

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

- ▶ Pre-clinical Research
- ▶ Clinical Research
- ▶ Education



Inflammatory and non-inflammatory mediated itch/pruritus



"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

Monasterium Laboratory
Skin & Hair Research Solutions GmbH

Mendelstr. 17, 48149 Münster, Germany
Phone: +49 (0) 251 93264-458
Fax: +49 (0) 251 93264-457

Founder & CEO: Prof. Dr. Ralf Paus

www.monasteriumlab.com

For enquiries, please contact:

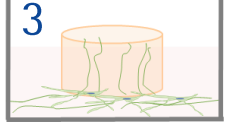
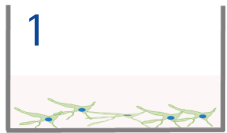
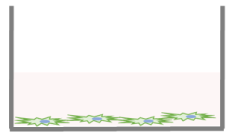
CSO & Deputy General Manager:
Dr. Marta Bertolini (PhD)

m.bertolini@monasteriumlab.com
+ 49 (0)251 93263-080

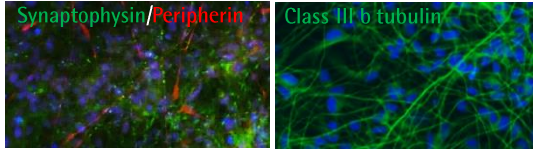
Sensory Re-innervation of Human Skin by Human Neural Stem Cell-Derived Peripheral Neurons

Ex Vivo

Our workflow:



1. Differentiation of human iPSC derived neural stem cells *in vitro*

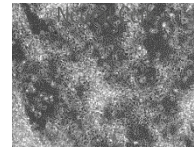


Human iPSC derived neural stem cells start to express: **class III β -tubulin** which is associated with neuronal maturation and is a microtubule element of the tubulin family found almost exclusively in neurons and neurite extensions (Sainath and Gallo, Cell Tissue Res 2015), **peripherin** which is a peripheral nervous system neuronal marker (Yuan et al., J Neurosci 2012), and **synaptophysin** which is a marker of mature neurons (Kwon et al., Neuron. 2011)

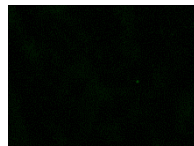
Animal-free model!

A NEW pre-clinical assay for testing the effects of drugs on innervated skin *ex vivo*

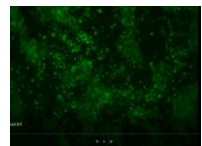
Fully differentiated human iPSC-Derived



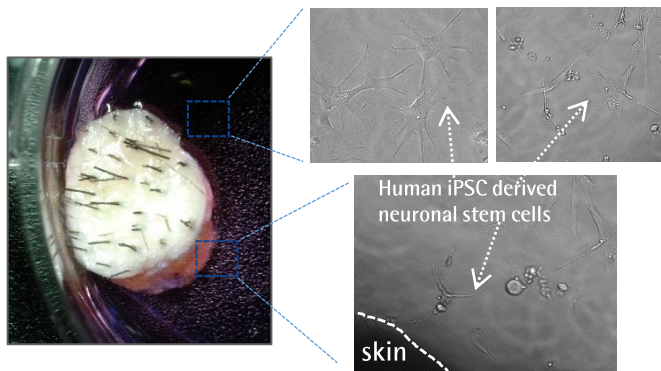
Unstimulated cells



Capsaicin stimulated cells



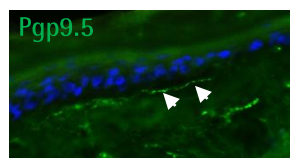
2. Initiation of co-culture of human skin with human differentiated iPSC derived neural stem cells *ex vivo*



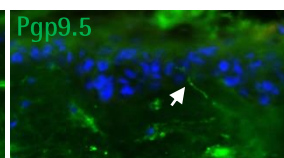
Topical application possible

Chéret et al., J Invest Dermatol 2021

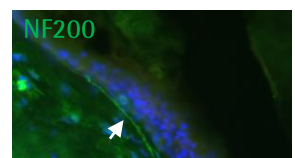
3. Model ready to use: Human skin punch is fully re-innervated



nerve fibers (Pgp9.5+) reaching the epidermis



nerve fibers (Pgp9.5+) entering into the epidermis

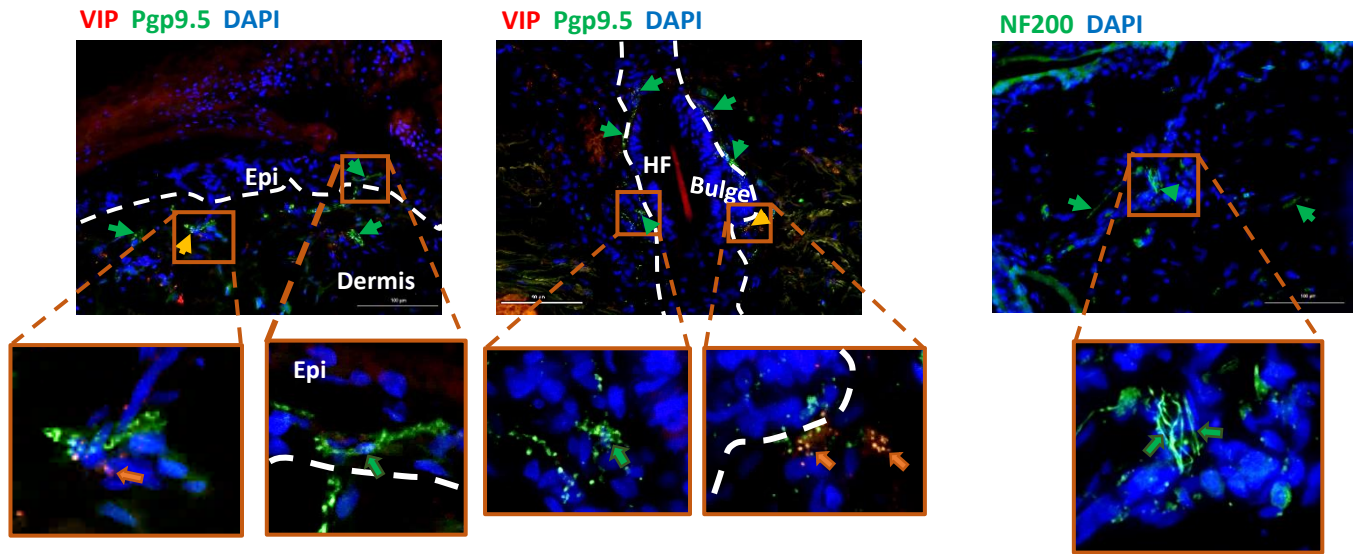


myelinated (NF200+) nerve fibers along the hair follicles

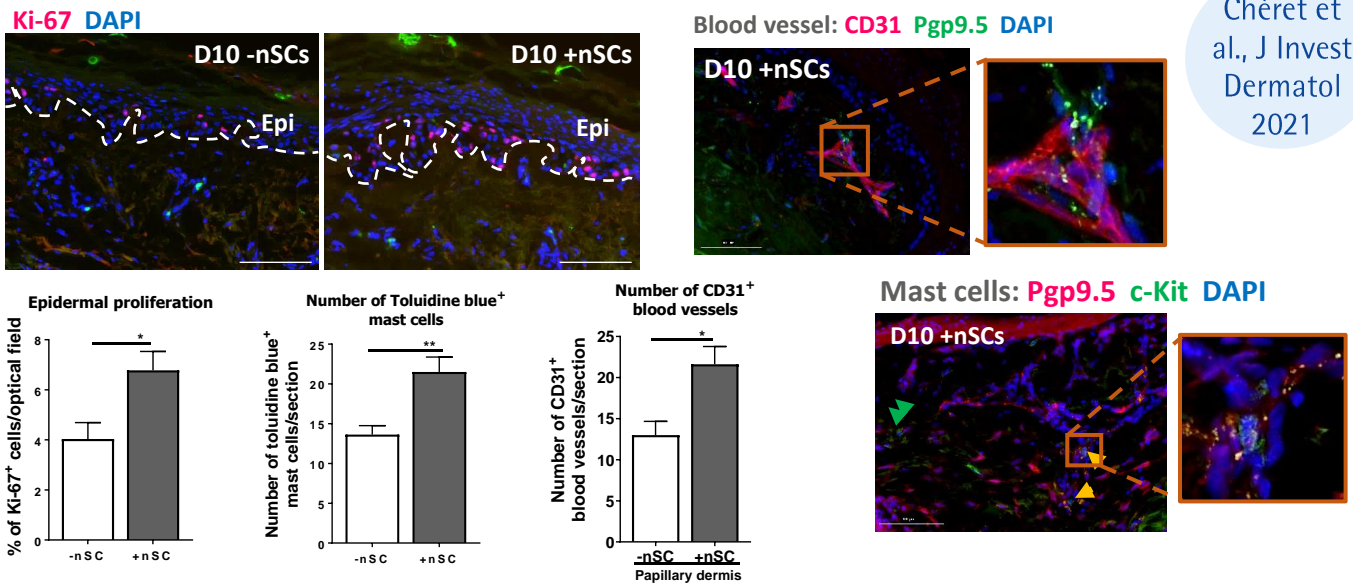
INSTEAD: No remaining nerve fibers can be detected in human skin cultured *ex vivo* in the absence of human iPSC derived neural stem cells

Sensory Re-innervation of Human Skin by Human Neural Stem Cell–Derived Peripheral Neurons *Ex Vivo*

Presence of peptidergic and myelinated sensory fibers after re-innervation



Enhanced skin survival and prolonged organ culture conditions, and close contact between nerve fibers and skin cells

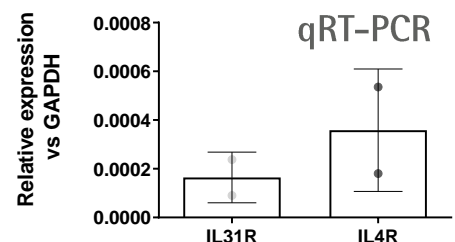


Ch ret et al., J Invest Dermatol 2021

This novel assay can be combined with other disease models *ex vivo* (e.g. stimulation with IL-4 and IL-13 for mimicking atopic dermatitis) and can be utilized for dissecting and manipulating the bi-directional communication between defined skin and hair follicle cell populations and (sensory) human nerve fibers under stringently controlled *ex vivo* conditions, or for testing drugs that target the cross-talk between human skin, hair follicles and cutaneous nerve fibers.

Relevant for e.g. sensitive skin, itch, atopic dermatitis, psoriasis

Differentiated human iPSC-derived Neural Stem Cells (nSCs) also express *IL4R* and *IL31R*, and other itch-relevant markers



WHY US?



**MONASTERIUM
LABORATORY**

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:

Alfredo Rossi, Amos Gilhar, Désmond J. Tobin, Erwin Tschachler, Falk G. Bechara, Francisco Jimenez, Kristian Reich, Mauro Picardo, Thomas Luger, Tiago R. Matos, Vinzenz Oji, Athanasios Tsianakas and many more!