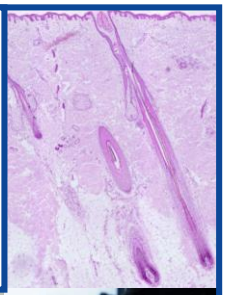
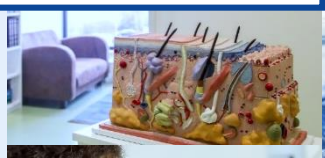
MONASTERIUM LABORATORY
Skin & Hair Research Solutions
www.monasteriumlab.com

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



Inflammatory and non-inflammatory mediated itch/pruritus: New Model!

"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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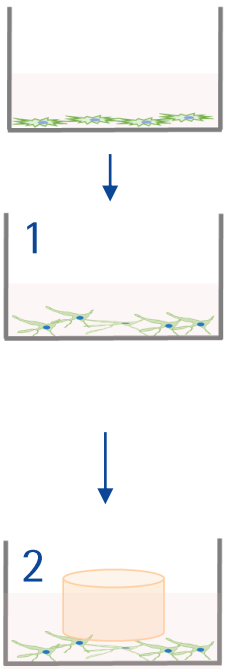
NEW MODEL: Sensory Reinnervation of Human Skin by Human Neural Stem Cell–Derived Peripheral Neurons *Ex Vivo*

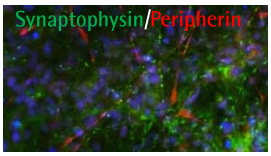
A NEW pre-clinical assay for testing the effects of drugs on innervated skin *ex vivo*

Animal-free model!

Our workflow:

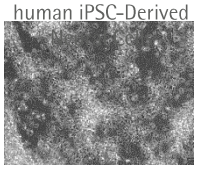


1. Differentiation of human iPSC derived neural stem cells *in vitro*

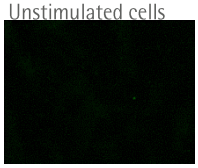


Human iPSC derived neural stem cells start to express: **class III β-tubulin** which is associated with **neuronal maturation** and is a microtubule element of the tubulin family found almost exclusively in neurons and neurite extensions (Sainath and Gallo, Cell Tissue Res 2015), **peripherin** which 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)

Fully differentiated human iPSC-Derived

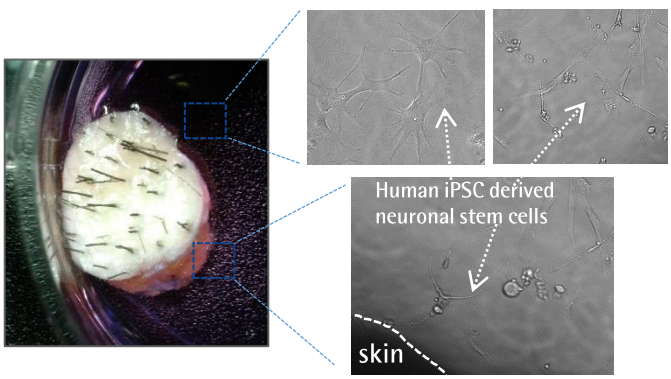


Unstimulated cells



Capsaicin stimulated cells

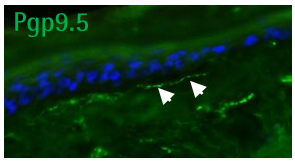
2. Initiation co-culture of human skin with human differentiated iPSC derived neural stem cells *ex vivo*



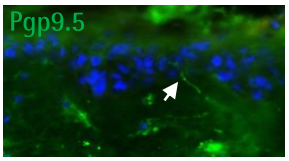
Topical application possible

Chéret et al., J Invest Dermatol 2021

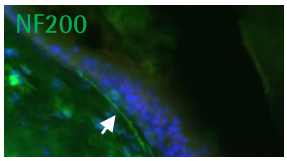
3. Model ready to use: Human skin punch is fully re-innervated



nerve fibers (PGP9.5+) reaching the epidermis



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

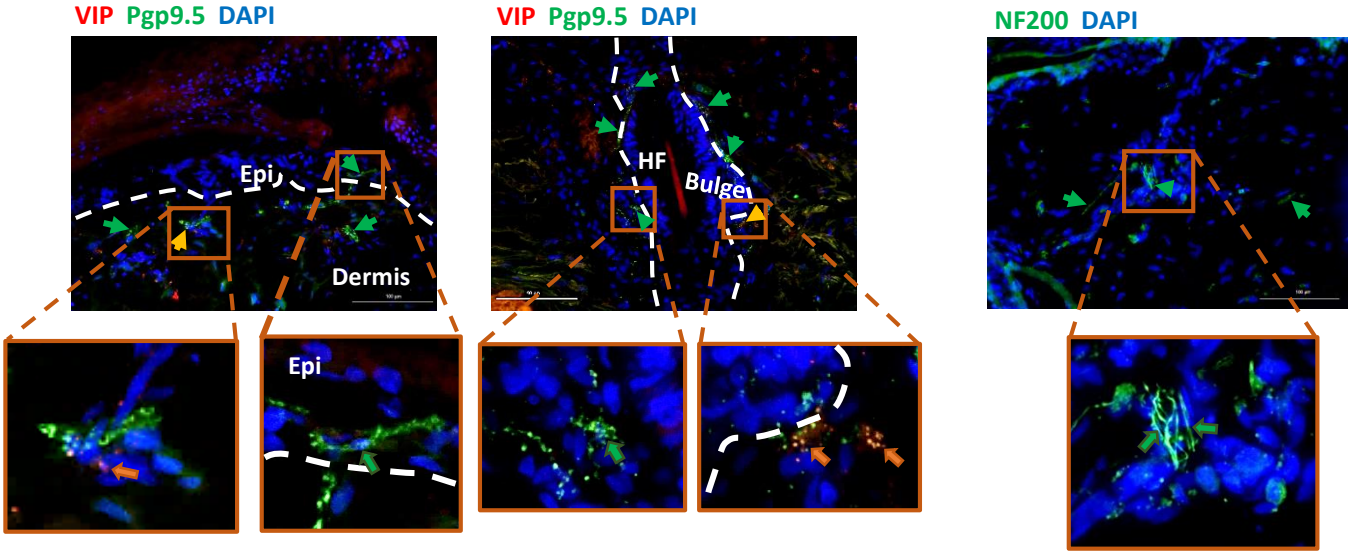


myelinated (NF200+) nerve fibers along the hair follicles

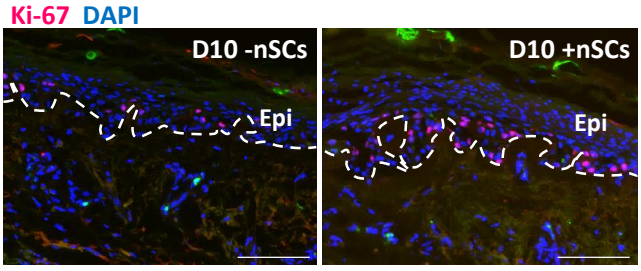
INSTEAD: No remaining nerve fibers can be detected in human skin cultured *ex vivo* in the absence of human iPSC derived neural stem cells

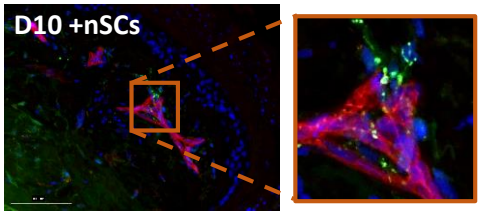
NEW MODEL: Sensory Reinnervation of Human Skin by Human Neural Stem Cell–Derived Peripheral Neurons *Ex Vivo*

Presence of peptidergic and myelinated sensory fibers after re-innervation

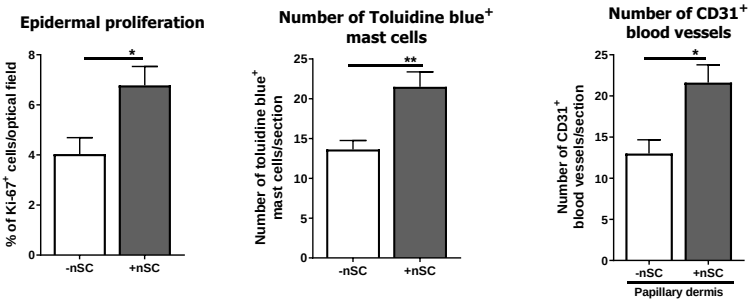


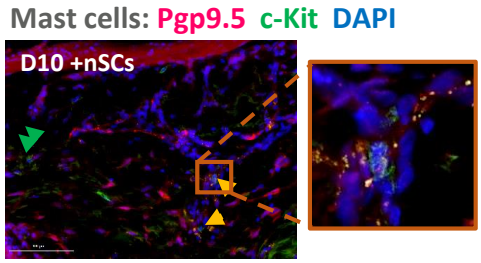
Enhanced skin survival and prolonged organ culture conditions, and close contact between nerve fibers and skin cells





Chèret et al., J Invest Dermatol 2021

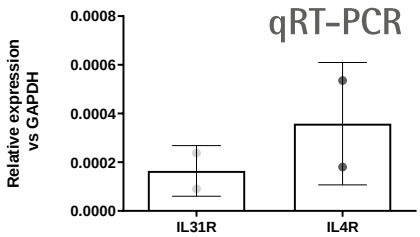




This novel assay **can be combined with other diseases models ex vivo** (e.g. stimulation with IL-4 and IL-13 for mimicking atopic dermatitis) and can be utilized for dissecting and manipulating the bi-directional communication between defined skin and hair follicle cell populations and (sensory) human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

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!

Global client list & testimonials

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

Monasterium Laboratory Skin & Hair Research Solutions GmbH was founded in 2015 by **Prof. Ralf Paus**, MD, FRSB.