



**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

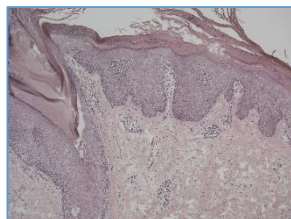


Psoriasis

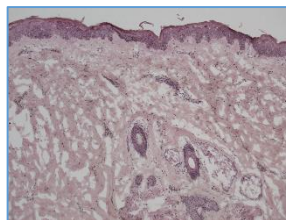
Psoriasis



Lesional skin



Peri-lesional skin



"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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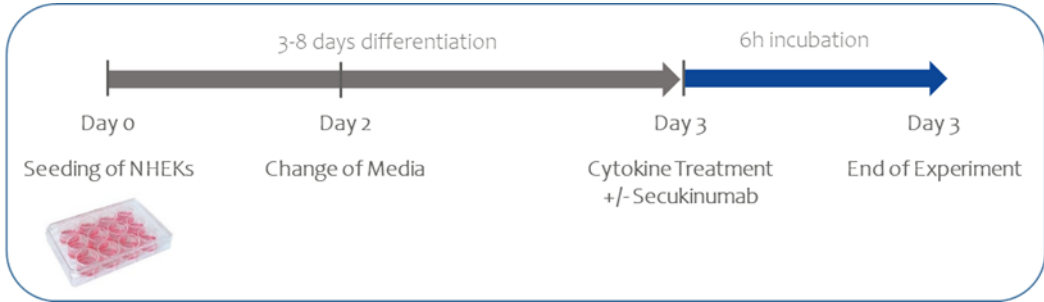
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Modelling psoriasis-like responses in primary epidermal keratinocyte responses *in vitro*

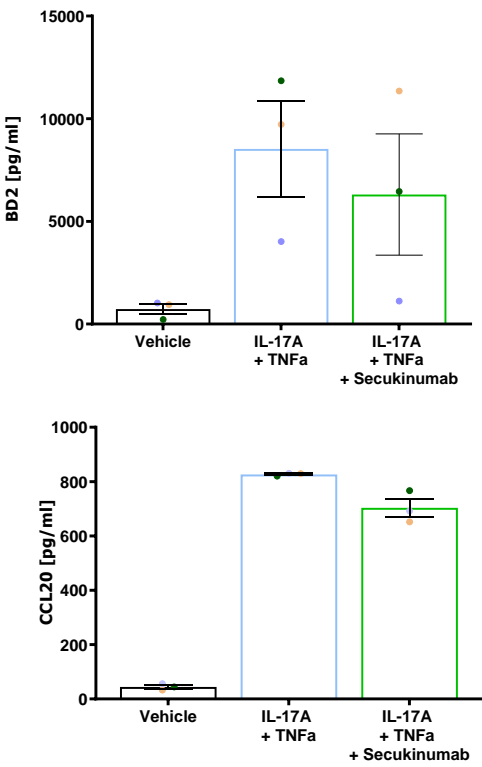
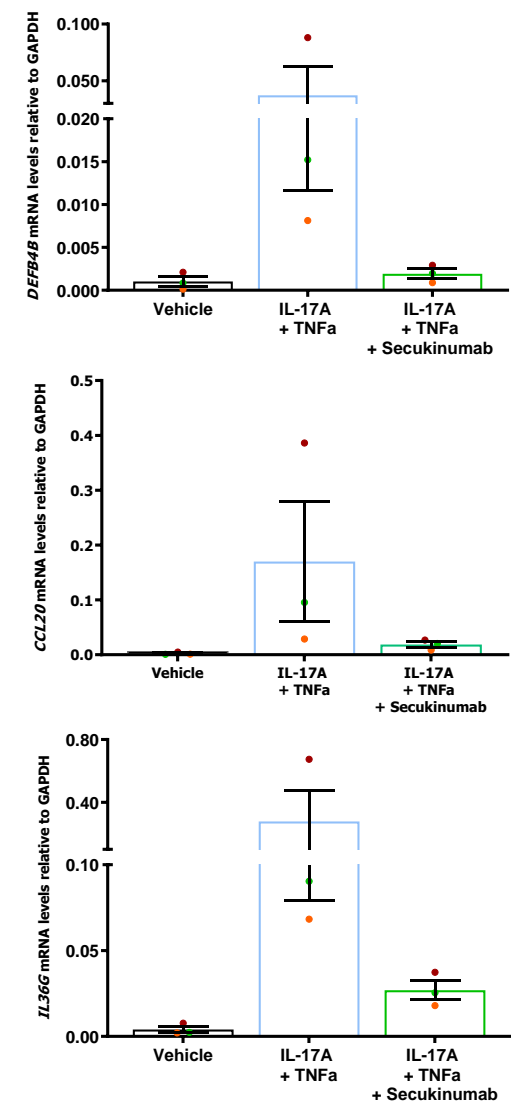
Cytokine cocktail (IL-17A/TNF α) successfully induces psoriasis-associated gene expression in human epidermal keratinocytes



Study Example: Secukinumab inhibits transcriptional changes and reduces the release of β 2-defensin (BD2) and CCL20 into the medium induced by IL-17A+TNF α

Gene expression

Release into the medium



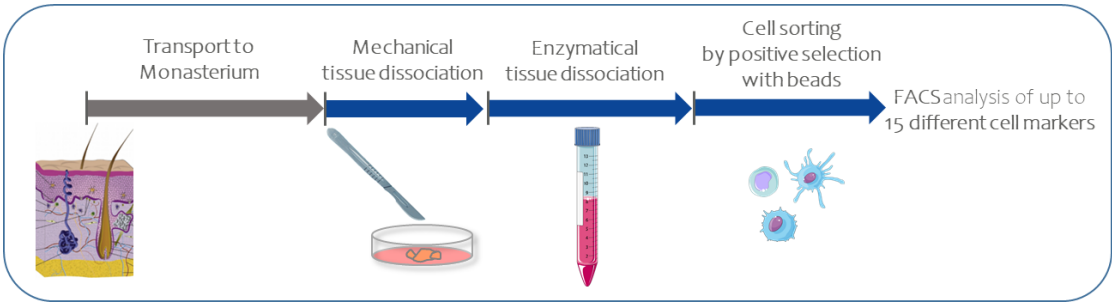
● Donor 1 ● Donor 2 ● Donor 3

Secukinumab is an anti-IL17A recombinant antibody

Gene expression analysis can be complemented by protein analysis (Western blot, FACS, cytokine assays, immunocytochemistry, etc.)

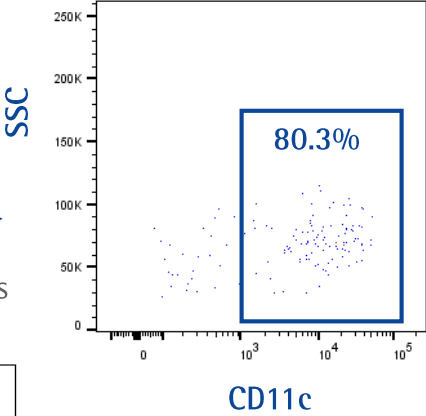
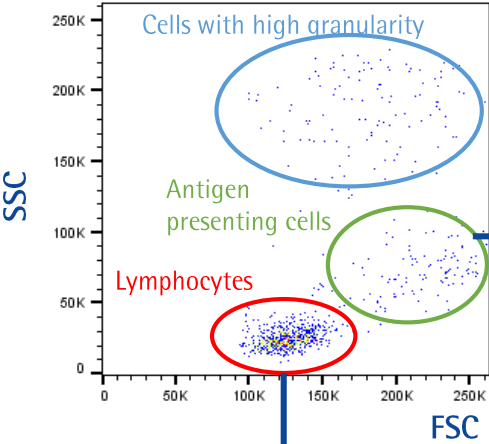
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Isolation of psoriasis-relevant immune cells from human skin

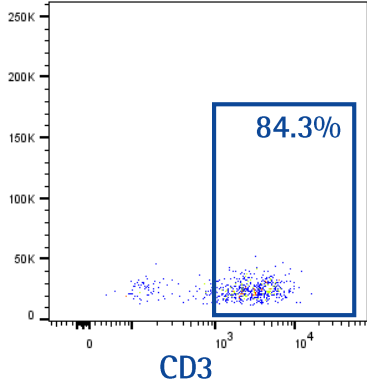


FACS analysis of CD45+ cells from human skin

Percentage of CD11c+ Dendritic cells among Antigen Presenting cells



Percentage of CD3+ T-cells among the Lymphocytes



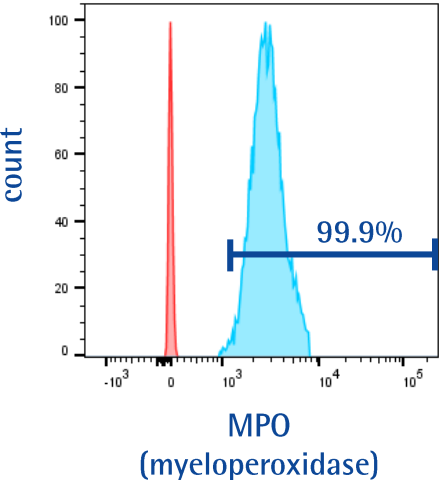
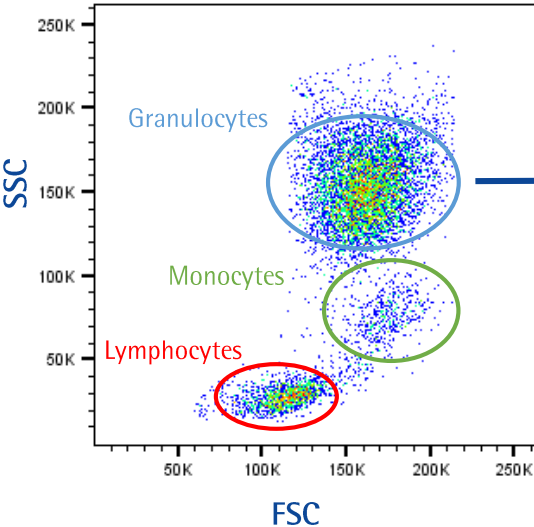
Available also: scRNAseq on patient samples!

FACS analysis can be performed in both healthy and psoriatic skin and blood samples also after drug treatment

Isolation of psoriasis-relevant immune cells from human blood

FACS analysis of CD45+ cells from human whole blood

Percentage of MPO+ Neutrophils among the lymphocytes

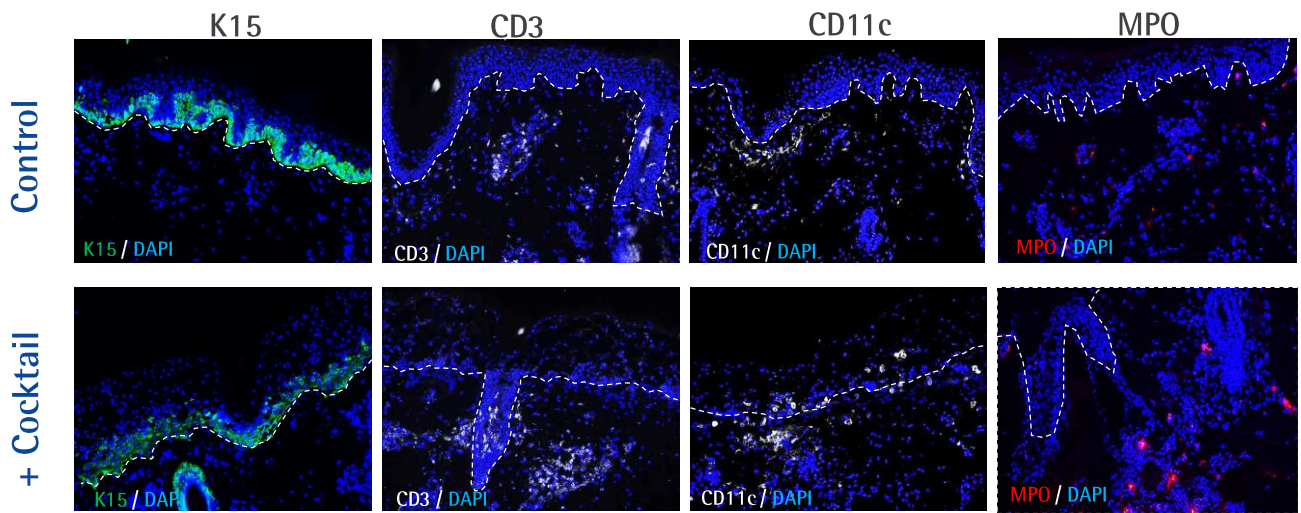


	MPO negative cells
	MPO positive cells

Available also: Functional *in vitro* experiments with cells from lesional skin

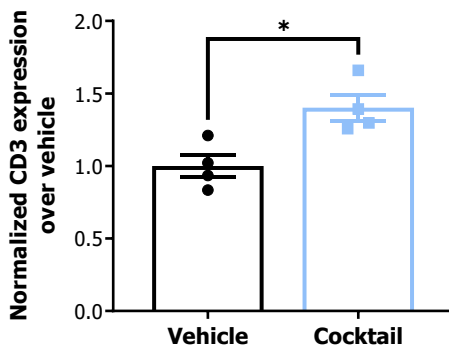
Modelling psoriasis-like responses in human HEALTHY skin *ex vivo*

Cytokine cocktail activates epidermal keratinocytes and resident immune cells inducing a psoriasis-like phenotype

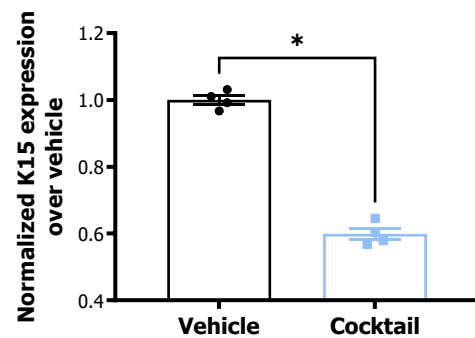


Resident skin immune cells still present and stimulated by cytokine cocktail!

CD3 expression in the skin

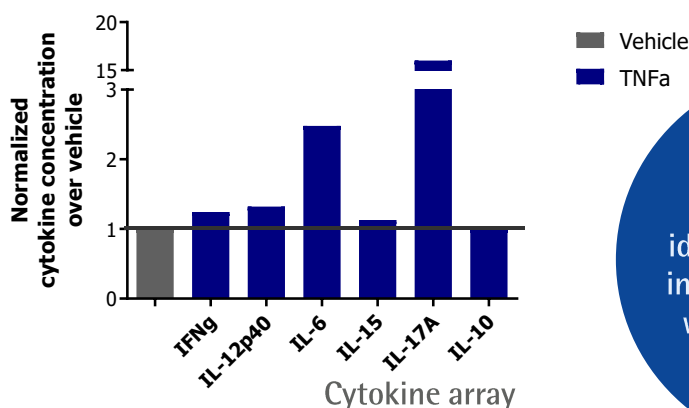


K15 expression in the basal layer



TNF α treatment of human healthy skin stimulates the secretion of psoriasis relevant cytokines into the medium

Cytokine release into the medium

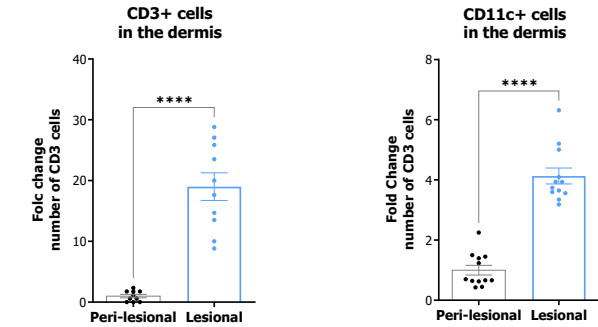
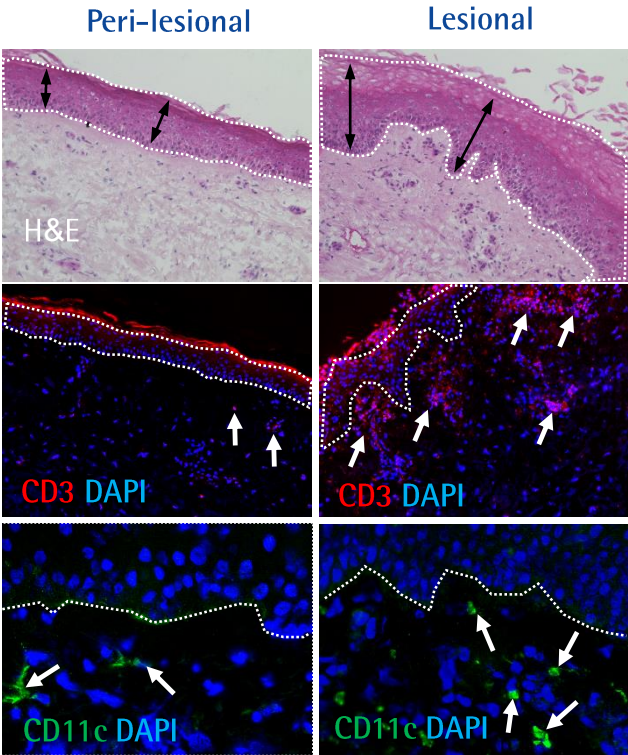


Customized analysis of your target of interest by: multiplex immunostaining, FACS analyses, transcriptome or proteome analyses

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

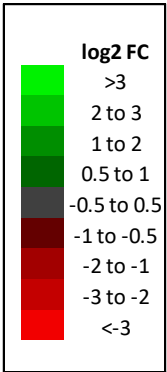
Investigating the effect of a drug on lesional skin from psoriasis patients *ex vivo*

Psoriasis phenotype of patient skin is maintained during *ex vivo* organ culture



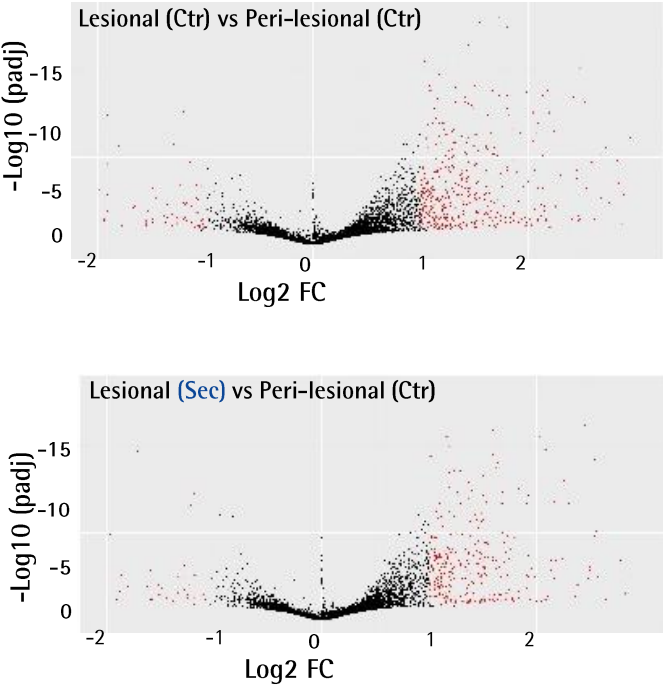
Relative gene expression of
lesional vs peri-lesional
human psoriatic skin after 24hrs
ex vivo organ culture

Gene	log2FC	p-value
CCL20	2.37	9.3E-17
CD69	1.94	6.5E-03
CXCL1	0.73	5.6E-03
CXCL13	2.58	3.3E-03
CXCL8	2.36	4.0E-23
CXCR6	2.26	3.0E-03
DEFB4B	1.93	1.4E-04
IL10	0.51	3.2E-01
IL19	0.67	6.5E-02
IL1a	1.72	2.2E-10
IL1b	2.46	1.7E-13
IL23A	3.29	5.5E-11
IL2RA	3.63	2.7E-10
IL36A	8.52	5.7E-05
IL36G	5.25	2.4E-67
S100A7	1.48	1.8E-05
TNF	0.80	6.8E-02

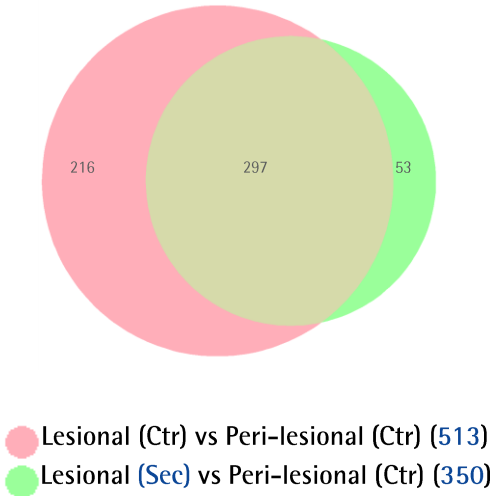


RNAseq

Study Example: Secukinumab (**Sec**) ameliorates psoriasis disease phenotype *ex vivo*, i.e. reduces the transcriptome differences between lesional and peri-lesional skin

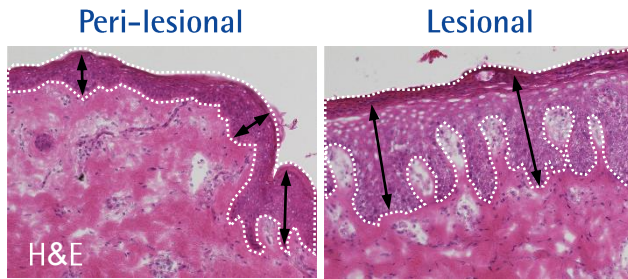


Number of differentially expressed genes

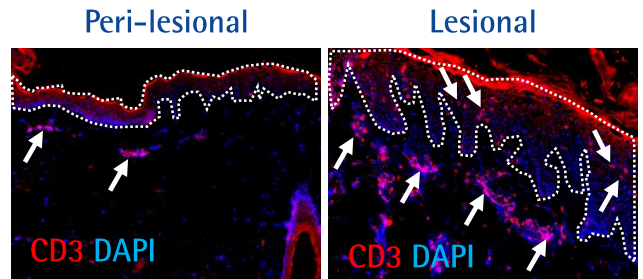


Target characterization or identification

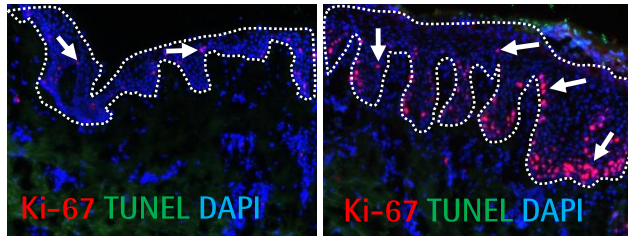
Analysis of human psoriasis patient skin biopsies



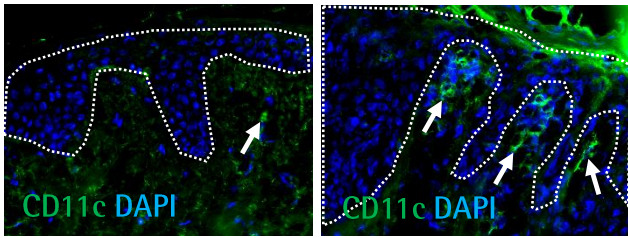
Epidermal thickness



CD3+ T-cells



Ki-67+ proliferating keratinocytes

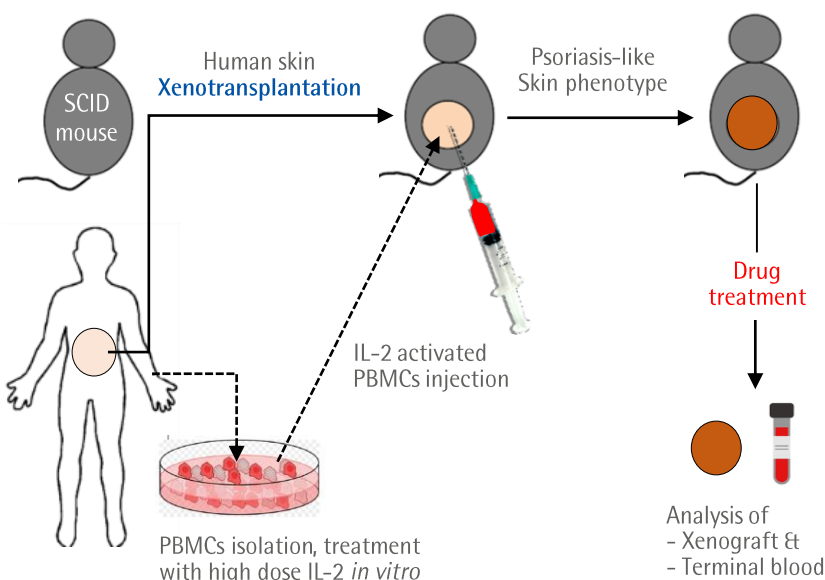


CD11c+ dendritic cells

Multiplex immunostaining can be complemented by in situ hybridization, RNAseq, scRNAseq, FACS, cytokine arrays, etc.

Contact us for receiving a customized project proposal that meets your needs!

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

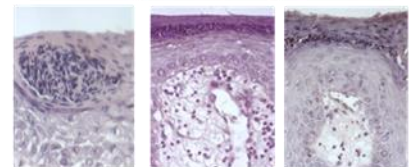
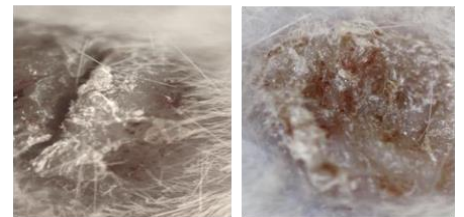


Custom-choice drug treatment by delivery through

1. Systemic
2. Topical

can be applied **prophylactically** or **therapeutically** to prevent or reverse the psoriasiform phenotype. Endpoint analysis of xenograft and terminal blood can be customized including classical quantitative Immunohistomorphometry, RNAseq, cytokine assay.

Psoriasiform



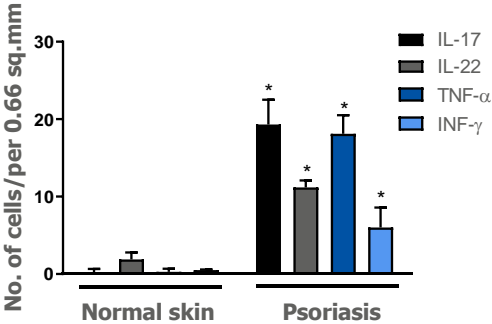
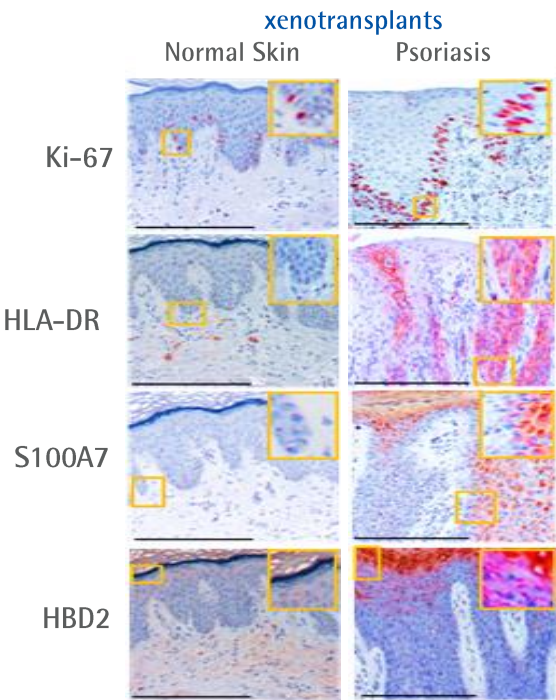
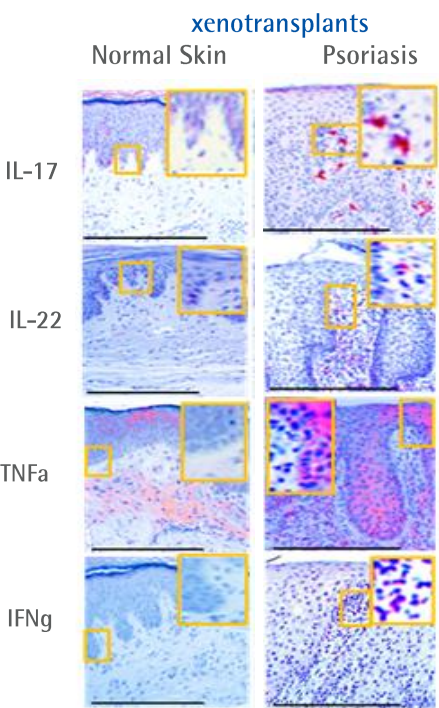
Alternative, *allogeneic IL-2 stimulated PBMCs from psoriasis patients* can be also used to induce psoriasis phenotype.

Keren et al., J Allergy Clin Immunol. 2018; Gilhar et al., J Invest Dermatol. 2011;

Schafer et al., Br J Pharmacol. 2010

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

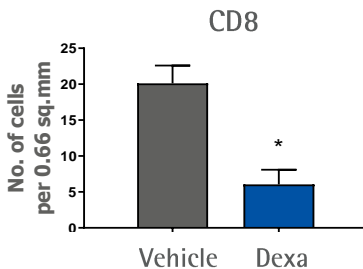
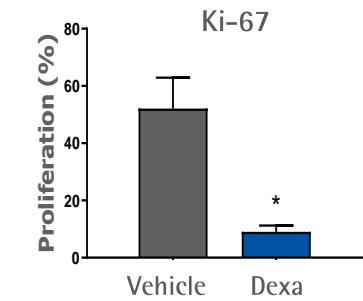
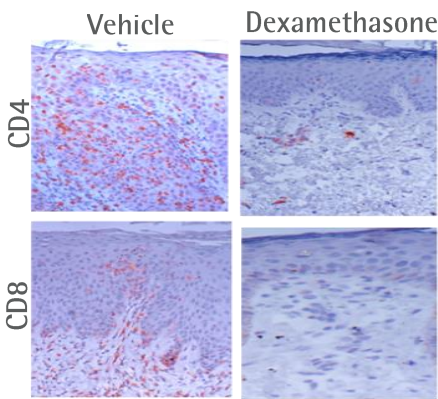
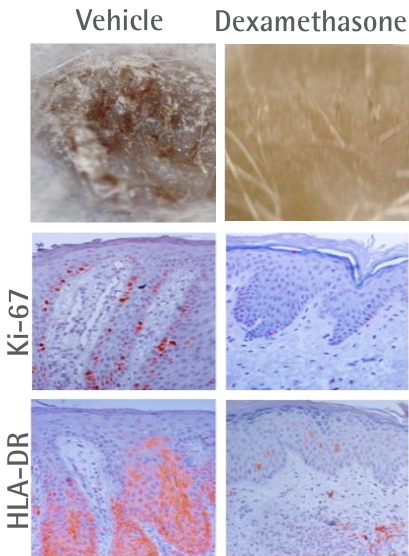
Psoriasis-like response in the skin



Additional drugs tested in this model:
Apremilast,
Secukinumab
(Cosentyx), etc.

Customize your humanized mouse model & validate drug efficacy

Amelioration of disease after treatment with dexamethasone



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!