LMU KLINIKUM
Klinik und Poliklinik
für Dermatologie und Allergologie

Department of Dermatology
Biennial Report 2023 / 2024

MÜNCHEN KLINIK

Imprint

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Contents

Foreword

Prof. Lars E. French, MD, Chairman, Department of Dermatology and Allergology at the Ludwig Maximilian University Hospital + Munich Municipal Hospital Group Dermatology 1

It is my pleasure to present the 2023–2024 Biennial Report of the Department of Dermatology and Allergology at the Ludwig Maximilian University Hospital in collaboration with the Munich Municipal Hospital Group (München Klinik). This report highlights the remarkable strides we have taken in patient care, research, and education — achievements made possible by the exceptional commitment of our interdisciplinary team.

Over the past two years, we continued to consolidate our position as one of Europe's leading academic dermatology centers. With over 80,000 outpatient consultations and nearly 4,700 inpatient cases annually, our department provided comprehensive care across a broad range of dermatologic, allergologic, and venereologic conditions. Our specialized clinics — including those for dermato-oncology (ISO, TüV and DKG certified), inflammatory and autoimmune skin diseases, allergology, pediatric dermatology, hair disease, aesthetic dermatology, dermatopathology and STIs — are at the forefront of patient-centered, state-of-the-art care.

In research, the department achieved a new record in scientific output with over 280 peer-reviewed publications and a cumulative impact factor exceeding 1,860. Groundbreaking studies included our work on spatial proteomics in toxic epidermal necrolysis, identifying the JAK-STAT pathway as an actionable therapeutic target — recently published in Nature. Our clinical trial units conducted over 40 clinical studies, affirming our leadership in translational research and experimental therapy.

A major milestone in this period has been the digital transformation of our department through the early and successful implementation of the Avelios Medical software platform, developed amongst others by one of our former residents, Dr. Sebastian Krammer. This fully modular hospital information system enables structured, AI-ready documentation and has already improved both clinical workflows and research capabilities. Its adoption by hospitals across Germany — and a recent €30 million investment from the top-tier U.S. venture capital firm Sequoia Capital — underscore its potential to reshape healthcare delivery and confirm our department's role as an early pioneer in digitized, data-driven patient care.

The department also continued to expand its academic mission. Within the LMU Medical Curriculum Munich (MeCuM), we provided education to more than 1,000 students annually. Postgraduate and continuing medical education remained strong, culminating in the 30th Training Week for Practical Dermatology and Venerology (FOBI), which attracted over 2,500 participants from around the world.

For my part, after 6.5 years as Chair of the Department and a considerable turnaround leading to a significant strengthening of the academic team, our quality of care, our finances, and last but not least a 250% increase in our impact factor and external funding, I have decided to leave Munich for a new academic position in the USA. Alongside my team, and colleague chairpersons, I would like to thank the leadership of the Ludwig-Maximilians-University, the Ludwig-Maximilians-University Hospital, and the Munich Municipal Hospital Group for their support.

I invite you to explore the following pages to gain insight into our endeavors and achievements during this reporting period.

Sincerely,

Lars E. French
Professor and Chair

1 Assignment

The Department of Dermatology and Allergy at the Ludwig Maximilian University Hospital in collaboration with the Department of Dermatology 1 of the Munich Clinic are devoted to providing sustained leadership in research, patient care, and education in the fields of dermatology, venerology and allergology.

Our nationally and internationally recognized Department includes centers of excellence for skin cancer (ISO 9001-Certified), inflammatory and allergic skin diseases, and cutaneous surgery. With a team of 18 senior physicians, 41 residents and 120 nursing members we offer high-level patient care in all areas of dermatology, venerology and allergology in the context of our large out-patient ambulatory care clinic, our daycare clinic, and our 74-bed inpatient dermatology service.

We offer a wide array of specialized outpatient clinics including skin cancer, bullous and autoimmune skin disease, medical dermatology, psoriasis, atopic dermatitis, autoinflammatory skin disease and hidradenitis suppurativa, acne and rosacea, trichology, allergology, dermatologic surgery, laser and aesthetic dermatology, chronic wounds, sexually transmitted diseases and physical therapies (phototherapy, PDT and laser therapy).

Supporting our patient care are professional in-house diagnostic laboratories for dermatopathology, molecular pathology, allergology, mycology and dermatological immune diagnostics. Our research activities are focused on basic and translational research with relevance to skin disease, mainly in the fields of skin cancer and inflammatory skin disease. Collaboration and networking with talented scientists and research groups within the Ludwig Maximilian University, the Technical University of Munich, the Helmholtz Center and Max-Planck-Institute, as well as collaborative networks with academic Departments in Bavaria, Germany and other leading international Dermatology Centers is of key importance to us.

Education is the third principal field of activity of our Department. Our pre-graduate training is an integral part of the extremely well organized LMU-University Medical Curriculum Munich (MeCuM) which makes optimal use of online and face-to-face onsite resources for an optimal blend of theoretical and practical bedside patient-oriented teaching. At a post-graduate level, regular grand rounds in the Department combined with our large biennial Training Week for Practical Dermatology and Venerology (FOBI, www.fortbildungswoche.de) round up a unique post-graduate continuing medical education offer.

2 Mission statement

The top 4 priorities of the Department of Dermatology and Allergy at the Ludwig Maximilian University Hospital in collaboration with the Department of Dermatology 1 of the Munich Municipal Hospital Group – are to:

View of the big lecture hall of the Department of Dermatology an Allergy at the Ludwig Maximilians University Hospital (left 2nd floor)

1. offer best possible high quality individualized diagnosis and therapy of skin disease, as well as patient education for the prevention and care of skin disease,

2. provide high level education and training in dermatology at the pre-, post-graduate, and CME level,

3. perform innovative translational research with the aim of contributing to improved patient care,

4. foster constructive collaboration and networks with private practitioners as well as primary and secondary institutional care providers.

3 Team

Faculty, Residents & Trainees

Secretaries / Administrative assistants

Diagnostic lab team

Members of the administrative team

Members of the nursing team

Organization chart management

Department Organigram 2023

LMU KLINIKUM
Klinik und Poliklinik
für Dermatologie und Allergologie

MÜNCHEN KLINIK

Klinikdirektor

Prof. Dr. L. E. French

Stellv. Klinikdirektor LMU

Prof. Dr. M. Flaig

Controlling & Finanzen
Diagnostische Labore
Dermatohistopathologie

Ltd. Oberärztin, Stellv. Chefärztin MüK

Prof. Dr.
D. Hartmann, Ph. D.

Dermatochirurgie
Ästhetische Dermatologie
Lasermedizin
Imaging

Leitung Pflege

Fr. N. Renner

Pflege - ambulanter Bereich

Fr. P. Guerrisi

Pflege - stationärer Bereich

Chefsekretariat

Fr. M. Michl

Fr. B. Ott

Oberärztinnen und Oberärzte

Prof. Dr. K. Giehl

Genodermatosen
Kinderdermatologie
BesonderHaut

Prof. Dr.
L. Heinzerling

Hauttumorzentrum
Infusionszentrum

PD Dr.
K. Kerl-French

Dermatohistopathologie

Dr. A.-C. Kuna

Tagesklinik
Konservative Station
Aufnahmezentrum

PD Dr. C. Pfeiffer

Privatstation
Autoimmunerkrankungen

Dr. E. Oppel

Allergologie
Implantatsprechstunde
Berufsdermatologie
Lichtabteilung

Dr. Pumnea

Entzündliche Dermatosen
Immunambulanz
Privatambulanz

Prof. Dr. F. Rueff

Klinisches
Studienzentrum
Allergologie

Dr. M. Seegräber

Operative Station
Dermatochirurgie
Ästhetische Dermatologie
Lasermedizin

PD Dr.
J. Wallmichrath

Dermatochirurgie

Prof. E. Sattler

Privatambulanz
Imaging

Dr. D. Tomsitz

Allgemeine Ambulanz
Stellv. Hauttumorzentrum

Prof. H. Wolff

Trichologie
Stellv. Allgemeine
Ambulanz

Funktionsoberärztinnen und -oberärzte

Dr. O. Horvath

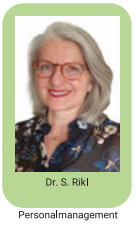
Autoimmunerkrankungen
Entzündliche Dermatosen

Dr. S. Steckmeier

Privatambulanz
Ästhetische Dermatologie
Lasermedizin

Dr. J. Srour

Psoriasiszentrum
Entzündliche Dermatosen
Extrakorporale Photopherese



Dr. S. Rikl

Personalmanagement

Dr. J. Walch

Konsiliardienst
Großhadern

Dr. A. Gürtler

Kopfdermatosen
MeCum
Privatambulanz

Dr. D. Lill

Aufnahmezentrum

Dr. S. Zippel

Psychosoziale Beratung

Organization chart management
Department Organigram 2024

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Stellv. Klinikdirektor

Prof. Dr. M. Flaig
Controlling und Finanzen
Diagnostische Labore
Dermatohistopathologie

Leitende Oberärztin Stellv. Chefärztin

Prof. Dr. D. Hartmann, Ph.D.
Dermatochirurgie
Ästhetische Dermatologie
Lasermedizin, Imaging

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Pflege
ambulanter Bereich

Fr. P. Guerrisi
Pflege
stationärer Bereich

Chefsekretariat

Fr. M. Michl

Fr. B. Ott

Oberärztinnen und Oberärzte

Dr. R. Ferrer
Trichologie, Stellv. entzündl. Hauterkrankungen

Prof. Dr. I. Helfrich
Forschung

Prof. Dr. K. Giehl
Genodermatosen
Kinderdermatologie
BesonderHaut

Prof. Dr. L. Heinzerling
Hauttumorzentrum
Infusionszentrum

Dr. A.-C. Kuna
Tagesklinik
Konservative Station
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PD Dr. C. Pfeiffer
Privatstation
Autoimmunerkrankungen

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Autoimmunerkrankungen
Entzündliche Dermatosen

Dr. S. Steckmeier
Privatambulanz
Ästhetische Dermatologie
Lasermedizin

Dr. T. Nordmann
Allergologie

Dr. M. Mitwalli
Extrakorp. Photopherese

Dr. S. Rikl
Personalmanagement

Prof. Dr. F. Lauffer
Entzündliche Hauterkrankungen

Dr. E. Oppel
Allergologie
Implantatsprechstunde
Berufsdermatologie
Lichtabteilung

Dr. T. Pumnea
Entzündliche Dermatosen
Immunambulanz
Privatambulanz

Prof. Dr. F. Rueff
Klinisches Studienzentrum
Allergologie

Dr. M. Seegräber
Operative Station
Dermatochirurgie
Ästhetische Dermatologie
Lasermedizin

Dr. B. Kendziora
Dermatochirurgie

Dr. S. Mastnik
Tagesklinik
Aufnahmezentrum

Dr. A. Gürtler
Kopfdermatosen
MeCum
Privatambulanz

Dr. D. Lill
Aufnahmezentrum

Dr. S. Zippel
Psychosoziale Beratung

Prof. Dr. E. Sattler
Privatambulanz
Imaging

Dr. D. Tomsitz
Allgemeine Ambulanz
Stellv. Hauttumorzentrum

Prof. Dr. H. Wolff
Trichologie
Stellv. Allgemeine Ambulanz

Residents

- Semra Akçetin
- Narjes Alelq
- Bedour Alshalwi
- Bassam Alshareef
- Raed Althebati
- Marie Amecke genannt Mönninghoff
- Lisa Arnold
- Nora Aszodi-Pump
- Mattis Bertlich
- Anne-Sophie Böhm
- Constantin Brand
- Mohammed Buwayrid
- Laura Calabrese
- Benjamin Clanner-Engelshofen
- Federica Corsi
- Sophia Czell
- Maximilian Deußing
- Laurie Eicher
- Carolin Ertl
- Natalie Evenschor
- Ruben Ferrer
- Zeno Fiocco
- Martin Flatz
- Melia Fleischmann
- Surina Frey
- Leonie Frommherz
- Xiomara Garza Vázquez
- Valerie Glatzel
- Anne Gürtler
- Charlotte Gust
- Josephine Hofmann
- Lea Jakob
- Nina Janjic
- Jawaher Jastaneyah
- Canan Kabakci
- Till Kämmerer
- Carola Kaltenhauser
- Benjamin Kendziora
- Nora Kramer
- Irma Kupf
- Silvan Lange
- Julia Leding
- Anna Leonhardt
- Diana Lill
- Michaela Maurer
- Sebastian Mastnik
- Nora Mittag
- Mohammed Mitwalli
- Nizar Murshid
- Teresa Müller
- Matthias Neulinger
- Ugne Stahl
- Anna Oschmann
- Isabelle Pfeiffer
- Farnaz Rahimi
- Benedikt Reinert
- Theresa Ruf
- Suzanna Salzer
- Annika Sander
- Justin Gabriel Schlager
- Christina Schmitt
- Pia Schöpf
- Thomas Schulz
- Sonja Senner
- Bashair Sharqi
- Jérôme Srour
- Pia-Charlotte Stadler
- Stephanie Steckmeier
- Suzan Stürmer
- Stefan Weißinger
- Laura Wildeis
- Marius Winkler
- Mira Woll
- Sarah Zierold

4 Patient care and laboratories

With around 4.700 inpatients and 80.000 outpatient consultations a year, our hospital is the largest academic dermatology center in Europe. We provide care of the highest standard for a large spectrum of illnesses, ranging from general dermatology to rare and complex conditions. Our team draws on the expertise of world-class specialists in allergology, dermato-oncology, inflammatory skin diseases and pediatric dermatology.

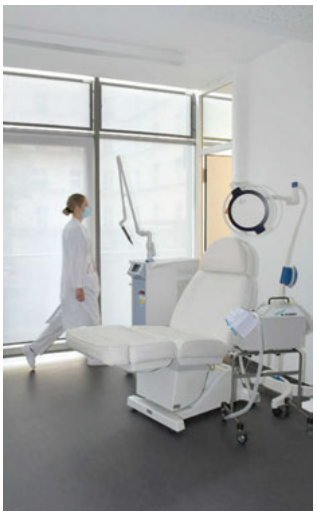
Specialty clinics of the Department

We offer a broad range of standard and state-of-the-art treatments including molecular targeted drugs, immune checkpoint inhibitors, prostaglandins, immunoglobulins, extracorporeal photopheresis, photochemotherapy and hyposensitization procedures. We also provide opportunities for participation in cutting-edge clinical trials for skin cancer and inflammatory skin diseases. We benefit from a wide referral base of external dermatologists and practitioners, as well as from advanced interdisciplinary cooperations. Our expertise, educational offer, research achievements and commitment to patient care have made our team nationally and internationally recognized.

Private outpatient clinic

Outpatient clinic (policlinic) and specialist care clinics

Our comprehensive service encompasses a public and a private outpatient clinic for general dermatology, as well as an emergency service. Our general outpatient clinic is mostly based on open access schedules to better meet patients' needs. Our general dermatology clinic functions as a filter to our specialized clinics and consultations, which cover following areas of interest: aesthetic dermatology, acne and rosacea, allergology, atopic dermatitis, autoimmune



bullous diseases and collagenoses, genital and venereal diseases, genodermatoses, laser therapy, psoriasis and phototherapy, inflammatory skin diseases, non-invasive diagnosis, dermato-oncology, dermatosurgery, pediatric dermatology, phlebology, proctology, trichology and wound healing disorders.

Our private outpatient clinic, headed by Prof. L. French and Prof. E. Sattler, is equipped with modern high-tech in vivo diagnostic devices (total body photography, digital dermoscopy, confocal microscopy,

DIAGNOSTISCHE LABORE
Klinik und Poliklinik für Dermatologie und Allergologie, LMU

Leitung: Prof. Dr. M. Flaig

DERMATOPATHOLOGIE
Leitung: Prof. Dr. M. Flaig
Stv.: PD Dr. K. Kerl-French

HISTOLOGIE

Leitung: PD Dr. K. Kerl-French
Stv.: Prof. Dr. M. Flaig

- Eingangslabor
- Konventionelle Histologie

MTD Team: Korbar, Lindner, Flemming, Köchl, Birrou, Fokken

MOLEKULAR-PATHOLOGIE

Leitung: Prof. Dr. M Flaig
Stv.: PD Dr. K. Kerl-French

- Molekularbiologie
- Immunohistochemie
- MKC
- Schnellschnitt

MTD Team: Puchta, Sirges-Szasz, Krug

ALLERGOLOGIE LABOR

Leitung: Dr. E. Oppel
Stv.: PD Dr. B. Summer

- Standard Tests
- Lungenfunktion
- Arzneimittel-Hauttests
- Epikutantests
- Zelluläre Immunitätslage
- In-vitro Tests
- Flow-CAST
- Basophil-Aktivierungstest
- LTT Implantatallergien

MTD Team: Gaßner, Ferino, Pohl

SPEZIALLABOR FÜR IMMUN- und INFEKTIONSDIAGNOSTIK

Leitung: Prof. Dr. M. Flaig

Dermatologische Immundiagnostik

Fachliche Leitung: PD Dr. K. Kerl-French
Stv.: Dr. M. Maurer

- Direkte IF
- Indirekte IF
- ELISA (BP, DSG, Tgl.)

MTD Team: Albrecht, Anic

Dermatologische Infektionsdiagnostik

Fachliche Leitung: Prof. Dr. M. Flaig
Stv.: Dr. T. Pumnea

Mykologie	STI-Diagnostik
• Kultur-Diagnostik	• Syphilis-Diagnostik
• PCR-Diagnostik	• Gono, Mycopl, Chlam
	• Point of Care STI Diag.
	• PCR Diagnostik varia

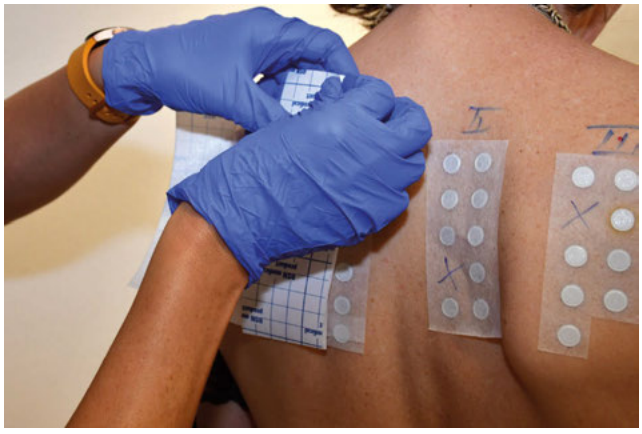
MTD Team: Kerschnitzki, Kieslinger

optical coherence tomography, linefield optical coherence tomography, sonography) and includes its own small surgery room. It also offers second opinions, individual cost estimations, and translation services.

Allergology

Team of the allergology clinic

Based on the long tradition in allergology of the LMU Klinikum, our clinic offers individualized diagnosis and treatment at the highest level for: food and drug allergy, insect venom allergy, contact allergy, metal-implant allergy, mastocytosis, urticaria and angioedema, allergic rhinitis, asthma and eosinophil-associated diseases. Under the direction of PD Dr. E. Oppel and Prof. F. Ruëff, the medical and nursing staffs perform more than 10.000 consultations a year, offering on site in vitro and in-vivo diagnostics, such as prick- and patch tests, food and drug challenge tests, specific IgE's, basophil activation test, and lymphocyte transformation tests. We provide individually tailored therapies, using a wide range of specific immunotherapies, desensitisation procedures and biopharmaceuticals.



Bullous autoimmune skin diseases and collagenoses specialty clinic

Our specialized clinic for bullous skin diseases and complex collagen-vascular diseases strives to offer patients a correct diagnosis of their rare disease and the full spectrum of treatment options including access to clinical studies. Advanced residents are trained to enhance their knowledge in blistering and autoimmune diseases. Our unit has a full diagnostic laboratory for blistering diseases, experienced histology service and access to sophisticated imaging and functional testing within the university clinical network.

PD Dr. C. Pfeiffer, lead physician

Dermato-oncology specialty clinic

Our ISO-certified dermato-oncology specialty clinic is a national and international reference center for melanoma and non-melanoma skin cancer, providing more than 5750 consultations annually. In this clinic, patients with locally advanced and metastatic disease benefit from comprehensive follow- up and therapeutic management, performed by a team of highly skilled physicians and nurses. Our team has deep knowledge of all state-of-the-art and experimental therapies, including immune checkpoint inhibitors, molecular targeted therapies, oncolytic viruses, bispecifics, traditional chemotherapies and respective side effects.

Team of infusion unit Prof. L. Heinzerling, MD, MPH
Left to right: Th. Schulz, A. Zekjiri, Dr. L. Eicher, M. Agoro, S. Maier, R. Buchillon Lizca (front center), I. Schnaitter, Prof. Dr. L. Heinzerling, MPH, Chr. Straßer, Dr. L. Arnold, Dr. A.-S. Böhm, D. Heß, M. Neulinger Munoz

As a part of the Munich Comprehensive Cancer Center and tumor board, our dermato-oncology reviews and provides individualized and interdisciplinary management especially for complex cases. The specialty clinic

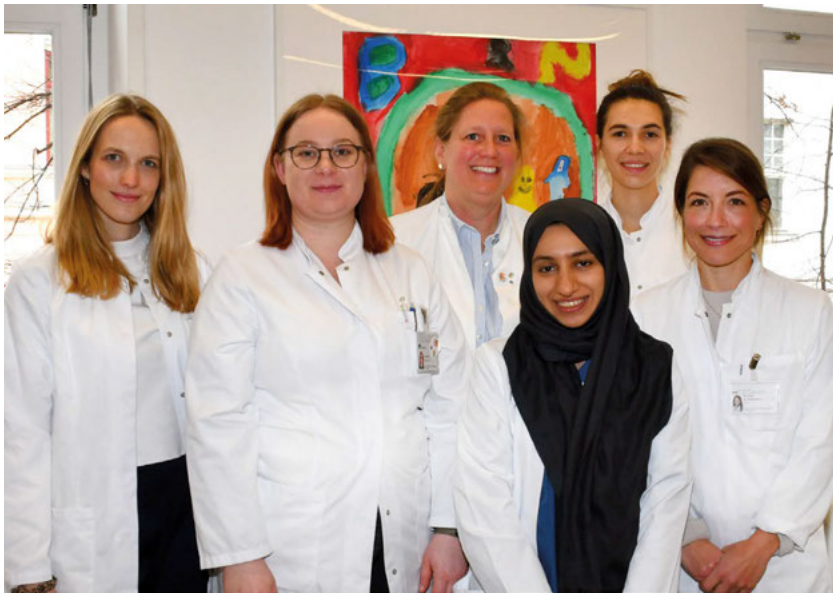
is led by Prof. Lucie Heinzerling, MPH, since November 2020, who has certified the center and also introduced an interdisciplinary toxboard. Patients with cutaneous lymphoma are offered specialized diagnosis, follow-up and treatment and for patients with rare tumor entities novel innovative therapy approaches are part of comprehensive therapy regimens.

The dermato-oncological study center offers cutting-edge clinical trials including mRNA vaccination and investigator-initiated trials on patients with e.g. checkpoint-inhibitor resistance or therapy-refractory side effects. Furthermore, the engagement in microbiome research has enabled the unit to offer fecal microbiome transfer in selected patients.

Pediatric dermatology and genodermatosis Specialty clinic with „BesonderHaut" outpatient counseling center

Prof. Dr. med. Kathrin Giehl

- Leonie Frommherz, MD
- Josephine Hofmann, MUDr.
- Narjes Alelq, MD
- Sophia Hertle, social pedagogue
- Sophia Limberg, pediatric psychotherapist



Left to right: S. Limberg, S. Hertle, Prof. Dr. K. Giehl, Dr. N. Alelq, J. Hofmann, Dr. L. Frommherz

Prof. K. Giehl and her team focus on routine and highly specialized care for common to rare dermatologic diseases of infants, children and adolescents. Genetic counselling for rare hereditary diseases (genodermatoses) is also available. The unit cooperates with the LMU Dr. von Haunersches' childrens hospital to ensure the best interdisciplinary treatment for our youngest patients.
In addition to specialized pediatric dermatology care in the outpatient clinic, affected children and their families receive free support in our „BesonderHaut" outpatient counseling center.

This includes psychosocial counseling, social legal counseling, parent/ family counseling, information on networks and selfhelp associations, accompanying discussion offers for children in dealing with severe and rare skin diseases, patient/parent training and psychological support for children and adolescents, relieving discussions with caregivers, recommendation and mediation of outpatient measures, co-organization and implementation of training courses and workshops.

Psoriasis, photodiagnostics & phototherapy specialty clinic

In our psoriasis unit, patients with all types of psoriasis can access state-of-the-art treatment, encompassing topical medications, phototherapy, photochemotherapy, traditional systemic drugs and biologics. A strong basic and clinical research background and more than 8.000 yearly consultations make this unit, now led by Prof. F. Lauffer, Dr. R. Ferrer and PD Dr. E. Oppel, a national referral center.

The team also provides standardized photoprovocation protocols for photosensitive disorders and phototherapy for patients with atopic dermatitis, cutaneous lymphoma, lichen sclerosus, prurigo nodularis, scleroderma and vitiligo.

Sexually transmitted infections and genital disease specialty clinic

At our sexual health center, overseen by Dr. T. Pumnea, we focus on addressing sexually transmitted infections and conditions affecting the genital area. We perform around 5000 consultations annually, offering discreet testing and tailored healthcare for STIs, including HIV and ailments such as lichen sclerosus.

Trichology specialty clinic

Left to right: PD Dr. M. Bertlich, Dr. R. Ferrer, B. Fokken, U. Wolf

This unit, directed by Dr. R. A. Ferrer M.D., Ph.D. performs more than 3500 consultations a year; offers trichoscopy, trichograms, and specialized counselling and care forcicatricial and non-cicatricial alopecia using topical and systemic therapies, including off label medications.

Inpatient division

Thanks to a solid cooperation with the Dermatology Department 1 of the Munich Municipal Hospital Group (München Klinik Thalkirchnerstrasse), our Department can rely on 74 hospital beds hosting an average of 4.700 inpatients every year. Our physicians and dermatology-trained nurses cooperate with a multi-disciplinary team of other professionals (physiotherapist Ms. S. Scholz, social workers Ms. Weisser-Jokic and C. Guggemos, and many more) to ensure the best comprehensive treatment for our patients.

Dr. Marlene Seegräber heads our general and surgical-oncological ward, also available for our patients undergoing slow Mohs surgery routine. It mainly hosts our patients undergoing complex surgical procedures or infusion therapies for skin cancer or autoimmune diseases. Our largest ward is under the direction of Prof. L. French and Dr. Dirk Tomsitz, later PD Dr. Christiane Pfeiffer and it includes a section for privately insured patients.

Our committed staff takes care of particularly severe and recalcitrant skin pathologies, requiring appropriate diagnostics and treatment.
The most common conditions include therapy-resistant psoriasis, autoimmune and autoinflammatory skin diseases, food and drug challenges, hyposensitization to insect venom, chronic wounds and skin cancer.

Our Department believes in continuity of care. The day-care unit takes care of patients with chronic conditions requiring long-term treatment even after hospital discharge.

Our day-care unit also provides infusion therapy for patients with melanoma and non-melanoma skin cancer, photodynamic therapy of non-melanoma skin cancer, photochemotherapy of psoriasis and cutaneous lymphoma.

It also includes a wound healing section (led by Prof. Dr. D. Hartmann, Dr. G. Schlager and T. Müller), and an extracorporal photopheresis unit (headed by Dr. J. Srour) for cutaneous lymphoma, graft-versus-host disease and autoimmune skin diseases.

Daily rounds on an inpatient ward

5 Three specialty clinics of the Department in focus

A. Aesthetic Dermathology

Left to right: Dr. A. Gürtler, Prof.Dr. D. Hartmann, Dr. S. Steckmeier, Dr. M. Seegräber

Dermatological surgery, laser and aesthetic medicine, plebology and wound healing

This multidisciplinary division, headed by Prof. Dr. D. Hartmann, M.D., Ph.D., offers a wide portfolio of interventional dermatology, combining inpatient and outpatient care.

Our skilled dermatologic surgeons perform complex oncological and reconstructive procedures, including micrographic surgery of basal cell carcinoma, surgery of melanoma with sentinel node biopsies, complex mesh-grafts and flaps, nail surgery, electrochemotherapy, dermabrasion for rhinophyma, sweat gland curettage for hyperhidrosis, blepharoplasty, vacuum therapy and hydrosurgery for chronic wounds, thermo- and laser ablation of refractory anogenital warts.

The team, led by Prof. Dr. D. Hartmann Ph.D., and composed by specialists Dr. Marlene Seegräber and residents, also includes a hand and plastic surgeon, PD Dr. J. Wallmichrath, as well as experienced anaesthesiologists.

In our aesthetic clinic qualified specialists, amongst them Dr. S. Steckmeier, not only perform a large variety of evidence based anti-aging aesthetic procedures such as Botulinumtoxin, dermal fillers, microneedling, injection lipolysis and chemical peels, also supported by our medical cosmetician A. Meichsner. They also focus on the medical use of Botulinumtoxin in the treatment of bruxism, hyperhidrosis, diseases like systemic scleroderma ("tobacco pouch mouth"), scar and volume defect treatments and traumatic or medically related asymmetry of facial expressions as in facial palsy.

As an academic clinic, we attach particular importance to the analysis and treatment of side effects such as filler granulomas or pigment disorders, as well as the further training of our residents.

In our laser clinic, patients are offered treatment with modern ablative and non-ablative devices for medical and aesthetic conditions (erb-YAG, CO2, pulsed-dye, ruby, neodym-YAG).

Scar Treatment is also a focus of this clinic. Therapy of keloids, hypertrophic scars, and atrophic scars as common forms of abnormal scarring often require a multimodal and multidisciplinary approach to achieve optimal outcomes, tailored to the individual's specific needs.

Initial treatments for both hypertrophic and keloid scars typically include topical silicone gels or sheets, and corticosteroid injections, often combined with cryotherapy. Pressure therapy can also be effective in reducing scar thickness in suitable locations. For therapy-refractory keloids, the use of 5-fluorouracil (5-FU) may be employed as an off-label treatment.

Left to right: Dr. M. Seegräber, Dr. A. Gürtler

In recent years, an increasing number of patients with ear keloids, often caused by trauma such as piercings, have sought treatment at our department. In cases where the keloid has a small base or are too large in size for injection and cryotherapy, one management approach

Preoperative

2 weeks postoperative

1 year Follow-Up

is the combination of surgical removal followed by postoperative radiotherapy. The specific surgical technique chosen depends on the size, location, and characteristics of the keloid.

Brachytherapy, delivering radiation directly to the surgical site through the placement of radioactive sources, is also used. This allows for localized treatment, minimizing damage to surrounding healthy tissue, which is particularly important in sensitive areas like the ear.

Scars can be stigmatizing, serve as reminders of traumatic events, or cause symptoms such as itching. With a dye laser, we can reduce the red coloration of scars. Additionally, sunken or raised scars can be leveled with the surrounding skin using a fractional CO2 laser.

An atrophic scar can become flat again through the so-called "shrinking effect" by applying heat. The CO2 laser also stimulates collagen production in the dermis.

To complete the clinical offer, the division provides a special wound care unit focusing on the multidisciplinary diagnosis and treatment of difficult to treat ulcers and a phlebology unit, performing diagnosis and treatment of venous insufficiency and superficial and deep vein thrombosis.

B. Inflammatory skin diseases – Allergology

Inflammatory skin disease specialty clinic

The lifetime prevalence of inflammatory skin diseases such as atopic dermatitis is high in Western countries. Around 3% of the German population suffers from psoriasis vulgaris; the prevalence of hiddradenitis suppurativa (acne inversa) is also high.

Chronic inflammatory skin diseases are more and more regarded as systemic inflammatory diseases, as the continuous inflammation of the skin has effects on other organs of the human body and thus promotes, for example, the development of artherosclerosis, insulin resistance, obesity, bronchial asthma and inflammatory joint diseases. In recent years, there has been enormous development in the field of new therapies for inflammatory skin diseases.

Left to right L. Birrou, Dr. S. Frey, A. Sing, Prof. Dr. F. Lauffer, S. Gaßner, D. Ferino, B. Alshalwi, Dr. Th. Nordmann, K. Schmidt, Dr. R. Ferrer, C. Maratas, PD Dr. E. Oppel, T. Peters

Over 10 biologic therapies are now available for psoriasis alone, while 3 biologics and 3 Janus kinase inhibitors are available for atopic dermatitis. Fortunately, two new biologics have been approved for hidradenitis suppurativa in the last two years, so that we can now offer these patients more options. In our Inflammatory Skin Disease clinic, we offer special consultations for the entire spectrum of inflammatory skin diseases including psoriasis, hidradenitis suppurativa and atopic dermatitis. Both initial presentation for onset of systemic therapy and further treatment including the administration of biologics are possible in our department. The aim is to control the inflammatory activity as completely as possible in order to restore quality of life and prevent comorbidity. In addition to therapies already approved, we also offer new investigative treatments in clinical trials in close cooperation with our dermato-allergological study center.

Phototherapy and photodiagnostics

The significance of UV therapy has been the subject of repeated critical debate in recent years, as new systemic treatments for inflammatory skin diseases could make the use of phototherapy superfluous. However, it has been shown that light therapy remains useful for individualized therapy and for supportive treatment of therapy-refractory cases. For us, the use of UV-A therapies is an indispensable part of treatment, particularly in the case of sclerosing diseases. In addition, light therapy and photodiagnostics are an essential part of dermatological training and teaching. In this respect, phototherapy is still an essential pillar of the dermatological therapy portfolio of a university clinic.
Our light therapy clinic mainly treats classic inflammatory dermatoses (psoriasis, atopic dermatitis), cutaneous lymphomas and sclerosing diseases (circumscribed scleroderma/morphea). Equipment for UV-B, high-dose UV-A, PUVA whole and partial body treatments is available so that each patient can be offered an individualized treatment concept including supplementary topical or systemic therapy. The department also has extensive expertise in carrying out photodiagnostic procedures (determination of the minimum erythema dose, photoprovocation, photo patch test) as supplementary diagnostics for allergic and autoimmune skin diseases.

Allergology

Our allergology clinic focuses on the diagnosis, treatment, and prevention of allergic diseases ranging from mild allergic symptoms to life-threatening anaphylaxis, and affecting million people worldwide. Estimates assume a lifetime prevalence of 20-30%.

Pursuing the long tradition in allergology of the LMU Klinikum, our clinic offers individualized diagnosis and treatment for: allergic rhinitis, asthma, contact allergy, food and drug allergy, eosinophil-associated diseases, metal-implant allergy, mastocytosis, urticaria and angioedema, and insect venom allergy. Led by PD Dr. E. Oppel and Prof. F. Ruëff, the doctor and nurse staffs perform more than 10.000 consultations a year, offering on site state-of-the-art-diagnostic procedures including

- skin prick tests and intradermal testing
- Patch tests and photo patch tests
- Serological diagnostics (determination of specific antibodies including molecular-based allergy diagnosis)
- cellular tests such as the basophil activation test and the lymphocyte transformation test)
- food and drug challenge tests

All evidence-based diagnostic procedures are offered, taking into account the latest scientific findings and guidelines in the interest of quality assurance. The range of therapies for adults and children also includes the latest developments in the pharmaceutical sector, including those that are only being tested in clinical trials and are otherwise not generally available.

Additionally, our clinic is particularly specialized in the treatment of patients with hymenoptera venom allergies.

For the treatment of anaphylactic reactions to hymenoptera we use efficient and fast-acting specific immunotherapy regimens. Furthermore, we have special experience in the diagnostic and management of drug hypersensitivity reaction (e.g. DRESS, Stevens-Johnson syndrome and TEN).

Since allergic diseases often manifest themselves in more than one organ system, the various disciplines treating allergic diseases at LMU Klinikum joined forces and form the interdisciplinary Comprehensive Allergy Center of the LMU (CAC). (www.lmu-klinikum.de/allergiezentrum)

Given the complexity of allergic diseases and immune disorders, it is crucial for allergology clinics to adhere to high standards of care. Certification ensures that these departments operate according to recognized guidelines and best practices, fostering both patient safety and clinical effectiveness.

Certification for the interdisciplinary Comprehensive Allergy Center of the LMU

In July 2023, Prof. Zuberbier, head of the Institut of Allergology of the Charité officially certified our interdisciplinary Comprehensive Allergy Center at the LMU as part of an audit.

Through stringent standards according to recognized guidelines and best practices, ongoing education, and a focus on patient safety, our interdisciplinary certified center (dermatology, otorhinolaryngology, pulmonology, occupational medicine and pediatrics) not only improve the quality of care but also contribute to the advancement of allergology as a medical specialty.

Furthermore, the certification opens doors for interdisciplinary participation in clinical trials and research studies, allowing participating departments to contribute to the development of new therapies and diagnostic tools.

Team of the Comprehensive Allergy Center of the LMU, PD Dr. E. Oppel is 4th from the right

C. General dermatology outpatient and STI specialty clinic

In our general dermatology outpatient clinic led by Dr. D. Tomsitz, all patients – adults and children alike - with any kind of dermatologic disease are seen by a team comprised of dermatologists, nurses and final year medical students. Most diagnostic examinations are performed onsite, including skin biopsies, microbiologic analysis, or serologic tests. Treatment can either be monitored and followed-up in the general dermatology outpatient clinic, or in case of chronic and complex diseases can be referred to a special outpatient clinic, e.g. patients with allergic diseases, bullous autoimmune skin diseases or collagenoses. In patients who require intensive dermatologic care hospitalization and inpatient care can be planned.

A unique feature of this clinic is that no prior appointment is necessary, and patients can present with their acute or chronic diseases without any time delay. About 25,000 patients are managed here per year.

Our STI specialty clinic

The unit for sexual health led by Dr. T. Pumnea, not only diagnoses and treats all kinds of acute sexually transmitted diseases, but also regularly follows-up on patients with HIV infection or inflammatory diseases of the genital area, like lichen sclerosus. With regards to disease prevention, vaccinations for human papillomavirus or HIV-PrEP (Pre-Exposure Prophylaxis) are offered to patients with a high risk of acquiring HIV infection. Additionally, a team of psychologists are at the patient's disposal for counseling. We prioritize prevention, support, and education in our approach. Currently, about 5,000 patients per year are being seen and treated in this specialty clinic.

6 Research

The Department of Dermatology at LMU Munich stands as one of Europe's largest and most prestigious academic dermatology departments, pioneering innovative research to transform the understanding and treatment of skin diseases. Through interdisciplinary collaboration in fields ranging from chronic inflammatory conditions to oncology, hair loss disorders, adverse drug reactions, implant allergies, and dermatosurgery, we have significantly contributed excellence to forwarding dermatological science and patient care.

OUR VISION:
The Department of Dermatology is committed to fostering an inclusive, diverse, and globally connected environment. Our staff comprises individuals from many countries, reflecting a multicultural ethos that enriches our clinical care and scientific endeavors. We collaborate extensively with leading institutions worldwide, ensuring a multidisciplinary and cutting-edge approach to research and patient care.

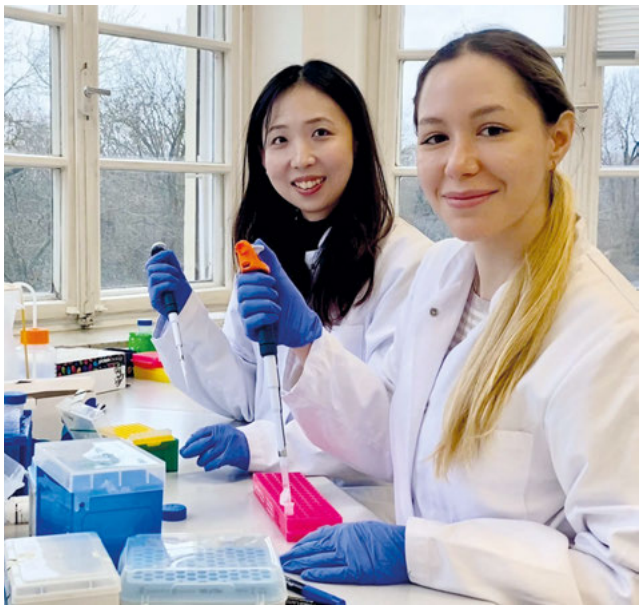
Key research focus areas and achievements

- Chronic Inflammatory Skin Diseases

Significant advancements have been made in understanding conditions like psoriasis, atopic dermatitis, lupus erythematosus, adverse cutaneous drug reactionsand lichen planus. Using cutting-edge tools such as CRISPR-Cas, proteomics and molecular profiling, our research has uncovered new therapeutic targets and disease endotypes, paving the way for personalized treatments to improve patient outcomes.

- Dermato-Oncology

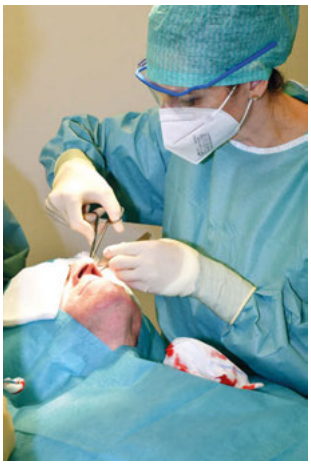
Our dermato-oncology research focuses on tumor-stroma communication, immune checkpoint pathways, and tumor cell plasticity. Using technologies like intravital microscopy and preclinical models, we develop therapies to address treatment resistance and metastasis, strengthening our leadership in melanoma and non-melanoma skin cancer research. In 2023/2024, we conducted 41 clinical studies in Phase Ib-IV trials. A major initiative, the Side Effect Registry Immuno-Oncology (SERIO), tracks severe immunotherapy side effects. Since 2011, and online since 2020, SERIO collaborates with 73 centers in 13 countries to analyze risk factors and management strategies for immune-related adverse events (irAEs). The registry provides biological samples for further research and offers expert guidance on managing therapy-refractory irAEs. Our clinical research also focuses on optimizing skin cancer treatments with immunotherapy, cellular therapies, targeted therapies, and mRNA vaccines. Interim results from investigator-initiated trials (PROMIT and PRIA) show promising outcomes, with 216 patients recruited in 2023. We also study the gut microbiome's role in immunotherapy response and toxicity. By integrating novel therapies, imaging techniques, and biomarker research, we aim to overcome treatment resistance, personalize care, and improve patient outcomes, maintaining our leadership in dermato-oncology.



Left to right: X. Zhou, M. Gürsoy, MD

- Dermatosurgery

Evidence-based medicine (EBM) guides our dermatosurgical practice, ensuring every intervention for skin cancer is based on the latest and most reliable scientific evidence. Systematic reviews and meta-analyses from our team have contributed to refine surgical techniques, minimizing risks such as infection, scarring, and recurrence.



Prof. Dr. D. Hartmann

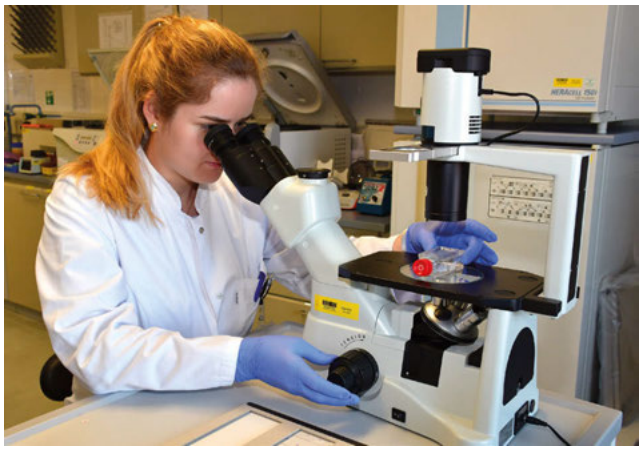
- Hair Loss Disorders

Research into alopecia areata and frontal fibrosing alopecia has revealed critical pathways, such as the role of DPP4 in hair regeneration. These breakthroughs are paving the way for new therapeutic interventions aimed at restoring hair growth and improving patient quality of life.

- Implant Allergies

Significant progress has been made in understanding adverse reactions to medical implants. By identifying biomarkers and immune responses, diagnostic precision has improved, resulting in personalized care protocols. This work has fostered a European research network and an international registry for implant allergies, advancing global prevention and treatment strategies.

- Proteomics and Toxic Epidermal Necrolysis (TEN)



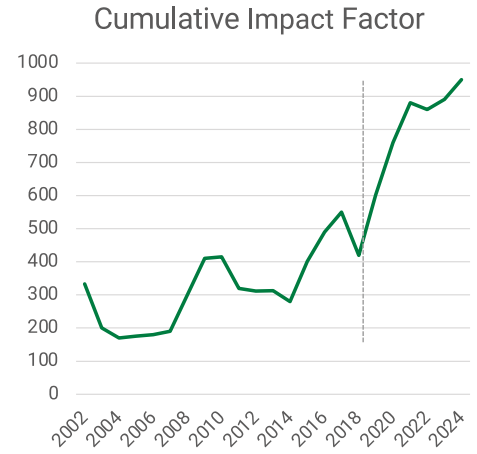
Dr. P. Stadler

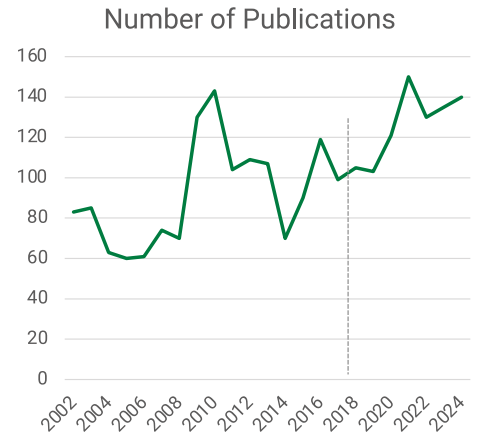
Deep Visual Proteomics (DVP), a novel transformative technology, has enabled high-resolution spatial analysis of protein expression in skin disease tissues, leading to major discoveries, such as identifying the JAK/STAT pathway hyperactivation as a driver of TEN. This insight has informed a new treatment strategy using JAK inhibitors, validated experimentally with potential to improve patient outcomes in one of the most severe dermatological conditions.

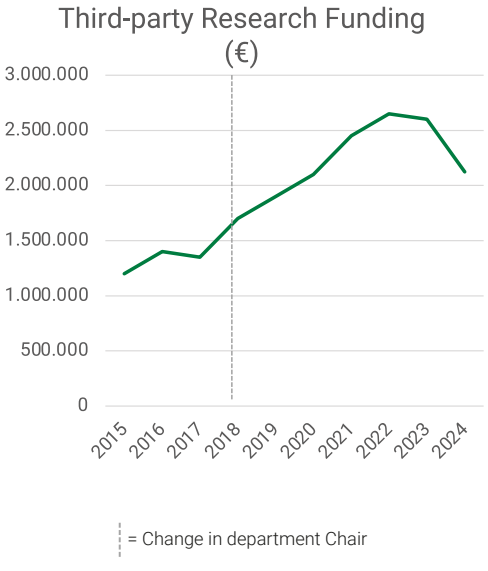
- Severe Inflammatory Skin Diseases

Using cutting-edge technologies such as single-cell RNA sequencing and spatial transcriptomics, our research into Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TEN) and neutrophilic dermatoses has uncovered molecular drivers of inflammation and tissue damage. These findings are being translated into therapeutic strategies targeting the disease's underlying mechanisms.

- Academic performance, publications, third party funding, impact factor







In 2022, the department achieved a cumulative impact factor of 835.8 across 115 peer-reviewed publications. In 2023 and 2024, this success grew further, with a cumulative impact factor of 920.1 across 136 publications in 2023 and 943.8 across 146 publications in 2024.

These metrics underscore the department's exceptional scientific productivity and influence on the global dermatology research landscape.

Equally important is our dedication to nurturing the next generation of dermatologists and clinician-scientists. By offering robust mentorship, training programs, and opportunities for young physicians, we empower them to excel in their careers and make meaningful contributions to dermatology.

The following selected publications (in most recent order) present an insight into the broad spectrum of research activities at our Dermatology Department:

1. Nordmann TM, Anderton H, Hasegawa A, Schweizer L, Zhang P, Stadler PC, Sinha A, Metousis A, Rosenberger FA, Zwiebel M, Satoh TK, Anzengruber F, Strauss MT, Tanzer MC, Saito Y, Gong T, Thielert M, Kimura H, Silke N, Rodriguez EH, Restivo G, Nguyen HH, Gross A, Feldmeyer L, Joerg L, Levesque MP, Murray PJ, Ingen-Housz-Oro S, Mund A, Abe R, Silke J, Ji C, French LE, Mann M. Spatial proteomics identifies JAKi as treatment for a lethal skin disease. **Nature**. 2024 ; 635:1001-1009
2. Ruf T, Rahimi F, Anz D, Tufman A, Salzer S, Zierold S, Tomsitz D, French LE, Heinzerling L Extracorporeal Photopheresis as a Treatment Option for Immune-Related Adverse Events: Two Case Reports and a Prospective Study. **J Immunother**, 2024; 47(6):227-231
3. Frieß F, Flaig M, Albert MH, Klein C, Hauck F. Severe Extrahematopoietic Manifestations in Complete STAT1 LOF after Successful Allogeneic HCT. **J Clin Immunol**. 2024; 44(8):189.
4. Thomas P, Arenberger P, Bader R, Bircher AJ, Bruze M, de Graaf N, Hartmann D, Johansen JD, Jowitz-Heinke A, Krenn V, Kurek M, Odgaard A, Rustemeyer T, Summer B, Thyssen JP. A literature review and expert consensus statement on diagnostics in suspected metal implant allergy. J **Eur Acad Dermatol Venereol**. 2024; 38(8):1471-1477
5. Ferrer RA, Torregrossa M, Franz S. Germ-free, carefree: injured skin uses IL-24 to kick-start repair independent of pathogen-recognition. **Signal Transduct Target Ther**. 2023; 8:379-382
6. Martins Nascentes Melo L, Herrera-Rios D, Hinze D, Löffek S, Oezel I, Turiello R, Klein J, Leonardelli S, Westedt IV, Al-Matary Y, Egea-Rodriguez S, Brenzel A, Bau M, Sucker A, Hadaschik E, Wirsdörfer F, Hanenberg H, Uhlenbrock N, Rauh D, Poźniak J, Rambow F, Marine JC, Effern M, Glodde N, Schadendorf D, Jablonska J, Hölzel M, Helfrich I. Glucocorticoid activation by HSD11B1 limits T cell-driven interferon signaling and response to PD-1 blockade in melanoma. **J Immunother Cancer**. 2023; 11(4):e004150

A. Research highlight – Spatial proteomics identifies a novel therapeutic target in toxic epidermal necrolysis

MAX-PLANCK-INSTITUT FÜR BIOCHEMIE

LMU KLINIKUM Klinik und Poliklinik für Dermatologie und Allergologie

Proteomics collaborative research group members

Prof. Matthias Mann
Department of Proteomics and Signal Transduction at the Max-Planck-Institute of Biochemistry, Planegg

Prof. Lars E. French

Thierry M. Nordmann, MD/PhD
Junior Group Leader

Pia-Charlotte Stadler, MD

Proteomics, the large-scale study of proteins, has become a rapidly emerging field in medical research, providing insights into the molecular understanding of diseases. As proteins are direct effectors of biological function, proteomics offers an alternative approach to common transcriptomic analyses, with the potential to enhance diagnostic accuracy and accelerate the development of targeted therapiesy.

In recent years, our clinic has established a close collaboration with Prof. Matthias Mann and Dr. Thierry Nordmann at the Max Planck Institute of Biochemistry (MPIB), also located in Munich, Germany. Prof. Mann is the director of the MPIB and a global leader and pioneer in proteomic research. Dr. Nordmann joined his team as a postdoc and is now a junior group leader at the department of Prof. Mann as well as senior physician in our Department.

In 2022, the laboratory of Prof. Matthias Mann has developed a novel spatial proteomic technology called Deep Visual Protoeomics (DVP). DVP combines high-content imaging, AI-guided cell segmentation, precise cell-by-cell laser microdissection and ultra-sensitive proteomic analysis. Most importantly, formalin-fixed, paraffin-embedded (FFPE) tissue sections can be used for DVP analysis.

Breakthrough in identifying an actionable therapeutic target to a lethal skin disease

Using this technology, we identified a novel potential treatment for Toxic Epidermal Necrolysis (TEN), a severe and often lethal skin condition. The results of this study were published on October 16th 2024, in Nature. Until now, there was no effective treatment option for TEN, and therapeutic strategies were limited to supportive care. By applying DVP to FFPE skin biopsies, we identified a dominant interferon signature in immune cells of TEN and a strong activation of the JAK/STAT pathway as a key pathogenic driver in this disease.

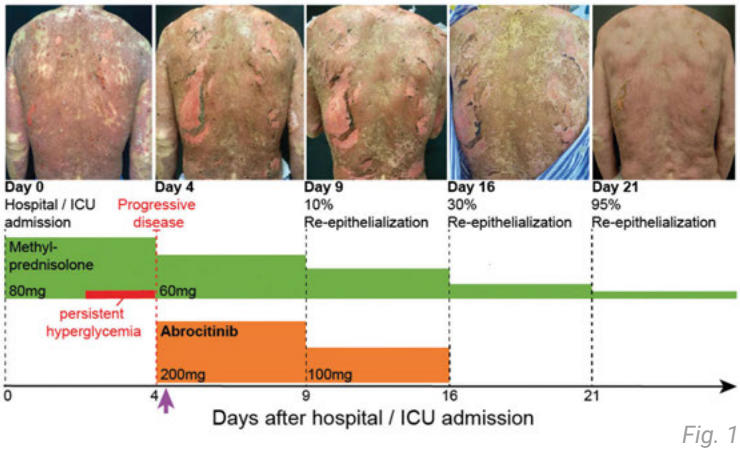


Fig. 1

To validate the biological meaning, we targeted this pathway using JAK inhibitors in multiple preclinical models, including a novel in-vitro model and two distinct mouse models, all of which showed a consistently beneficial effect. Finally, we successfully treated seven patients suffering from TEN or SJS/TEN (off label), which led to rapid disease control, full recovery and no observed side-effects (Fig.1).

Cell-type Resolved Proteomics of Inflammatory Skin Disease

Another focus of our research collaboration is the characterization of immune cells and keratinocytes across all major inflammatory skin disease, including lichen planus, atopic dermatitis und psoriasis. Through cell-type proteomic analysis of various cell types within the epidermis and dermis of these diseases, we are in the process of establishing a proteomic atlas of the three main reaction patterns of the skin (psoriatic, eczematous, lichenoid).

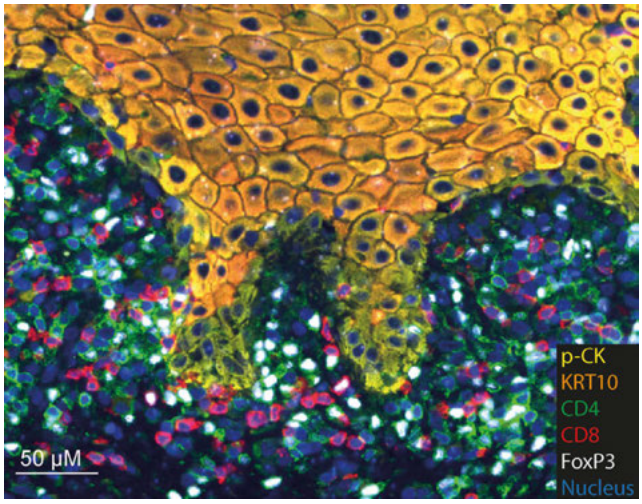


Fig. 2

For this, we analyzed 150 samples so far, including healthy skin after establishing a multiplex staining (Fig. 2), to cover all relevant cellular subtypes. In preliminary analysis, we can currently quantify around 7000 proteins per cell type, many of which are differentially regulated between these diseases.

Selected Publications

1. Nordmann TM, Anderton H, Hasegawa A, Schweizer L, Zhang P, Stadler PC, Sinha A, Metousis A, Rosenberger FA, Zwiebel M, Satoh TK, Anzengruber F, Strauss MT, Tanzer MC, Saito Y, Gong T, Thielert M, Kimura H, Silke N, Rodriguez EH, Restivo G, Nguyen HH, Gross A, Feldmeyer L, Joerg L, Levesque MP, Murray PJ, Ingen-Housz-Oro S, Mund A, Abe R, Silke J, Ji C, French LE, Mann M. Spatial proteomics identifies JAKi as treatment for a lethal skin disease. Nature. 2024; 635:1001-1009

2. Nordmann TM, Schweizer L, Metousis A, Thielert M, Rodriguez E, Rahbek-Gjerdrum LM, Stadler PC, Bzorek M, Mund A, Rosenberger FA, Mann M. A Standardized and Reproducible Workflow for Membrane Glass Slides in Routine Histology and Spatial Proteomics. Mol Cell Proteomics. 2023; 22:100643

Selected Posters

1. Nordmann TM, et al: Single-cell type proteomic analysis in FFPE tissue sections of sever cutaneous adverse drug reactions. (ADF 2024)
2. Stadler PC, et al: Multiomics analysis enables machine learning based differentiation of clinical mimickers in lichenoid skin disease (ADF 2024).
3. Stadler PC, et al: Rapid disease stratification with high accuracy using multiomics and machine-learning in erythroderma. (SID 2024)
4. Nordmann TM, et al: A Proteomic Skin Disease Atlas for Accurate and Rapid AI-Driven Clinical Decision Making. (HUPO 2024)

B. Research groups in focus

1. Focus Program "Inflammatory Skin Diseases"

Prof. Dr. Lars French
Prof. Dr. F. Lauffer
PD Dr. med. Eva Oppel
Dr. med. Teodora Pumnea
Dr. med. Pia-Charlotte Stadler

Members of the Inflammatory Skin Diseases research group

Group members and associates

- Nora Aszodi, MD
- Anne-Sophie Böhm, MD
- PD Benjamin Clanner-Engelshofen, MD
- Sophia Czell, MD
- Laurie Eicher, MD
- Zeno Fiocco, MD
- Surina Frey, MD
- Valerie Glatzel, MD
- PD Anne Gürtler, MD
- Orsolya Horvath, MD
- Benjamin Kendziora, MD, PhD
- Julia Leding, MD
- Anna Leonhardt, MD
- Michaela Maurer, MD
- Mohammed Mitwalli, MD
- Matthias Neulinger, MD
- Thierry Nordmann, MD
- Ugne Stahl, MD
- Anna Oschmann, MD
- PD Christiane Pfeiffer, MD
- Takashi Satoh, MD
- Gabriel Schlager, MD
- Sonja Senner, MD
- Jerome Srour, MD
- Annika Sander, MD
- Irma Kupf, MD
- Nina Janjic, MD
- Marie Amecke, MD

The Focus Program «Inflammatory Skin Diseases» of the Department of Dermatology and Allergy, University Hospital, LMU Munich, has the objective of informing and educating different target groups concerning inflammatory skin diseases

The objectives of the Focus Program «Inflammatory Skin diseases» are as follows:

a. Promoting awareness of the general public with regard to inflammatory skin diseases, as well as influencing behavioral patterns and raising awareness for underdiagnosed diseases, such as hidradenitis suppurativa, pyoderma gangraenosum and many others.

b. Ongoing education for medical professionals, i.e. physicians (mostly dermatologists, but also general practitioners), medical assistants and nursing staff regarding prevention, diagnosis and treatment of inflammatory skin diseases.

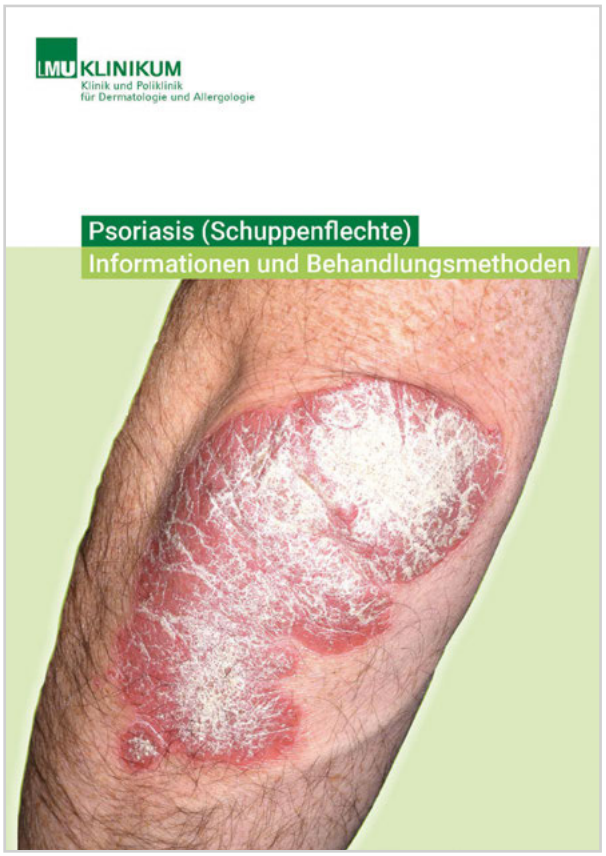
c. Promoting research in the area of inflammatory skin diseases as well as furthering young medical academics in this area at the Department of Dermatology and Allergy of the University Hospital, LMU Munich, which will benefit patients in the long run.

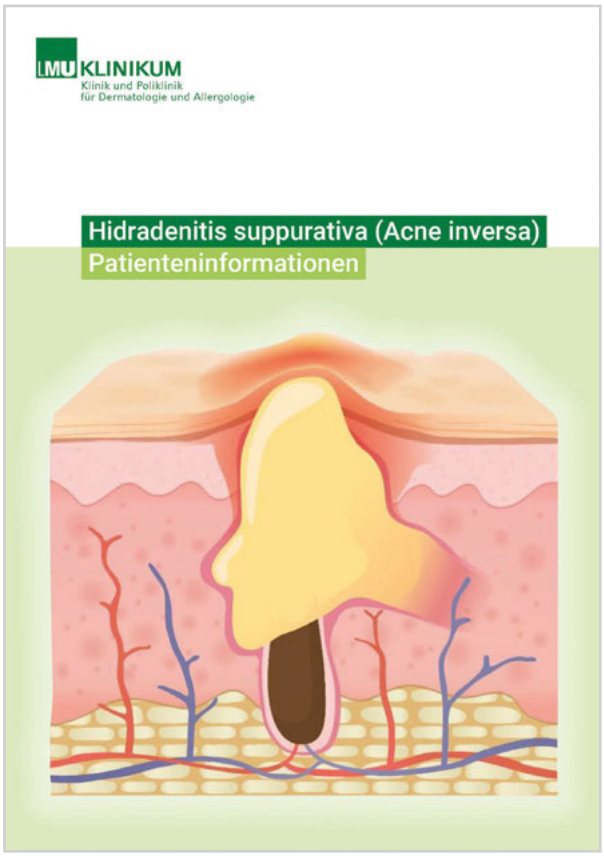
A large group of very motivated senior physician and residents are actively involved in promoting the focus program under the direction of Prof. Lars E. French.

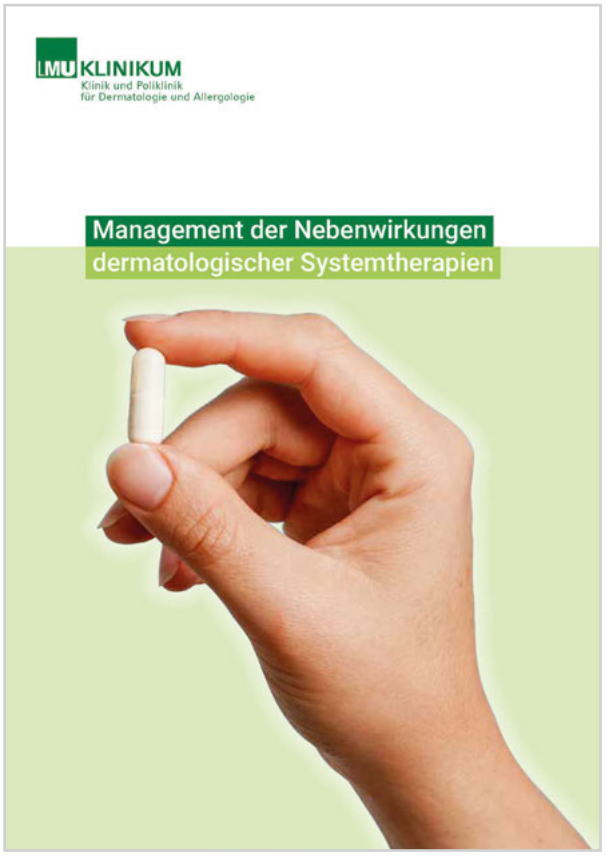
In past 2 years, following activities were completed:

For the general public

Production of informational brochures about important diseases including alopecia areata, generalized pustular psoriasis and palmoplantar pustulosis, vitiligo, management of adverse events of modern systemic therapies for inflammatory skin diseases and updates on urticaria, psoriasis, atopic dermatitis and hidradenitis suppurativa.







- Public information events on inflammatory skin diseases in infancy and autoimmune diseases and patient-oriented podcasts on topics such as: atopic dermatitis, psoriasis, acne, hidradenitis suppurativa

For medical assistants and nursing staff in dermatological practices

- Quarterly standardized trainings regarding disease, scoring and treatment options for topics including: atopic dermatitis (incl. EASI and SCORAD training), psoriasis (incl. PASI training), acne and hidradenitis suppurativa (incl. Hurley- and ISH-4-Score Training)

For healthcare professionals

- 4 yearly CME events on inflammatory skin diseases
- Conceptualization and production of an informational pocket booklet for physicians entitled “Use of Immunomodulatory Systemic Therapies in Daily Dermatological Practice” which is biannually updated

Biomedical research

The team of physicians of the focus program are engaged in an ambitious and innovative clinically relevant research project aimed at the transcriptomic and proteomic profiling of inflammatory skin diseases with the aim of discovering endotypes of individual inflammatory diseases, identifying molecular classifiers of the individual diseases and discovering novel biomarkers.

1. Stadler PC, Oschmann A, French LE, Oppel EM. Diversity of cutaneous drug eruptions. MMW Fortschr Med. 2023; 165(5):57-60
2. Stadler PC, Oschmann A, Kerl-French K, Maul JT, Oppel EM, Meier-Schiesser B, French LE. Acute Generalized Exanthematous Pustulosis: Clinical Characteristics, Pathogenesis, and Management. Dermatology. 2023;239(3):328-333

2. Alopecia research group

Dr. Rubén A. Ferrer, M.D., Ph.D.
Principal investigator

Group members and associates

- Ke Zhou
- Yucheng Zhou

Research field:

Our research group is dedicated to investigating the molecular and cellular mechanisms underlying both cicatricial and non-cicatricial forms of alopecia in humans, with a particular focus on alopecia areata, frontal fibrosing alopecia, and lichen planopilaris. These conditions represent a spectrum of hair loss disorders with varying underlying causes, including autoimmune, inflammatory, and fibrotic processes, leading to either temporary or permanent hair follicle destruction.

We aim to uncover the key molecular drivers and cellular interactions that lead to hair follicle dysfunction and loss, whether through immune-mediated agression as in alopecia areata or the destructive scarring processes seen in cicatricial forms such as frontal fibrosing alopecia and lichen planopilaris. By leveraging cutting-edge techniques in molecular biology, immunology, and dermatopathology, our goal is to pinpoint the precise mechanisms that can serve as effective therapeutic targets. We have for example identified DPP4, a pro-fibrotic factor, as a negative regulator of hair follicle activation and regeneration. Consequently, inhibiting DPP4 presents a promising strategy for restoring hair growth, as demonstrated in preclinical mouse models (see figure next page).

Our research is guided by the belief that a deep understanding of the cellular pathways involved in these diverse forms of alopecia will enable us to develop personalized, targeted treatments to either halt disease progression or restore hair growth. Ultimately, our aim is to translate our findings into clinical applications, offering hope and improved outcomes for patients suffering from these debilitating conditions.

Project related funding:

- LMU Excellent investment funds
- DFG (German Research Foundation)-Grant „Role of DPP4 in wound healing, scarring and hair regeneration"

Left to right: Y. Zhou, Dr. R. Ferrer, K. Zhou

Selected references:

1. **Ferrer RA,** Saalbach A, Grünwedel M, Lohmann N, Forstreuter I, Saupe S, et al. Dermal fibroblasts promote alternative macrophage activation improving impaired wound healing. J Invest Dermatol. 2017

2. Lohmann N, Schirmer L, Atallah P, Wandel E, **Ferrer RA**, et al. Glycosaminoglycan-based hydrogels capture inflammatory chemokines and rescue defective wound healing in mice. Sci Transl Med 9. 2017

3. Gay D, Ghinatti G, Guerrero-Juarez CF, **Ferrer RA**, Murakami S, Gault N, Ferri F, et al. Phagocytosis of SFRP4 by regenerative M2 macrophages drives chronic Wnt activity for a fibrotic skin wound healing fate. Nature Commun. 2020

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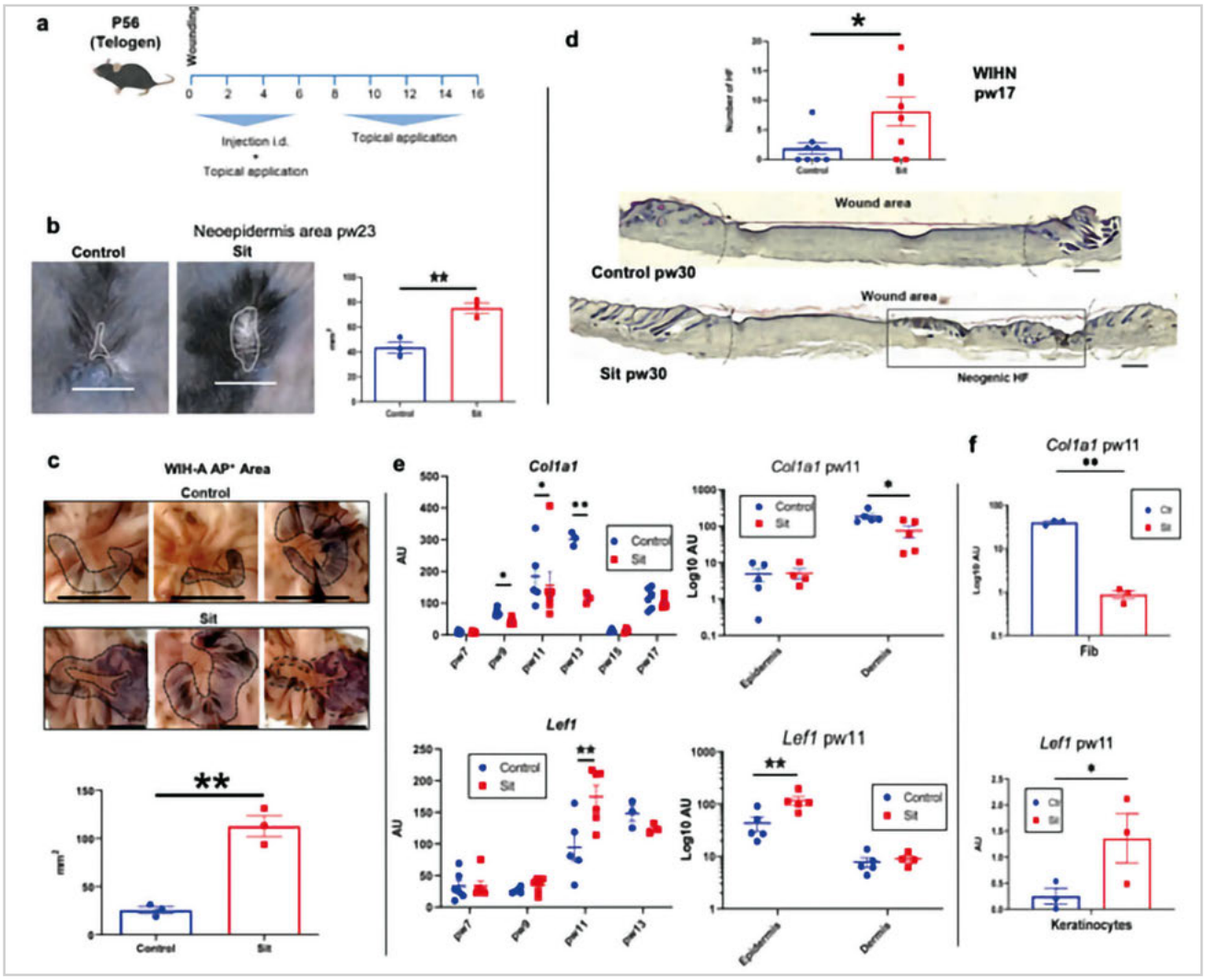

Skin from the back of wild-type mice in telogen (resting phase of hair cycle) was wounded and treated with Sitagliptin (DPP4-Inhibitor, Sit) or vehicle control. (a) Treatment scheme. (b) Representative image of healed wounds at 23 days (pw23) after wounding showing neoepidermis area (inside dashed white line) surrounded by WIH-A (wound induced hair follicle activation/anagen) area of unwounded skin (left) (bar = 5 mm) and quantification of neoepidermis area (right). (c) Representative image of wounds at pw23 showing WIH-A area around neoepidermis (inside dashed black line) with alkaline phosphatase (AP) staining showing neogenic hair follicles or anagen hair follicles (bar = 5 mm) and quantification of AP-positive area. (d) Quantification of AP+ HF placodes in pw17 wounds and representative H&E image of pw30 wounds showing wound area inside a black dashed line and a black boxed area containing neogenic hair follicles (bar = 200 mm). (e) Expression of the fibrosis marker Col1a1 and Wnt target Lef1 (important for anagen and regeneration) in whole wounds along the remodeling phase of wound healing and after separation of dermis and epidermis at pw11. (f) Gene expression for anagen/regeneration Wnt target Lef1 in keratinocytes from wounds at pw11 or prototypic profibrotic marker Col1a1 in fibroblasts isolated from wounds at pw11. WIHN = wound induced hair follicle neogenesis

3. Evidence-Based Dermatosurgery

Group Members

- Anna Leonhardt, M.D.
- Benjamin Kendziora, M.D., Ph.D., M.Sc.
- Christina Schmitt, M.D.
- Prof. Daniela Hartmann, M.D., Ph.D.
- Gabriel Schlager, M.D. (Universidad de Navarra, Madrid)
- Irma Kupf
- Laura Calabrese, M.D. (University of Siena, Siena)
- Luis Messner
- Mario Günther, Ph.D., M.Sc. (University of Pittsburgh, Pittsburgh)
- Sarah Lukacs
- Valerie Glatzel, M.D.

Evidence-based dermatosurgery team, left to right: L. Messner, Chr. Schmitt, I. Kupf, B. Kendziora, A. Leonhardt, V. Glatzel

EBM is particularly important in dermatosurgery. By using the most reliable and up-to-date scientific evidence, dermatosurgeons can select the most effective surgical techniques and treatments, ensuring patients experience the best possible results. This is especially important when treating conditions like skin cancer, where minimizing recurrence and ensuring proper healing are critical. Every surgical procedure carries risks such as infection, scarring, or poor wound healing. By following evidence-based guidelines, dermatosurgeons can minimize these risks, improving safety for patients. For instance, studies can provide insights into the best ways to prevent infections or reduce scarring after surgery. In addition, EBM promotes standardization of care. In dermatosurgery, this means that the procedures used—from anesthesia and surgical techniques to wound care—are based on proven methods. This leads to more consistent and reliable care across patients and reduces the likelihood of errors or variations in treatment.

Main fields of research

Our research group focuses on conducting epidemiologic research and meta-analyses in dermatosurgery with the goal of helping to guide medical care in dermatosurgery.

Current projects

Effect measures are statistical constructs that show the strength of the association between an exposure and an endpoint. Outcomes can be reported in different ways by studies. Differences in the reporting of outcomes can make it difficult or impossible to calculate consistent effect measures in meta-analyses. However, consistent effect measures are necessary to calculate a pooled effect measure in meta-analyses. To calculate a pooled effect measure in a meta-analysis despite inconsistent effect measures in included studies, relevant studies are often excluded, which can lead to a bias in the pooled effect measure. We developed a software package which allows the calculation of uniform effect measures.

This software package is being used in a meta-analysis to determine the diagnostic accuracy of ex-vivo confocal laser scanning microscopy in dermatology. The time efficiency of confocal microscopy compared to conventional histology allows in theory a histological bedside assessment of skin samples and intraoperative assessment of tumor margins in skin excisional data. For routine use without conventional histology, the diagnostic accuracy of confocal microscopy is crucial.

Several studies on the diagnostic accuracy of ex-vivo confocal microscopy in dermatology have been performed at our institution. However, the diagnostic accuracy can only be assessed with sufficient certainty in larger cohorts and with the inclusion of several centers and thus different patient collectives and examiners. This is possible in meta-analyses, as other clinics have also carried out similar diagnostic accuracy studies. At present, however, there exists no meta-analysis of the accuracy of ex-vivo confocal microscopy in dermatology.

In collaboration with the University of Siena, we performed on another meta-analysis on hidradentis suppurativa. Biologics have revolutionized the treatment of hidradenitis suppurativa and are increasingly used adjuvantly and neoadjuvantly in combination with excisions of diseased tissue. To date, no randomized head-to-head comparisons have been made between adalimumab, a TNF-alpha inhibitor, and the two newer biologic agents targeting the IL-17-pathway, namely secukinumab and bimekizumab. Therefore, we perform a network meta-analysis to investigate the comparative efficacy and safety of biologic agents for the treatment of moderate-to-severe HS by including data of methodologically comparable phase III trials. A network meta-analysis is a statistical method that allows for the comparison of multiple interventions across a network of studies, even when some treatments have not been directly compared in head-to-head trials.

In collaboration with the AWMF, we are working on a guideline evaluating perioperative antibiotics not only in dermatosurgery, but in all surgical disciplines.

We are simultaneously setting up a registry in dermatosurgery with the aim of systematically collecting and storing data on operated patients. There is currently no registry in Germany for tracking and dermatosurgical better understanding factors relevant for outcomes of individual surgical procedures in dermatosurgery.

Traditionally, no causal conclusions can be drawn from observational studies, which also include registry studies. In collaboration with the Department of Philosophy at the University of Pittsburgh, we are investigating whether and under what conditions causal conclusions can be drawn from registry studies.

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4. Experimental Dermato-Oncology

Univ.-Prof. Dr. rer. nat. Iris Helfrich
Professor for „Experimental Dermato-Oncology"
Head of "Plasticity & Resistance in melanoma"

Group Members

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- Domnich Maksim, Dipl. Biologist
- Egea-Rodriguez Sara, Dr. rer. nat., Post-doc
- Mach Agnieszka, MD candidate
- Pentz Simone, lab manager
- Perlin-Gürsoy Melissa, MD candidate
- Schönherr Rebecca, MD candidate
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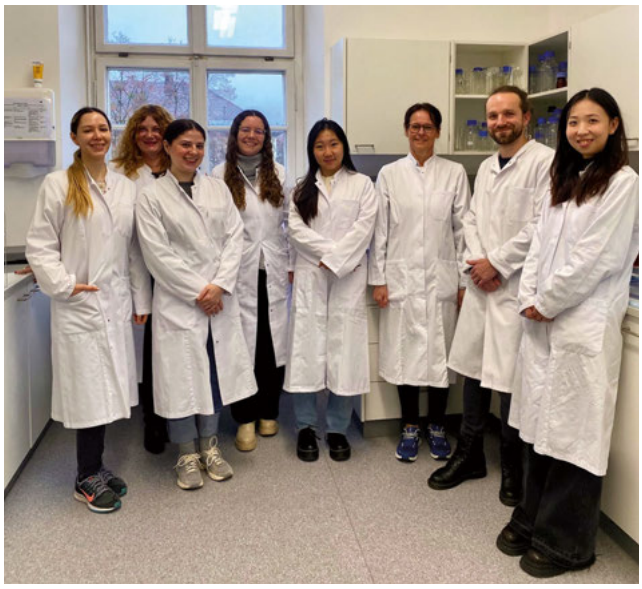


Left to right: M. P. Gürsoy, I. Helfrich, T. Bröker, S. Egea-Rodriguez, Z. Zang, S. Pentz, M. Domnich, X. Zhou

Global representation across continents

The research group of Prof. Iris Helfrich presents remarkable international diversity, with the participation of students and scientists from 8 countries spanning 4 continents. This global representation highlights the group's ability to bridge expertise and perspectives from geographically and culturally diverse regions, fostering innovation and advancing the international impact of its research endeavors. Such a broad network underscores the commitment to leveraging interdisciplinary excellence and promoting global scientific collaboration.

Main fields of research

1. Unraveling tumor cell plasticity and immune evasion in melanoma progression and brain metastasis

Advancements in melanoma therapy, including signaling-targeted drugs and immune checkpoint inhibitors, have revolutionized treatment outcomes. However, the cure of advanced-stage melanoma remains elusive due to therapy resistance, immune evasion, and the persistence of metastases, particularly in the brain. Increasing evidence indicates that these phenomena are not solely driven by genetic mutations but also by the adaptive epigenetic plasticity of tumor cells. This plasticity enables rapid phenotypic shifts that contribute to immune escape, metastasis, and drug resistance, creating significant challenges for durable therapeutic success.
Brain metastases in melanoma represent a particularly devastating complication, reflecting both the tumor's inherent adaptability and the unique immune-privileged nature of the brain microenvironment. Tumor cells can evade immune recognition and cytotoxic mechanisms, enabling colonization of the brain. These processes are compounded by the high genetic and phenotypic heterogeneity of melanoma, where resistance mutations often exist within small subclones even before treatment, rapidly proliferating under therapeutic pressure.

Our research employs sophisticated preclinical tumor models to dissect these dynamics. Using spontaneous primary tumor models, we simulate the natural progression of melanoma, including brain metastasis, without artificial inflammatory triggers. Our findings, combined with international insights, demonstrate that addressing tumor cell plasticity and immune evasion is paramount for overcoming resistance. By identifying functional „target structures" associated with tumor adaptability, we aim to develop therapies that not only inhibit melanoma progression but also prevent and treat brain metastases, transforming the clinical management of advanced melanoma.

Project-related funding

- Hiege Stiftung – Die Deutsche Hautkrebsstiftung: „Einfluss der Tumorzellplastizität auf Etablierung und Therapie von Hirnmetastasen des Malignen Melanoms – Neue Modelle, Neue Optionen"

2. Phenotypic therapy and immune escape in cancer: clinical research unit - KFO 337 PhenoTImE - (https://www.uni-due.de/phenotime)

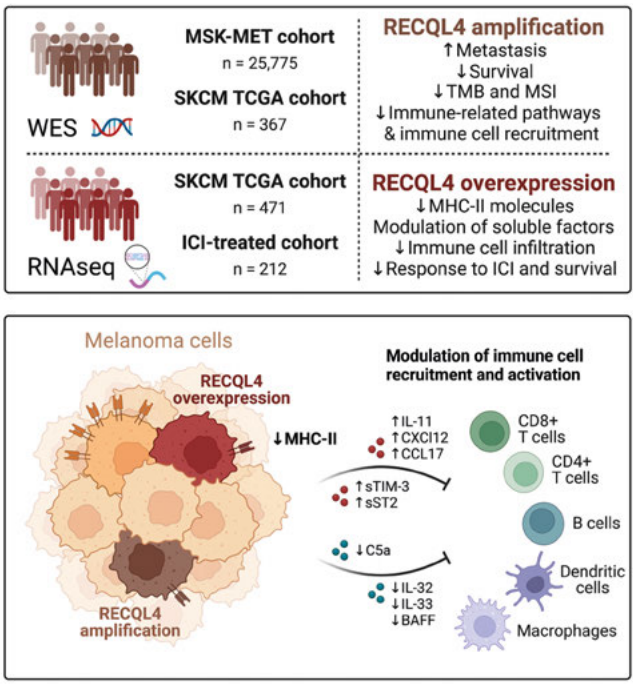
Neutrophils have emerged as pivotal players in oncology research due to their profound influence on the success of cancer immunotherapy, as evidenced in both preclinical and clinical studies. Their duality in cancer—capable of both promoting and suppressing tumor progression—has garnered significant attention. Notably, elevated neutrophil counts in cancer patients, observed both in circulation and peripheral tissues, strongly correlate with poor prognoses. This dynamic functional plasticity is tightly regulated by the tumor microenvironment's complex composition.

Recent findings highlight a temporal shift in neutrophil behavior: while exhibiting an anti-tumor phenotype during early tumorigenesis, they later adopt pro-tumorigenic roles, facilitating tumor growth and metastasis. By unraveling the mechanisms steering this functional dichotomy, we aim to deepen our understanding of cancer progression and identify novel therapeutic targets to reprogram neutrophils toward anti-tumor activity within the framework of the Clinical Research Unit 337 "Phenotypic Therapy and Immune Escape in Cancer" (PhenoTImE), supported by the German Research Foundation (DFG).

We employ cutting-edge methodologies, including innovative experimental systems and primary patient-derived samples, to perform functional and genetic analyses of tumor associated neutrophils (TAN) during melanoma progression. Furthermore, we have established state-of-the-art mouse models with either transplanted or spontaneously developing melanomas, engineered to express genetically fluorescent TAN. These models enable real-time microscopic visualization and provide unprecedented insights into the interactions between TAN and therapeutic immune checkpoint blockade. By leveraging these advanced tools, our goal is to elucidate how TAN modulate the efficacy of cancer therapies, paving the way for groundbreaking strategies to improve patient outcomes in melanoma and beyond.

Project-related funding

- DFG Clinical Research Group 337 "PhenoTImE": „Unraveling the plasticity and tumor-promoting role of neutrophils as a function of tumor heterogeneity"



3. Advancing Cancer Therapy through DNA Helicase Research: The AntiHelix Horizon2020-MSCA-ITN Consortium (https://www.elettra.eu/AntiHelix)

As part of the EU-funded AntiHelix Consortium (Horizon2020-MSCA-ITN), we hypothesize that inhibiting DNA helicases could significantly enhance current cancer treatment strategies. This concept is supported by the principle of synthetic lethality and the clinical success of certain DNA repair inhibitors, such as PARP1 inhibitors, which are already employed alongside chemotherapy or immunotherapy to improve patient outcomes. Our primary focus is to elucidate how DNA helicase activity contributes to cancer progression and influences the efficacy of immunotherapies, with particular emphasis on the RECQL4 helicase.

The AntiHelix Consortium unites five internationally renowned academic laboratories, all with extensive expertise in DNA helicase research, spanning cell biology, biochemistry, and structural biology. These groups study diverse yet interconnected DNA helicases. Additionally, the consortium includes a world-leading research institute specializing in single-molecule biophysical analyses of protein-DNA interactions; a clinical oncology research group; and three innovative companies at various stages of drug discovery.

This interdisciplinary collaboration fosters an innovative research environment at the crossroads of comple-

mentary disciplines, including cell biology, biochemistry, structural biology, single-molecule biophysics, optical technologies, medicinal chemistry, drug design, computational biology, and clinical oncology. By integrating these diverse experimental and translational approaches, the consortium is uniquely positioned to develop groundbreaking therapeutic strategies targeting DNA helicases, with the potential to revolutionize cancer treatment and advance precision medicine.

Selected publications 2023/2024

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C. Research groups in overview

a. Dermathopathology

Prof. Michael Flaig, MD
PD Dr. Katrin Kerl-French, MD
Dr. Michaela Maurer, MD

Dermatopathology group members and associates

- Prof. Daniela Hartmann, MD, Ph.D.
- Dr. Benjamin Kendziora
- Jawaher Jastaneyah, MD
- Dr. Valerie Glatzel
- Dr. Anna Leonhardt
- Mohammed Mitwalli, MD
- Ursula Puchta, CLA
- Marija Korbar, CLA
- Latifa Birrou, CLA
- Sabine Sirges-Szas, CLA
- Kerstin Lindner, CLA
- Wencke Flemming, CLA
- Silke Krug, CLA

Dermathopathology team

Main fields of research

The main focus of our research concerns oncogenesis and the characterization of solid and lymphocytic cutaneous neoplasms with special emphasis on oncogenic pathogens. Current efforts are dedicated to the oncogenetic genesis of Merkel cell carcinoma, tumor cell-clonality in melanoma, pathogenesis of granular parakeratosis, and the morphogenesis of basaloid and trichoblastic neoplasms.

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b. Imaging research Hub

Daniela Hartmann, Prof., MD Ph.D.
Lead ex vivo imaging
Elke Sattler, Prof., MD
Lead in vivo imaging

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- Anne Gürtler, MD
- Benjamin Kendziora, MD
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- Stephanie Steckmeier, MD
- Sebastian Mastnik, MD
- Michaela Maurer, MD
- Isin Sinem Bağcı, MD
- Fabia Daxenberger, MD
- Maximilian Deußing, MD
- Laurie Eicher, MD
- Charlotte Gust, MD
- Sebastian Krammer, MD
- Marie Düsedau, MD student
- Quirine Eijkenboom, MD student
- Ramona Fenderle; MD student
- Elena Kunrad, MD student
- Marie Nutz, MD student
- Sophia Schlingmann, MD student
- Kathrin Patzer, MD student
- Kristina Iwanitz, MD dent. student
- Alexander Winster, MD dent. student

Prof. Dr. E. Sattler at the line-field OCT

Main fields of research

The two focuses of the in vivo imaging group are to improve the application of modern non-invasive imaging techniques to optimize the early detection of melanoma and non-melanoma skin cancer, and also to support the diagnosis of inflammatory and infectious dermatoses. Using new prototype devices, we recognize and establish new patterns for diagnosis to improve the sensitivity and specificity of clinical diagnosis and correlate these findings to ex vivo imaging and histopathological results.

Members of the imaging research group

Innovative non-invasive methods used for our studies include videodermoscopy and total body mapping, optical coherence tomography, confocal laser microscopy and line-field confocal OCT (see figure below). They all offer a non-invasive examination without pain, surgery, local anaesthesia, scarring etc. but yet allow a precise diagnosis in real-time and therefore can spare unnecessary biopsies or excisions or speed up referral to the right treatment. As the same skin site can be visualized over time, e. g. before and after treatment, these methods are also valuable tools for therapy monitoring.

Support in the development of the current prototypes, improvement of diagnostic sensitivity and specificity in recognized indications and establishment of characteristic patterns in the diagnosis of new indications are the major foci of our research projects, next to the evaluation of the integration of artificial intelligence into the examination process in vivo.

Ex vivo confocal laser scanning microscopy (ex vivo CLSM) is a novel diagnostic method allowing rapid, high-resolution imaging of freshly excised skin samples in an intraoperative setting. It enables the surgeon to know the diagnosis and whether the resection edges are clear or not within few minutes after the excision. This innovative bedside "intraoperative" histology "equivalent" may decrease the number of surgical procedures and length of hospitalization in the near future. Current projects examine the integration of artificial intelligence into the ex vivo CLSM examination process.

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Ex vivo imaging

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In vivo imaging

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c. IRTEN– International Registry for Toxic Epidermal Necrolysis

Prof. Lars E. French, MD
PD Eva Oppel, MD

Group members and associates

- Anna Oschmann, MD
- Pia-Charlotte Stadler, MD
- Irma Kupf, MD

Prof. Lars E. French

PD Eva Oppel

A. Oschmann, MD

P. Stadler, MD

I. Kupf, MD

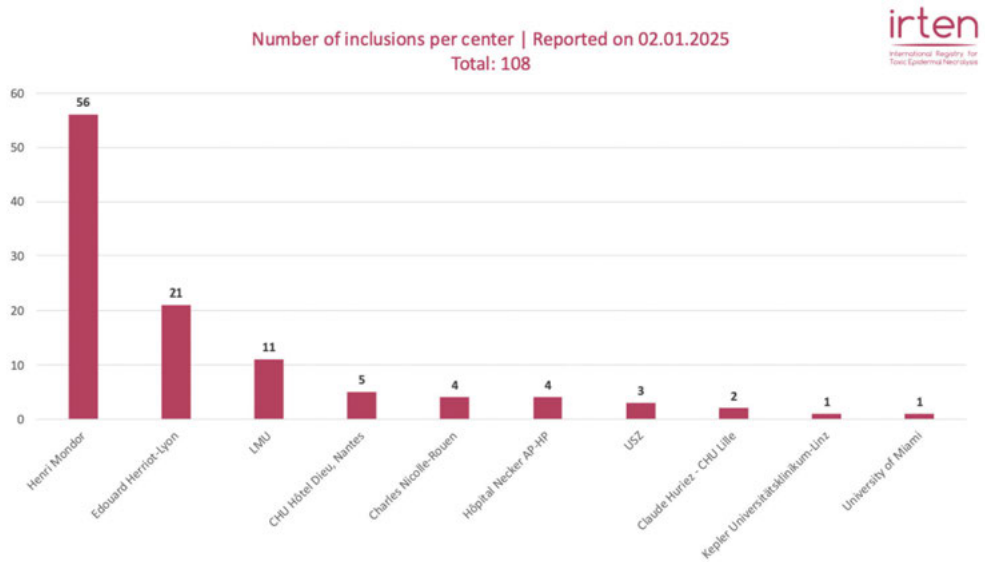
International Registry for Toxic Epidermal Necrolysis (IRTEN)

Together with an international team of experts, the Department of Dermatology and Allergology of the LMU Klinikum in Munich/Germany launched the „International Registry for Toxic Epidermal Necrolysis" (IRTEN).

IRTEN is an international, web-based registry for the prospective, pseudonymised collection of clinical data and biological samples of patients suffering from Stevens-Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN) and SJS-TEN-Overlap Syndromes.

The aim of IRTEN is to gain a better understanding of SJS, TEN and SJS-TEN-Overlap Syndromes. We expect new insights into the epidemiology of the disease, clinical characteristics and genetic features of the patients, as well as information about culprit drugs and therapeutic options. We would be very pleased to recruit new competence centers for our project.

Up to date the registry already included >100 patients.



You can find more information on our website www.irten.org, where centers with interest in participating in IRTEN can also register online. Please do not hesitate to contact us with any questions (derma.irten@med.uni-muenchen.de).

Founding Centers

- LMU Klinikum Munich, Germany
- Universitätsspital Zürich, Switzerland
- Hôpitaux Universitaires Henri Mondor, France
- University of Miami, USA
- Kyoto University, Japan
- Niigita University, Japan

Collaborating centers

- Universitätsklinikum Lübeck, Germany
- Kepler Uniklinikum Linz, Austria
- Hôpital Edouard Herriot Lyon, France
- Hôpital Necker, Paris, France
- Hôpital Saint-Eloi, Montpellier, France
- Hôpital Charles Nicolle, Rouen, France
- Hôpital Saint-André, Bordeaux, France
- CHU Hôpital Dieu, Nantes, France
- Hôpital Morvan, CHU de Brest, France
- Hôpital de la Cavale Blanche, CHU Brest, France
- CHU Bichat, Paris, France
- Hôpital Roger Salengro, CHU de Lille, France
- Hôpital Claude Huriez, CHU de Lille, France
- CHU Angers, Angers, Fance

d. Rare and genetic skin diseases

Prof. Dr. med. Kathrin Giehl, MD

Group members and associates

- Leonie Frommherz, MD
- Gabriela Frömel, MD, doctorate
- Josephine Hofmann, MUDr, doctorate
- Gundi Waldmann, MD student, doctorate

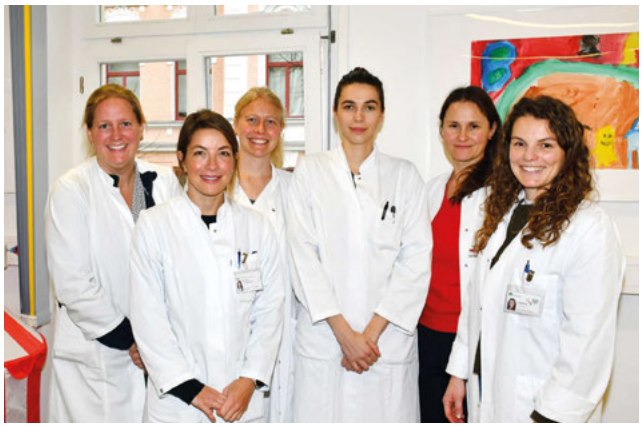
Main fields of research

The main focus of our group is clinical research in the field of rare and genetic skin diseases.

We investigate:

» the phenotype and genotype correlation as well as quality of life aspects in patients with basal cell nevus syndrome.
» Specific clinical aspects, microbiome analysis and cytokine measurements in Morbus Darier and Hailey-Hailey.
» The quality of life of young patients with skin and hair diseases.
» Epidermolytic ichthyosis, caused by mutations in keratins 1, 10 and 2, with a focus on understanding the molecular mechanisms. The project aims to explore how these mutations disrupt protein networks involved in skin barrier formation, inflammatory processes and the cutaneous microbiome.

As an active member of the European Reference Network for Skin disorders (ERN-skin) we coorperate with other European specialists on different clinical research projects to improve patient care in rare skin diseases.



Left to right; Prof. K. Giehl, Dr. L. Frommherz, Dr. A. Sander, J. Hofmann, MD, M. Manduch, J. Heitland

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e. Experimental Dermatosurgery and Wound Healing Research Group

Prof. D. Hartmann

Prof. Daniela Hartmann, MD, Ph.D.
Lead of the Experimental Dermatosurgery and Wound Healing Research Group

Group members and associates

- Prof. Daniela Hartmann, MD, Ph.D.
- Maximilian Deußing, MD
- Benjamin Kendziora, MD, Ph.D.
- Justin Gabriel Schlager, MD
- Prof. Elke Sattler, MD, Ph.D.
- Lisa Buttgereit
- Alisa Swarlik
- Lara Stärr
- Aimée Braun
- Katharina Wex

Dr. G. Schlager

Dr. B. Kendziora

Dr. M. Deußing

Main fields of research

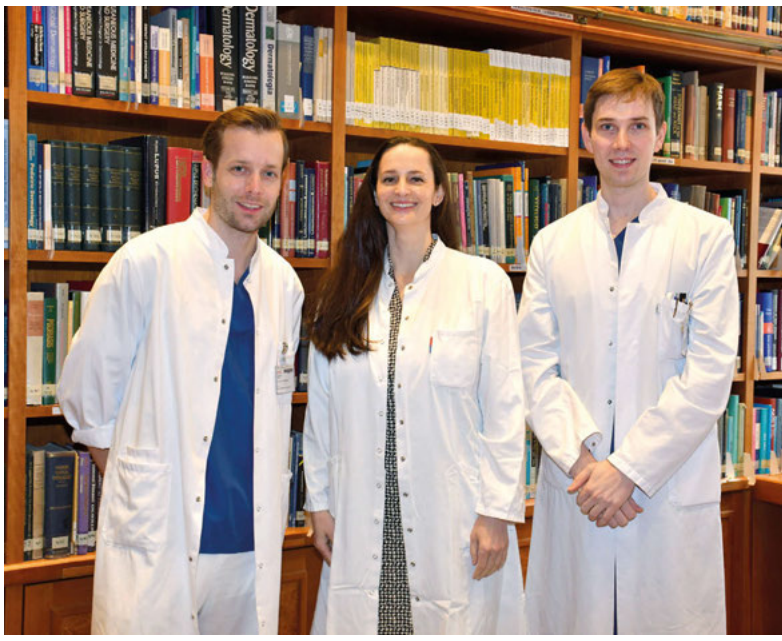
The focus of the Experimental Dermatosurgery and Wound Healing Research Group is to establish, develop and apply modern surgical treatments, techniques, approaches and diagnostic methods in skin surgery and wound therapy. Great part of the experimental dermatosurgery research is covered by the ex vivo confocal laser scanning microscopy for the use in Mohs surgery and ultra-rapid, intraoperative tumor assessment enabling the surgeon to perform immediate reexcision or wound closure within a single session.

Current projects examine the integration of artificial intelligence into the ex vivo CLM examination process, laser-assisted skin surgery and cold-atmospheric-plasma therapy. Based on three of our meta-analyses and a large observational study, we could provide new evidence on risk factors for surgical site infections in dermatologic surgery.

As part of the Antibiotic Stewardship Working Group of the German Society of Dermatologic Surgery (DGDC), we contributed to the development of new recommendations for the use of perioperative antibiotic prophylaxis in skin surgery.

These recommendations are now being embedded into a guideline in collaboration with the Robert Koch Institute in Berlin.

Another scientific focus lies on new innovative approaches to promote healing of chronic wounds. We recently performed an investigator initiated clinical study on the effectiveness and safety of cold atmospheric plasma and are currently recruiting patients for a multicenter trial on allogenic mesenchymal stem cells for chronic wounds.



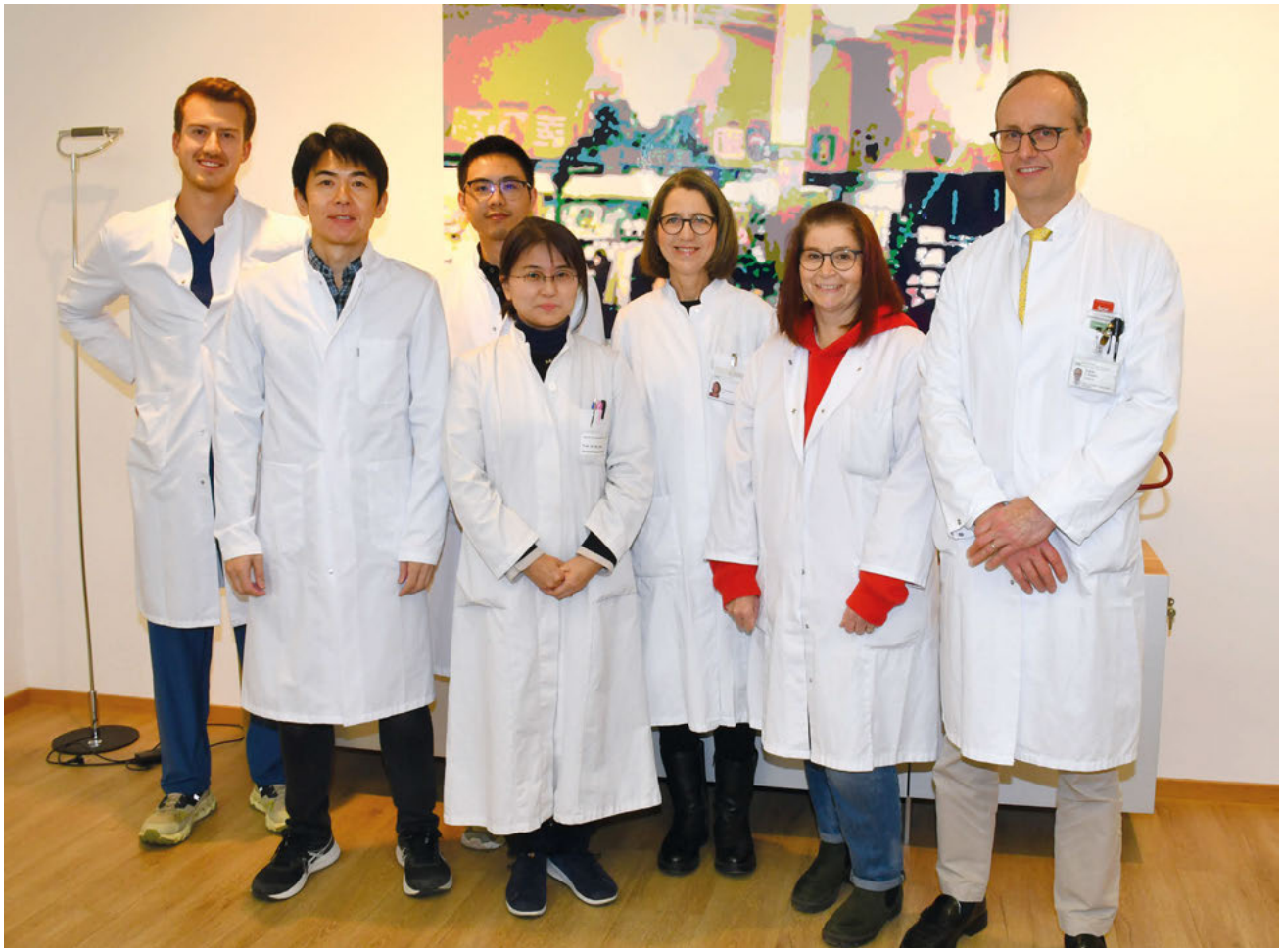
Members of the experimental dermatosurgery and wound healing research group

f. Laboratory of cutaneous molecular immunology

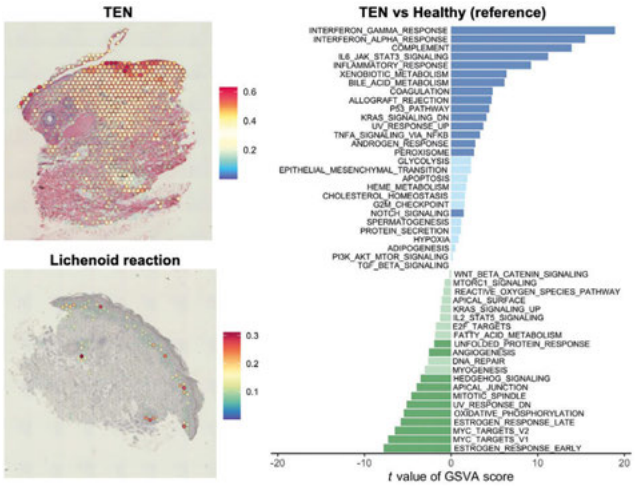
- Prof. Lars E. French, MD, head of the laboratory
- Takashi Satoh, MD/PhD, MSc, principal investigator
- Rui Aoki-Urano, MD/PhD
- Laura Calabrese, MD
- Pia-Charlotte Stadler, MD
- Matthias Neulinger Munoz, MD
- Peng Zhang, MD
- Claudia Kammerbauer, MTA, research associate

Our laboratory is dedicated to unraveling the complex molecular mechanisms underlying severe inflammatory skin diseases, with a particular focus on Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TEN) and neutrophilic dermatoses including hidradenitis suppurativa and pyoderma gangrenosum.

SJS/TEN represents one of the most severe adverse drug reactions, characterized by extensive epidermal detachment and potentially life-threatening complications. Despite its severity, the molecular pathways driving this condition remain incompletely understood. Our team employs cutting-edge technologies, including single-cell RNA sequencing and spatial transcriptomics, to decode the intricate cellular interactions and inflammatory cascades that lead to the devastating tissue damage in SJS/TEN.

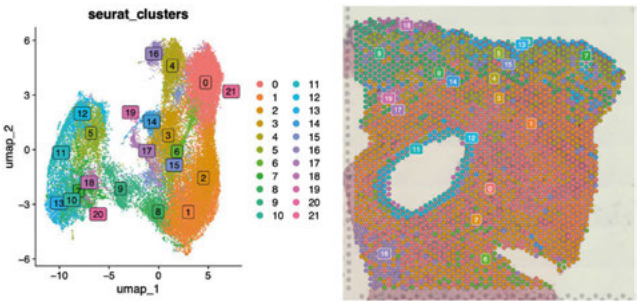


Members of the cutaneous molecular immunology research group



***Spatial transcriptomics (left)**: In SJS/TEN, macrophages accumulated at the top of the dermis and infiltrated the epidermis, whereas in the lichenoid reaction, macrophages were primarily located in the superficial dermis adjacent to the epidermis. **Single-cell RNA sequencing (right):** There was a significant enrichment of interferon gamma and alpha responses in macrophages from SJS/TEN compared to healthy controls.*

In parallel, we investigate neutrophilic dermatoses, a group of disorders characterized by neutrophil infiltration in the skin. Our research on hidradenitis suppurativa and pyoderma gangrenosum aims to identify key molecular triggers and signaling pathways that drive neutrophil recruitment and activation in these debilitating conditions. By understanding these mechanisms, we hope to identify novel therapeutic targets and develop more effective treatments.



***Spatial transcriptomics:** Hidradenitis suppurativa lesions were classified into 21 subtypes based on spatial gene expression patterns (left). The tunnels in the dermis exhibited distinct inflammatory gene signatures compared to the epidermis (right).*

Our laboratory integrates various approaches, including:

- Advanced transcriptomic and proteomic analyses
- Translational research using patient samples
- Molecular and cellular biology techniques

Through our research, we aim to:

- Identify novel therapeutic targets
- Develop biomarkers for early diagnosis and monitoring
- Understand disease mechanisms at the molecular level

We collaborate with clinicians, researchers, and industry partners worldwide to accelerate the development of new therapeutic strategies for these challenging skin conditions.

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g. Oncological research group

Immuno-oncology and cancer therapy

Prof. Lucie Heinzerling, MD, MPH

Group members and associates

- David Anz, MD
- Malte Beckmann, MD
- Peter Bonczkowitz, cand. med.
- Lea Daisenberger, cand. med.
- Tessa Fangmeier, cand. med.
- Waltraud Fröhlich, technician
- Canan Kabakci, MD
- Claudia Kammerbauer, technician
- Nora Kramer (formerly Mittag), MD
- Isabel Manger, cand. med.
- Monika Morak, PhD
- Giulia Pesch, cand. med.
- Ignazio Piseddu, MD
- Magdalena Röckel, cand. med.
- Takashi Satoh, MD/PhD
- Christina Schmitt, MD
- Julio Vera-González, Prof. Bioinformatics
- Ying Wang, PhD

Collaborators

- Eran Elinav, PhD MD
- Lars Engstrand, MD
- Guido Kroemer, PhD MD
- Federica Pinto, PhD
- Bertrand Routy, PhD MD
- Nicola Segata, PhD
- Valerie Diane Valeriano, PhD
- Maria Vehreschild, MD
- Laurence Zitvogel, MD

Main fields of research

The focus of our translational and basic research is studying how to modulate the immune system for better outcome of skin cancer with immunotherapies and to optimize management of immune-related side effects (irAE). We compare autoimmunity in this context with autoimmune disease and characterize the respective pathomechanisms. Within a translational research project, we determine factors for checkpoint inhibitor resistance and assess how resistance can be overcome. Within our biomarker research we try to establish prognostic and predictive biomarkers. Importantly, we identified a gene expression signature in primary melanoma tumors for assessment of risk of formation of metastases. We also investigate the mechanisms by which the microbiome modulates response and toxicity in cancer patients.

Dermato-oncology research and study team (right front) Prof. L. Heinzerling, MD, MPH; (Left to right): Th. Schulz, M. Morak, E. Schütze, S. Maier, Y. Wang, R. Buchillon Lizca, I. Schnaitter, C. Kammerbauer, Ch.Straßer, Dr. L. Arnold

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h. SERIO – Side Effect Registry Immuno-Oncology

Prof. Lucie Heinzerling, MD, MPH

Group members and associates

- Lisa Arnold, MD
- Richard David-Rus, MSc
- Carolin Ertl, MD
- Samuel Knauss, MD
- Mingzi Kong, PhD
- Dirk Mentzer, MD
- Theresa Ruf, MD
- Thomas Schulz, MD
- Dirk Tomsitz, MD
- Sarah Zierold, MD

Medical doctors and lab team members of Prof. L. Heinzerling (right front), MD, MPH, involved in side effect investigation projects and SERIO registry

Focus of research

The Side Effect Registry Immuno-Oncology (SERIO) documents rare, complex and severe side effects of immunotherapy since 2011. In cooperation with the Paul- Ehrlich Institute access to the data base is online since February 2020 (www.serio-registry.org) with more than 73 national and international centers from 13 countries documenting so far. We analyze the data bank to determine risk factors, optimal management and outcome of immune-related adverse events and regularly publish articles about specific topics of interest. Via the registry we can also access biological samples especially of rare side effects like heart muscle biopsies from patients with cardiomyositis or with neurological side effects to further investigate pathomechanisms. We advise other centers on complex and therapy-refractory immunotherapy-induced side effects and stage interdisciplinary toxicity boards to determine the best therapy option for such patients.

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i. Experimental Dermato-Immunology

Prof. Dr. Felix Lauffer, MD, Ph.D.

Group members and associates

- Jessica Eigemann, MSc
- Sigrid Vollmer

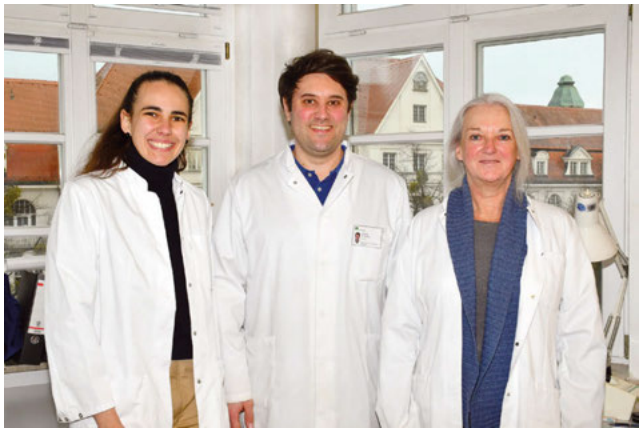
Main fields of research

The focus of the "Experimental Dermato-Immunology" group is on research into the pathogenesis of chronic inflammatory skin diseases such as psoriasis vulgaris, atopic eczema, cutaneous lupus erythematosus and lichen planus. Over the last 15 years, there has been enormous development in the field of chronic inflammatory skin diseases.

For example, numerous targeted therapies have been approved for psoriasis and atopic dermatitis, which are directed against central cytokines of the inflammatory reaction. Nevertheless, there are still no specific therapies available for the vast majority of inflammatory skin diseases. This applies in particular to the group of type 1 dominant skin diseases, in which a cytotoxic immune reaction against resident cells of the skin occurs.

The aim of our research is to better understand cross-disease mechanisms of cutaneous inflammation by studying human samples from well-characterized patient cohorts using modern molecular biology methods and correlating the results with clinical attributes. Central genes and transcription factors identified in the process can be knocked out using CRISPR-Cas technology and thus examined for their functionality in primary cells and in vitro skin models. This has already enabled us to identify new mechanisms of interface dermatitis, which is a common histological feature of the group of type 1 dominant skin diseases. In addition to the question of new therapeutic targets, other questions remain unanswered, e.g. the primary triggers of the diseases or factors that lead to the chronification of inflammatory skin diseases.

Furthermore, we assume that several endotypes exist within a disease, which differ significantly in terms of clinical response, prognosis and the natural course of the disease. As these endotypes cannot be identified using current diagnostic methods, we are investigating whether the combination of clinical and molecular



Left to right: J. Eigemann, Prof. F. Lauffer, S. Vollmer

markers can improve the targeted use of therapeutics. In order to transfer the knowledge gained to the clinic, a further focus of the working group is the implementation of investigator-initiated clinical studies, which can be realized in cooperation with the Dermato-Allergological Study Center (DASZ).

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j. Bullous autoimmune diseases

Dr. Christiane Pfeiffer, MD, PhD (PD Dr. med. habil.)

Group members and associates

- Mohammed Mitwalli, MD
- Orsolya Horváth, MD, PhD (parental leave)

Main fields of research

Based on our specialized laboratory, as well as with interactions within the bullous skin disease network of the ADF (Arbeitsgemeinschaft dermatologische Forschung) we are able to diagnose not only bullous pemphigoid and pemphigus but also rare subforms of blistering diseases. We collaborate for proteomics analysis with the MPI and are co-authors of the current German treatment guideline as well as the update (working copy). We offer our patients all treatment options, on in- and out-patient base.

PD Dr. C. Pfeiffer, leading physician

Selected references

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k. Autoimmune connective tissue diseases

Dr. Christiane Pfeiffer, MD, PhD (PD Dr. med. habil.)

Group members and associates

- Mohammed Mitwalli, MD

Main fields of research

As founding partner of the German Network for Systemic Sclerosis, we are interested in registry-based clinical science. Our special clinic for connective tissue diseases offers assessment, as well as second opinion for patients with systemic sclerosis, systemic lupus erythematosus and cutaneous lupus erythematosus and dermatomyositis. Specialized in systemic forms, we also treat patients with severe forms of local disease. As part of the ERN we strive to improve treatment for affected patients. Through the registry work we collect new knowledge. Treatment offers include participation in clinical trials.

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I. Artificial intelligence

The DR-AI project has successfully concluded its multifaceted exploration into the application of artificial intelligence in dermatology and radiology. This initiative not only aimed to enhance diagnostic accuracy through innovative AI methodologies but also emphasized ethical considerations and the interpretability of machine-learning models in medical contexts. The project culminated in significant findings that contribute to the growing body of knowledge on AI in healthcare, paving the way for future advancements in medical imaging.

Project Summary

The DR-AI project sought to explore and evaluate the use of AI technologies in dermatology and radiology. It focused on assessing the efficacy and interpretability of AI methods across various scenarios, including ethical considerations. This interdisciplinary initiative achieved key results across subprojects that demonstrated the potential of AI in medical imaging, improving diagnosis accuracy, interpretability, and robustness, especially in complex diagnostic cases.

1. Self-Supervised Learning in Dermatology: Self-supervised learning maintained an accuracy of 87.7% with limited labeled data, suggesting its effectiveness over standard pretraining in data-scarce situations.

2. Multimodal Fusion for Skin Lesion Classification: The FusionM4Net model combined clinical and dermatoscopic images with patient metadata, increasing accuracy from 67.0% (clinical only) and 74.7% (dermatoscopic only) to 77.6%, demonstrating the benefits of a multimodal approach.

3. Advanced Multimodal Integration in Dermatology: Implementing joint-individual fusion structures with multi-modal attention modules further improved skin cancer classification accuracy to 77.2%, emphasizing the advantages of integrating diverse data types.

4. Graph-Ensemble Learning for Multi-Label Classification: The application of graph neural networks enhanced skin lesion classification AUC from 83.7% to 87.6%, notably improving melanoma detection rates.

Left to right: Dr. M. Deußing, Prof. Dr. Lars E. French, Dr. S. Krammer, V. Bentele

5. Transformer-Based Data Fusion: Utilizing Transformer networks in dermatology increased diagnostic accuracy from 89.9% (CNN-based) to 93.5%, with interpretable saliency maps that marked both image and metadata relevance for greater clinical transparency.

6. Interpretability in Pneumothorax Detection: Attention-based saliency maps generated by Vision Transformers (ViTs) achieved an AUC of 0.95 on the Chest X-Ray 14 dataset. ViTs outperformed traditional CNNs in interpretability, offering clearer, actionable insights for radiologists in identifying pneumothorax.

7. Out-of-Distribution (OOD) Detection: The In-Distribution Voting (IDV) approach proved effective in identifying OOD data, achieving an AUC of 0.999 across datasets. This highlights the necessity of specialized OOD detection in maintaining diagnostic accuracy, as conventional models tend to misclassify OOD images.

8. Automated Labeling of German Radiology Reports: A deep learning-based model significantly outperformed rule-based methods, with F1-scores of 0.94 for mention detection, 0.89 for negation, and 0.61 for

uncertainty detection. This approach, needing only 1,000 manually annotated reports, offers a promising alternative to manual labeling.

9. Adaptive Multiple Windowing for Improved Classification: The innovative WindowNet model adapted optimally to different windowing techniques in chest X-ray classification, enhancing performance with an AUC of 0.812 compared to the baseline of 0.750.

10. Impact of Image Resolution on Classification: Higher-resolution training at 1024x1024 pixels yielded the best results (AUC of 84.2%), improving the detection of small pathologies like nodules and atelectasis. This finding underscores the role of image resolution in maximizing diagnostic precision.

11. Ethics in Dermatological AI: An overview of dermatological AI applications emphasized the importance of ethical scrutiny, particularly regarding responsibility in machine-learning-driven treatment decisions. An additional study examined the potential diffusion of responsibility, stressing the need for clear accountability.

12. Contextual Sensitivity of Metadata in Medical Imaging: Metadata integration proved beneficial in model training but demonstrated that models may overfit to dataset-specific correlations, raising challenges for generalizability.

These results offer critical insights into the robustness, accuracy, and applicability of AI in medical imaging, paving the way for more reliable and ethically sound diagnostic AI tools.

The DR-AI project has concluded successfully, and detailed information about the project, including publications and outcomes, can be found on the official BMG website.

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m. Implant allergy research

Prof. Dr. Peter Thomas, Dr. Burkhard Summer and Dr. Eva Oppel, researchers at the Department of Dermatology and Allergology at Ludwig-Maximilians-University Munich, have made significant advancements in the field of implant allergy research. Their groundbreaking work has focused on understanding the allergic reactions and sensitivities that can occur in patients who receive medical implants, such as joint replacements, dental implants, or pacemakers. These allergies, while relatively rare, can lead to serious complications, including implant failure, chronic inflammation, and delayed healing. Through extensive clinical and laboratory studies, Dr. Summer and Dr. Oppel have been able to identify key biomarkers and immune responses associated with implant allergies. Their research has not only improved diagnostic techniques but also led to the development of more personalized treatment approaches. These advancements enable doctors to better assess a patient's risk of developing an allergic reaction to an implant before surgery, thus improving patient outcomes and reducing complications. The excellent results of their work have earned widespread recognition, helping to raise awareness about implant allergies within both the medical community and the general public.

Building on these successes, Dr. Summer and Dr. Oppel are now spearheading the creation of a European research network dedicated to implant allergy. This network will facilitate collaboration among experts across Europe, allowing for the sharing of knowledge, resources, and best practices. To start with this a consensus statement with the European cooperation partners on diagnostics in suspected metal implant allergy was published this year. As part of this initiative, they are also establishing an international register for implant allergy cases. This register will serve as a centralized database for documenting and tracking implant allergy cases worldwide, enabling researchers and clinicians to gather comprehensive data, identify patterns, and develop new strategies for prevention and treatment. The establishment of this network and register is a crucial step toward standardizing implant allergy research and ensuring that patients with implant allergies receive the best possible care. Dr. Summer and Dr. Oppel's work is not only advancing the understanding of this complex issue but also paving the way for future innovations in both diagnostics and therapeutics, ultimately improving the quality of life for patients in the future.

Publications

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2. Thomas P, Arenberger P, Bader R, Bircher AJ, Bruze M, de Graaf N, Hartmann D, Johansen JD, Jowitz-Heinke A, Krenn V, Kurek M, Odgaard A, Rustemeyer T, Summer B, Thyssen JP. A literature review and expert consensus statement on diagnostics in suspected metal implant allergy. J Eur Acad Dermatol Venereol. 2024 Aug;38(8):1471-1477

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Left to right: R. Pohl, PD Dr. B. Summer, PD Dr. E. Oppel, Prof. Dr. P. Thomas

n. Laboratory for immune pathogenesis of psoriasis

Univ.-Prof. Dr. Jörg Prinz
Revealing the autoimmune pathogenesis of psoriasis

Group members during the past period

- Sigrid Vollmer
- Tatsushi Ishimoto, MD, PhD
- Mengwen He
- Akiko Arakawa, MD, PhD

The experimental work of the research group is focused on the investigation of the T-cell-mediated pathogenesis of psoriasis vulgaris as an HLA-C*06:02-associated autoimmune disease. In the preliminary work, we used a pathognomic psoriatic Vα3S1/Vβ13S1 T-cell receptor from a pathogenic lesional psoriatic T-cell clone to demonstrate that the major risk allele HLA-C*06: 02 mediates an autoimmune response against melanocytes through presentation of an ERAP1-dependent autoantigen, thus elucidating the role of HLA-C*06:02 association and epistasis between HLA-C*06:02 and ERAP1 variants in psoriasis risk. However, psoriasis is not a congenital disease, but develops over the course of a lifetime under the influence of environmental and lifestyle factors as well as infections.

Using the Vα3S1/Vβ13S1 T-cell receptor, we identified various environmental antigens that can stimulate the psoriatic autoimmune response due to the polyspecificity of T cell receptors. In particular, peptides from wheat were strong antigens for the CD8+ T cells of psoriasis patients. A wheat-free diet was able to achieve a significant improvement in psoriasis and psoriatic arthritis in a proportion of patients and appears as a suitable measure for refractory psoriasis courses. We also used the Vα3S1/Vβ13S1 TCR to elucidate the pathomechanism by which streptococcal tonsillopharyngitis can induce psoriasis as an infectious trigger.

We discovered that the inflammatory conditions of streptococcal tonsillopharyngitis induce a cross-reactive autoimmune response of CD8+ T cells between B cells

Current and former members of the psoriasis lab

in the tonsils and melanocytes in the skin and can thus trigger psoriasis. Interestingly, analysis of the immunopeptidome presented by HLA-C*06:02 showed that the stimulatory self-peptides presented by HLA-C*06:02 on B cells differ from the melanocyte autoantigen. These results decipher a pathomechanism that may also be relevant for the induction of other streptococcal-induced autoimmune diseases, which are of worldwide importance as acute rheumatic fever and rheumatic heart disease. Further studies are devoted to the clinical characterization of generalized pustular psoriasis.

Collaboration partners

- Andreas Schlosser, Rudolf-Virchow-Zentrum, Center for Integrative and Translational Bioimaging Universität Würzburg
- Efstratios Stratikos, Laboratory of Biochemistry, Department of Chemistry, National and Kapodistrian University of Athens, Greece

Publications 2023-2024

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o. Exposome research group

PD Dr. med. Dr. rer. biol. hum.
Benjamin Clanner-Engelshofen, M.Sc., B.Sc.
Head of the research group

Group members

- Tobias Steegmüller, M.Sc.
- Maeliss Nzokam, M.Sc.
- Thorsten Adam, MD
- Luka Ständer, MD
- Mohammed Mitwalli, MD

Associates

- Leonie Frommherz, MD
- Pia-Charlotte Stadler, MD
- Benjamin Kendziora, PhD, MD
- Anne Gürtler, MD
- Till Kämmerer, MD

Main fields of research

The exposome encompasses all environmental exposures, both internal and external, from preconception through the lifespan. Research into the exposome aims to understand the variety and effects of these exposures, including diet, chemicals, physical factors, and psychosocial stressors, along with their biological impacts. These exposures influence not only skin inflammation but also carcinogenesis, pigmentation, immune responses, skin barrier properties, sebaceous function, and various skin diseases. While the significance of the exposome is acknowledged, understanding its effects and the interactions between its components remains complex and requires advanced monitoring and laboratory techniques.

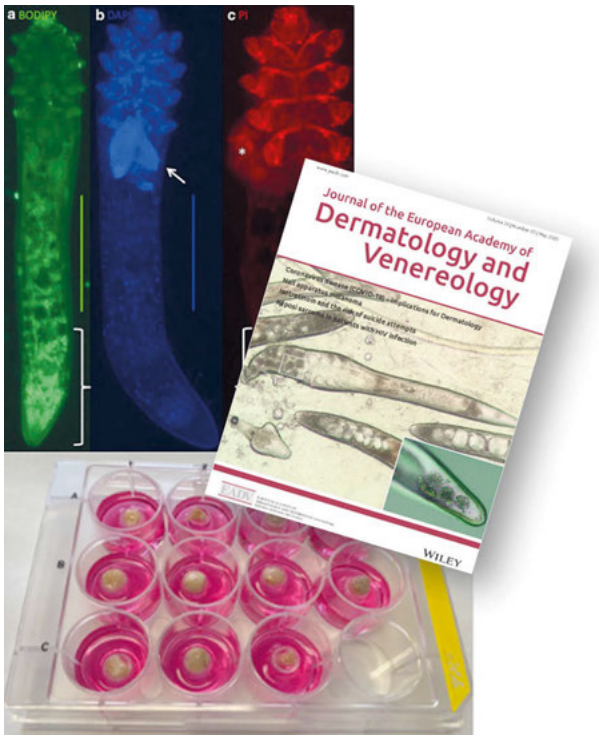
Skin microbiota differences are linked to various dermatological diseases including acne, rosacea, and atopic dermatitis. The research group focuses on the skin microbiome, particularly Demodex mites associated with rosacea. They developed methods to isolate and study Demodex mites, identifying Corynebacterium kroppenstedtii subsp. demodicis as their endobacterium. This finding enhances understanding of the interactions between mites, their bacteria and the human host. We also established an ex vivo culture system for Demodex mites, enabling studies on their proliferation and the effects of treatments like isotretinoin, which reduces mite density. For this study the group leader was awarded the 14th Heinz-Maurer-Award.

Epidemiological studies were conducted to better understand rosacea and perioral dermatitis (POD). Further

Members of the exposome research group

studies focused on demographics, clinical presentation, triggers, treatment adherence, and quality of life. Additionally, ocular rosacea, which is often underdiagnosed, was studied.

Future research aims to deepen the understanding of Demodex mites, their bacterial endosymbionts, and their interaction with human hosts in the context of rosacea. Studies will include mite anatomy, behavior, and the development of an in-vitro culture system. This research lays the groundwork for further exploration into the complex relationships between mites, their bacteria, and humans.



Representative publications

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3. A comprehensive epidemiological study of rosacea in Germany. Zierl S, Guertler A, Hildebrand JA, Clanner-Engelshofen BM, French LE, Reinholz M. Eur J Dermatol. 2021 Dec 1;31(6):744-751

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6. Efficient isolation and observation of the most complex human commensal, Demodex spp. Clanner-Engelshofen BM, Ruzicka T, Reinholz M. Exp Appl Acarol. 2018 Sep;76(1):71-80

7. First ex vivo cultivation of human Demodex mites and evaluation of different drugs on mite proliferation. Clanner-Engelshofen BM, Ständer LM, Steegmüller T, Kämmerer T, Frommherz LH, Stadler PC, Gürtler A, Reinholz M. J Eur Acad Dermatol Venereol. 2022 Dec; 36 (12); 2499-2503

7 Clinical research: Department of Dermatology, clinical trials unit

A. Dermatooncology Study Center

Prof. Lucie Heinzerling, MD, MPH
Melanoma, Lymphoma, Merkel cell carcinoma, rare skin cancers

Prof. L. Heinzerling, MD, MPH

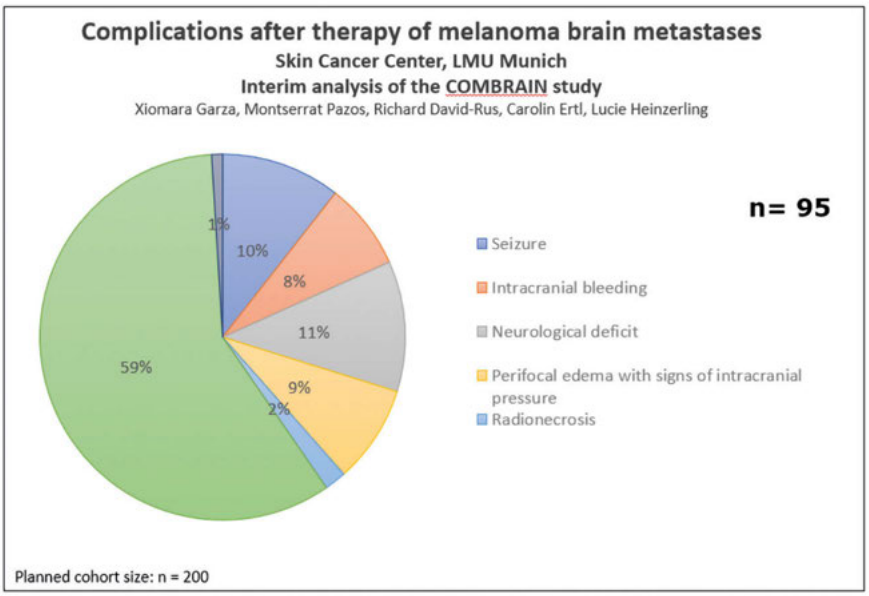
Group members and associates

- Lisa Arnold, MD
- Raquel Bouchillon, nurse
- Dagmar Dick, technician
- Carolin Ertl, MD
- Zeno Fiocco, MD
- Xiomara Garza Vazquez, MD
- Sebastian Haferkamp, MD
- Daniela Heß, study nurse
- Claudia Kammerbauer, technician
- Michael Lauseker, statistician
- Sonja Maier, study coordinator
- Bastian Schilling, MD
- Irina Schnaitter, nurse
- Christine Straßer, study coordinator
- Dirk Tomsitz, MD

Main fields of research

The focus of our clinical research is studying how to optimize skin cancer treatment with immunotherapy, cellular therapies, targeted therapy and local therapy options. In this context, we conduct clinical studies with new compounds including mRNA vaccines, combinations or innovative treatment schemes. Interim analysis of two investigator-initiated trials (IITs) for checkpoint-inhibitor resistant patients (PROMIT) and therapy-refractory immune-related adverse events – PRIA - (NCT 04225390 and NCT05700565), have recently shown positive results. In 2023, we have recruited 216 patients into clinical studies. Additionally, we investigate the role of the gut microbiome with respect to response and toxicity of immunotherapy.

We assess how to break checkpoint inhibitor resistance with different immunotherapies, cellular therapies, targeted therapy and oncolytic viruses. We also use modern imaging techniques for diagnostic procedures. Within our biomarker research we try to establish prognostic and predictive biomarkers for response and toxicity. In addition to this, our group perform analysis of complication of melanoma patients with brain metastases with risk factors and associated therapy regimens.



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B. Dermatology & Allergology Study Center / Dermato-allergologisches Studien-Zentrum (DASZ)

Prof. Felix Lauffer, MD
Prof. Franziska Ruëff, MD

Group members and associates

- PD E. Oppel, MD
- Ch. Kuna, MD
- T. Pumnea, MD
- I. Pfeiffer, MD
- Ch. Gust, MD
- St. Weißinger, MD

Members of the DASZ

Main fields of research

The development of innovative drugs and new therapeutic methods has a long tradition in our Department. Today clinical research can no longer be carried out „on the side", but requires a large team of motivated, well-trained nurses and physicians, who focus on these activities. In certain studies, separate "blinded" and "unblinded" teams are required, which almost doubles the human resources needs and expenditure.

Since 2015 in the DASZ many clinical trials with a focus on chronic inflammatory and allergic skin diseases have been performed. The focus includes clinical trials on atopic dermatitis and psoriasis, as well as some other inflammatory skin diseases and allergic diseases. Drug licensing studies of phase II and phase III; some phase IV studies, and quality-of-life studies are performed at the DASZ. At present, the DASZ team consists of two senior physicians, two resident doctors, six study nurses and three student assistants. A particular advantage of our unit is the large number of patients presenting themselves here every year, so that we are a high recruiting center in many trials in which we choose to participate.
The following indications have been studied in the DASZ with innovative medicinal substances in clinical trials in recent years:

- Atopic dermatitis
- Acne inversa (hidradenitis suppurativa)
- Bullous pemphigoid
- Herpes labialis
- Hand eczema
- Indolent systemic Mastocytosis
- Lichen ruber
- Netherton Syndrome
- Prurigo nodularis
- Generalized pustular psoriasis
- Psoriasis vulgaris
- Urticaria, chronic spontaneous and chronic inducible

In 2023 and 2024 a total of 40 clinical trials in the above indications were performed at the DASZ, around one third of them in atopic dermatitis. Most patients benefit greatly from participating in clinical trials at DASZ and receive innovative care that frees them from a disease that has often been endured for years. Being at the forefront of the development of new pharmaceuticals gives us the opportunity to make new clinical discoveries and, last but not least, to participate in important publications.

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8 Medical education and training / Guest speakers

Advancing medical education at our dermatological clinic

Medical education remains a fundamental priority of our department, standing alongside patient care and research. Our commitment to fostering a high standard of knowledge and skill among students, physicians, and healthcare professionals is reflected in our wide-ranging educational initiatives, which include:

1. **Education of medical and dental students** from Ludwig Maximilian University Munich, designed to provide a comprehensive understanding of dermatologic principles.

2. **Hosting international visiting medical students**, offering exposure to diverse dermatologic practices and patient populations.

3. **Specialist training for dermatology residents**, encompassing subspecialties such as dermatosurgery, aesthetic dermatology, allergy, dermatopathology, pediatric dermatology, inflammatory skin diseases, hair and nail disorders, non-invasive imaging, phlebology, and dermatooncology.

4. **Continuing education for healthcare professionals**, including board-certified dermatologists, general practitioners, and specialized nurses.

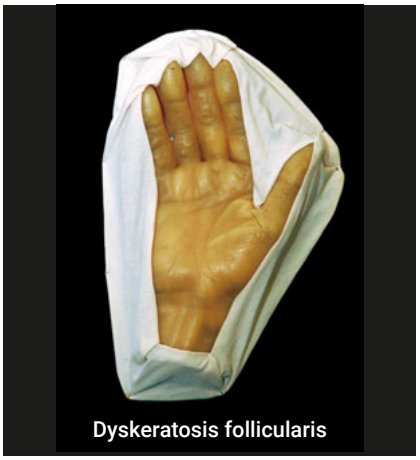
Each year, our department educates approximately 600 medical students and 200 dental students. From the preclinical phase (1st to 4th semester) through to the clinical phase (5th to 10th semester), our teaching strategy integrates a mix of lectures, seminars, and bedside teachings. Topics covered include everything from basic cutaneous manifestations and dermatopathology to advanced subjects like dermato-oncology, autoimmune diseases, pediatric dermatology, and both topical and systemic treatments.

All lectures and seminars are accessible in digital formats, providing audible podcasts and PDFs that students can access in advance. Herby, we are committed to continuously improving our curriculum by incorporating new clinical guidelines, therapy standards, and feedback from students. Recent extensive revision included a wider representation of all skin types (Fitzpatrick I-IV) to better reflect patient diversity and educate on the differences of the same diagnosis in different skin types.

The on-demand approach of lectures and seminars allows us to use in-person sessions for interactive case discussions based on clinical images, enhancing practical understanding and student engagement. Bedside teaching remains a hallmark of our program, allowing students to closely observe and interact with patients, thereby gaining invaluable real-world experience.

To uphold the highest standards of medical education, we actively seek feedback from our students through


Adenoma sebaceum Prinale


Dyskeratosis follicularis


Sarkom

Collection Dermatology Clinic LMU

surveys and evaluations. This feedback helps us refine our curriculum and teaching methods, ensuring that we remain at the forefront of dermatologic education and continue to provide exceptional training to future generations of healthcare professionals.

For students in their final practical year, dermatology is offered as a selective course in addition to mandatory rotations in internal medicine and general surgery. Due to limited availability, the dermatology elective is highly sought after. We provide an intensive training experience, featuring rotations in both inpatient and outpatient settings, where students work as part of the medical team under guided supervision with weekly additional student lectures of advanced topics. Our program also includes weekly interactive case discussions, specialized training sessions, and mentorship for up to 20 visiting international students annually. Each student, whether from a German or international university, is matched with a mentor to help them navigate the program and maximize their learning experience.

Reviving wax moulages: A historical and innovative approach to dermatologic education

A recent initiative in our educational strategy is the revitalization of moulages. Moulages are life-like wax models that replicate dermatologic conditions with remarkable accuracy. Historically, moulage has been a valuable tool in dermatology education. In the late 19th and early 20th centuries, these wax models were meticulously crafted to depict various skin diseases and were used extensively in medical schools and museums to teach students about conditions that were rare or difficult to access.

Today, we are reintroducing this time-honored practice, but with a modern twist. Utilizing advanced 3D scanning and printing technologies, we are digitizing the historic

3D scan process

43 moulages of the Department to create virtual models that can be accessed on digital platforms. This approach not only preserves these unique teaching tools but also makes them available to a broader audience of students and professionals worldwide. In addition, 3D scanning allows us to enhance these models by incorporating interactive features, such as magnification and layering, to provide a more comprehensive understanding of complex dermatologic pathologies.

By combining the tactile and visual benefits of traditional moulage with cutting-edge digital technologies, we aim to offer our students a unique learning experience. They can study detailed representations of dermatologic conditions that are rarely seen in clinical practice, bridging the gap between textbook knowledge and clinical skills.

This integration of moulage into our curriculum reflects our ongoing commitment to innovation in medical education, ensuring that our students are not only well-prepared for clinical challenges but are also engaged and inspired by their learning journey.

Guest speakers
2023/2024

Speaker	Institution	Topic
Ben-Anaya Nesrine Dr. univ.	Institut für Versorgungsforschung in der Dermatologie und bei Pflegeberuifen (IVDP), Competenzzentrum Dermatologische Forschung (CeDeF) Universitätsklinikum Hamburg-Eppendorf	Atopische Dermatitis – wo ist Handlungsbedarf?
Brehler Randolf Prof. Dr. med.	Hautklinik des Universitätsklikums Münster	Unerwünschte Wirkung von Biologika aus allergologischer Sicht
Briegel Ignaz	Medizinische Klinik und Poliklinik V, Klinikum der Universität München	Welches Schnitzel verursacht Milchglas?
Brockow Knut Prof. Dr. med.	Klinik und Poliklinik für Dermatologie und Allergologie am Biederstein, Technische Universität München	Allergologische Abklärung bei Arzneimittelexanthemen
Ebermann Thorsten Fachanwalt für Medizinrecht, Fachanwalt für Strafrecht	GNP Rechtsanwälte	Rechtliche Aspekte und Erstattungsfähigkeit neuer Therapien der Alopecia areata und Vitiligo
Fischer Carmen Dr. med.	Dr. von Haunersches Kinderspital, Klinikum der Universität München	Sesam öffne Dich
Flatz Lukas Prof. Dr. med.	Universitäts-Hautklinik, Universitätsklinikum Tübingen	Immune signatures predict development of autoimmune toxicity in immune checkpoint inhibitor-treated patients with cancer
Flatz Lukas Prof. Dr. med.	Universitäts-Hautklinik, Universitätsklinikum Tübingen	Discovery of tumor-associated T cell antigens in cancer patients
Ghoreschi Kamran Prof. Dr. med.	Klinik für Dermatologie, Venerologie und Allergologie, Charité - Universitätsmedizin Berlin	Januskinase Inhibitoren und ihre Gesichter in der Dermatotherapie
Gröger Moritz PD Dr. med.	Klinik und Poliklinik für Hals-Nasen-Ohrenheilkunde, Klinikum der Universität München	Empfehlungen zur Indikationsstellung und Dokumentation der Therapie mit Biologika bei CRSwNP
Hackl Caroline Dr. med.	Medizinische Klinik und Poliklinik V, Klinikum der Universität München	Baby gut – alles gut?!
Hofmann Maja A. PD Dr. med.	Klinik für Dermatologie, Venerologie und Allergologie Charité – Universitätsmedizin Berlin	Vitiligo – Update aktuelle Therapieoptionen
Kirsten Natalia Dr. med.	Klinik für Dermatologie und Venerologie, Universitätsklinikum Hamburg-Eppendorf (UKE)	Kombinationsbehandlung der HS: Innovationen und Herausforderungen
Kolkhir Pavel PD Dr. med.	Institut für Allergieforschung, Charité Berlin	Neue Entwicklungen in der Urtikaria-Therapie
Lauffer Felix PD Dr. med.	Klinik und Poliklinik für Dermatologie und Allergologie am Biederstein, Technische Universität München	Update Psoriasis Therapie 2023
Maison Nicole Dr. med.	Dr. von Haunersches Kinderspital, Klinikum der Universität München	Mikrobiom und Asthma-Entstehung: möglicher Einfluss von viralen Infektionen und COVID-Maßnahmen
Milger-Kneidinger Katrin PD Dr. med.	Medizinische Klinik und Poliklinik V, Klinikum der Universität München	Bronchodilatator-Reversibilität bei schwerem Asthma
Nicolay Jan P. Prof. Dr. med.	Universitätsmedizin Mannheim	Systemtherapie von Patienten mit kutanem Lymphom
Nordmann Thierry Dr. med.	Dept. Proteomics and Signal Transduction, Max Planck Institute of Biochemistry	Neue wissenschaftliche Erkenntnisse bei schweren Arzneimittelreaktionen

Speaker	Institution	Topic
Pyatilova Polina Dr. med.	Institut für Allergieforschung, Charité Berlin	Aktuelles zur Behandlung der indolenten sytemischen Mastozytose
Reese Imke Dr. rer. medic.	Ernährungsberatung und -therapie, Schwerpunkt Allergologie	Ernährung und atopische Dermatitis – ein Update
Routy Bertrand Ph.D. Prof.	CRCHUM, Centre hospitalier de l'Université de Montréal	Gut Microbiota in oncology from a biomarker to therapeutic treatments
Schönermarck Ulf Dr. med.	Medizinische Klinik und Poliklinik IV, Nephrologisches Zentrum, Klinikum der Universität München	Pruritus bei internistischen Grunderkrankungen
Stadler Rudolf Prof. Dr. med.	Ehem. Direktor der Universitätsklinik für Dermatologie am Johannes Wesling Klinikum, Ruhr-Universität Bochum	Quo vadis Dermatologie im molekularen Zeitalter der Medizin
Staubach-Renz Petra Prof. Dr. med.	Universitätshautklinik Mainz	Junge und erwachsene Patienten mit Urtikaria – gibt es Handlungsbedarf?
Stihl Clemens Dr. med.	Klinik und Poliklinik für Hals-Nasen-Ohrenheilkunde, Klinikum der Universität München	Re-FESS unter Biologika – ein sinnvoller Ansatz?
Sticherling Michael Prof. Dr. med.	Uniklinikum Erlangen	Update Systemtherapie entzündlicher Dermatosen im Kindesalter
Straube Andreas Prof. Dr. med.	Neurologische Klinik und Poliklinik, Klinikum der Universität München	Das nozizeptive System und Juckreiz
Taieb Alain Prof. Dr. med.	INSERM 1312, Bordeaux Institute of Oncology, University of Bordeaux	Propranolol and infantile hemangioma: translational advances and controversies
Vehreschild Maria Univ.-Prof.	Medizinische Klinik II, Goethe Universität Frankfurt am Main	Fäkaler Mikrobiomtransfer (FMT)
Wächter Annabel Dr. med.	Institut und Poliklinik für Arbeits-, Sozial und Umweltmedizin, Klinikum der Universität München	Überraschungen nach Wegfall des „Unterlassungszwangs“
Wagner Nicola PD Dr. med.	Hautklinik, Uniklinikum Erlangen	Allergologische Testung bei atopischem Ekzem
Wechselberger Judith Dr. med.	Institut und Poliklinik für Arbeits-, Sozial und Umweltmedizin, Klinikum der Universität München	Bitte führen Sie eine Isocyanat-Provokation durch
Weins Andreas Dr. med.	Universitätsklinikum Augsburg	Seltene entzündliche Dermatosen im Kindesalter – Diagnostik, Management und Therapie
Widmann Magdalena Dr. med.	Klinik und Poliklinik für Hals-Nasen-Ohrenheilkunde, Klinikum der Universität München	Der schwierige Fall: wenn die Befunde nicht stimmig sind
Yosipovitch Gil Prof. Dr. med.	Miami Itch Center, Dr. Phillip Frost Departmentr of Dermatology and Cutaneous Surgery, Miller School of Medicine, University of Miami	Update on the pathogenesis and therapy of itch
Zimmermann Sabine Dr. med.	Medizinische Klinik und Poliklinik V, Klinikum der Universität München	Asthma-Exazerbation nach Impfung – Kausalität oder Koinzidenz?

246 guest speakers: see www.fortbildungswoche.de

9 Avelios Medical – birth of a state-of-the-art hospital software of the future

Digitizing hospital documentation with Avelios software

In 2022, the LMU University Hospital took a decisive step towards digital transformation with the adoption of Avelios Medical — an innovative software platform designed to streamline workflows and alleviate the burden on healthcare professionals. The implementation supports two key goals: enhancing patient care and reducing administrative workload.

Outdated IT: A challenge for many hospitals

Many hospitals still rely on outdated IT infrastructures — systems primarily developed in the 1990s with a focus on billing rather than medical documentation. These systems neither generate structured data nor allow for seamless interoperability between departments, professions and other software. Unintuitive interfaces and inefficient processes increase administrative burden, strain staff resources and risk compromising treatment quality.

Avelios medical: Designed by medical professionals

Avelios Medical's founders experienced these challenges firsthand. Medical doctor Dr. Sebastian Krammer and computer scientist Nicolas Jakob established a research group on artificial intelligence at LMU Hospital and launched the government-funded consortium DR-AI, backed with €2.8 million. Through this work, they quickly discovered that hospitals' antiquated systems could not provide the structured data they needed for modern technologies. However, many of the challenges they encountered were even more fundamental — not only hindering the use of AI, but also burdening medical staff with inefficient daily routines, excessive bureaucracy and a lack of essential data access caused by fragmented systems and limited interoperability.

The founders of Avelios Medical (left to right): Christian Albrecht, Nicolas Jakob and Dr. Sebastian Krammer

Teaming up with Christian Albrecht, a McKinsey alumnus, to solve the problem, they founded Avelios Medical. The result is a comprehensive, modular hospital information system (HIS) that supports both medical documentation (e.g., outpatient, ward, medication, surgery) and administrative functions (e.g., billing, resource management), as well as patient-facing services through an integrated patient portal.

By guiding users through intelligent data fields, the software improves both the quality and completeness of medical documentation, capturing over 2,000 structured data points per treatment without adding administrative burden. This robust data foundation enables AI development and training, with seamless integration into clinical workflows through Avelios. At the same time, the data unlocks new research opportunities and transforms workflow efficiency through automation.

HIS: Too difficult to replace?

Implementing a conventional HIS typically requires a high-risk "big bang" approach — an abrupt, resource-intensive system overhaul. Faced with this complexity and risk, many hospitals continue to rely on legacy systems — at the expense of efficiency, treatment quality, and the workload of medical staff. Avelios offers a modular alternative: hospitals can roll out individual modules incrementally or adopt the full HIS at once, allowing hospitals to replace legacy systems at their own pace. This approach significantly lowers the barrier to transformation and reduces associated risks — providing flexibility that remains rare in the healthcare IT landscape.

Improved efficiency and treatments at the LMU Hospital

The Department of Dermatology at LMU, treating over 80,000 patients annually, was the first to implement Avelios software. Since then, the software has been progressively introduced across the broader hospital organization. Features such as automatically generated discharge letters and an integrated photo app have improved operational efficiency — freeing up time for patient treatment.

Beyond operational gains, the platform also drives significant progress in research. The platform's structured data is linked to international standards like SNOMED CT and enriched with semantic annotations. These features enhance medical data interpretation, enable automated analysis at scale and promote data reuse for studies, AI development and international collaborations.

Sequoia capital validates LMU's strategic decision

By adopting the innovative system early on, LMU's Department of Dermatology not only modernized internal workflows but also positioned itself as a pioneer of digital transformation in hospital care. The department's strategic decision to invest early in transformative healthcare software has received high-profile affirmation. Global technology investor Sequoia Capital, known for backing industry pioneers such as NVIDIA, Apple, Google, Facebook and Airbnb, recently invested €30 million in Avelios Medical, recognizing the company as a future leader in the digitization of medical care.

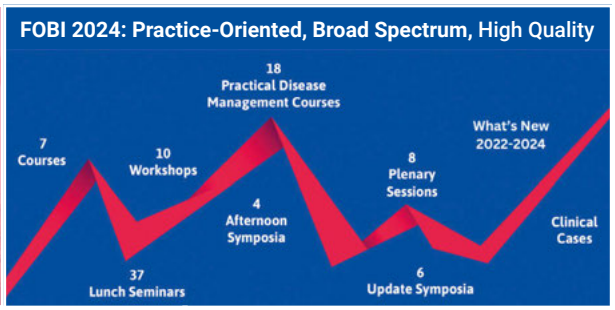
10 FOBI - Training week for practical Dermatology and Venerology

29th continuous medical education meeting / FOBI 2024

www.fortbildungswoche.de

The Munich Advanced Training Week or Continuous Medical Education Meeting for Practical Dermatology and Venerology founded by Professor Alfred Marchionini in 1951 took place for the 29th time from July 8-12, 2024.

Organized by the Department of Dermatology of the Ludwig Maximilian University Munich and a leading conference in German-speaking countries within Europe, the 29th edition was an unprecedented success!



With over 250 expert speakers, high quality workshops, courses, and plenary lectures were offered as the core of the Munich Advanced Training Week (FOBI).

New in 2024 was the introduction of 6 update symposia (systemic therapy of psoriasis, trichology, pediatric dermatology, systemic therapy of atopic dermatitis, skin cancer therapy occupational dermatology), all of which we met with successful feedback.

- "The best training I know. I would like to have a FOBI every year."
- "I liked the diversity - university topics are not neglected but also the reference to actual patient care in everyday life."
- "A great CME with a great industry exhibition!"
- "Outstanding plenary lectures! Excellent What's New session on Friday!"
- "Great international speakers e.g. Brian Kim"
- "Everything was perfectly organized. FOBI 2024 exceeded my expectations!"

The scientific program of the training week is based on the proven successful structure comprising exceptional clinical case presentations and thematic plenary lectures in the morning and early afternoon, followed by sponsored symposia and parallel practical hands-on workshops and courses in the later afternoon.

To round up this offer up, the last day offered a half-day "What's new" session with focused 20-minute plenary lectures highlighting new developments of clinical relevance on selected topics.

Prof.
Brian Kim

Prof. Dr. med
Tilo Biedermann

Prof. Dr. med
Ulrike Blume-Peytavi

Prof. Dr. med
Sascha Gerdes

Univ.-Prof. Dr. med
Stephan Grabbe

Univ.-Prof. Dr. med
Christoffer Gebhardt

Prof. Dr. med
Michael Hertl

Dr. med
Said Hilton

Dr. med
Felix Lauffer

Prof. Dr. med
Hagen Ott

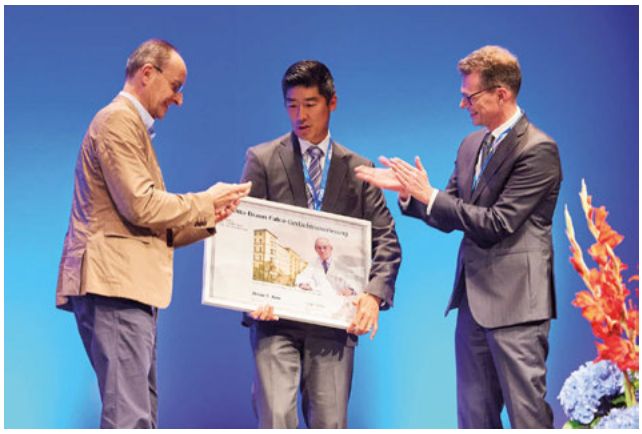
Prof. Dr. med
Stefan Schneider

Prof. Dr. med
Julia Weizel

Prof. Dr. med
Thomas Werfel

The FOBI 2024 in numbers:

- 3610 participants
- 246 speakers in the scientific program
- 30 plenary lectures
- 6 Update Symposia
- 38 courses & workshops
- 41 seminars & symposia
- 16 exceptional clinical case presentations
- Resident's day - Board Certification preparation course
- 110 exhibitors and sponsors
- 5325 hours of Live-Stream consumed
- Over 800 participants per day on the Live-Stream platform
- 3157 m2 exhibition space
- Great participant evaluation: 95.6% very good/good (1210 individual evaluations)



Braun-Falco Memorial Lecture given by Prof Brian Kim and award ceremony (L to R: Prof L French, Prof B Kim, Prof M Braun-Falco)

Another highlight of the 2024 Edition was the 2nd Braun-Falco Memorial Lecture in memory of Prof. Dr. med. Dr. h.c. mult. Otto Braun-Falco (Born 25. April 1922 in Saarbrücken; † 9. April 2018 in Munich). Professor Braun-Falco was a giant of our specialty who headed the Department of Dermatology and Allergology at the Ludwig Maximilian University Hospital from 1967 to 1990 and contributed to the early successful development of the Munich Advanced Training Week amongst others. Professor Brian Kim from the Department of Dermatology at Mount Sinai Medical Center, a leader in the field of itch and neurosensation, gave us an outstanding lecture entitled "The translational revolution of itch".

I am very grateful to the Scientific Program Committee, our PCO Interplan (www.interplan.de), and our speakers who have worked so hard to make FOBI 2024 a memorable high-quality live CME event at the International Congress Center Munich (ICM).

FOBI 2024 Scientific Program Committee (L to R):
Prof H Wolff, Prof D Hartmann, Prof L Heinzerling, Dr J Pilz, Dr C Pfeiffer, Prof L French (congress president)

The FOBI 2024 PCO Team - Interplan (L to R): C. Kiendl, J. Greger, L. Richter, J. Bitzer & Interplan CEO M. Preußner

11 Congresses / Scientific meetings

In the years 2023 and 2024 our department organized and co-organized several successful scientific meetings, seminars and events, in presence, hybrid or purely online version. Most importantly, we would like to shed a light on the high quality seminars. Listed below are the most memorable ones, including:

- Quarterly scientific trainings on Inflammatory skin diseases („Entzündliche Dermatosen“) including public Information events, education for medical professionals as well as quarterly CME events were established at our Department with great success, and have been organized in cooperation with our senior physicians and our residents.

- Two annual meetings on applied allergology (Symposium „Angewandte Allergologie“ des Allergiezentrums der LMU) organized by Dr. Eva Oppel (15.02.2023 and 07.02.2024). These meetings have been rewarded with great success due to its development within the LMU clinic.

- The spring meeting of the Munich Dermatological Society held at our Department and organized by Prof. Dr. Lars E. French (MDG-Frühjahrssitzung) on the 24.4.2024 with the key lecture “Quo vadis Dermatologie im molekularen Zeitalter der Medizin” held by Prof. R. Stadler.

- The autumn meeting of the Munich Dermatological Society held at our Department and organized by Prof. Dr. Lars E. French (MDG- Herbstsitzung) on the 15.11.2023 with the key lecture “Das Hauttumorzentrum als universitärer Partner in der ganzheitlichen Betreuung dermatoonkologischer Patienten” held by Prof. L. Heinzerling.

- A two-day Laser Certification Course, held on the 1. - 2.12.2023 organized by Prof. Dr. Daniela Hartmann, Ph.D., and our laser team, consisted of practical demonstrations of various laser treatments, as well as numerous plenary lectures. The fully online variant of the course took four times in the past two years on the 10.05.2023, 13.09.2023, 06.03.2024 and 16.10.202 and proved to be successful followers of the previous Laser Certification Courses held in 2021 and 2022.

- Several dermatooncological meetings organized by Prof. Lucie Heinzerling were held in 2023 and 2024 in our department covering main topics and updates in skin cancer treatments as well as management of side affects and complications.

12 Psychological counseling center

Dr. Stefan Zippel, M.Sc.
Psychologist & human biologist
Dr. Corbinian Fuchs
Psychosocial counselling & human biologist

Despite a decline in new HIV infections, the Robert Koch Institute reports that one-third of HIV diagnoses in Germany occur during advanced immunodeficiency, with 18% already presenting an AIDS-defining disease at diagnosis. This underscores the importance of regular testing and early treatment.

In 1987, Bavaria opened its first state-supported psychosocial AIDS counseling center at the LMU University Hospital's Department of Dermatology and Allergy. State Minister Dr. Karl Hillermeier emphasized the need to combat fear, prejudice, and the isolation faced by HIV-positive individuals. Today, the center remains committed to these ideals, providing holistic care to over 500 individuals annually. It is unique in Bavaria and one of the few in Germany closely linked with an STI & HIV outpatient clinic.

The center also focuses on prevention through education, reaching nearly 400,000 students across Bavaria with information on HIV, STIs, and sexual identity. Teachers are also empowered to expand their sexual education curriculum. The center's work has continued uninterrupted, even during the COVID-19 pandemic, by transitioning to online formats.

Research on the sexual and psychological health of youth informs the center's programs, and efforts are underway to increase awareness of human papillomavirus (HPV) vaccination among students.

Dr. Stefan Zippel, a key figure at the center, has been recognized for his contributions with the Bavarian Health and Care Medal, the "Munich Shines" medal, and the highest civilian distinction, the "Cross of Merit", in recognition of his contributions to STI and the HIV prevention.

The center maintains strong networks with state agencies, educational institutions, and NGOs, amplifying its impact across Bavaria and beyond.

Selected references

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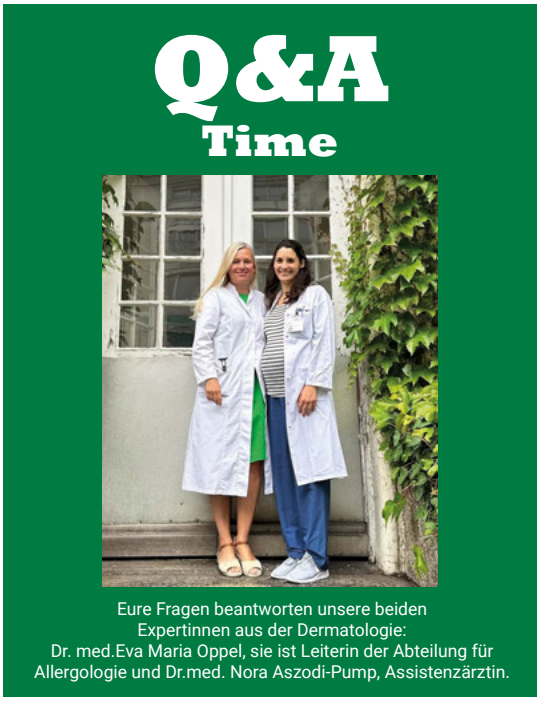
2. Monika Goetsch, Artikel „Kämpfer gegen Ausgrenzung und Stigmatisierung". IN: Open Access LMU 31.7.2020

13 Public relations

Public events

Our clinic regularly organizes very well-attended quarterly events for patients, employees in the medical health service and physicians. The focus is on common clinical pictures and the latest updates on therapy options such as inflammatory dermatoses or diagnoses from the oncological field. In addition, specialist lectures for inpatients (e.g. food allergies) are offered on a regular basis.



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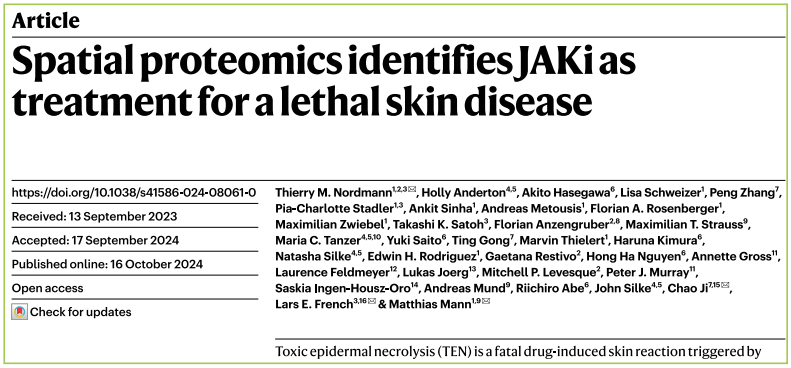
Internet / Intranet / Social media / Media relations

The Web-page of the Department (http://www.klinikum.uni-muenchen.de/Klinik-und-Poliklinik-fuer-Dermatologie-und-Allergologie/de/index.html) is updated regularly to provide most actual informations to patients and medical staff. Also social media are supported by informations and blogs on www.twitter.com/LMU_Uniklinikum and www.facebook.de/LMU.Klinikum.

We have also recently started producing informative podcasts on current topics in dermatology. These are available on our website. A contribution from our urticaria experts was very well received on the LMU's Instagram channel. The physicians of our clinic are highly appreciated for interviews, articles or videos about dermatological focal points.



Article

Spatial proteomics identifies JAKi as treatment for a lethal skin disease

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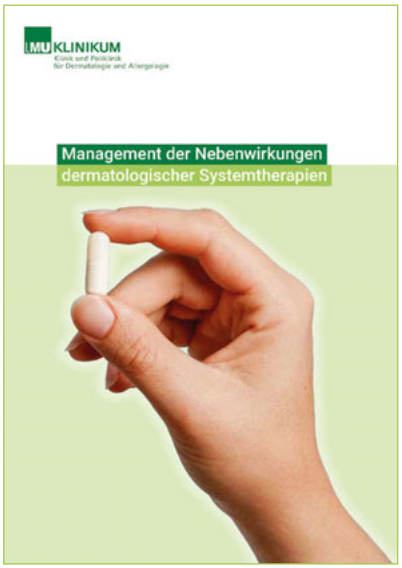
Toxic epidermal necrolysis (TEN) is a fatal drug-induced skin reaction triggered by

Our high scientific standards are reflected in a recent publication by our research group under the first authorship of Dr. Thierry Nordmann on the subject of proteomics. This was accepted in the renowned journal Nature.

Patient information brochures for specific illnesses

More new patient information brochures have been created to give informations about most common inflammatory skin diseases. These have the purpose to give objective informations to patients and will be available free of charge from our webpage.



14 Promotions, grants, honors and awards

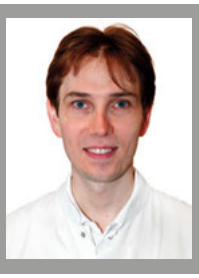
Promotions

Prof. Felix Lauffer was appointed Professor (Univ-Prof.) and director of our specialty clinic for inflammatory skin diseases and immunodermatological lab at Ludwig Maximilian University in 2024

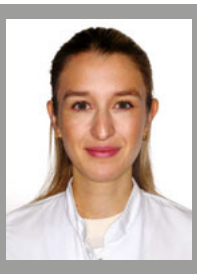
PD Dr. Christiane Pfeiffer was appointed leading consultant at Dermatologie 1, München-Klinik in 2024

Dr. Rubén Ferrer was appointed consultant (Oberarzt) at Ludwig Maximilian University in 2024

Dr. Dr. Benjamin Kendziora was appointed consultant (Oberarzt) at Dermatologie 1, München-Klinik in 2024

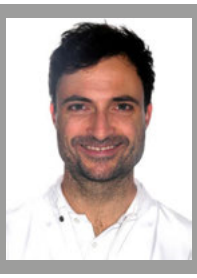


Dr. Anne-Charlotte Kuna was appointed consultant (Oberärztin) at Dermatologie 1, München-Klinik in 2023



Dr. Anne Gürtler was appointed consultant (Funktionsoberärztin) at Ludwig Maximilian University in 2023

Dr. Diana Lill was appointed consultant (Funktionsoberärztin) at Dermatologie 1, München-Klinik in 2023



Sebastian Mastnik was appointed consultant (Funktionsoberarzt) at Dermatologie 1, München-Klinik in 2024

Mohammed Mitwalli was appointed consultant (Funktionsoberarzt) at Ludwig Maximilian University in 2024

Congratulations to our new Board-certified Dermatologists! FHM board exam, Dermatology and Venerology

2023:

- Dr. Narjes Alelq
- Dr. Leonie Frommherz
- Dr. Diana Lill
- Dr. Teresa Müller
- Dr. Farnaz Rahimi

2024:

- Dr. Federica Corsi
- Dr. Laurie Eicher
- Dr. Till Kämmerer
- Dr. Benjamin Kendziora, Ph.D.
- Dr. Sebastian Mastnik
- Dr. Michaela Maurer
- Dr. Mohammed Mitwalli
- Dr. Suzanna Salzer
- Dr. Justin Schlager
- Dr. Sonja Senner

Sub-specialization Allergology, Andrology, Medical Tumor Therapy, Proctology, Plastic Surgery, Palliative Medicine or Medical Quality management

2023:

- Priv. Doz. Dr. Mattis Bertlich
- Dr. Jérôme Srour

2024:

- Priv. Doz. Dr. Mattis Bertlich
- Dr. Kendziora, Ph.D.
- Dr. Jérôme Srour

European Board of Dermatology Exam (EBDV)

2024:

- Dr. Till Kämmerer
- Dr. M. Mitwalli

Nominations as chairpersons or senior physicians and at other medical/university departments in Germany and abroad

- Prof. Dr. Daniela Hartmann: since December 2024 Chairwoman of the Department of Dermatology II, München Klinik
- Dr. Justin Schlager was appointed consultant at Clinica Universidad de Navarra, Madrid
- Dr. Jérôme Srour was appointed consultant at Hautzentrum Wien

Grants

The Department of Dermatology at the LMU-Hospital has received grants amounting to more than € 6 million in 2023 and 2024:

Prof. Daniela Hartmann, MD, Ph.D,

Research grant, DFG 2024, Project „Intraoperative konfocale Laserscanningmikroskopie and künstliche Intelligenz für optimierte chirurgische Exzision von Basalzellcarcinomen“ (475.617€)

Prof. Lucie Heinzerling, MD, MPH

Research grant, European Union, Horizon 2020. Project „Oncobiome: GutOnco Microbiome Signatures (GOMS) associated with cancer incidence, prognosis and prediction of treatment response” (847.125,- €)

Research grant, e: Med, Bundesministerium für Bildung und Forschung. Project „Melautim: Profiling of melanoma patients and patients with autoimmunity – Systems medicine analysis of melanoma and autoimmunity regarding in the context of immunotherapy” (541.037,- € of 4.754.671,- € transferred)

Research grant, Deutsche Krebshilfe. Project “PROMIT: Preconditioning of Tumor, Tumor Microenvironment and the Immune system to Immuno-Therapy” (538.730,- € of 581.775,- € transferred)

Research grant, Stiftung Immunonkologie/Therakos (UK) Ltd. Project “SERIO: Side Effect Registry Immuno-Oncology “ (290.000,- €)

Research grant, Bundesministerium für Gesundheit. Project „SCP2 (Skin Classification Project: Smart algorithms to support melanoma diagnostics)” (1.334.224€ of 1.975.554€ transferred)

Research grant, Jöster Foundation. Project „360° CAR- Navigating the full circle of CAR-T cell side effects and safety" (433.400,- € of 3.599.187,- € transferred)

Research grant, Sturm foundation. Project „Optimizing terapy of immunotherapy-induced side effects" (23.500 €)

PD Dr. Dr. Benjamin Clanner-Engelshofen,

Research grant, FöFoLe+ of the Munich Clinician Scientist Program (MCSP). Project TACTIC – Toxicologically tACkling Therapy In rosaCea (126.500€)

Univ.-Prof. Dr. rer. nat. Iris Helfrich ,

Research grant, DFG. Project "Unraveling the plasticity and tumor-promoting role of neutrophils as a function of tumor heterogeneity" (387.840€)

Reasearch grant, Ymmunobio. Project "Investigation of the therapeutic effect of CEACAM1 blockage in the context of immunotherapy" (27.500€)

Reasearch grant, Hiege Stiftung- Die Deutsche Hautkrebsstiftung. Project "Influence of tumor cell plasticity on the establishment and therapy of brain metastases of malignant melanoma -New models, new options-" (37.000€)

Reasearch grant, EU, Horizon2020, Marie Curie PhD Program. Project "Therapeutic validation of DNA helicases in cancer" (249.216€)

Dr. Benjamin Kendziora, Ph.D.,

Research grant, FöFoLe+ of the Munich Clinician Scientist Program (MCSP). Project Reduzierung von systematischer Verzerrung in Meta-Analysen durch Weiterentwicklung einer Software zur Berechnung einheitlicher Effektmaße und Anwendung der Software bei der Bestimmung der Diagnostischen Genauigkeit von Ex-Vivo Konfokaler Laserscanmikroskopie in der Dermatologie (126.500€)

Dr. Rubén Ferrer,

Research grant, LMUexcellent (76.400€)

PD Dr. Burkhard Summer, PD Dr. Eva Oppel,

Research grant, Aesculap, Project „Eisen als potentielles neu erkanntes Allergen bei Patienten mit Implantatallergie – Rolle von Metall-/Partikelfreisetzung von Implantaten und Instrumentarium", (64.850 €)

Research grant, Smart Practice, Project "Clinical Evaluation of Metal Panel Allergens: Aluminum, Copper, Manganese, Molybdenum, Tin, Titanium, Vanadium and Zinc Dose Response Study (82.795 €)

IT grant, DFG, Project "Großgeräte der Länder", (50.000,- €)

Dr. Leonie Frommherz,

Research grant from EI Cure project of 25.000 BP in 2024

Prof. Dr. Kathrin Giehl,

Research grant of 340.000 Euro for the BesonderHaut outpatient counseling center and children with skin diseases

Prof. Lars E. French,

Research grant Leo Pharma (703.300 €) Defining the molecular heterogeneity of, and role of IL-1 family numbers in-, the inflammatory skin diseases hidradenitis suppurativa, acne vulgaris and palmoplantar pustulosis

Department Awards

The Department received in 2023 and 2024 the Focus Magazine Certificate of one of the top Dermatology Departments in Germany.

Honors and awards

PD Dr. Mattis Bertlich has received the "Joachim Ganzer Preis für Allergien-Immuntherapie" by DGAKI (Deutscher Allergiekongress) in September 2024.

The psychologist Dr. Stefan Zippel has been awarded with the highest civilian distinction, the Cross of Merit, in recognition of his contributions.

Dr. Stefan Zippel and Ulrike Scharf, minister of state at the conferment on October 2nd, 2024

Prof. Lars French has been inducted into the Dermatology Hall of Fame in 2024:

The Dermatology Hall of Fame proudly announces its 2024 inductess:

Lars Einar French, MD
Amy Paller, MD
Phillip McKee, MD

Felix Pinkus, MD (1868 - 1947)
Harvey Blanck, MD (1918 - 2001)
Hermann Pinkus, MD (1905 - 1985)

15 Retrospective on Prof French's Presidency of the International League of Dermatological Societies (ILDS) 2019-2023

Representing 217 member organisations and 215.000+ dermatologists at the highest level globally (www.ilds.org)

Prof Lars French's Presidency Lookback

7 Jul 2023

Moving the ILDS to new horizons in dermatological policy, education and global health

As Prof Lars French completes his term as the President of the International League of Dermatological Societies (ILDS) ahead of the 25th World Congress of Dermatology, we are honoured to reflect on the remarkable achievements and significant milestones that characterised his four-year tenure.

Prof Lars French's presidency at the International League of Dermatological Societies (ILDS), alongside our outstanding Board of Directors has been a period of remarkable progress and innovation in dermatological policy, education, and global health. Throughout his presidency, Prof French has demonstrated dynamic leadership, strategic vision, and an unwavering dedication to advancing global dermatological health.

Let's take a look back at the significant milestones and achievements that have shaped his presidency.

One of the defining moments of Lars' presidency was his official assumption of the ILDS presidency at the **24th World Congress of Dermatology** in June 2019. Taking over from Past President Harvey Lui, Lars received the ILDS/WCD Gavel from WCD2019 President Giovanni Pellancani, symbolising the responsibility and authority entrusted to him to lead the ILDS into the future.

Prof French's leadership was instrumental in developing and implementing the **ILDS and International Foundation for Dermatology (IFD) Priorities for 2020-2023** centred around the theme "Global Partnerships for Skin Health." This involved close collaboration with the passionate and talented ILDS Board, Committees, and Secretariat over the past four years, ensuring a focused and strategic approach to address the challenges faced by the dermatology community worldwide.

Under Prof French's guidance, the ILDS has experienced unprecedented growth and fostered crucial partnerships. At the **#EADV2019** conference, Lars played a key role in **World Skin Health Day** promotions and engaged in important discussions alongside International Society of Dermatology President, George Reizner.

He also promoted the **Global Psoriasis Atlas (GPA)**, a collaboration between ILDS, International Psoriasis Council (IPC), and International Federation of Psoriasis Associations (IFPA), which was launched later in October 2019. Thanks to the GPA team and collaborating organisations, future funding for the GPA was secured, and a Scientific Advisory Board was established for the project.

Strengthening the ILDS's relationship with the **World Health Organization (WHO)** has been another significant accomplishment of the ILDS under Prof French's leadership. In March 2022, the ILDS secured an additional three years of "official relations" status with the WHO.

Source: The International League of Dermatological Societies (ILDS)

Notably, the neglected tropical disease department recognised the importance of skin diseases and embraced the term „skin NTDs." This led to the launch of the Skin NTD Framework in June 2022, providing guidance to countries and partners in addressing skin NTDs and ensuring the holistic management of other skin diseases.

Prof French has been actively involved in advancing **World Skin Health Day** over the last four years, with the support of the talented World Skin Health Day Working Group and joint project partner, the International Society of Dermatology (ISD), which has reached over 34 million people since 2017. As Chair of the World Skin Health Day Working Group, this included the development of a full rebrand, a new website, and planning the 10th-anniversary celebrations, set to launch at the 25th World Congress of Dermatology in Singapore.

In 2020 and beyond ILDS successfully navigated the challenges posed by the **COVID-19** pandemic. From March 2020 onwards, the ILDS released regular articles from Member Societies around the world, sharing their experiences in dealing with the pandemic. Guidelines were prepared, and a collaboration with the American Academy of Dermatology (AAD) led to the launch of the ILDS-AAD COVID-19 Dermatology Registry, spearheaded by Prof Esther Freeman from Harvard University. This demonstrated Prof French's commitment to supporting the dermatology community and ensuring the dissemination of vital information during challenging times.

During the 75th World Health Assembly in May 2022, the **World Skin Health Coalition** (previously known as the Global Dermatology Coalition) was officially launched. As part of this diverse coalition, the ILDS worked alongside GlobalSkin (formerly International Alliance of Dermatology Patient Organisations) and other stakeholders to raise awareness of the impact of dermatological diseases and increase the healthcare prioritisation of these conditions by the World Health Organization (WHO) and global decision-makers.

The primary objective of the coalition is to raise awareness about the significant burdens imposed by dermatological diseases and strive for improved patient outcomes on a global scale. Prof French's involvement in the project, representing ILDS together with ILDS board-member Luca Borradori, ensured that the voices of ILDS Members and dermatology professionals around the world were heard and contributed to the coalition's efforts to effect positive change in addressing dermatological issues worldwide.


Source: The International League of Dermatological Societies (ILDS)

Prof French's presidency also saw the successful hosting of the **3rd World Skin Summit** in October 2022 in Peru. This event, prepared together with ILDS Board Member Henry Lim, the ILDS Board and the Peruvian Dermatology Society brought together experts and stakeholders to address global dermatological challenges and define strategies for the ILDS to tackle them effectively. The summit also marked the launch of the **Global Atopic Dermatitis Atlas (GADA)**, a significant milestone in addressing data gaps and building upon the success of the Global Psoriasis Atlas (GPA).

Dermatologists are uniquely positioned in global health because skin conditions are often the presenting sign of severe illness such as NTDs and COVID-19, we at the ILDS are a non-governmental organisation that has the privilege of being an official relation of the World Health

Organization (WHO) and aim to improve skin health for the world through our active collaboration with the WHO.

In April 2023, nine ILDS Board Members and Advisors came together to commemorate World Health Day in a captivating video. With their collective expertise, they highlighted and raised awareness of the vital role that dermatology and skin health play as part of the global health agenda. Watch the video now!

Throughout their terms, Prof French and the outstanding ILDS Board of Directors have represented the ILDS at countless meetings and member society conferences worldwide, tirelessly **promoting the work of the ILDS** and raising awareness of dermatological issues on the global stage.

Notably, Prof French joined IFD Chair, Claire Fuller, IFD Vice-Chair, Esther Freeman with other ILDS staff representatives for conversations with key stakeholders at the first-ever **WHO Global Meeting on Skin-Related NTDs** in Geneva in March 2023, advocating for greater efforts to address the burden, disability, and stigma caused by skin diseases.

In April 2023, Prof French launched the **Global Partnerships for Education and Care (GPEC)** programme, aiming to improve the standard of dermatological education and care worldwide. By facilitating mutual learning and exchange partnerships between dermatology departments from different resource settings worldwide, GPEC addresses an unmet need identified during the World Skin Summit in Ho Chi Minh City. **Learn more about the programme in this video from Prof French** (https://youtu.be/qtW8ynk8Ow8).

Prof Lars French's presidency has also seen the modernisation and professionalisation of the **ILDS office** and staff team in London, with the appointment of a new Executive Director, Arpita Bhose, and Head of Operations, Emma van Rooijen. The team has grown significantly over the last four years, enabling the ILDS to better serve its members and advance its mission.

Additionally, Prof French strengthened the International Foundation for Dermatology (IFD) by recruiting Prof Esther Freeman as the IFD Vice-Chair and External Advisor for the COVID-19 Registry and GLODERM.

Prof Valeska Padovese was also welcomed as an expert External Advisor to the IFD Migrant Health Working Group, focusing on Migrant Health, vulnerable populations, and Sexual Health/HIV.

As Prof Lars French concludes his presidency, along-

Source: The International League of Dermatological Societies (ILDS)

side many of the incredible ILDS Board, including ILDS Secretary-General, Hassan Galadari, ILDS Treasurer, Brigitte Dréno, Past President, Harvey Lui, International Director, Ramesha Bhat, Associate Director, Ncoza Dlova, Asia Pacific Regional Director, Kenji Kabashima, International Director, Margarita Larralde, Latin America inc. Caribbean Regional Director, Omar Lupi, WCD2019 President, Giovanni Pellacani and Regional Director, Daniel Siegel, the ILDS stands at the forefront of global dermatological policy, education, and health. Their tireless efforts, visionary leadership and unwavering commitment have propelled the ILDS to new horizons, leaving a lasting impact on the field of dermatology and paving the way for a better future for people around the world.


Source: The International League of Dermatological Societies (ILDS)

We thank each and every one of the ILDS Board of Directors for their commitment and service to the ILDS during the past four years and for making such a huge and invaluable contribution towards the ILDS' vision "Skin Health for the World".

Source: The International League of Dermatological Societies (ILDS)


Source: The International League of Dermatological Societies (ILDS)

"I am immensely grateful to the ILDS Board, staff, partners, supporters, and our unique and growing global community of members, for an unforgettable journey of collaboration and progress over the last four years.
Your unwavering support has made my term as President truly remarkable.


Source: The International League of Dermatological Societies (ILDS)

It has been an incredible journey, thank you. Here's to a bright future for global dermatology and Skin Health for the World!"

Prof Lars French

16 Partners, collaboration with industry, fundraising

We are deeply grateful to our supporters—pharmaceutical companies and medical device manufacturers—whose generous contributions make these educational events possible. Their partnership ensures that we can continually offer high-quality educational programs for the dermatological community. Moreover, our clinic is actively involved in numerous clinical studies, which not only broaden the treatment options for our patients but also contribute to the advancement of dermatological science. The high volume of studies we conduct reflects the confidence the research-based pharmaceutical industry places in us. In addition to industry support, many of our research projects are funded by public institutions. Government funding is essential, particularly for research into rarer diseases, as it provides the resources needed to conduct studies on a solid scientific foundation.

We extend our sincere thanks to our partners from both the scientific and industrial sectors. Their trust and support are crucial to the success of our research endeavors, and their collaboration helps drive innovation in the field of dermatology.

- Almirall Hermal GmbH
- Amgen GmbH
- Healthcare Celltrion
- Incyte
- Janssen-Cilag GmbH
- Klinge Pharma
- Leo Pharma GmbH
- Lilly Deutschland GmbH
- Novartis Pharma GmbH
- Pfizer Pharma GmbH
- Sanofi-Aventis Deutschland GmbH
- UCB Pharma GmbH

Other corporate partners

- Aesculap AG
- ALK Abéllo A/S
- Allergopharma
- Astra Zeneca GmbH
- Beiersdorf AG
- Bencard Allergie
- Biofrontera AG

- Bristol-Myers Squibb GmbH & Co. KGaA
- Celgene
- Ceram Tec
- Chiesi
- Delcath
- Dermasence
- Dermapharm AG
- Euroimmun Medizinische Labordiagnostika AG
- Galderma Laboratorium GmbHs
- GlaxoSmithKline GmbH & Co. KG
- Hal Allergy
- Hans Karrer GmbH
- Kyowa Kirin GmbH
- L'Oréal Deutschland GmbH
- MSD Sharp & Dohme GmbH
- Mylan Pharma GmbH
- Nestlé Nutrition GmbH
- Nutricia GmbH
- P&M Cosmetics GmbH & Co. KG
- PellePharm
- Pfizer Pharma GmbH
- Dr. Pfleger Arzneimittel GmbH
- Pierre-Fabre Pharma GmbH
- Recordati Rare Diseasess
- La Roche Posay
- Sun Pharma
- Takeda Oncology
- Texamed GmbH
- Thermo Fisher Scientific
- Töpfer GmbH
- Ultrasun

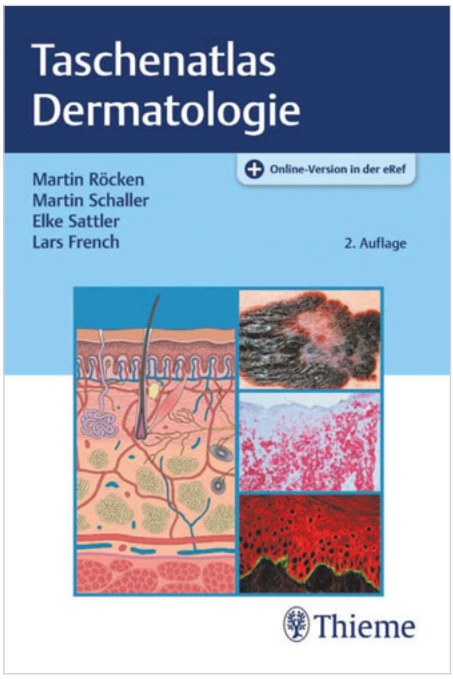
Donor

- 20.000 € Prof. Dr. Wieselhuber

17 Publications in 2023 and 2024

"Taschenatlas Dermatologie" is an illustrated guide composed of adhacent pages of text and illustrations aimed at concisely covering the broad spectrum of dermatological pathologies. This easy-to-use book provides a wealth of practical knowledge essential in both daily practice and when planning treatment.

The beautifully illustrated and comprehensive pocket atlas of clinical dermatology is a handy clinical reference for dermatologists and general practitioners, as well as an excellent review tool for medical students.



Die atopischen Krankheiten umfassen v.a. 3 große Entitäten, deren pathophysiologische Interaktion nicht absolut sicher geklärt ist:

- atopisches Ekzem,
- Rhinitis allergica,
- allergisches/extrinsisches Asthma.

Gemeinsam ist allen 3 Krankheiten die Neigung zu erhöhtem Spiegel an Gesamt-Immunglobulin E (IgE) oder IgE für spezifische Proteinantigene von Pollen, Milben und (seltener) auch Nahrungsmitteln. Die Prädisposition für die 3 Krankheiten wird gemeinsam vererbt. Inwieweit die atopische Dermatitis pathophysiologisch mit den beiden anderen Erkrankungen verknüpft ist, bleibt noch ungeklärt, v.a. weil fast die Hälfte aller Patienten mit atopischer Dermatitis im Serum keine erhöhten IgE-Serum-Konzentrationen aufweisen.

Atopisches Ekzem

Epidemiologie

Viergipfliger Verlauf mit dem größten Gipfel zwischen 3. Monat und 2. Lebensjahr (5–10%), einem zwischen 6. und 16. Lebensjahr und je einem zu Beginn des Berufslebens und jenseits des 60. Lebensjahrs (▸ Abb. 14.9).

Pathogenese

Drei pathogenetische Faktoren werden als besonders relevant diskutiert.

▸ **Gestörte epidermale Barriere.** Sie wird u.a. häufig durch Mutationen im Filaggrin-Gen mitverursacht und führt zur erhöhten Empfindlichkeit gegenüber minimalen toxischen Reizen wie Exsikkation. Die gestörte epidermale Barriere manifestiert sich in der Neigung zur Trockenheit der Haut (Xerose). Dies führt insbesondere dazu, dass die Betroffenen bei alltäglichen Belastungen der Haut wie häufigem Waschen oder Desinfizieren, so bei Feuchtberufen, nur verzögert eine schwächere sog. Schwiele ausbilden. Stattdessen reagiert die Haut auf die Schädigung mit einem Ekzem. Auch bei starker Austrocknung, so in geheizten Räumen im Winter, kann sich eine Xerose so weit verschlechtern, dass die Haut mit einem Ekzem reagiert; dies ist insbesondere bei älteren Menschen häufig. Die follikulären Hyperkeratosen bei Atopikern könnten pathophysiologisches Korrelat einer Überkorrektur bei gestörter epidermaler Barrierebildung sein.

Klinisches Korrelat Teils follikuläre Hyperkeratosen und eine Störung des epidermalen Wasserverlusts. Mäuse mit genetischen Störungen der epidermalen Filaggrine entwickeln eine Neigung zur Entzündung der Haut, die einem Ekzem ähnlich sind.

▸ **Gestörte Immunität.** Die immunologische Dysfunktion ist dadurch belegt, dass die atopische Dermatitis durch immunsuppressive Therapien i.d.R. gebessert wird und im Ekzem aktivierte T-Lymphozyten und mit IgE beladene DC nachweisbar sind. Letztere können T-Lymphozyten besonders wirksam stimulieren und die Rekrutierung allergenspezifischer T-Lymphozyten in die Haut und die Initiierung von Autoimmunantworten verursachen.

Patienten mit atopischem Ekzem haben einerseits Defekte der angeborenen Immunität (Innate Immunity), mit einer verringerten Produktion an Defensinen, nicht nur in der Epidermis, sondern auch im Schweiß. Zum anderen ist die T_{H1}/T_{H2}-Balance in Richtung einer IL-4-dominierten T_{H2}-Immunität verschoben. Dies führt zu dem erhöhten IgE-Spiegel, und ist auch pathogenetisch wichtig, da Antikörper gegen den gemeinsamen IL-4-/IL-13-Rezeptor bei schweren atopischen Ekzemen klinisch zur Besserung führen. Da IL-4 die IL-23-Produktion in APC unterdrückt und so die IL-17-Produktion verhindert, kann die erhöhte IL-4-Produktion die Empfindlichkeit für Staphylokokken erklären.

▸ **Infektion mit Staphylococcus aureus.** Die kombinierte Dysfunktion von epidermaler Barriere, Defensinproduktion und eine verminderte IL-17-Produktion mag dafür verantwortlich sein, dass etwa 95% aller atopischen Ekzeme mit Staphylococcus aureus infiziert sind. Staphylococcus aureus selbst kann über Zellwandmoleküle eine Aggravation des Ekzems verursachen.

Klinik

▸ **Säugling/Kleinkind.** Ab dem 3. Monat beginnen Babys meist mit dem Kratzen der stark juckenden Haut; gleichzeitig weisen sie oft starke, eiterdurchsetzte Schuppenkrusten (Milchschorf) am behaarten Kopf auf (▸ Abb. 14.9). In den kommenden Wochen entwickelt sich eine entweder an Kopf und Extremitäten betonte oder generalisierte, stark exsudative Dermatitis mit diffus verteilten ödematösen Plaques, Krusten, Schuppenkrusten und Exkoriationen. Die Superinfektion dominiert oft und erfordert eine kombinierte antientzündliche/antiinfektiöse Therapie. Eine deutliche Spontanbesserung tritt bei etwa 90% bis zum 3. Lebensjahr ein.

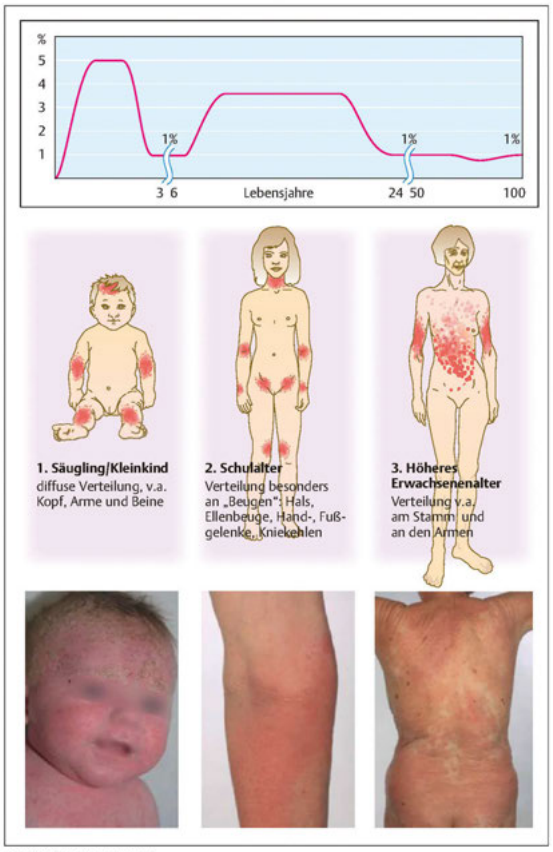


Abb. 14.9 Atopisches Ekzem [2].

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