



**MONASTERIUM
LABORATORY**

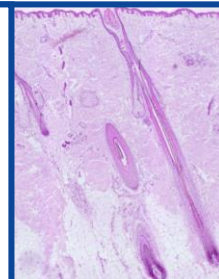
Skin & Hair Research Solutions

www.monasteriumlab.com

*All about
skin and hair
bioscience!*

State-of-the-art technology and expertise
for all your pre-clinical, mechanistic, and
clinical needs in dermatology research.

- ▶ Preclinical Research
- ▶ Clinical Research
- ▶ Innovative Technologies Program
- ▶ Education



Atopic Dermatitis



"We combine
our unique expertise,
our project design creativity,
and our passion to advance
our clients' success in
delivering novel and game-
changing skin and hair
research solutions"

Founder & CEO:
Prof. Dr. Ralf Paus

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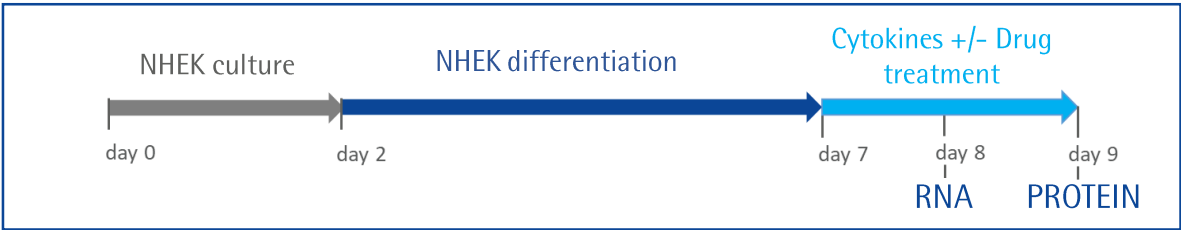
For enquiries, please contact:

Principal Scientist & Deputy General Manager:
Dr. Marta Bertolini (PhD)

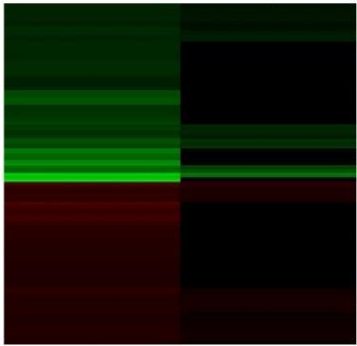
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+ 49 (0)251 93263-080

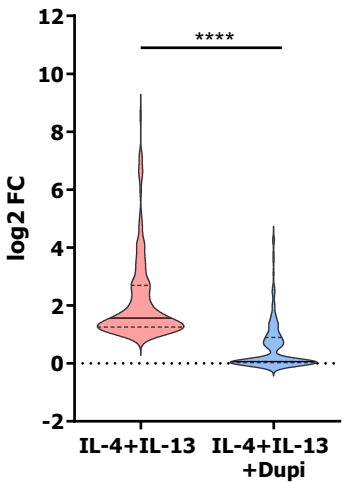
Modelling atopic dermatitis-like responses in primary epidermal keratinocyte responses *in vitro*



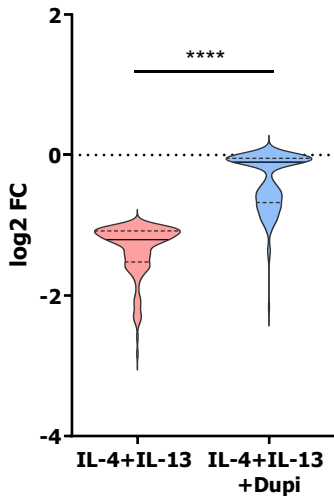
Study Example: Dupilumab (Dupi) inhibits transcriptional changes induced by IL-4+IL-13



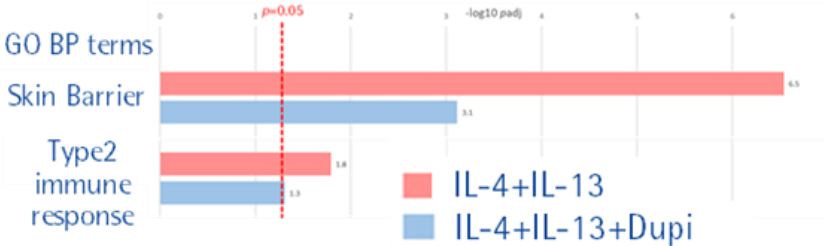
IL-4 + IL-13 top markers UP



IL-4 + IL-13 top markers DOWN

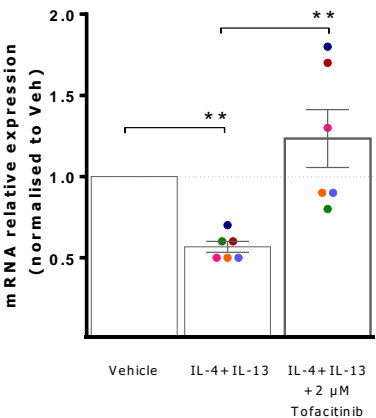


Gene expression analysis can be complemented by protein analysis (Western blot, FACS, immunocytochemistry)

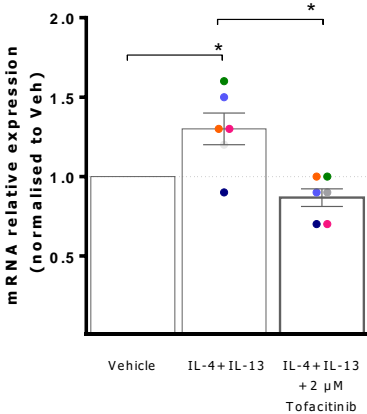


Study Example: Tofacitinib counteracts transcriptional changes on atopic dermatitis associated parameters

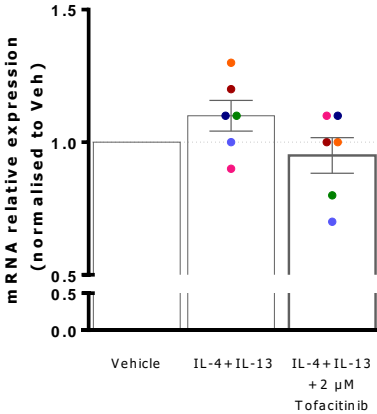
FLG



IL1A



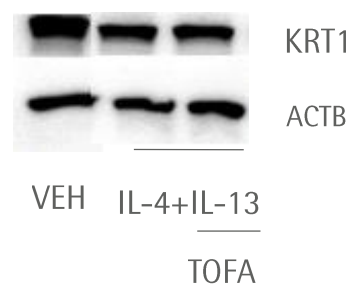
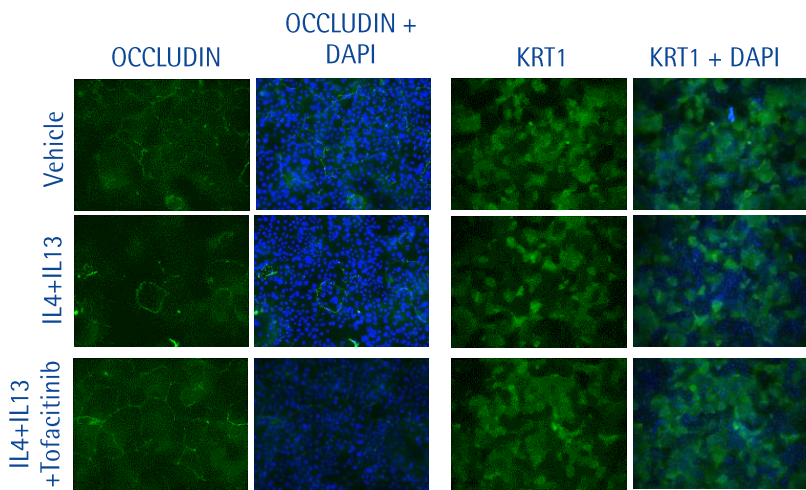
TSLP



FLG: Filaggrin, TSLP: thymic stromal lymphopoietin.

Modelling atopic dermatitis-like responses in primary epidermal keratinocyte responses *in vitro*

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

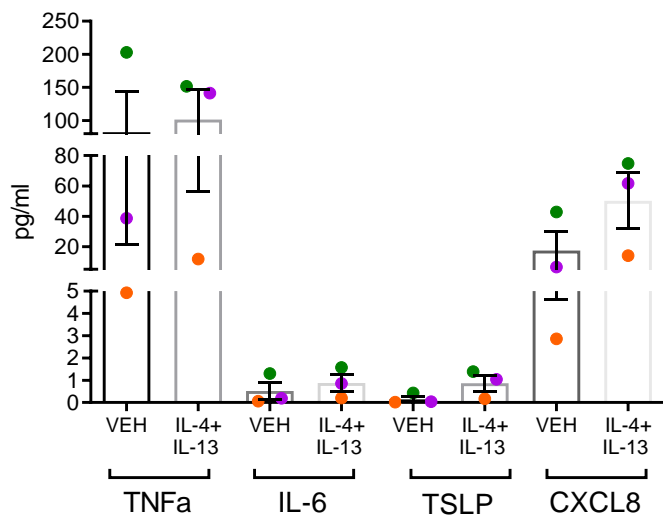


Gene and protein expression analysis on keratinocyte can be complemented by measurement of cytokines/chemokines into the medium

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

Tofa: Tofacitinib, i.e. JAK signalling inhibitor

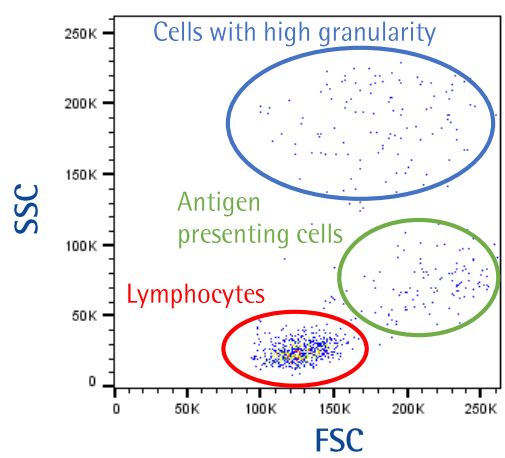
Our models can be utilized also to identify new pathways involved in atopic dermatitis as well as investigating MoA



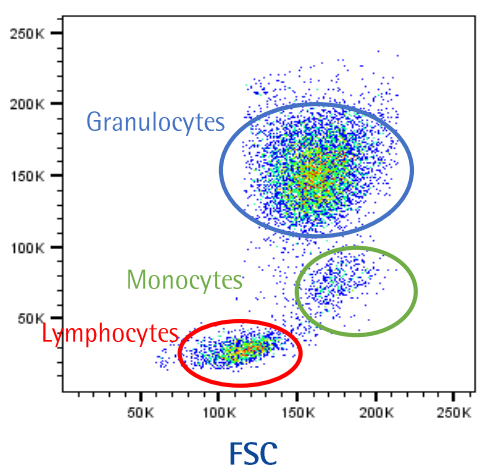
In vitro studies on skin or blood isolated immune cells also available

Blood and skin from HEALTHY SUBJECTS and atopic dermatitis PATIENTS

FACS analysis of CD45+ cells from human skin



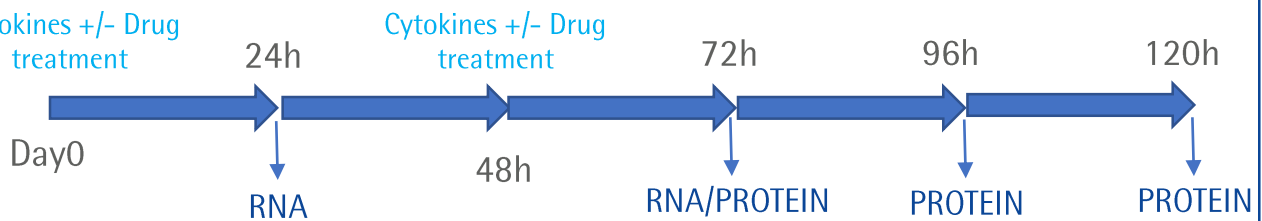
FACS analysis of CD45+ cells from human whole blood



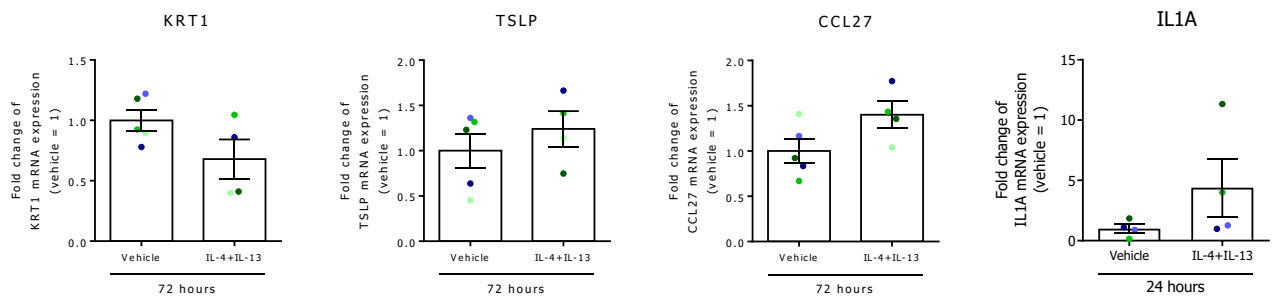
Modelling atopic dermatitis-like responses in human HEALTHY skin *ex vivo*

Skin punches isolation
start *ex vivo* culture

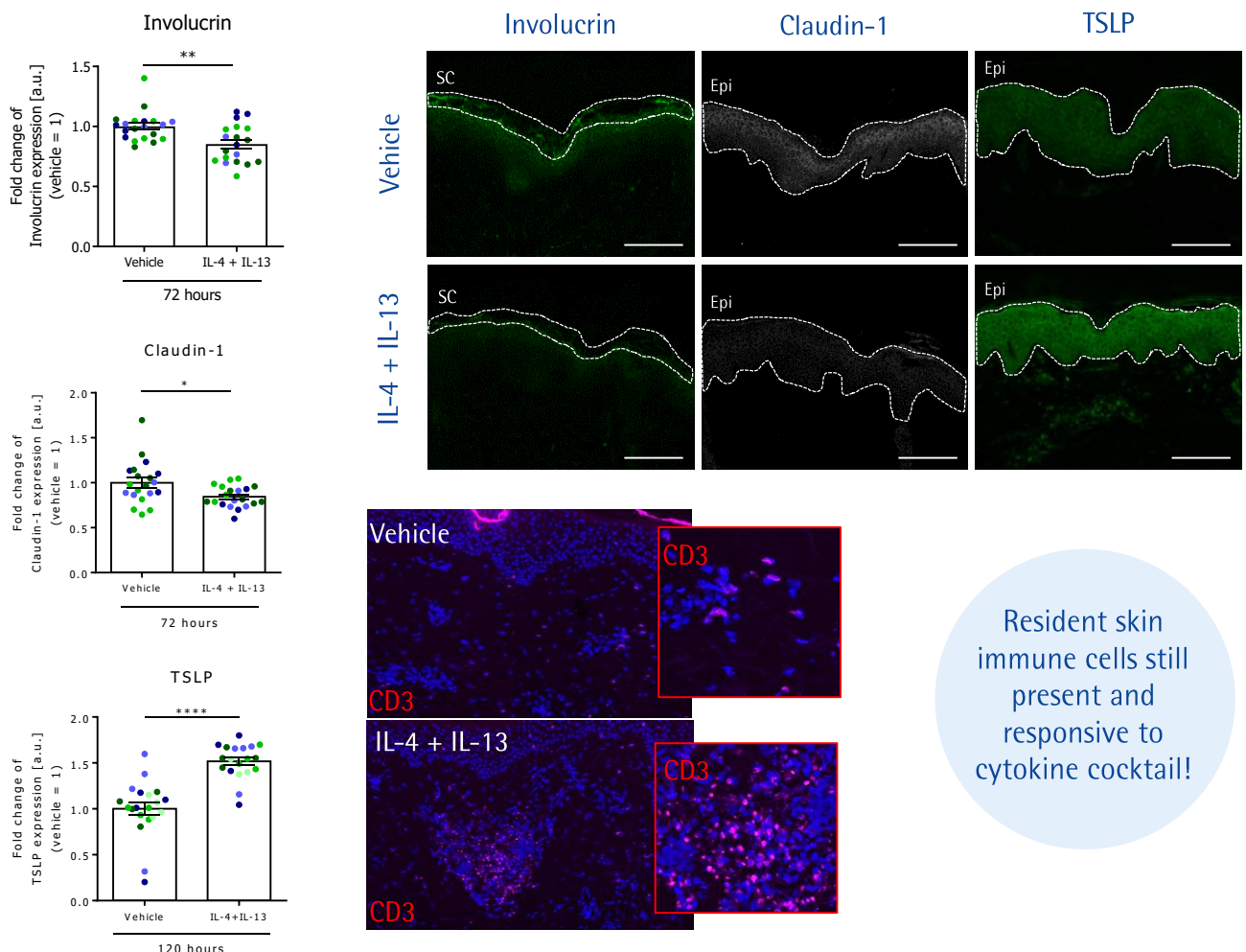
Cytokines +/- Drug
treatment



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

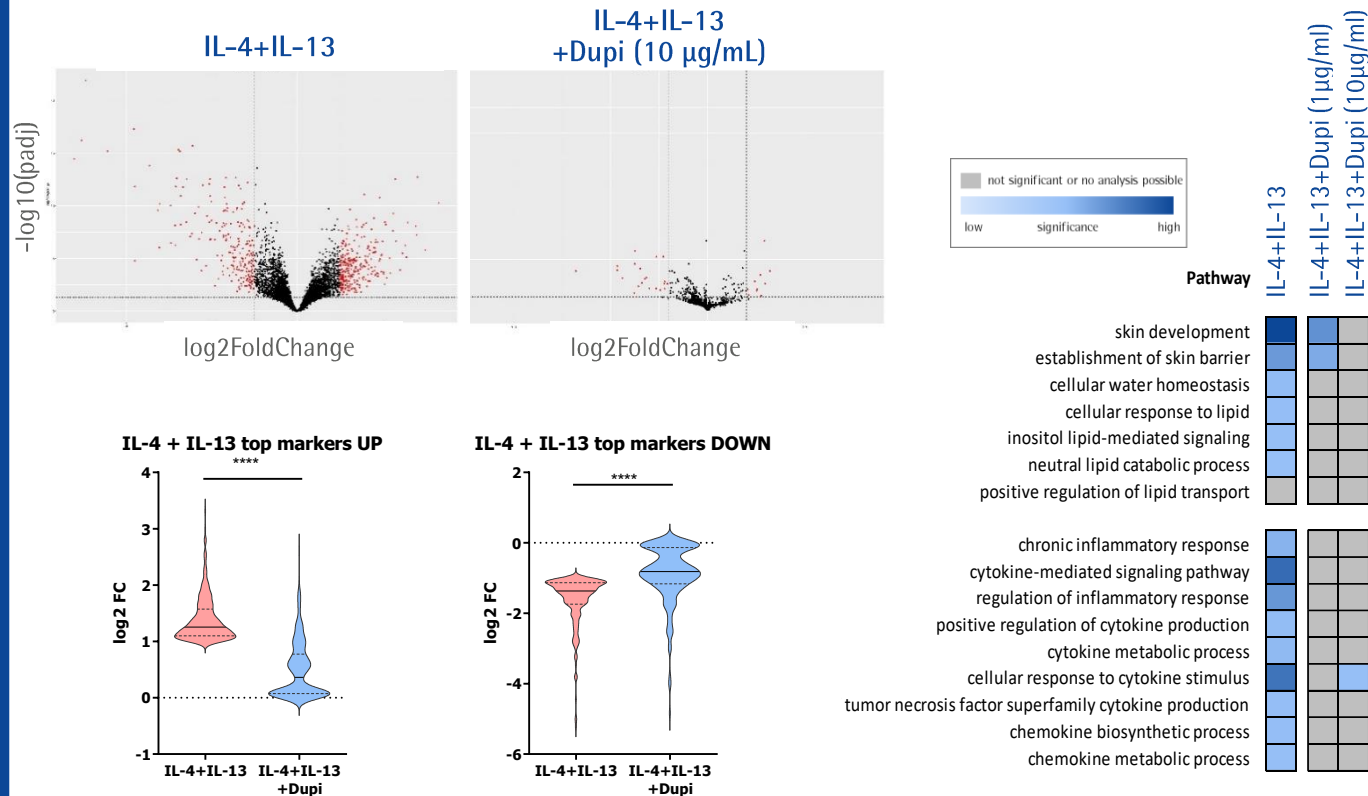


IL-4+IL-13 stimulation impairs skin barrier, induces pro-inflammatory responses, and expansion of resident cells



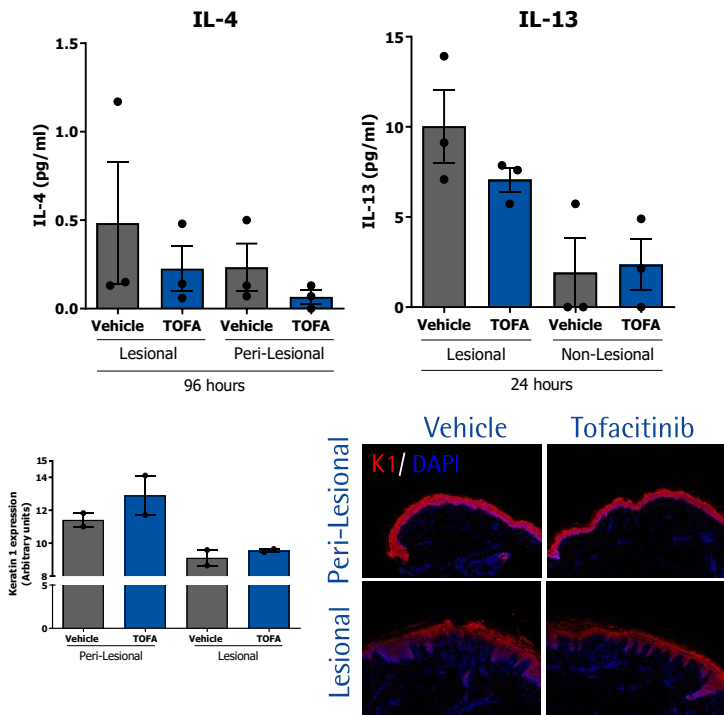
Modelling atopic dermatitis-like responses in human HEALTHY skin ex vivo

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 (AD) 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

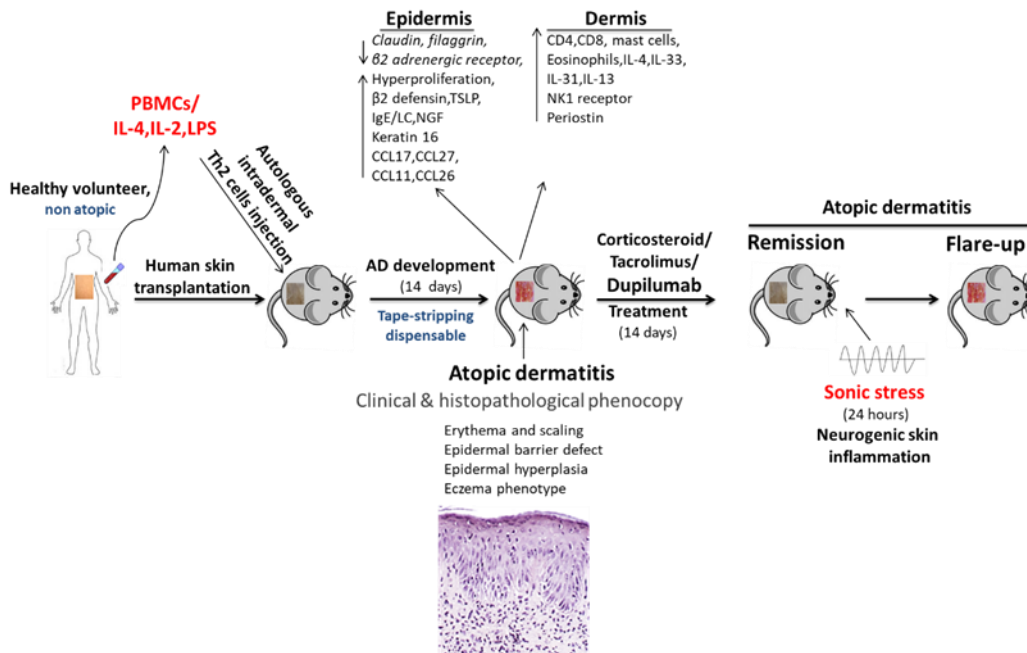
GO BP	Term ID	Padj	-log ₁₀ (Padj)
immune response	GO:0006955	5.765 × 10 ⁻¹³	
biological process involved in interspecies interaction between organisms	GO:0044419	6.717 × 10 ⁻¹³	
defense response to other organism	GO:0098542	9.580 × 10 ⁻¹³	
response to external biotic stimulus	GO:0051707	5.566 × 10 ⁻¹²	
defense response	GO:0043207	5.727 × 10 ⁻¹²	
response to biotic stimulus	GO:009607	6.882 × 10 ⁻¹²	
immune system process	GO:0002376	1.658 × 10 ⁻¹¹	
innate immune response	GO:0045987	3.063 × 10 ⁻¹¹	
response to stress	GO:0006950	4.801 × 10 ⁻⁹	
response to external stimulus	GO:009605	4.952 × 10 ⁻⁹	
cellular response to chemical stimulus	GO:0070887	3.683 × 10 ⁻⁷	
response to cytokine	GO:0034097	1.434 × 10 ⁻⁶	
cellular response to cytokine stimulus	GO:0071345	1.552 × 10 ⁻⁶	
response to organic substance	GO:0010033	2.887 × 10 ⁻⁶	
cytokine-mediated signaling pathway	GO:019221	5.672 × 10 ⁻⁶	
cellular response to organic substance	GO:0071310	1.578 × 10 ⁻⁵	
leukocyte activation involved in immune response	GO:0002366	5.664 × 10 ⁻⁵	
cell activation involved in immune response	GO:0002263	6.387 × 10 ⁻⁵	

KEGG	Term ID	Padj	-log ₁₀ (Padj)
JAK-STAT signaling pathway	KEGG:04630	3.776 × 10 ⁻⁴	

REACTOME	Term ID	Padj	-log ₁₀ (Padj)
Interferon Signaling	REACTR-HSA-91...	1.828 × 10 ⁻⁵	
Immune System	REACTR-HSA-16...	1.830 × 10 ⁻⁵	
Interferon alpha/beta signaling	REACTR-HSA-90...	3.252 × 10 ⁻⁵	
Cytokine Signaling in Immune system	REACTR-HSA-12...	9.744 × 10 ⁻⁵	
Metal sequestration by antimicrobial proteins	REACTR-HSA-67...	3.315 × 10 ⁻⁴	
Interleukin-4 and Interleukin-13 signaling	REACTR-HSA-67...	4.005 × 10 ⁻⁴	
Growth hormone receptor signaling	REACTR-HSA-98...	9.164 × 10 ⁻⁵	
Diseases associated with O-glycosylation of proteins	REACTR-HSA-39...	2.495 × 10 ⁻²	

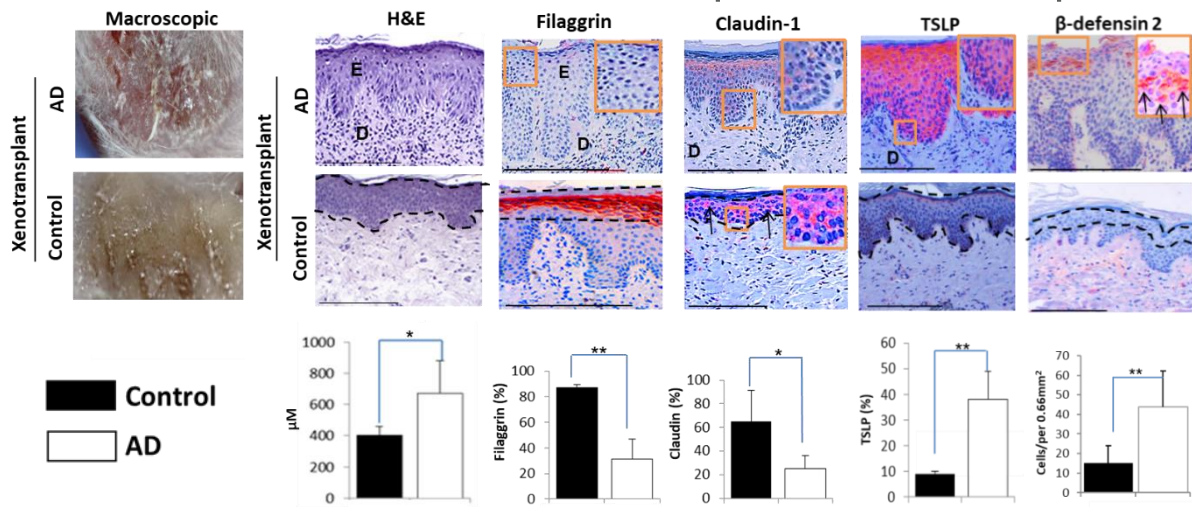
Investigating the effect of a drug on inhibiting atopic dermatitis like phenotype *in vivo*: Humanized mouse model

**NEW
MODEL**

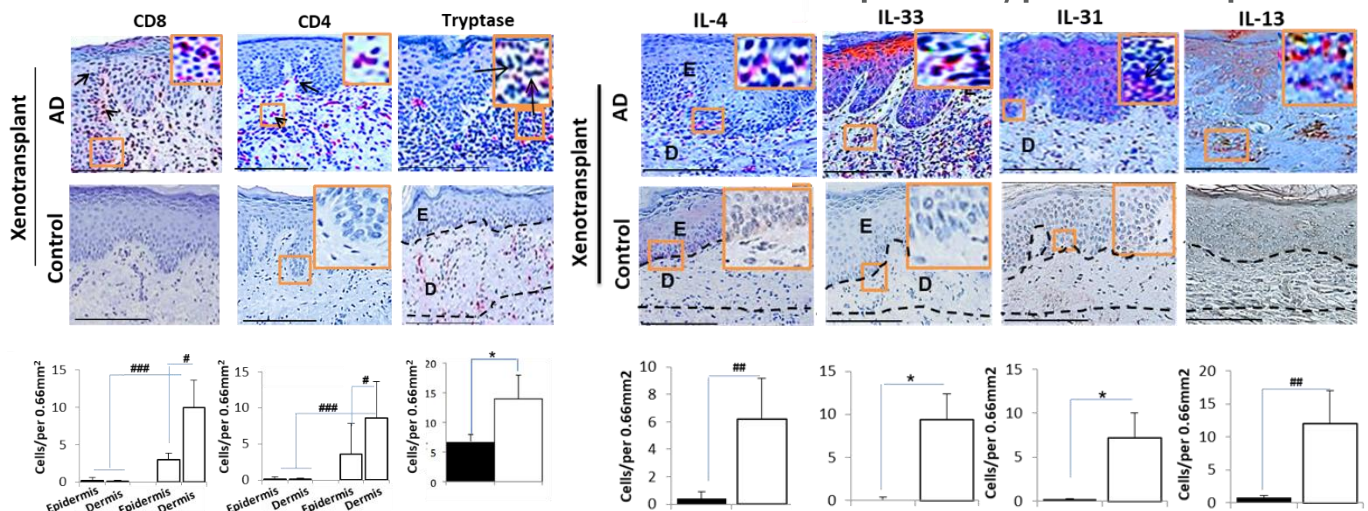


Experimental setup and read-out parameters can be customized

Epidermal barrier impairment

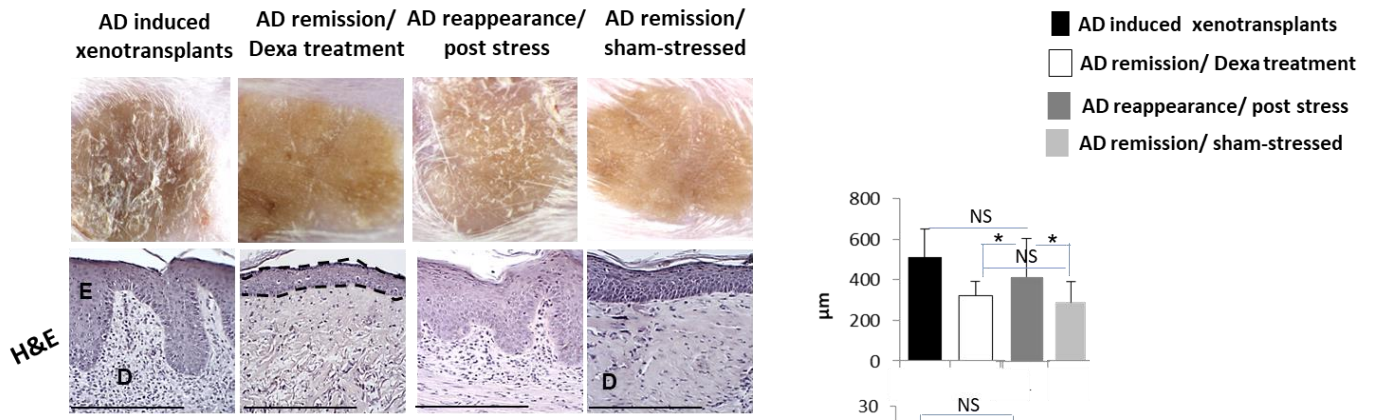


AD-like Immune phenotype and response

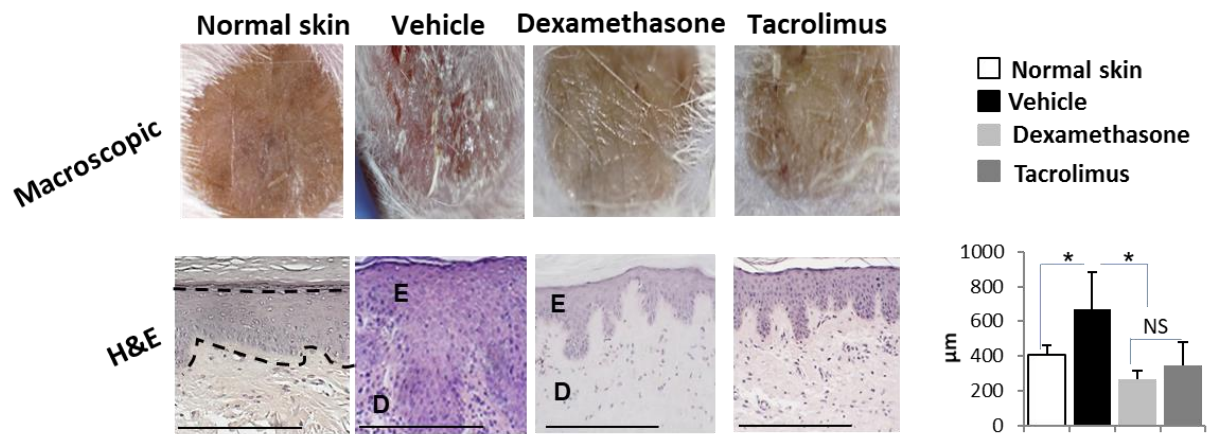


Investigating the effect of a drug on inhibiting atopic dermatitis like phenotype *in vivo*: Humanized mouse model

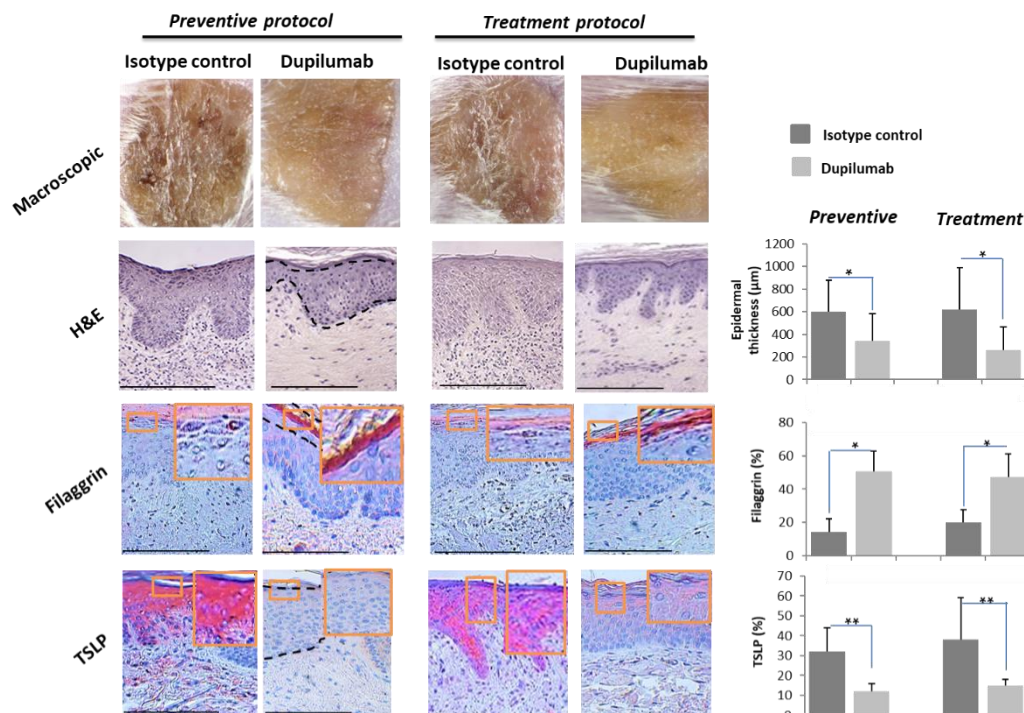
Relapse of lesions after stress induction



Amelioration of disease after treatment with dexamethasone, and tacrolimus



Prevention and Rescue of diseased phenotype with Dupilumab



WHY US?



**MONASTERIUM
LABORATORY**
Skin & Hair Research Solutions

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.

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

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*, and *ex vivo* assays, and humanized mouse models)
- Provide access to human healthy & diseased skin and hair specimen
- Develop novel cutting edge methodologies and techniques
- Develop tailor-made & customized assays
- Identify, characterize, or validate novel targets and therapeutics for skin & hair disorders
- Discover mechanistic action stories, biomarkers & predictors of response
- Investigate side effects in the skin or hair follicle
- Conduct investigator initiated skin & hair clinical trials
- Prepare comprehensive project reports & manuscript drafts

Innovation is our passion: Innovative Technology Program

Exceptional state-of-the-art research technology

Global client list & testimonials

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

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

We are supported by world-wide recognized experts in dermatology: Alfredo Rossi, Amos Gilhar, Désmond J. Tobin, Erwin Tschachler, Falk G. Bechara, Francisco Jimenez, Kristian Reich, Mauro Picardo, Thomas Luger, Tiago R. Matos, and many more!