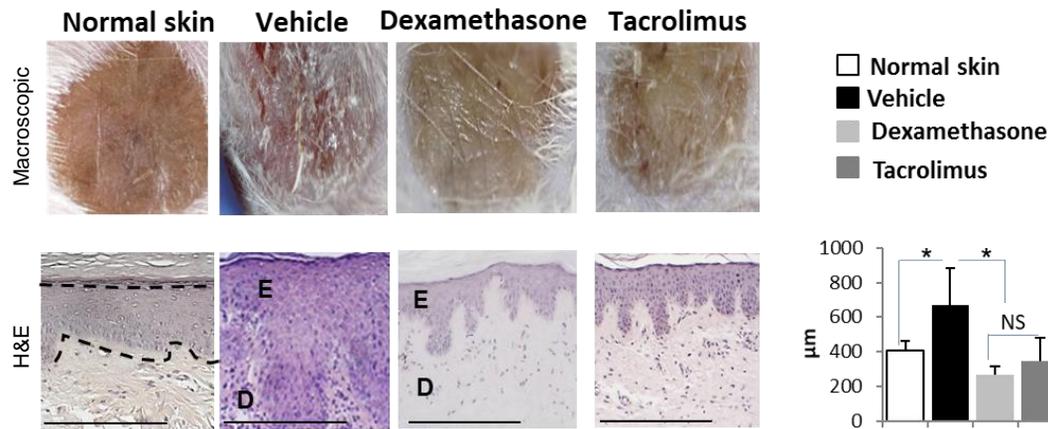


Investigating the effect of a drug on inhibiting atopic dermatitis-like phenotype *in vivo*: Humanized mouse model

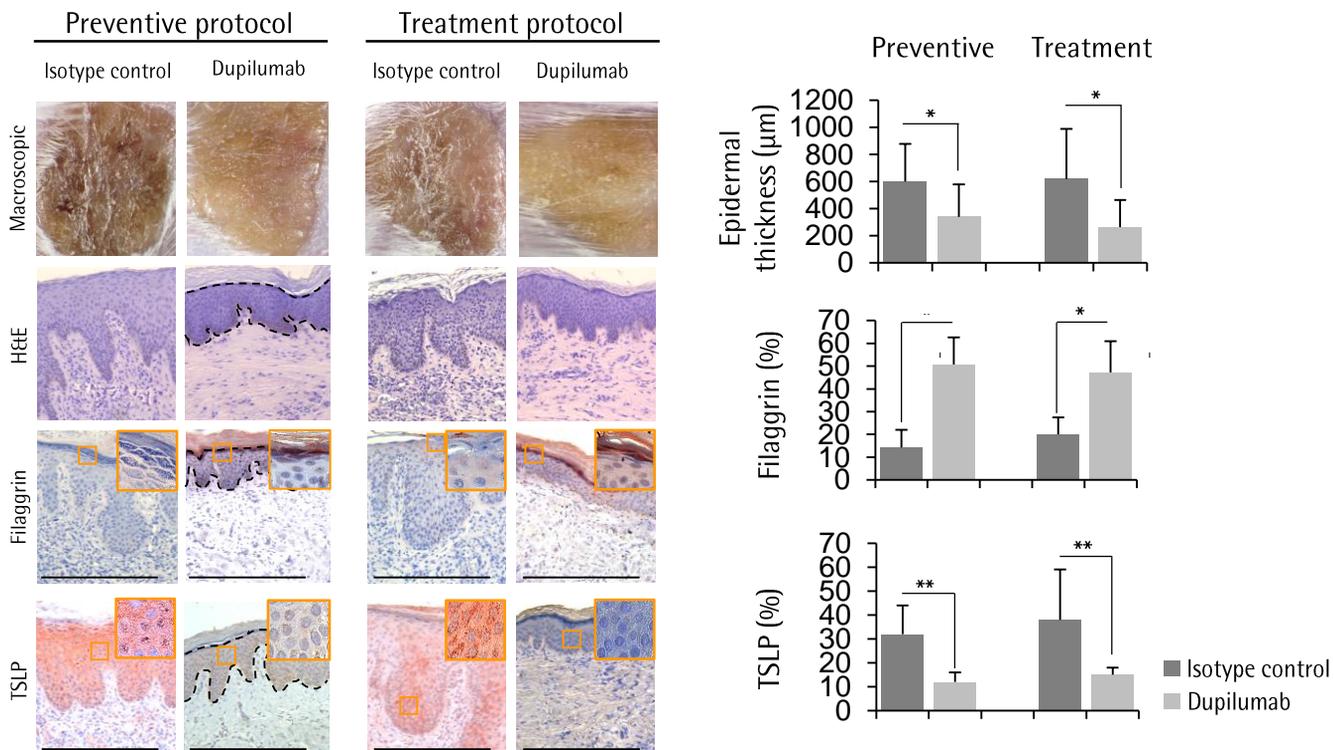
Relapse of lesions after stress induction



Amelioration of disease after treatment with dexamethasone, and tacrolimus



Prevention and rescue of diseased phenotype with Dupilumab



WHY US?



**MONASTERIUM
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A Q I M A Life Sciences Company

Great network of dermatologists and plastic surgeons collecting samples from healthy and diseased skin

Our vision is to provide our clients and partners with the highest quality research in investigative dermatology and trichology – from basic science to translational applied and contract research of high relevance for clinical applications.

World-class scientific leadership & international team

Clinically-relevant *ex vivo* and *in vivo* models

Strong academic background & publication record

What we can do for our clients:

- Conceptualize & build proof-of-concept studies
- Carry out full service portfolio for pre-clinical skin & hair research (*in vitro/ex vivo* assays, and humanized mouse models)
- Investigate side effects in the skin or hair follicle
- Establish novel cutting edge methodologies and techniques
- Design tailor-made & customized assays for all needs
- Identify, characterize, or validate novel targets and therapeutics for skin & hair disorders
- Discover mechanistic action stories, biomarkers & predictors of response
- Conduct investigator initiated skin & hair clinical trials
- Provide access to human healthy & diseased skin and hair specimen
- Prepare comprehensive project reports & manuscript drafts

Our ambition is to establish and refine research techniques:
Advanced Methodology Program

Global client list & testimonials

Investigative dermatology:
Acne Vulgaris, Atopic Dermatitis, Psoriasis, Alopecia Areata, Androgenic Alopecia, Hidradenitis Suppurativa, Vitiligo, Chronic Itch, Prurigo Nodularis, etc.

Biobank:
Full access to skin & hair samples (patients & healthy subjects)

Exceptional state-of-the-art research technology

We are supported by world-wide recognized experts in dermatology