

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.

- Pre-clinical Research
- Clinical Research
- Education

Inflammatory and non-inflammatory mediated itch/pruritus



Monasterium Laboratory

Skin & Hair Research Solutions GmbH

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m.bertolini@monasteriumlab.com + 49 (0)251 93263-080 "We combine our unique expertise, our project design creativity, and our passion to advance our clients' success in delivering novel and gamechanging skin and hair research solutions"

> President: Prof. Dr. Ralf Paus



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

Our workflow:







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



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



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









D10 +nSCs

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

Blood vessel: CD31 Pgp9.5 DAPI



Chèret et al., J Invest Dermatol 2021

Mast cells: Pgp9.5 c-Kit DAPI



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



WHY US?

Great network of dermatologists and plastic surgeons collecting <u>samples</u> <u>from healthy and</u> <u>diseased skin</u> 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.



Clinically-

relevant ex

vivo and in

vivo models

World-class scientific leadership & international team

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

Investigative dermatology: **Biobank:** We are supported Acne Vulgaris, Atopic Full access to skin by world-wide Dermatitis, Psoriasis, & hair samples recognized Alopecia Areata, (patients & healthy experts in Androgenic Alopecia, subjects) Exceptional dermatology Hidradenitis Suppurativa, state-of-the-art Vitiligo, Chronic Itch, research Prurigo Nodularis, technology etc.

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

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

> Global client list & testimonials