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IMM PROFILE

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IMM
Institute of
Musculoskeletal
Medicine

IMPRINT

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Münster, June 2022

INHALT
CONTENT

IMM Institute of Musculoskeletal Medicine

INSTITUTE OF MUSCULOSKELETAL MEDICINE IMM

RESEARCH AREAS

APPENDIX

WELCOME

Within the following pages, I hope to introduce the Institute of Musculoskeletal Medicine (IMM) and provide an insight into the basis and directions of our current research.

Musculoskeletal medicine carries a long-standing history in Münster. Building on existing structures, the IMM was founded in 2009 alongside the Centre of Musculoskeletal Medicine, forming a backdrop for the development of a dynamic translational research unit. By creating this integrated structure, it was our aim to concentrate the available resources within joint-, bone- and skeletal research in Münster, align them with the target areas of the Medical Faculty and thus to strengthen the focus within the faculty as well as both nationally and internationally. Our key driving factor was the need to develop integrated musculoskeletal research within its own domain, with patient care prioritised as a central characteristic of university medicine. During this time, it has been our aim to deliver high level basic research into musculoskeletal science, to prioritise projects addressing clinically relevant challenges and to link our findings back to the clinic to improve patient outcomes. In turn, it has been our goal to use scientific expertise to study clinical problems within their basic science context, using state-of-the-art research tools to generate bidirectional translation.

A second key aim has been to develop and utilise interdisciplinary expertise within the IMM. To this end, we have been able to include all major clinical musculoskeletal disciplines, including orthopaedics, traumatology, osteology and rheumatology and complemented them with relevant basic science disciplines, including developmental biology and immunology. This translational and interdisciplinary focus of the IMM has been supported with structural measures. Thus, the de-novo creation of faculty positions that either cover cross-sectional basic science areas or follow the Münster concept of 'Clinical Translational Professorships' (CTPs) providing a link between basic and clinical science, has been a key element in the development of the IMM.

With its five W3 rank professorships and around 100 staff, the IMM is today one of the largest research institutes at the medical faculty in Münster. As part of the Centre of Musculoskeletal Medicine, the IMM belongs to the best performing institutes when it comes to the acquisition of third-party research funds. This is also reflected by the number of young research talents working towards scientific qualifications within the institute. At present within the IMM, there are more than 20 early career scientists from 10 countries pursuing academic degrees alongside developing key research skills. In this context, supporting young scientists within their academic progression and towards the development of the next phases of their careers in either academia or industry is a key matter of pride for us.

I very much hope that you will enjoy flipping through these pages to find out more about the research areas and initiatives within the IMM.

Best regards

Thomas Pap
Executive Director of the IMM

IMM Institute of Musculoskeletal Medicine

medizinische fakultät
Westfälische Wilhelms-Universität Münster

WILLKOMMEN

Auf den folgenden Seiten möchte ich Ihnen unser Institut für Muskuloskelettale Medizin (IMM) vorstellen und Ihnen einen Einblick in unsere Forschung geben.

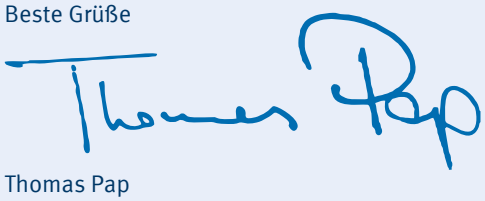
Die muskuloskelettale Medizin in Münster blickt auf eine lange Historie zurück. Aufbauend auf deren bestehenden Strukturen wurde 2009 das Zentrum für Muskuloskelettale Medizin und damit auch unser IMM gegründet. Das Ziel der Institutsgründung bestand darin, die verschiedenen Ressourcen im Bereich der Forschung zu Knochen- und Gelenkerkrankungen in Münster zu bündeln, sie an den Schwerpunkten der Medizinischen Fakultät auszurichten, und sie sowohl innerhalb der Fakultät als auch national und international zu stärken. Zentraler Ansatzpunkt ist dabei eine enge Verzahnung der muskuloskelettalen Forschung mit der Krankenversorgung als identitätsstiftendes Merkmal moderner universitätsmedizinischer Einrichtungen. Unser Ziel ist es einerseits, muskuloskelettale Grundlagenforschung auf hohem Niveau durchzuführen, diese aber gleichzeitig eng an klinisch relevanten Problemen auszurichten und mit der Klinik zu verzahnen. Umgekehrt sollen klinische Fragestellungen direkt in ihren grundlagenwissenschaftlichen Kontext untersucht bzw. mit Hilfe ihrer Methoden beantwortet werden, um so eine Translation in beide Richtungen zu erreichen.

Ein zweiter zentraler Schwerpunkt des IMM ist die Interdisziplinarität. Dazu haben wir ein breites Spektrum von Fächern wie Orthopädie, Unfallchirurgie, Osteologie, und Rheumatologie einbezogen und um relevante Disziplinen wie Entwicklungsbiologie und Immunologie ergänzt. Die interdisziplinäre und translationale Ausrichtung ist dabei nicht nur inhaltlich geprägt, sondern wird auch durch entsprechende Strukturen gestützt. Die Schaffung von Fakultätspositionen, die entweder grundlagenwissenschaftliche Querschnittsbereiche abdecken oder im Sinne des Münsteraner Konzepts von Klinisch-Translationalen Professuren (CTPs) die Verbindung von Grundlagen- und klinischer Forschung herstellen, ist daher ein wichtiges Element in der Entwicklung des IMM.

Heute ist das IMM mit seinen fünf W3 Professuren sowie fast 100 Mitarbeiterinnen und Mitarbeitern eines der größten Forschungsinstitute an der Medizinischen Fakultät in Münster. Mit dem gesamten Zentrum für Muskuloskelettale Medizin gehört es zu den drittmittelstärksten Einrichtungen der Medizinischen Fakultät. Das spiegelt sich auch in der Nachwuchsförderung wider, die eines der Kernanliegen des IMM ist. Gegenwärtig arbeiten am IMM mehr als 20 Wissenschaftlerinnen und Wissenschaftler aus insgesamt 10 Ländern an ihrer wissenschaftlichen Qualifikation. Dabei betreuen wir Wissenschaftlerinnen und Wissenschaftler nicht nur in der Studien-, Promotion- und Habilitationsphase, sondern helfen auch beim Aufzeigen zukünftiger Perspektiven, sei es in der akademischen Forschung oder der Industrie.

Ich hoffe, Sie haben Freude beim Blättern durch die folgenden Seiten und finden einige hilfreiche Informationen.

Beste Grüße



Thomas Pap
Direktor des IMM

UKM Universitätsklinikum Münster

WWU MÜNSTER

HEADS

Die Mitglieder des Leitungsteams des IMM bringen Expertisen auf ganz verschiedenen Gebieten der Muskuloskelettalen Medizin ein und tragen so zur Mission unseres Instituts bei, biomedizinische Grundlagenforschung und hochspezialisierte Patientenversorgung im Sinne einer Translation in beide Richtungen zu verknüpfen.

The members of the IMM leadership team use their complementary expertise in different areas of musculoskeletal medicine to contribute to the overall mission of our institute which is to bridge basic science with specialized patient care for translation into both directions.

Univ.-Prof. Dr. med.

THOMAS PAP

1997 Doctorade (Dr. med.), University of Magdeburg, Germany

2001 - 2005 Head of Emmy-Noether Gruppe (DFG), University of Magdeburg, Germany

2004 Habilitation, Medical Faculty, University of Zurich, Switzerland

2009 - ongoing Executive Director, Institute of Musculoskeletal Medicine, Center of Musculoskeletal Medicine, University of Münster, Germany

Univ.-Prof. Dr. med.

RICHARD STANGE

2003 Doctorade (Dr. med.), University Hospital Charité, Berlin, Germany

2015 Habilitation, Medical Faculty, University of Münster, Germany

2017 - ongoing Head, Department of Translational Regenerative Medicine, Institute of Musculoskeletal Medicine, University of Münster, Germany

2017 - ongoing Head, Department of Regenerative Musculoskeletal Medicine, University Hospital Münster, Germany

2020 - ongoing Head, Orthopaedic, Trauma, Hand and Reconstructive Surgery, UKM Marienhospital Steinfurt, Germany

1996	Doctorade (Dr. rer. nat.) Ludwig-Maximillian University, Munich, Germany
1996 - 2002	Postdoctorate, Harvad Medical School, USA
2010	Habilitation, University of Vienna, Austria
2002 - 2012	Group Leader at the Institute of Molecular Pathology (IMP), Vienna, Austria
2012 - ongoing	Head, Department of Bone and Skeleton Research, Institute of Musculoskeletal Medicine, University Münster, Germany

Univ.-Prof. Dr. rer. nat.

CHRISTINE HARTMANN

2001	Doctorate (Dr. med.), University of Erlangen-Nuremberg, Germany
2012	Postdoctorate (Habilitation Equivalent), Harvard Medical School, USA
2018	Adjunct Associate Professorship, Yale School of Medicine, USA
2020 - ongoing	Head, Department of Translational Rheumatology and Immunology, Institute of Musculoskeletal Medicine, University of Münster, Germany
2020 - ongoing	Chief, Section of Rheumatology and Clinical Immunology, University Hospital of Münster, Germany

Univ.-Prof. Dr. med.

MARTIN KRIEGEL

2006	Doctorate, Ruhr University Bochum, Germany
2014	Habilitation, Ruhr University Bochum, Germany
2018 - ongoing	Head Department of Plastic and Reconstructive Surgery, Institute of Musculoskeletal Medicine, University of Münster, Germany
2018 - ongoing	Head Division of Plastic and Reconstructive Surgery, University Hospital Münster, Germany
2018 - ongoing	Head Department of Plastic-, Reconstructive and Aesthetic Surgery, Fachklinik Hornheide, Münster, Germany

Univ.-Prof. Dr. med.

TOBIAS HIRSCH

ORGANIGRAMM
ORGANIZATION CHART

UKM Universitätsklinikum Münster

CLINICAL DEPARTMENTS

MED. CLINIC D, NEPHROLOGY, HYPERTENSION AND RHEUMATOLOGY
Univ.-Prof. Dr. H. Pavenstädt

Rheumatology and Clinical Immunology Section — **Univ.-Prof. Dr. Martin Kriegel**

Department of Regenerative Musculoskeletal Medicine — **Univ.-Prof. Dr. Richard Stange**

Plastic Surgery Section — **Univ.-Prof. Dr. Tobias Hirsch**

CLINIC OF TRAUMA, HAND AND RECONSTRUCTIVE SURGERY
Univ.-Prof. Dr. M. Raschke

Management
Dr. Melanie Rieger

Department of Translational Rheumatology and Immunology

Department of Regenerative Musculoskeletal Medicine

Department of Plastic and Reconstructive Surgery

Biomechanics

ADMINISTRATION

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Univ.-Prof. Dr. Thomas Pap

Project Coordination
Andrea Wauligmann

Administration
Jennifer Paruzel-Gerding

DEPARTMENTS

TRANSLATIONAL DEPARTMENTS

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Univ.-Prof. Dr. Richard Stange

Univ.-Prof. Dr. Tobias Hirsch

RESEARCH DEPARTMENTS

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Department of Molecular Medicine

Univ.-Prof. Dr. Christine Hartmann
Department of Bone and Skeletal Research

CORE

Dr. Christoph Kittl

Dr. Uwe Hansen
Electron Microscopy

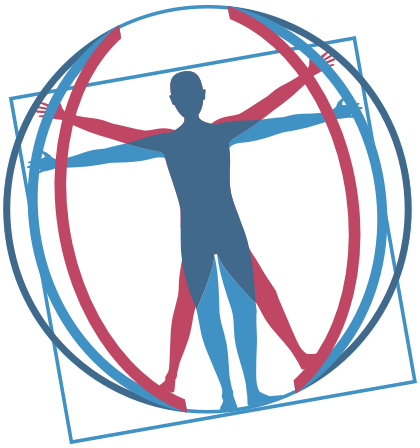
ABTEILUNG

MOLEKULARE MEDIZIN

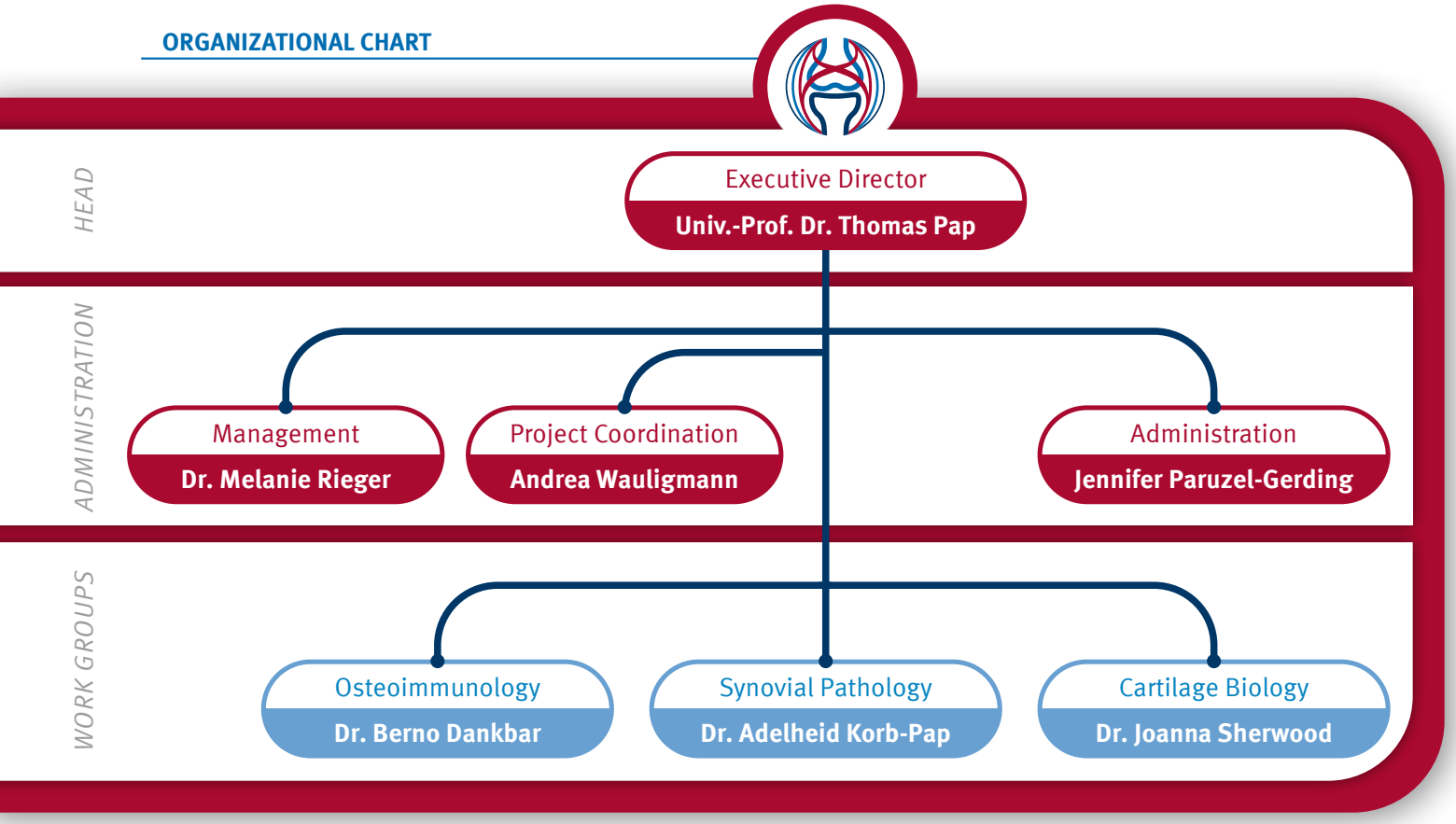
DEPARTMENT OF MOLECULAR MEDICINE

Unsere Abteilung beschäftigt sich vor allem mit den Mechanismen, die zur Programmierung und Aktivierung mesenchymaler Zellen bei entzündlichen, degenerativen und malignen Erkrankungen des Bewegungsapparates führen und die die zelluläre Regenerationsfähigkeit nach Verletzungen und im Alter bestimmen. Diese Forschungsbereiche stellen zentrale Schwerpunkte der drei Arbeitsgruppen Osteoimmunologie, synoviale Pathologie und Knorpelbiologie dar.

Our department focuses on mechanisms that lead to the programming and activation of mesenchymal cells in inflammatory, degenerative and malignant diseases of the musculoskeletal system and that determine their ability to regenerate after injuries and during aging. Within the department, the key research areas are studied in three working groups: cartilage biology, synovial pathology and osteoimmunology.



ORGANIZATIONAL CHART



HEAD

UNIV.-PROF. DR. MED. THOMAS PAP
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ADMINISTRATIVE TEAM

The administrative team provides support for the work groups in this department and to other departments within the institute. Each team member specializes in their respective organizational area and is available as a contact person for all inquiries relating to their work focus.

JENNIFER PARUZEL-GERDING

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- Office Management
- Event Management
- HR-Management
- 3-rd Party funding
- Finance
- IMM evaluation
- Administrative and organizational process management

DR. MELANIE RIEGER

Lab Manager
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- Supervision of governmental rules
- Occupational health and safety
- Genetic engineering
- Animal welfare
- Compliance
- Head of technical systems
- Process planning and organization
- Administration of laboratory and IT infrastructure

ANDREA WAULIGMANN

Project Coordinator BMBF
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Organizational tasks regarding funded BMBF projects:

- Reporting
- Financial review
- Contact person for funding organizations
- Communications
- Social media
- Organizational steering
- Process coordination
- Event Management

WORK GROUP Osteoimmunology

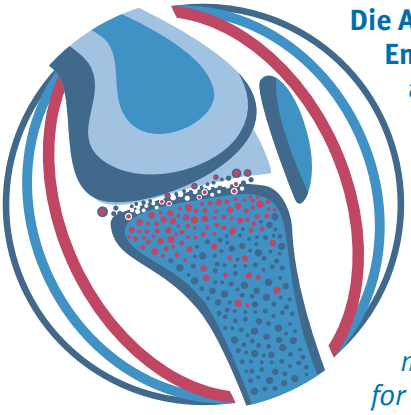
WORK GROUP Synovial Pathology

WORK GROUP Cartilage Biology

ARBEITSGRUPPE

OSTEOIMMUNOLOGIE

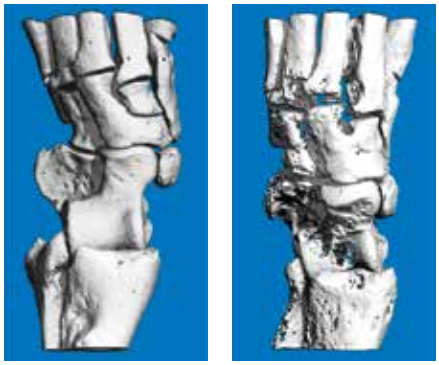
OSTEOIMMUNOLOGY GROUP



Die Arbeitsgruppe Osteoimmunologie beschäftigt sich mit dem Einfluss von Entzündung auf die Knochenhomöostase. Dabei liegt der Focus insbesondere auf den Wechselwirkungen zwischen synovialen Fibroblasten, Immunzellen, Osteoblasten und Osteoklasten. Ziel ist es, Mechanismen der Gelenkzerstörung aufzudecken und neue therapeutische Ansätze zur Behandlung der rheumatoiden Arthritis zu entwickeln.

The Osteoimmunology group is engaged in the impact of inflammation on bone homeostasis. The main focus is the interaction between synovial fibroblasts, immune cells, osteoblasts, and osteoclasts. The aim is to unravel mechanisms of joint destruction and to develop new therapeutic approaches for the treatment of rheumatoid arthritis.

µCT analysis showing considerable bone destruction in hind paws of arthritic mice (right) whereas no bone lesions could be observed in hind paws of healthy mice (left).



CURRENT PROJECTS

- **The protective function of the Wnt inhibitor sclerostin in inflammatory bone destruction** DFG, DA1143/3-2
- **Myostatin-induced mechanisms of inflammatory bone and cartilage destruction by invasive fibroblast-like synoviocytes** DFG SFB1009 Breaking Barriers
- **The impact of myostatin in breast cancer and myeloma bone metastases** DFG SPP2084 µBONE, DA1143/6-1
- **Unraveling Smad2/4-dependent osteoclast differentiation through transcriptome analysis** DFG, GO2846/2-1
- **The role of WAVE Complex in osteoclast-mediated bone destruction in experimental arthritis** DFG, DA1143/9-1

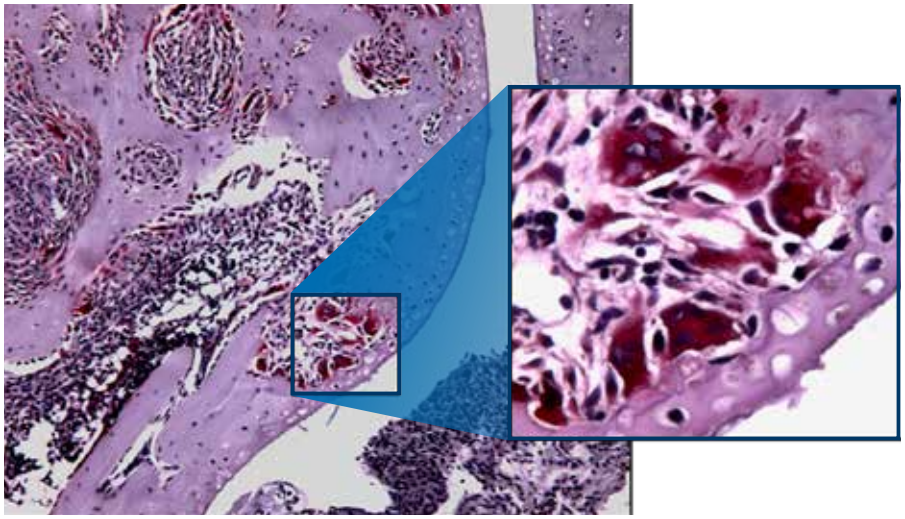


Figure OC: Histological staining showing osteoclasts (red-brownish) in an arthritic mouse joint resorbing bone.

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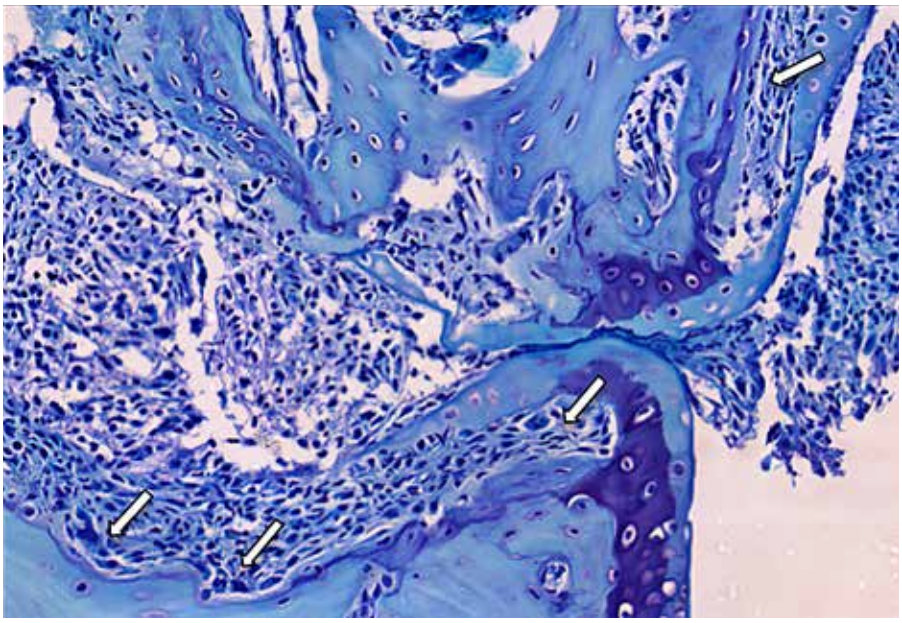
Figure joint/Histo: Histological staining demonstrating high inflammation in a hind paw of an arthritic mouse associated with pannus tissue invading the bone (arrows).



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- Fennen, Michelle et al. **A myostatin-CCL20-CCR6 axis regulates Th17 cell recruitment to inflamed joints in experimental arthritis.** *Scientific reports* vol. 11,1 14145. PMID: 34239010
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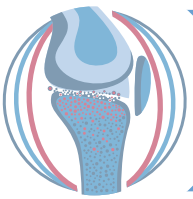
- Intemann, Johanna et al. **Importance of osteocyte-mediated regulation of bone remodelling in inflammatory bone disease.** *Swiss medical weekly* vol. 150 w20187. PMID: 32031236
- Diller, Magnus et al. **The activin-follistatin anti-inflammatory cycle is deregulated in synovial fibroblasts.** *Arthritis research & therapy* vol. 21,1 144. PMID: 31182152



TEAM OSTEOIMMUNOLOGIE

Dr. rer. nat. Corinna Wehmeyer, Postdoc
Mike Dienstbier, PhD student
Julia Reinhardt, PhD student
Eugenie Werbenko, PhD student
Fabienne Geers, Technical assistant
Peter Paruzel, Technical assistant

ARBEITSGRUPPE

SYNOVIALE PATHOLOGIE

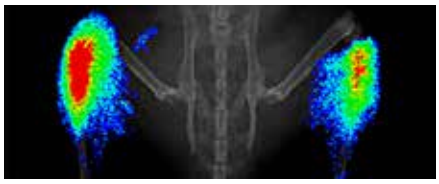
SYNOVIAL PATHOLOGY GROUP

In der rheumatoiden Arthritis sind aktivierte Fibroblasten-ähnliche Synoviozyten durch Interaktionen mit der extrazellulären Knorpelmatrix und anderen synovialen Zellen an Gelenkdestruktionen beteiligt. In unseren Projekten identifizieren wir Mechanismen, die diese pathologischen Prozesse vermitteln und potentielle therapeutische Targets darstellen.

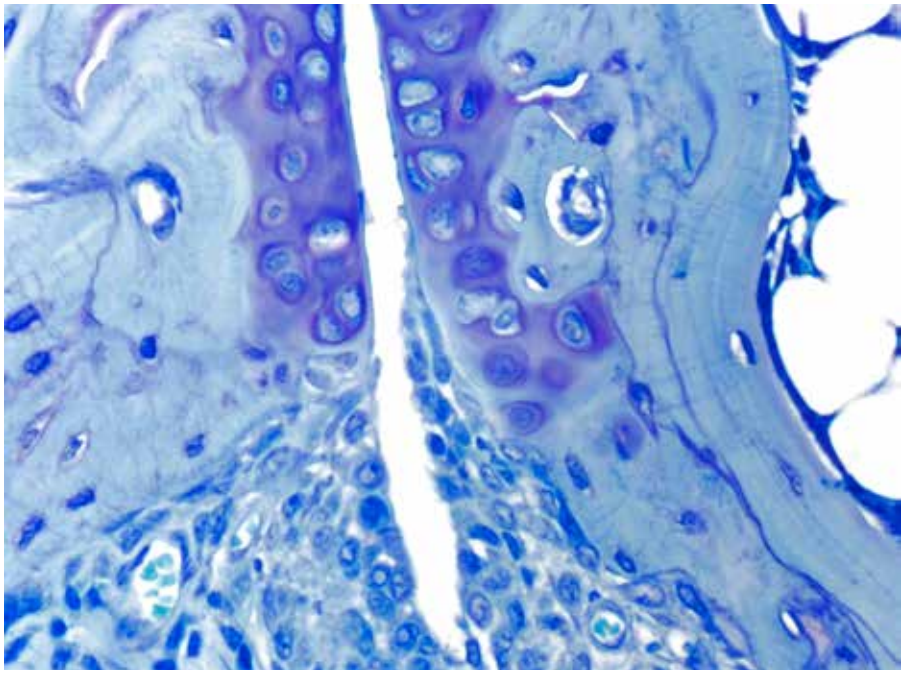
In rheumatoid arthritis, fibroblast-like synoviocytes participate in disease-related joint destructions caused by their activation, adhesion to components of the extracellular matrix and interactions with other synovial cells. In our projects we aim to identify mechanisms mediating these pathological processes that could represent targets for therapeutic use.

CURRENT PROJECTS

- **Responsive Bioconjugates selectively and rapidly targeting inflammatory and degenerative arthropathies (BICRA)** BMBF 16GW0335
- **Integrative preclinical strategies for targeting the local mesenchyme as a regulator of tissue specificity in inflammatory musculoskeletal disorders (MESINFLAME)** BMBF 01EC1901A
- **Molecular assessment of signatures characterizing the remission of arthritis (MASCARA)** BMBF 01EC1903A
- **Matrix mediated fibroblast activation in rheumatoid arthritis**
  DFG research group 'Novel molecular determinants for musculoskeletal extracellular matrix homoeostasis – a systemic approach' FOR2722.
  DFG KO4044/3-1, PA689/18-1
- **Identification of the pathways leading to resistance in Rheumatoid Arthritis**
  Cooperation project with the pharmaceutical company Galapagos, Belgium (VLAIO)



Joint damage attracts fibroblast-like synoviocytes' invasion into knee joints.



Histological staining showing the inflamed synovial tissue adherent to the cartilage surface (purple).

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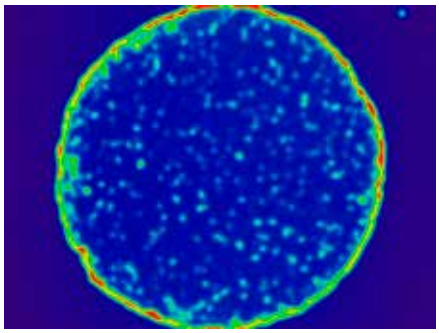
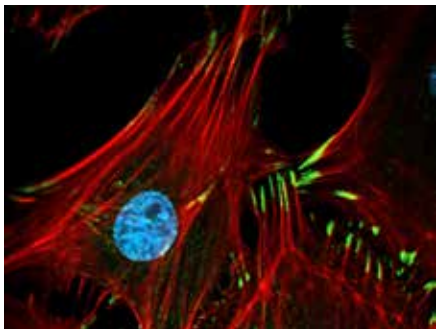
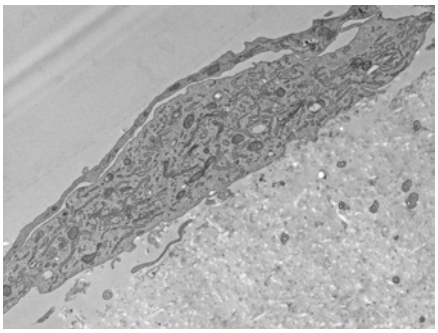


Staining of sections from 3D fibroblast-like synoviocytes organ cultures.



Immunofluorescence staining showing the cytoskeleton (red) and cell-cell and cell-matrix contact formations (green) in fibroblast-like synoviocytes.



Fibroblast-like synoviocyte (dark grey) attaching to and invading the extracellular matrix of articular cartilage visualized by electron microscopy.

PUBLICATION HIGHLIGHTS

- Beckmann, Denise et al. **Lasp1 regulates adherens junction dynamics and fibroblast transformation in destructive arthritis.** *Nature communications* vol. 12,1 3624. PMID: 34131132 (Paper of the Month 06/2021)
- Friščić, Jasna et al. **The complement system drives local inflammatory tissue priming by metabolic reprogramming of synovial fibroblasts.** *Immunity* vol. 54,5 (2021): 1002-1021.e10. PMID: 33761330
- Godmann, Lars et al. **Antibody-mediated inhibition of syndecan-4 dimerisation reduces interleukin (IL)-1 receptor trafficking and signalling.** *Annals of the rheumatic diseases* vol. 79,4 (2020): 481-489. PMID: 32094158
- Karonitsch, Thomas et al. **Targeted inhibition of Janus kinases abates interferon gamma-induced invasive behaviour of fibroblast-like synoviocytes.** *Rheumatology (Oxford).* vol. 57,3 (2018): 572-577. PMID: 29228301
- Hillen, Jan et al. **Structural cartilage damage attracts circulating rheumatoid arthritis synovial fibroblasts into affected joints.** *Arthritis research & therapy* vol. 19,1 40. PMID: 28245866
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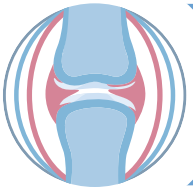
- Diarra, Danielle et al. **Dickkopf-1 is a master regulator of joint remodeling.** *Nature medicine* vol. 13,2 (2007): 156-63. PMID: 17237793



TEAM SYNOVIAL PATHOLOGY
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Sarah Bödecker, PhD student
Anna de Giuseppe, PhD student
Lucía Seseña Carrillo, PhD student
Florian Bischoff, Technical assistant
Annika Krause, Technical assistant

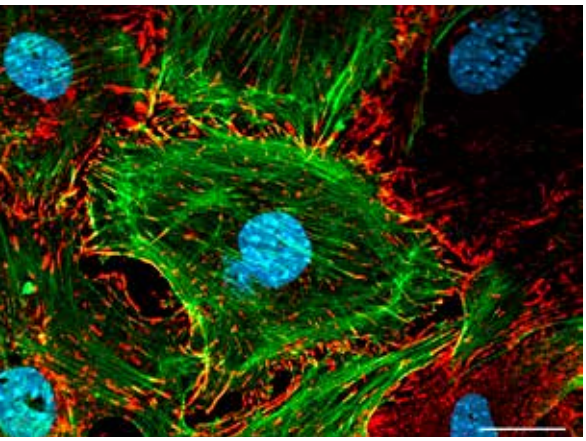
ARBEITSGRUPPE

KNORPELBIOLOGIE

CARTILAGE BIOLOGY GROUP

Die Arbeitsgruppe Knorpelbiologie konzentriert sich auf die Untersuchung der Mechanismen, die an der Kontrolle der phänotypischen Stabilität von Chondrozyten während der Entwicklung, Verletzung, Reparatur und Osteoarthritis von Gelenkknorpel beteiligt sind. Wir verwenden in vitro und in vivo genetische und chirurgische Modelle, um die Beziehung zwischen homöostatischen Faktoren, mechanischen Reizen und Entzündungen bei der Erhaltung der Knorpelgesundheit zu untersuchen.

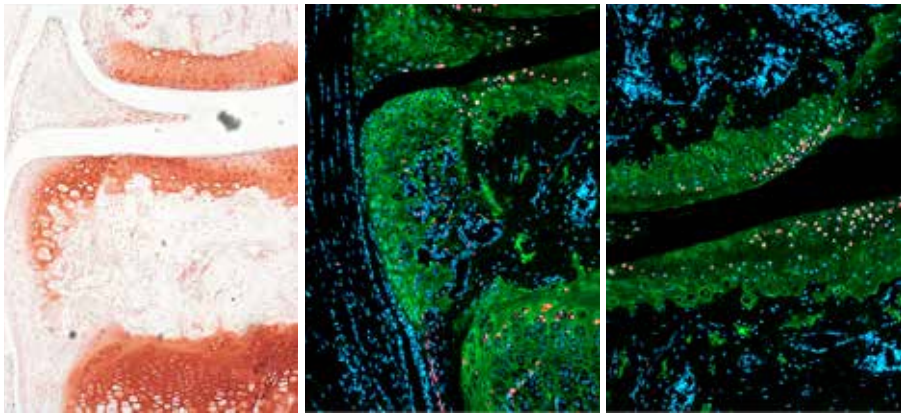
The cartilage biology group focuses on investigating the mechanisms involved in the control of chondrocyte phenotypic stability during articular cartilage development, injury, repair and during osteoarthritis. We use in vitro and in vivo genetic and surgical models to examine the relationship between homeostatic factors, mechanical stimuli and inflammation in maintaining cartilage health.



Immunofluorescence staining highlighting the actin cytoskeleton and integrin-mediated cell-to-cell interactions of murine articular chondrocytes

CURRENT PROJECTS

- **CXCR2-mediated cell-matrix interactions in cartilage repair and osteoarthritis** IMF (UKM) SH112111
- **Targeting TRPC6 as a mechanosensitive signalling hub linking inflammation and structural damage in osteoarthritis** DFG SH832/4-1
- **Function of CXCR2 signalling within the articular cartilage** MRC MR/N010973/1
- **Integrative preclinical strategies for targeting the local mesenchyme as a regulator of tissue specifi city in infl ammatory musculoskeletal disorders (MESINFLAME)** BMBF 01EC1901A
- **Regulation of CXCR2-mediated cartilage homeostasis via the transient receptor potential calcium channel TRPC6** IMF (UKM) SH121608



Histological compared to RFP and type II collagen immunofluorescent staining demonstrating the fate of Prg4+ lineage cells during early articular cartilage damage and osteophyte formation following osteoarthritis induction in a murine knee joint

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MicroCT reconstruction of murine knee joint

MicroCT X-ray micro computed tomography imaging used to evaluate bone microstructure during murine osteoarthritis, joint injury and inflammatory arthritis models via 3D image reconstruction and quantitative analysis

PUBLICATION HIGHLIGHTS

- Sherwood, Joanna et al. **A homeostatic function of CXCR2 signalling in articular cartilage.** *Annals of the rheumatic diseases* vol. 74,12 (2015): 2207-15. PMID: 25135253
- Stolberg-Stolberg, Josef et al. **Cartilage Trauma Induces Necroptotic Chondrocyte Death and Expulsion of Cellular Contents.** *International journal of molecular sciences* vol. 21,12 4204. PMID: 32545631
- Bertrand, Jessica et al. **BCP crystals promote chondrocyte hypertrophic differentiation in OA cartilage by sequestering Wnt3a.** *Annals of the rheumatic diseases* vol. 79,7 (2020): 975-984. PMID: 32371389
- Roelofs, Anke J et al. **Identification of the skeletal progenitor cells forming osteophytes in osteoarthritis.** *Annals of the rheumatic diseases* vol. 79,12 (2020): 1625-1634. PMID: 32963046
- Nalesso, Giovanna et al. **WNT-3A modulates articular chondrocyte phenotype by activating both canonical and noncanonical pathways.** *The Journal of cell biology* vol. 193,3 (2011): 551-64. PMID: 21536751
- Pap, Thomas et al. **Synovial fibroblasts and articular tissue remodelling: Role and mechanisms.** *Seminars in cell & developmental biology* vol. 101 (2020): 140-145. PMID:31956018
- Sherwood, Joanna **Osteoarthritis year in review 2018: biology.** *Osteoarthritis and cartilage* vol. 27,3 (2019): 365-370. PMID: 30808484

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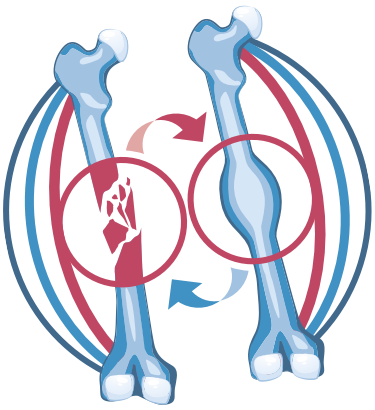
Alexandra Schäfer, PhD student
Julian Graf, Technical assistant

ABTEILUNG

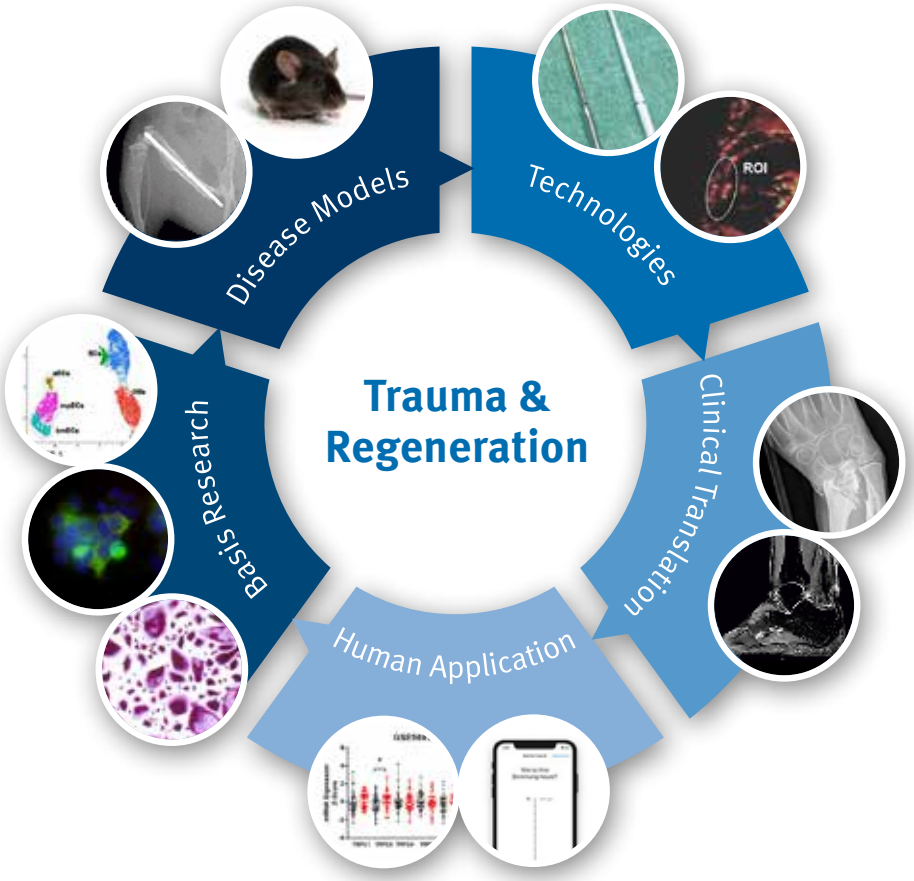
REGENERATIVE MUSKULOSKELETTALE MEDIZIN

DEPARTMENT OF REGENERATIVE MUSCULOSKELETAL MEDICINE



Die 2017 gegründete Abteilung ist auf die Erforschung und Behandlung von Heilungs- und Regenerationsstörungen des Muskel-Skelett-Systems spezialisiert. Dabei liegt ein besonderer Schwerpunkt auf dem Einfluss von Trauma, Alter, Osteoporose und chronischer Entzündung. Die Interaktion von Zellen und extrazellulärer Matrix im Rahmen der Regeneration von Knochen und Sehnen werden dabei in vitro und anhand von speziellen Tiermodellen untersucht und neue Verfahren zum Monitoring und zur Verbesserung regenerativer Prozesse entwickelt.

The translational department, established in 2017, focusses on research and treatment of impaired musculoskeletal healing and regeneration with a concentration on the impact of trauma, aging, osteoporosis and chronic inflammation. The influence and interaction of cells and extracellular matrix in the context of bone and tendon regeneration are investigated in vitro and in specific animal models in order to develop new techniques for the monitoring and improvement of musculoskeletal regeneration.



CURRENT PROJECTS

- **Mechanisms of Integrin α2β1 driven cell-matrix interaction in the course of bone regeneration and fracture healing**
  DFG STA650/9-1
- **Role of lysyl oxidases in musculoskeletal pathological calcification: towards new therapeutic targets**
  SNF 320030_204524 / 1, Co-investigator
- **Der Kationenkanal TRPC3 als Modulator der Osteoklastenaktivität – Evaluierung eines neuen Targets zur Therapie von Osteoporose**
  Elsbeth Bonhoff Stiftung, Projekt 206
- **Beta-arrestin-2 and G-protein dependent signaling to stimulate fracture healing with parathyroid hormone**
  DFG GA2142/2-1
- **The role of the heparansulfate proteoglycan syndecan-1 in bone metabolism**
  DFG STA650/4-1
- **The Role of Tolloid Proteinases in bone physiology and fracture healing**
  DFG KR4486/2-1

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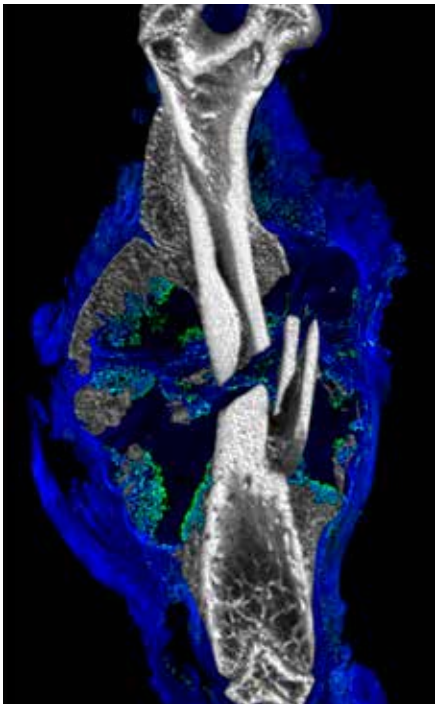
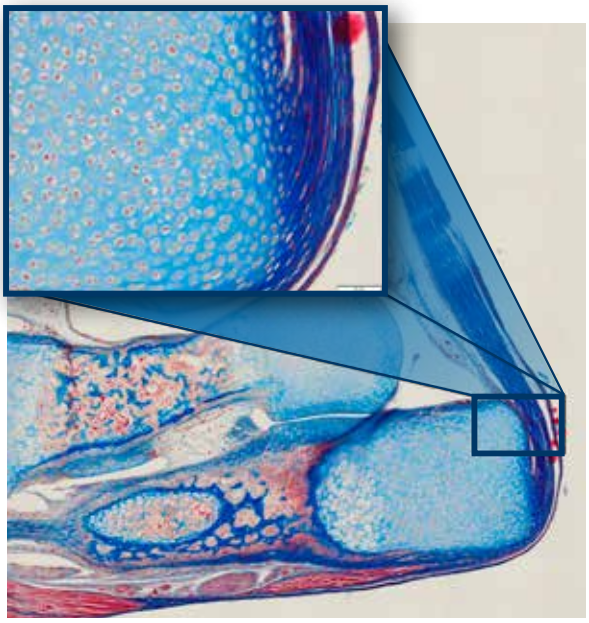
PUBLICATION HIGHLIGHTS

- Hülskamp, Michael David et al. **The small-molecule protein ligand interface stabiliser E7820 induces differential cell line specific responses of integrin α2 expression.** *BMC Cancer* vol. 21,1 571. PMID: 34006252
- Timmen, Melanie et al. **The heparan sulfate proteoglycan Syndecan-1 influences local bone cell communication via the RANKL/OPG axis.** *Scientific Reports* 2020;10(1):20510. PMID: 33239699
- Schmitz, Nina et al. **A novel MRI compatible mouse fracture model to characterize and monitor bone regeneration and tissue composition.** *Scientific Reports* vol. 10,1 16238. PMID: 33004928
- Michel, Philipp A et al. **Microsurgical reconstruction affects the outcome in a translational mouse model for Achilles tendon healing.** *Journal of Orthopaedic Translation* vol. 24 1-11. PMID: 32489862
- Kronenberg, Daniel et al. **Increased Collagen Turnover Impairs Tendon Microstructure and Stability in Integrin α2β1-Deficient Mice.** *International Journal of Molecular Sciences* vol. 21,8 2835. PMID: 32325713
- Stange, Richard et al. **Age-related bone deterioration is diminished by disrupted collagen sensing in integrin α2β1 deficient mice.** *Bone* vol. 56,1 (2013): 48-54. PMID: 23680479

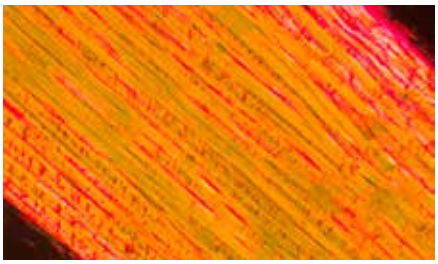


Fractured femur: Overlay of fractured bone (µCT, grey) and staining of newly formed blood vessels (green, endomucin) invading into cartilagous callus, blue: DAPI, nuclei

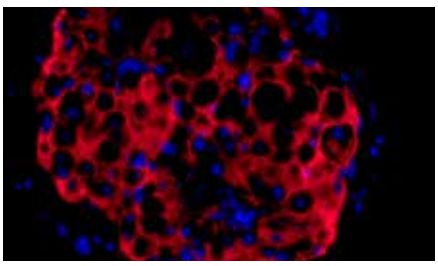


Histological staining of the murine Achilles tendon enthesis (bone-tendon interface)

Pathological mineralization of the Achilles Tendon during healing (µCT)



Polarization microscopy of a murine Achilles tendon stained with picrosirus to visualize collagen fibrils



Organoid culture composed of mesenchymal and endothelial cells, stained with Collagen II antibody

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Niklas Husmann, MD student
Eric Kieselhorst, MD student
Nils Roters, MD student
Lennart Wiehenkamp, MD student
Nina Ehrens, Technical assistant
Simone Kintzinger, Medical assistant
Simone Niehues, Technical assistant
Helga Raape, Technical assistant
Britta Kirsch, Study nurse
Claudia Stumpf, Secretary/PA

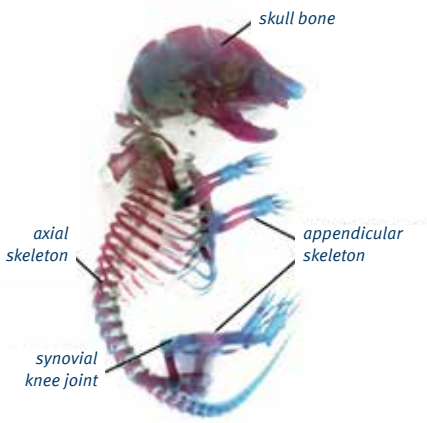
ABTEILUNG

KNOCHEN- UND SKELETTFORSCHUNG

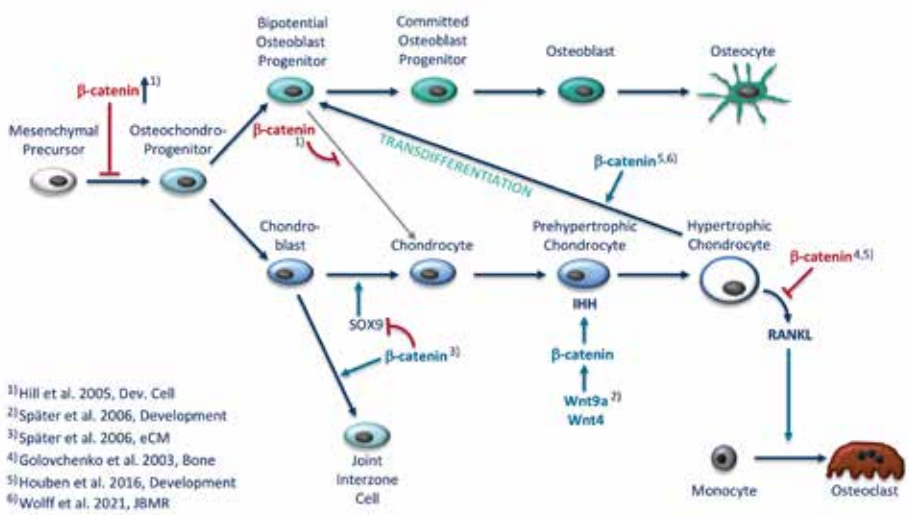
DEPARTMENT OF BONE & SKELETON RESEARCH

Wir beschäftigen uns mit der Rolle von Wnt-Signalen und den dazugehörigen Signaltransduktionswegen während der Embryonalentwicklung und der postnatalen Knochen- und Skeletthomöostase. Hierbei liegt der Fokus insbesondere auf den beta-catenin vermittelten Prozessen. Ziel ist es den Einfluss von Wnt-Signalen und Signalwegen auf die Differenzierung von Knorpelzellen, Osteoblasten und Zellen des Synovialgelenks, die von gemeinsamen mesenchymalen Vorläuferzellen abstammen, aufzudecken.

We focus on the role of Wnt ligands and their signal transduction pathways during embryonic skeletal development and postnatally on their role in bone and skeletal homeostasis under normal and disease conditions. In particular, the influence of the Wnt/beta-catenin pathway on the differentiation of chondrocytes, osteoblasts, and cells of the synovial joint, which are all derived from a common mesenchymal precursor cells during development are being studied. The aim is to understand the mechanisms by which Wnt-signals influence the plasticity and differentiation of skeletal cells.



Summary of the various roles of WNT/β-catenin signaling during skeletal lineage differentiation.



CURRENT PROJECTS

- **Analysis of the regulation of trabecular bone formation during mouse embryogenesis.** DFG, HA4767/2-1
- **Modified Wnt-signaling and its effects on degenerative and inflammatory joint alterations.** IZKF, Har2/002/14
- **Role of macrophages in the endochondral ossification process in wildtype and osteoclast-deficient mice.** DFG, HA4767/4-2
- **Analysis of the roles of the Wnt-ligands Wnt9a and Wnt4 in adult bone and joint homeostasis.** DFG, HA4767/5-1
- **Identification and characterization of mechano-regulated genes in the limb influencing the resistance of cartilage during development and disease.** BMBF, PrevOP/Overload Consortium, Teilprojekt SP07, 01EC1408F

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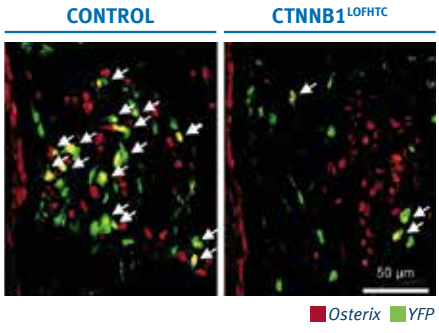
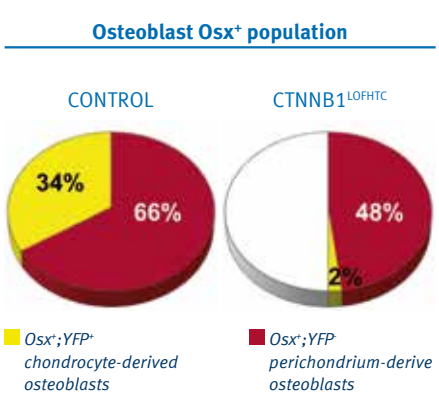
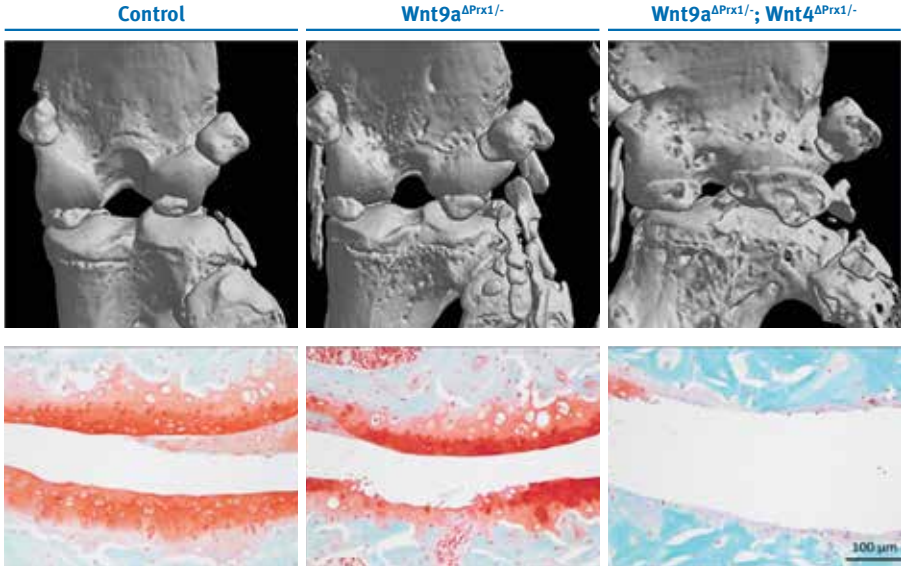




Immunofluorescent staining for the osteoblast marker Osterix (Osx) and the hypertrophic chondrocyte lineage-tracer YFP revealing a severe reduction of chondrocyte-derived osteoblasts (yellow) and of perichondrium-derived osteoblasts (red) see also quantification below.

PUBLICATION HIGHLIGHTS

- Wolff, Lena I et al. **Only the Co-Transcriptional Activity of β-Catenin Is Required for the Local Regulatory Effects in Hypertrophic Chondrocytes on Developmental Bone Modeling.** *Journal of bone and mineral research* 10.1002/jbmr.4396. PMID: 34155688
- Teufel, Stefan et al. **Loss of the WNT9a ligand aggravates the rheumatoid arthritis-like symptoms in hTNF transgenic mice.** *Cell death & disease* vol. 12,5 494. PMID: 33990546
- Houben, Astrid et al. **β-catenin activity in late hypertrophic chondrocytes locally orchestrates osteoblastogenesis and osteoclastogenesis.** *Development* vol. 143,20 (2016): 3826-3838. PMID: 27621061
- Lyashenko, Natalia et al. **Differential requirement for the dual functions of β-catenin in embryonic stem cell self-renewal and germ layer formation.** *Nature cell biology* vol. 13,7 (2011): 753-61. PMID: 21685890
- Später, Daniela et al. **Wnt9a signaling is required for joint integrity and regulation of Ihh during chondrogenesis.** *Development* vol. 133,15 (2006): 3039-49. PMID: 16818445
- Hill, Theo P et al. **Canonical Wnt/beta-catenin signaling prevents osteoblasts from differentiating into chondrocytes.** *Developmental cell* vol. 8,5 (2005): 727-38. PMID: 15866163



3D re-constructions of µCT scans from the knee of 12-month-old mice with limb-specific conditional deletion of Wnt9a, or Wnt9a and Wnt4, with ectopic calcifications present around the joint. Safranin O stained paraffin sections of knee joints showing proteoglycan loss and articular cartilage erosion (Teufel et al., 2021)

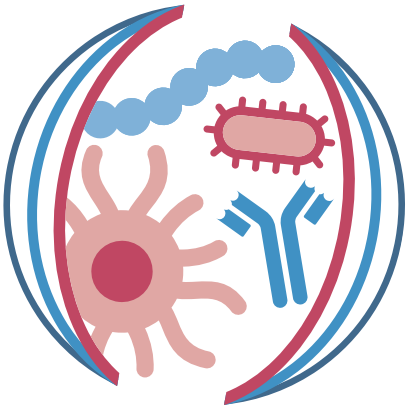
TEAM BONE & SKELETON RESEARCH
Stefan Teufel, Postdoc
Lena Wolff, Postdoc
Christine Fabritius, Technical Assistant

ABTEILUNG

TRANSLATIONALE RHEUMATOLOGIE UND IMMUNOLOGIE

DEPARTMENT OF TRANSLATIONAL RHEUMATOLOGY AND IMMUNOLOGY

Die 2020 neu eingerichtete Abteilung beschäftigt sich mit der Entstehung und Progression von Autoimmunerkrankungen (u.a. systemischer Lupus erythematodes (SLE), rheumatoide Arthritis (RA)). Der Forschungsansatz zielt dabei auf das Mikrobiom und dessen Wechselwirkung mit dem Immunsystem. Es sollen Leitkeime identifiziert, molekulare Mechanismen aufgedeckt und neue Behandlungsstrategien im Tiermodell erprobt werden.

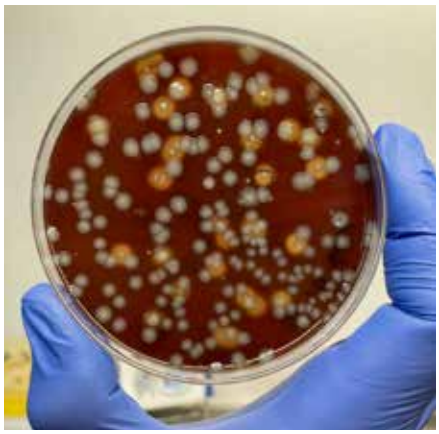


The department, which was newly established in 2020, deals with the development and progression of autoimmune diseases (systemic lupus erythematosus (SLE), rheumatoid arthritis (RA) among others). The research focusses on the microbiome and its interactions with the immune system. The aim is to identify indicator species, to uncover molecular mechanisms, and to test new treatment strategies in animal models.

CURRENT PROJECTS

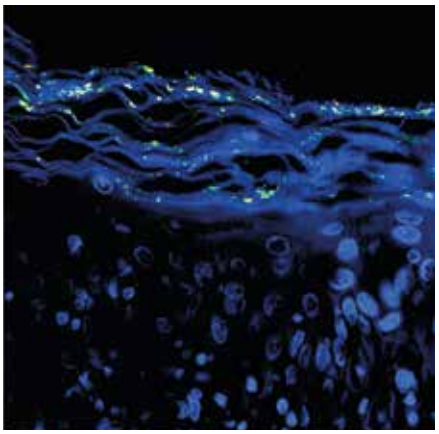
- **The Role of Bacterial RNA in Translocated Gut Pathobiont-Immune Cell Interactions.** Lupus Research Alliance, I.D.# Lupus Insight Prize
- **Gut Pathobiont Translocation and Barrier Function in Human SLE.** Lupus Research Alliance, I.D.# Global Team Science Award (GTSA) Planning Grant
- **The Role of Diet and Microbiome in Lupus.** Maren Foundation
- **Biomarker Identification in SLE Identified via Microbiome-Host Interactions.** Lupus Research Alliance, I.D.# LRA BMS Accelerator Award 690522 (Co-Investigator)
- **Human Gut Commensal Cross-reactivity in Antiphospholipid Syndrome.** NIH/NIAID, I.D.# R01 AI118855

A



A: A representative culture plate is shown, which is derived from a stool sample of a healthy individual. A high diversity is characteristic for the resident microbiota.

B



B: A skin pathobiont identified by fluorescence in situ hybridization (FISH) (Pseudopropionibacterium propionicum) in a skin biopsy sample of a lupus patient. The bacterium expresses a protein that resembles a self-antigen (Ro60), against which autoantibodies are formed during disease evolution and progression (Greiling et al. Sci Transl Med 2019).

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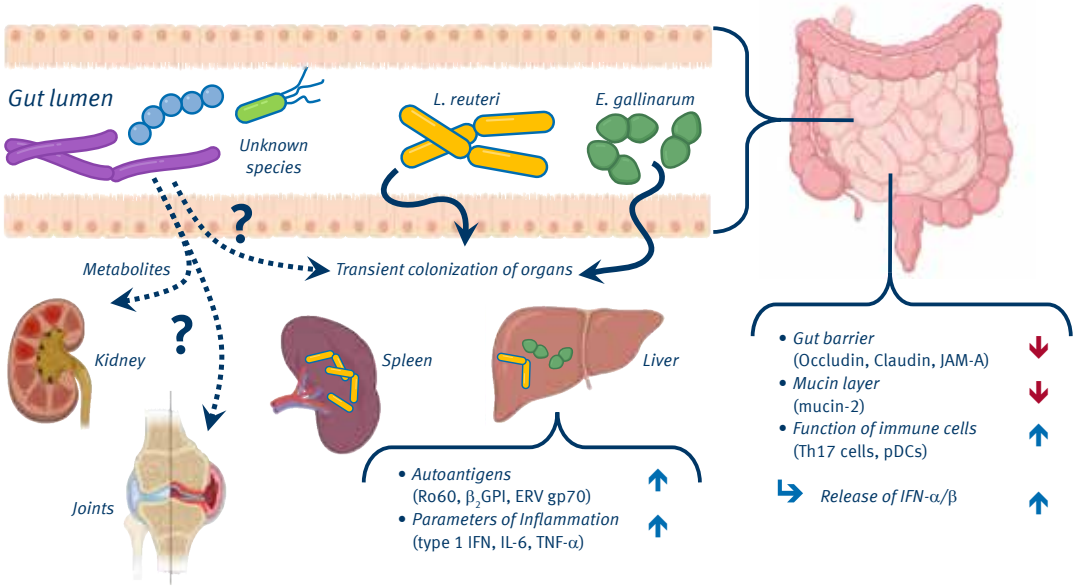
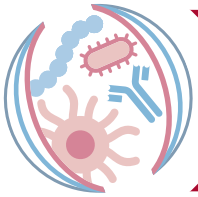
PUBLICATION HIGHLIGHTS

- Greiling, Teri M et al. **Commensal orthologs of the human autoantigen Ro60 as triggers of autoimmunity in lupus.** *Science translational medicine* vol. 10,434 (2018): eaan2306. PMID: 29593104
- Manfredo Vieira, Silvio et al. **Translocation of a gut pathobiont drives autoimmunity in mice and humans.** *Science* vol. 359,6380 (2018): 1156-1161. PMID: 29590047
- Ruff, William E et al. **Pathogenic Autoreactive T and B Cells Cross-React with Mimotopes Expressed by a Common Human Gut Commensal to Trigger Autoimmunity.** *Cell host & microbe* vol. 26,1 (2019): 100-113.e8. PMID: 31227334
- Ruff, William E et al. **Host-microbiota interactions in immune-mediated diseases.** *Nature reviews. Microbiology* vol. 18,9 (2020): 521-538. PMID: 32457482
- Zegarra-Ruiz, Daniel F et al. **A Diet-Sensitive Commensal Lactobacillus Strain Mediates TLR7-Dependent Systemic Autoimmunity.** *Cell host & microbe* vol. 25,1 (2019): 113-127.e6. PMID: 30581114



Lactobacillus reuteri and Enterococcus galinarum have been shown to translocate to internal organs and induce autoimmune reactions in mouse models. They were also associated with human autoimmune diseases in tissue. The cellular and molecular mechanisms of how other bacteria (e. g. Actinomycetes) affect organ functions in autoimmunity are being studied in vitro and in vivo.



TEAM TRANSLATIONAL RHEUMATOLOGY AND IMMUNOLOGY

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ABTEILUNG

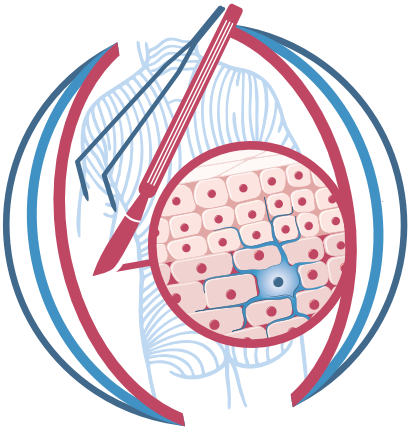
PLASTISCHE UND REKONSTRUKTIVE CHIRURGIE

DEPARTMENT OF EXPERIMENTAL PLASTIC SURGERY

In der Experimentellen Plastischen Chirurgie werden schwerpunktmäßig translationale Forschungsprojekte im Bereich der Rekonstruktion, Regeneration und Transplantation von komplexen Geweben durchgeführt. Hierbei stehen die „Vascularized Composite Allotransplantation“, die autologe Transplantation von Stammzellen zum Haut- und Weichgewebsersatz sowie die Verwendung innovativer lappenplastischer Deckungsverfahren mit mikrovaskulärem Gefäßanschluss und neuartige Operationstechniken im Vordergrund.

In Experimental Plastic Surgery, the focus is on translational research projects in the field of reconstruction, regeneration and transplantation of complex tissues. Main research focus is on „vascularized composite allografting“, autologous transplantation of stem cells for skin and soft tissue replacement, as well as the use of innovative free - flaps with microvascular connection and novel surgical techniques.

Intimal thickening in an artery of a VCA transplant under chronic rejection



CURRENT PROJECTS

- **Translational use of epidermal stem cells (ESC) for skin regeneration**
  Treatment of epidermolysis bullosa with ESC. ESCs are isolated, cultivated and processed into a transplant. These transplants differ fundamentally from all transplants in clinical use. The current 5 year follow up results have recently been published in the New England Journal of Medicine.

- **Vascularized composite allograft**
  Composite tissue is the term used to describe structures that are made up of different base tissues. In close collaboration with the Yale School of Medicine, our research group is investigating a microsurgical model that sheds light on the connection between visceral organ rejection and soft tissue rejection.

- **Robotic assisted surgery (RAS)**
  Robotic assisted surgery has the potential to optimize the precision of reconstructive plastic surgery and implement new surgical techniques. In a preclinical as well as clinical project our research group is the first to combine a novel optical microscope with a robotic assisted surgical system.
  This project is funded by the REACT – EU digitalization grant.

EUROPÄISCHE UNION
REACT-EU
Europäischer Fonds
für regionale Entwicklung

- **Lipedema**
  Lipedema is a chronic inflammatory disease of the fatty tissue. Often misdiagnosed and underestimated it occurs in up to 10% of women. Our team is working on methods to differentiate lipedema and regular adipocytes as well as novel surgical techniques for the treatment of lipedema.

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PUBLICATION HIGHLIGHTS

- Kueckelhaus, Maximilian et al. **Initial experience with the superficial circumflex iliac artery perforator (SCIP) flap for extremity reconstruction in Caucasians.** *Journal of plastic, reconstructive & aesthetic surgery:* JPRAS, S1748-6815(21)00328-4. PMID: 34509392

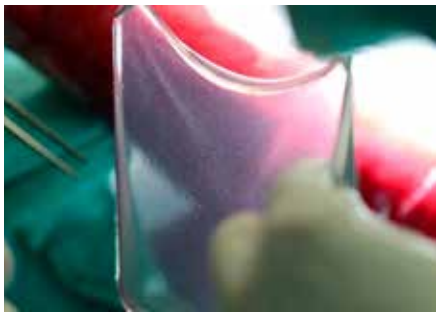
- Klietz, Marie-Luise et al. **Der Einfluss von Gewinnung und Verarbeitung auf das Regenerationspotenzial von Fettstammzellen und die Adipozytenvitalität.** [The influence of harvesting and processing on the regenerative potential in fat grafting]. *Handchir Mikrochir Plast Chir.* 2021;53(4):412-419. PMID: 33530127

- Puscz, Flemming et al. **A chronic rejection model and potential biomarkers for vascularized composite allotransplantation.** *PloS one* vol. 15,6 e0235266. PMID: 32589662

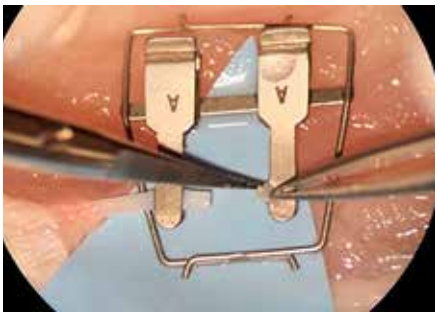
- Hirsch, Tobias et al. **Regeneration of the entire human epidermis using transgenic stem cells.** *Nature*, 2017 Nov 16;551(7680):327-332. PMID: 29144448

- Kueckelhaus, Maximilian et al. **Transgenic Epidermal Cultures for Junctional Epidermolysis Bullosa - 5-Year Outcomes** *N Engl J Med* 2021; 385:2264-2270. DOI: 10.1056/NEJMoa2108544

Top row: Symani robotic microsurgery system with remote surgical instrument control (Photos: MMI S.P.A), Bottom row: BHS robotic microscope with augmented reality headsets (Photo: BSH Technologies GmbH)



Sheet of transgenic keratinocytes before treatment of junctional epidermolysis bullosa



Microanastomosis of VCA animal model under magnification

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David Kampshoff
Dr. Dr. med. Matthias Aitzetmüller
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Laura Raschke
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FUNKTIONSBEREICH

TECHNOLOGIEPLATTFORM ELEKTRONENMIKROSKOPIE

FUNCTIONAL AREA OF ELECTRON MICROSCOPY

Die Technologieplattform Elektronenmikroskopie bietet interessierten Forschungsgruppen wissenschaftliche und technische Unterstützung für ihre elektronenmikroskopischen Fragestellungen. Wir unterstützen Projekte beginnend mit der Wahl der für das Projekt geeigneten Methode, dem sinnvollen Probenumfang und der entsprechenden Probenvorbereitung bis hin zur wissenschaftlichen Interpretation der gewonnenen Ergebnisse einschließlich der histologischen Beurteilung von Geweben oder Zellen auf ultrastruktureller Ebene.

The platform for electron microscopy provides interested scientists technical and scientific support for their electron microscopic research questions. We are offering complete support in electron microscopy beginning from preparation and fixation of samples, embedding and sectioning as well as analysis and interpretation of the generated data.

A Philips EM-410 transmission electron microscope is available for examining the samples.

WIR STELLEN FOLGENDE TECHNIKEN ZUR VERFÜGUNG:

- Einbettung in verschiedene Kunstharze
- Herstellung von Semi- und Ultradünnschnitten
- Transmissionselektronenmikroskopie und Immunogold-Elektronenmikroskopie
- Gefrierbruch-Replika-Techniken einschließlich Immunogold-Markierung
- Oberflächenreplikas, z. B. zur Visualisierung der Aufnahme von Gold-markierten Substraten in Zellen
- Hochauflösende Platin-Kohle-Replikas z.B. Darstellung des Zytoskeletts einschließlich Immunogold-Markierung
- Negativkontrastierung und Rotationsbedampfung von Makromolekülen einschließlich der Isolierung von authentischen Suprastrukturen mit Hilfe von paramagnetischen Immunobeads

WE ARE OFFERING THE FOLLOWING TECHNIQUES:

- *Embedding in different epoxy resins*
- *Preparation of semithin und ultrathin sections*
- *Transmission electron microscopy and Immunogold electron microscopy*
- *Freeze fracturing – replica techniques inclusive immunogold labeling*
- *Surface replicas, e.g. visualization of uptake of gold-labeled substrates in cells*
- *High-resolution platinum-carbon-replicas, e.g. visualization of cytoskeleton*
- *Negative staining and rotary shadowing of macromolecules including isolation of authentic suprastructures with immuno-magnetic beads*

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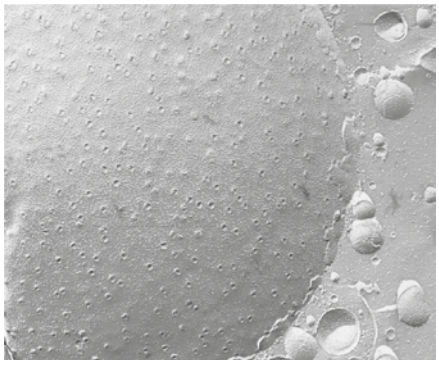
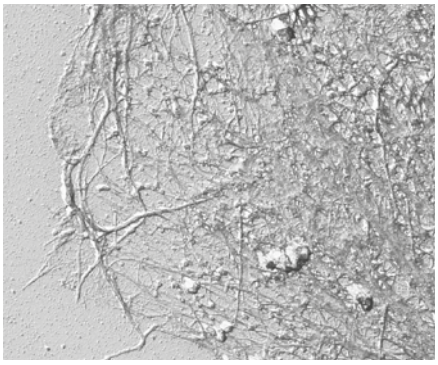
A



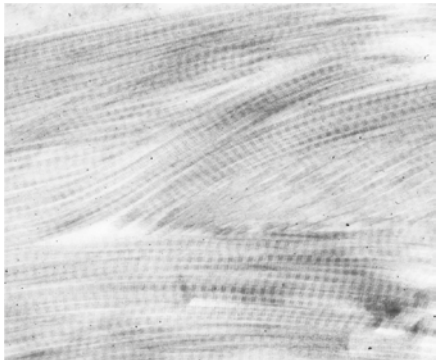
A: Freeze-fracture view of a murine endothelial cell. Nucleus with nuclear pores

B



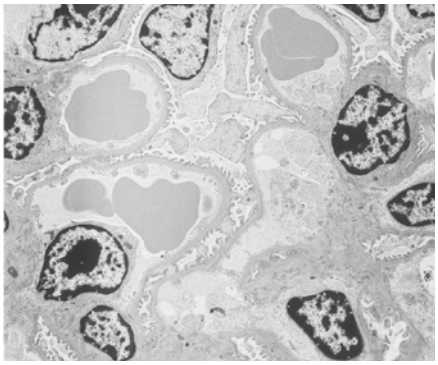
B: Platinum-carbon-replica: Visualization of the cytoskeleton of a rheumatoid arthritis synovial fibroblast

C



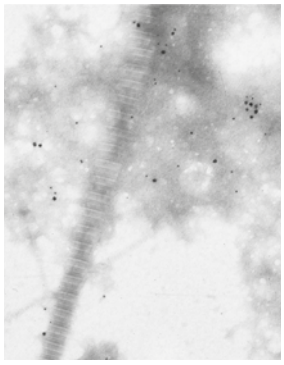
C: Ultrathin section of mouse skin: striated collagen fibril of the deep dermis

D



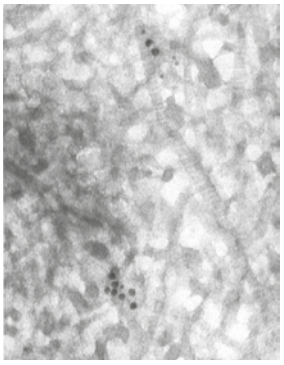
D: Ultrathin section of a mouse kidney: Overview of the glomerulus

E



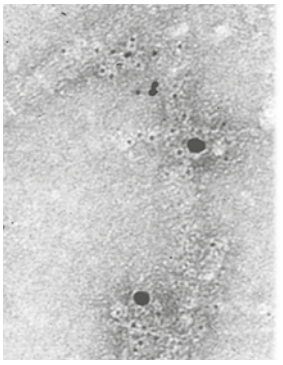
E: Immunogold labelling (WARP 18nm gold particles; collagen VI 12nm gold particles) of a human cartilage extract containing supra-structural matrix components

F

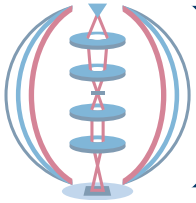


F: Ultrathin section of bovine cartilage with immunogold labeling (WARP 18nm gold particles; collagen VI 12nm gold particles)

G



G: Bovine cartilage: Triple labelling against WARP (18nm gold particles), perlecan (12nm gold particles) and collagen VI (6nm gold particles) in combination with a negative staining

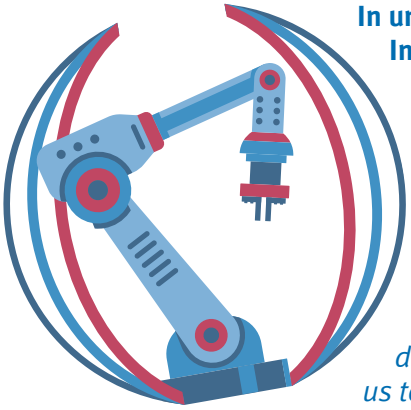


TEAM ELECTRON MICROSCOPY
Karin Gäher, Technical Assistant

www.bonelab.de

BIOMECHANIK

BIOMECHANICS LAB



In unserem Funktionsbereich Biomechanik werden Materialprüfmaschinen, Industrieroboter, optische Messmaschinen und individuelle Aufbauten zur Beantwortung klinischer Fragestellungen der Traumatologie (Wirbelsäule, Becken, Schulter, Hand, Knie und Fuß) verwendet. In enger Zusammenarbeit mit den Unfallchirurgen werden diese biomechanischen Daten genutzt, um zum Beispiel bessere Implantate und OP-Techniken zu entwickeln.

The core of the biomechanics laboratory are material testing machines, industrial robots, optical measuring machines, and individual rigs, which are used to answer clinical questions in traumatology (spine, pelvis, shoulder, hand, foot and knee). The link between the lab and the surgeons enables us to translate biomechanical data into clinics, which is used to develop new implants and surgical techniques.

Industrial robot for experimental analysis of joint kinematics, demonstrated by the example of an artificial knee

Simulation of a throwing movement in a robotic setup with static loading of the rotator cuff and biceps tendon

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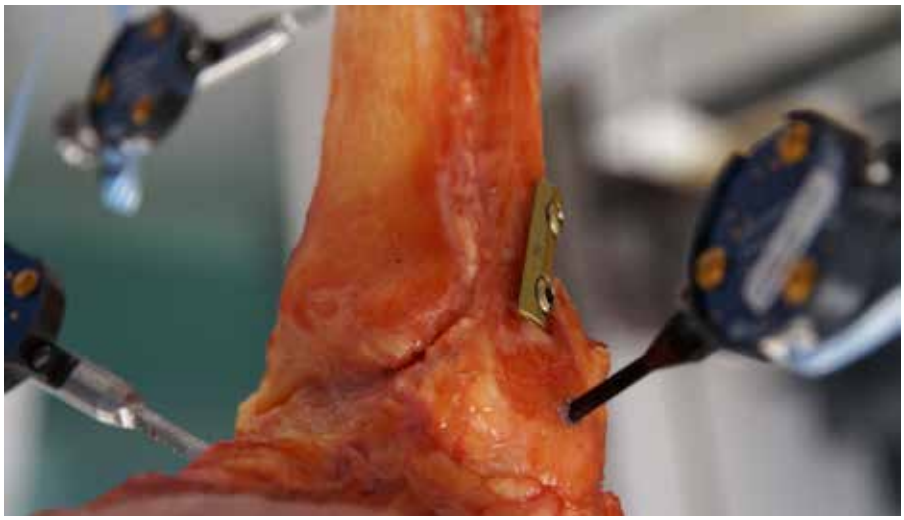
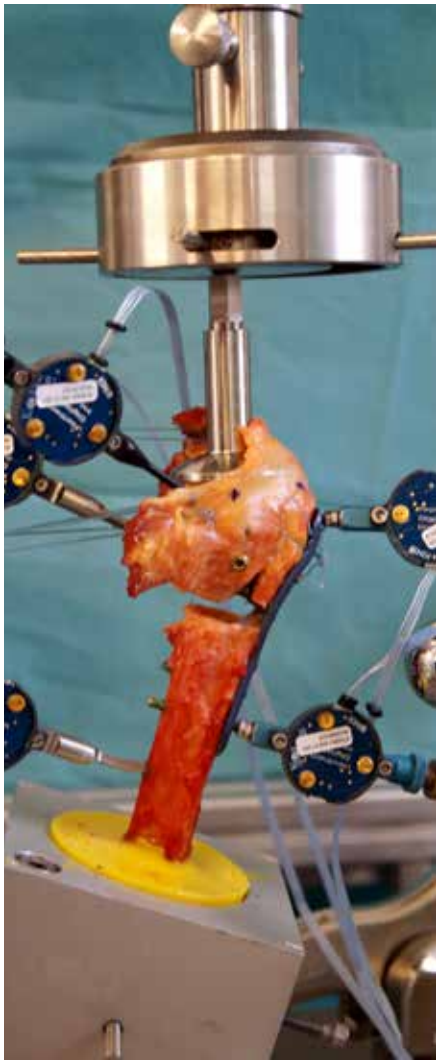


Reconstruction of syndesmosis ruptures and detection of movements in the ankle using optical sensors

Anterior-posterior radiograph of the ankle joint to check for correct reconstruction placement and radiographic measurement of joint gaps



Cyclic loading of a humeral head fracture treatment with simultaneous muscle loading and tracking of fragment movements with optical sensors

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TEAM BIOMECHANICS LAB
Jens Wermers M.Sc., Engineer
Luise Maria Hägerich, Student assistant
Franziska Wermeling, Student assistant

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DRITTMITTEL-FÖRDERUNGEN
THIRD-PARTY FUNDING

DFG – DEUTSCHE FORSCHUNGS-GEMEINSCHAFT

Dr. Corinna Wehmeyer
In der Knochenmatrix eingebettete Osteozyten und ihre regulatorische Funktion bei der Knochenhomöstase während der Rheumatoiden Arthritis
DFG WE6095/4-1 | 2021-2024

Dr. Berno Dankbar
Die Rolle des WAVE-Komplexes bei der Osteoklasten-vermittelten Knochenzerstörung in der experimentellen Arthritis
DFG DA1143/9-1 | 2021-2024

Dr. Joanna Sherwood
Modulation von Signalwegen entzündlicher und degenerativer Prozesse in der Arthrose durch den mechanosensitiven rezeptoraktivierten Kationenkanal-6 (TRPC6)
DFG SH832/4-1 | 2020-2023

Dr. Berno Dankbar
Aufklärung der Smad2/4-abhängigen Differenzierung von Osteoklasten durch Transkriptomanalyse
DFG GO2846/2-1 | 2020-2023

Prof. Richard Stange
Mechanismen Integrin alpha2beta1 abhängiger Zell-Matrix-Interaktion im Verlauf der Knochenregeneration und Frakturheilung
DFG STA650/9-1 | 2020-2023

Dr. Adelheid Korb-Pap, Prof. Thomas Pap
Matrix vermittelte Fibroblastenaktivierung in rheumatoider Arthritis
im Rahmen der FOR2722:
Neue molekulare Determinanten der Homöostase der muskuloskelettalen extrazellulären Matrix - ein systemischer Ansatz
DFG KO4044/3-1, PA689/18-1 | 2018-2021

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Der Einfluss von Myostatin auf die Knochenmetastasierung beim Mammakarzinom und Multiplen Myelom
im Rahmen des SPP µBONE:
Kolonisierung und Interaktionen von Tumorzellen innerhalb des Knochenmilieus
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Prof. Christine Hartmann
Analyse der Rolle der Wnt-Liganden Wnt9a und Wnt4 in Knochen- und Gelenkhomeostase adulter Mäuse
DFG HA4767/5-1 | 2017-2020

Dr. Berno Dankbar, Prof. Thomas Pap
Myostatin-induced mechanisms of inflammatory bone and cartilage destruction by invasive fibroblast-like synoviocytes
DFG SFB1009A11 | 2016-2020

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Die Rolle von Makrophagen in der embryonalen endochondralen Ossifikation in Wildtyp und Osteoclast-defizienten Mäusen
DFG HA4767/4-1 | 2016-2019

Dr. Athanasios Stratis
Regulation der chronischen Entzündung bei Psoriasis-Arthritis durch S100A8 und S100A9, Mechanismen und therapeutische Implikationen
DFG STR1153/1-2 | 2016-2017

Dr. Berno Dankbar
Die protektive Funktion des Wnt-Inhibitors Sclerostin in der inflammatorischen Knochendestruktion
DFG DA1143/3-2 | 2015-2018

Dr. Patric Garcia
Beta-arrestin-2 und G-Protein gekoppelte Mechanismen zur Stimulation der Frakturheilung durch Parathomon
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Regulation der entzündlichen Knochenzerstörung bei Rheumatoider Arthritis durch das kleine ubiquitin-artige Modifikatormolekül SUMO-1
DFG PA689/16-1 | 2015-2019

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Regulation der Fibroblastenantwort auf IL-1 bei rheumatoider Arthritis durch das transmembrane Heparansulfatproteoglycan syndecan-4
DFG Sachbeihilfe PA689/7-3 | 2015-2017

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Die Rolle des Heparansulfatproteoglycans Syndecan-1 im Knochenstoffwechsel
DFG STA650/4-1 | 2014-2017

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Die Rolle von Tolloid Proteinasen in der Knochenphysiologie und Frakturheilung
DFG KR4486/2-1 | 2014-2017

Dr. Jessica Bertrand
(Emmy-Noether Nachwuchsgruppe)
Regulation der phänotypischen Stabilität von Chondrozyten durch transmembrane Heparansulfat-Proteoglycane der Syndecan-Familie
DFG BE4328/5-1 | 2012-2017

Prof. Thomas Pap
Mechanisms of transendothelial fibroblast migration in rheumatoid arthritis
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The role of myostatin in joint destruction in rheumatoid arthritis
DFG SPP Immunobone DA1143/4-2
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The role of myostatin in bone destruction in rheumatoid arthritis
DFG SPP Immunobone DA1143/4-1
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Analysis of the regulation of trabecular bone formation during mouse embryogenesis
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Regulation of cytokine-dependent calcification of cartilage tissue by NPP1 and syndecan-4
DFG PA689/12-1 | 2011-2014

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Das autonom zellgängige bakterielle Effektorprotein YopM als neues biologisches Therapeutikum
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Modulation von Entzündungssignalen in synovialen Fibroblasten von RA- Patienten durch Syndecan-4
DFG PA689/7-2 | 2011-2013

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Syndecan-4 als Regulator der Chrondroblastenentwicklung im Rahmen der Frakturheilung
DFG STA650/2-2 | 2012-2013

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Das Heparansulfat-Proteoglycan Syndecan-4 als Regulator im Knochenstoffwechsel
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Die Funktion des Wnt-Inhibitors Sclerostin in der Knochendestruktion bei rheumatoider Arthritis
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Die S100 Proteine S100A8 und S100A9 als Schlüsselregulatoren der chronischen Entzündung bei Psoriasis-Arthritis
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Die Rolle der SUMO-Protease SENP7 bei der stabilen Aktivierung synovialer Fibroblasten bei rheumatoider Arthritis
DFG PA689/11-1 | 2010-2011

Dr. Uwe Hansen, Prof. Thomas Pap
Untersuchung der rheumatischen Knorpelzerstörung mit Hilfe eines neu etablierten in vitro Modells (MATRIN-Assay) unter Verwendung von authentischen Kollagenmatrizes
DFG HA2672/3-1 | 2009-2011

Dr. Berno Dankbar, Prof. Thomas Pap
Krankheitsspezifische Induktion der Serinprotease FAP in der rheumatoiden Arthritis: Funktion und Regulation bei der osteoklastären Knochendestruktion
DFG DA1143/2-1 | 2009-2011

Dr. Berno Dankbar, Prof. Thomas Pap,
Dr. Frans van Valen
Maligne Knochentumore: Modulation von Apoptose und Invasion durch den Gewebeinhibitor von Metalloproteinasen-3 (TIMP-3)
DFG DA1143/1-1 | 2008-2011

Prof. Thomas Pap
Regulation of fibroblast attachment and invasiveness by PI3Kgamma- mediated signalling pathways in rheumatoid arthritis
DFG SFB492 TP B19 | 2009-2011

Prof. Thomas Pap, Dr. Victor Wixler
Das LIM-Domänen Protein FHL2 als neuer Regulator des aggressiv-invasiven Verhaltens synovialer Fibroblasten bei rheumatoider Arthritis
DFG PA689/10-1 | 2009-2011

Prof. Thomas Pap, Dr. Marvin Peters
Mechanismen der Apoptoseregulation durch SUMO-spezifische Proteasen in synovialen Fibroblasten von Patienten mit rheumatoider Arthritis
DFG PA689/9-1 | 2008-2011

Prof. Wilhelm Aicher, Prof. Thomas Pap
Analyse des Beitrages erhöhter IL-16 Expression in synovialen Fibroblasten zur rheumatoiden Arthritis
DFG PA689/8-1 | 2008-2010

DRITTMITTEL-FÖRDERUNGEN
THIRD-PARTY FUNDING

BMBF – BUNDESMINISTERIUM FÜR BILDUNG UND FORSCHUNG

Prof. Thomas Pap, Dr. Adelheid Korb-Pap
Verbund: Wirkstofftransport: Responsive Biokonjugate zur selektiven und zügigen Anreichung in inflammatorischen und degenerativen Gelenken - BICRA - in vitro und in vivo Untersuchungen
BMBF 16GW0335 (BICRA) | 2021-2024

Prof. Thomas Pap (Verbundkoordinator)
Verbund: **Integrative präklinische Strategien zur Untersuchung des lokalen Mesenchyms als Regulator bei entzündlichen muskuloskelettalen Erkrankungen**
Teilprojekt P1:
Prof. Pap, Dr. Sherwood, Dr. Korb-Pap
Targeting cartilage damage as a trigger of epigentic changes and mesenchymal activation in inflammatory musculoskeletal diseases
BMBF 01EC1901A (MESINFLAME) | 2020-2023

Prof. Thomas Pap
Verbund: **Molecular Assessment of Signatures Characterizing the Remission of Arhthritis**
Teilprojekt: **Identification and profiling of fibroblast subsets in rheumatic diseases during remission and relapse**
BMBF 01EC1903C (MASCARA) | 2020-2023

Prof. Thomas Pap, Dr. Jessica Bertrand
Mechanosensitive Signalkomplexe diesen als frühe therapeutische Ziele in der posttraumatischen Osteoarthrose (OA) SP08 im Verbundprojekt: **Verständnis und Prävention der Progression der primären Osteoarthrose**
BMBF 01EC1408F (Overload-PrevOP) | 2015-2019

Prof. Christine Hartmann
Identifizierung und Charakterisierung von Mechanismen, die die Belastungsresistenz des Knorpels während der Entwicklung und bei Erkrankungen beeinflussen (SP07) im Verbundprojekt: **Verständnis und Prävention der Progression der primären Osteoarthrose**
BMBF 01EC1408F (Overload-PrevO) | 2015-2019

Prof. Thomas Pap
Deutsches Epigenom Programm - DEEP,
Teilprojekt SP. 5.3: **Epigenetics of synovial fibroblasts in Inflammation**
BMBF 01KU1216L (DEEP) | 2012-2015

Dr. Adelheid Korb-Pap, Prof. Thomas Pap
Cell-Matrix interaction structures as key modulators of inflammatory signals in rheumatoid arthritis (RA) fibroblast-like synoviocytes (FLS)
BMBF 01EC1008D (IMPAM) | 2011-2013

Dr. Richard Stange, Prof. Thomas Pap
Influence of collagen I – binding integrins on osteocyte development and function in bone development and osteoporosis
BMBF 01EC1006E (OSTEOPATH) | 2011-2013

EU-FÖRDERUNG (EU)

Prof. Thomas Pap
Novel Diagnostics and Biomarkers for early Identification of Chronic Inflammatory Joint Diseases
Partner No. 7, D-BOARD
Projekt-Nr: 305815 D-BOARD | 2012-2015

WEITERE FÖRDERER

(Industrie, Fachgesellschaften, Stiftungen, Medizinische Fakultät)

VLAANDEREN AGENTSCHAP INNOVEREN & ONDERNEMEN (VLAIO) (BELGIUM)

Dr. Adelheid Korb-Pap
Identification of the pathways leading to resistance in Rheumatoid Arthritis
Cooperation with GALAPAGOS NV
HBC.2020.3251 | 2021-2023

DEUTSCHE GESELLSCHAFT FÜR ORTHOPÄDIE UND ORTHOPÄDISCHE CHIRURGIE E. V. (DGOOC)

Prof. Thomas Pap und Dr. Joanna Sherwood
Förderung eines Teilprojektes im Verbund:
Charakterisierung und Modulation des Hexosamin-Pathways in vivo und in vitro zur Untersuchung der Rolle von Hyaluronsäure und Glukosamin bei Arthrose und Trauma
2019

RHEUMASTIFTUNG BERLIN

Prof. Thomas Pap
Neue Konzepte zur Diagnostik und Therapie der Chondrokalzinose
2018-2020

IZKF INTERDISZIPLINÄRES ZENTRUM FÜR KLINISCHE FORSCHUNG MÜNSTER

Prof. Christine Hartmann
Modified Wnt-signaling and its effect on degenerative and inflammatory joint alterations
2014-2016

Prof. Thomas Pap
SUMO-1 as a modulator of inflammatory bone loss: molecular mechanisms and therapeutic implications
2012-2015

IMF INNOVATIVE MEDIZINISCHE FORSCHUNGS-FÖRDERUNG MÜNSTER

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CXCR-2-mediated cell-matrix interactions in cartilage reapair and osteoarthritis
2021-2024

Dr. David Jan Josef de Gorter
The role of WAVE Complex in osteoclast-mediated bone destruction in rheumatoid arthritis
2017-2019 +1

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Regulation of CXCR2-mediated cartilage homeostasis via the transient receptor potential calcium channel TRPC6
2017-2020

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Investigation of autophagy in the synovium
2015-2016

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Rolle des Melanocortin-1-Rezeptor-Systems bei der Frakturheilung unter chronisch inflammatorischen Bedingungen
2014-2015

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Therapie inflammatorischer Erkrankungen mit Tyrosinkinase-Hemmern: Modulation der Wirkstoffaufnahme durch Pathologie-assoziierte und genetische Veränderungen des „Multidrug And Toxin Extrusion Protein1" (MATE1)-Transporters
2011-2013

DGRh START-UP FÖRDERUNG

Dr. Jessica Bertrand
The role of TRPC1 in osteoclast mediated bone destruction during rheumatoid arthritis
2012-2013

Dr. Adelheid Korb-Pap, Prof. Thomas Pap
Regulation of fibroblast attachment and invasion through interaction with cartilage-specific type IX collagen during TNFalpha-mediated cartilage destruction in vitro and in vivo
2009-2011

ELSBETH BONHOFF STIFTUNG

Dr. Birgit Mentrup, Prof. Richard Stange
Der Kationenkanal TRPC3 als Modulator der Osteoklastenaktivität - Evaluierung eines neuen Targets zur Therapie von Osteoporose
2019-2020

Dr. Melanie Timmen, Dr. Richard Stange
Der Kationenkanal TRPC6 als Mediator des Knochenstoffwechsels - Untersuchung molekularer Mechanismen der Osteoporose-entstehung
2015-2016

SWISS NATIONAL SCIENCE FOUNDATION

Prof. Richard Stange:
Role of lysyl oxidases in musculoskeletal pathological calcification: towards new therapeutic targets
SNF 320030_204524 / 1, Co-investigator

LUPUS RESEARCH ALLIANCE (USA)

Prof. Martin Kriegel
The Role of Bacterial RNA in Translocated Gut Pathobiont-Immune Cell Interactions
Lupus Insight Prize 2021

Prof. Martin Kriegel
Biomarker Identification in SLE Identified via Microbiome-Host Interactions
LRA BMS Accelerator Award 690522 (Co-Investigator) 2020 - 2022

THE MAREN FOUNDATION

Prof. Martin Kriegel
The Role of Diet and Microbiome in Lupus
2021

NATIONAL INSTITUTES OF HEALTH (NIH) (USA)

Prof. Martin Kriegel
Human Gut Commensal Cross-reactivity in Antiphospholipid Syndrome
NIAID, I.D.# R01 AI118855 2015-2022

PROMOTIONEN
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SCIENTIFIC

Meike Sambale | 2021
The homeostatic role of the transient receptor potential canonical 1 (TRPC1) channel in articular cartilage

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Role of Macrophages in Bone Marrow Cavity Formation

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Mechanisms underlying Chondrocyte Differentiation and Trabecular Bone Formation

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Modulating Wnt signaling in chondrocytes to maintain phenotypic stability

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The Role of Lasp1 in inflammatory synovial joint destruction

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Analysis of the Regulation of Trabecular Bone Formation during Mouse Embryogenesis

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Untersuchungen zur Rolle von Syndecan-4 in der experimentellen intestinalen Entzündung

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Molecular Mechanisms of Synovial Fibroblast Activation in Rheumatoid Arthritis

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The Role of Wnt-Inhibitor Sclerostin in Rheumatoid Arthritis

Lars Godmann | 2016
The Impact of Syndecan-4 Mediated IL-1 Signalling on Rheumatoid Arthritis

Christoph Cromme | 2015
The Effects of YopM on Inflammatory Polyarthritis

Heriburg Hidding | 2013
Die Rolle der Proteoglykane Syndecan-1 und Syndecan-4 während der Frakturheilung

Christina Koers-Wunrau | 2012
Die Rolle von TIMP-3 in der Regulation der Apoptose von invasiven, mesenchymalen Zellen

Simon Strietholt | 2012
Die Rolle Sentrin spezifischer Proteasen in der stabilen Aktivierung von Synovialfibroblasten bei Patienten mit Rheumatoider Arthritis

Noreen Pundt | 2009
Die Rolle der PI3Kg- abhängigen Signalwege in der Entwicklung des invasiven Phänotyps synovialer Fibroblasten in der rheumatoiden Arthritis

Lars-Henrik Meyer | 2008
Die Rolle des Four-and-a-half-LIM-only-Protein 2 (FHL2) in der Gelenkzerstörung bei Rheumatoider Arthritis

Katja Neugebauer | 2007
Untersuchungen zur Rolle von Syndecan-4 in der zytokin- abhängigen Knorpeldestruktion durch synoviale Fibroblasten bei der Rheumatoiden Arthritis

MASTERARBEITEN
MASTER THESES

Lena Schemmelmann | 2021
Mechanismen der Regeneration des muskuloskelettalen Systems

Christiane Hielscher | 2016
Investigation of Autophagy in the Synovium

Johanna Intemann | 2015
Characterization of Junctional Adhesion Molecule-C in Adhesion and Motility of Synovial Fibroblasts

Tabea Kräft | 2015
Development of a Binary Enzyme System for the Specific Delivery by Nanocarrier

Daniel Hinze | 2014
Selektive Signalwege des PTH1-Rezeptor in der Frakturheilung in vivo und Knochenbildung in vitro

Stefan Wäldele | 2013
Einfluss von FAPalpha auf die Gelenkzerstörung im TNF- abhängigen Mausmodell der rheumatoiden Arthritis

Lars Godmann | 2011
Mechanisms of IL-1 Mediated Syndecan-4 Signaling

MEDIZINISCH
MEDICAL

Katharina Krause | 2021
Untersuchung der nativen Knochenstruktur am Melanocortin-1-Rezeptor-Knock-out-Maus-modell

Gertje Neu | 2021
Der Einfluss des Kollagen-bindenden Integrins α2/β1 auf die Entstehung von heterotopen Ossifikationen in der murinen Sehne

Jian Xing | 2021
Chondrocyte cell fate tracing in a murine model of articular cartilage regeneration

Louisa Wendler | 2020
Untersuchung der Molekulare Mechanismen der beschleunigten Frakturheilung in der Integrin α2β1 defizienten Maus
Titel geändert: Einfluss von kollagenbindenden Integrinen auf den Frakturheilungsprozess an der α2-defizienten Maus

Nina-Marie Thiemeyer | 2020
Die Rolle von syndecan-1 in der rheumatoiden Arthritis

Adrian Deichsel | 2020
The role of integrin alpha1beta1 in joint destruction and remodelling in inflammatory arthritis

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Die Rolle von integrin α11β1 in rheumatoider Arthritis

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Der Kationenkanal TRPC6 als ein Mediator im Knochenstoffwechsel

Jürgen Bülow | 2018
Histomorphometrische Untersuchungen an der Syndecan-4 defizienten Maus

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Funktionelle und strukturelle Analyse der Knochenstruktur der microRNA-146a defizienten Maus

Janine Hallensleben | 2016
Biomechanische Untersuchungen des Syndecan-4-knockout-Phänotyps der Maus bezüglich der Frakturheilung nach 28 Tagen

Philipp Salmen | 2015
Vom Einfluss chemisch sympathischer Denervierung mittels 6-Hydroxydopamindopamin und der Ausschaltung des Tachykinin-1 Gens auf den Knochenmetabolismus und die Frakturheilung in Mäusen

Kirsten Tepe | 2015
Charakterisierung der Knochenstruktur des Syndecan-4-Maus-Modells mittels in vivo micro-Computertomographie und Positronenemissionstomographie

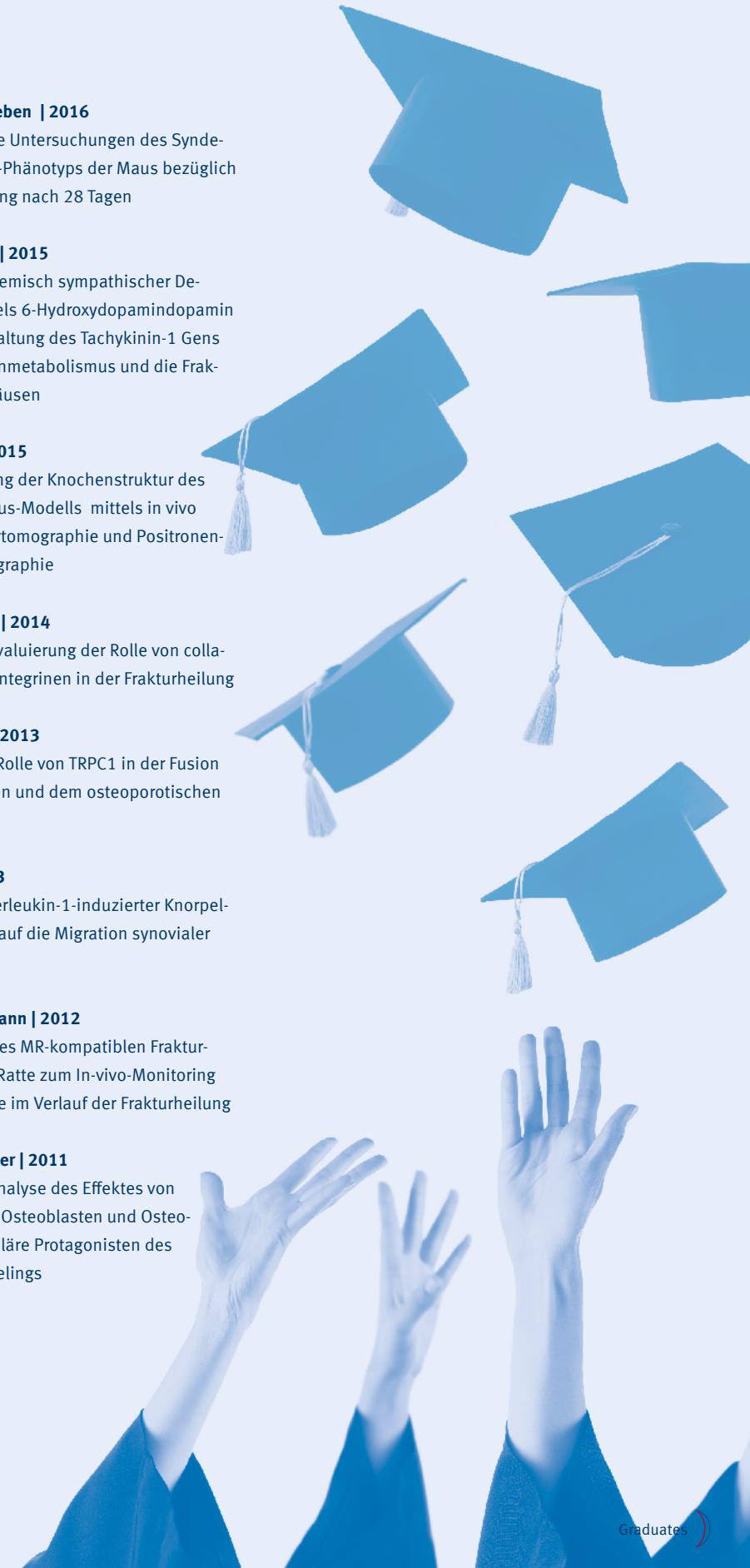
Britta Gernhold | 2014
Histologische Evaluierung der Rolle von collagenbindenden Integrinen in der Frakturheilung

Daniel Umlauf | 2013
Die essentielle Rolle von TRPC1 in der Fusion von Osteoklasten und dem osteoporotischen Knochenverlust

Jan Hillen | 2013
Der Einfluss Interleukin-1-induzierter Knorpelveränderungen auf die Migration synovialer Fibroblasten

Hannah Tiggemann | 2012
Entwicklung eines MR-kompatiblen Frakturmodells an der Ratte zum In-vivo-Monitoring der Angiogenese im Verlauf der Frakturheilung

Sebastian Fischer | 2011
Histologische Analyse des Effektes von Syndecan-4 auf Osteoblasten und Osteoklasten als zelluläre Protagonisten des ossären Remodelings



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  Prof. T. El Khassawna
  Prof. C. Heiß
  Prof. U. Müller-Ladner
  PD Dr. E. Neumann
  Prof. A. Pilatz

Göttingen
- **Georg-August-Universität Göttingen**
  Prof. U. Kornak

Hamburg
- **University Hospital Hamburg-Eppendorf**
  Prof. M. Amling
  Prof. S. Loges
  Prof. T. Schinke
  Prof. U. Schumacher

Heidelberg
- **University of Heidelberg**
  Prof. HM Lorenz
  Dr. LO Tykocinski

Herne
- **Ruhr-University Bochum**
  PD X. Baraliakos

Homburg
- **Saarland University**
- **University Hospital Saarland**
  Prof. M. Cucchiarini
  Prof. H. Madry

Jena
- **Friedrich Schiller University Jena**
- **University Hospital Jena**
  PD Dr. V. Hörr
  Prof. T. Kamradt
  Prof. B. Löffler
  PD Dr. A. Pfeil
  PD Dr. U. Schulze-Späte
  Prof. B. Wildemann
- **Leibnitz Institute on Aging**
  PD Dr. M. Ermolaeva

Köln
- **University of Köln**
- **University Hospital Köln**
  Prof. B. Brachvogel
  Dr. B. Eckes

Leipzig
- **University Hospital Leipzig**
  Prof. JC Simon

Lübeck
- **University of Lübeck**
- **University Hospital Schleswig-Holstein, Campus Lübeck**
  Prof. J. Brinckmann
  Prof. P. Lamprecht
  Prof. G. Riemekasten

Magdeburg
- **Otto von Guericke University Magdeburg**
- **University Hospital Magdeburg**
  Prof. J. Bertrand

München
- **Ludwig-Maximilians-Universität München**
  Prof. E. Hesse

Münster
- **FH Münster University of Applied Sciences**
  Prof. D. Mähner
- **Max-Planck-Institute for molecular Biomedicine**
  Prof. R. Adams
  Dr. G. Bixel
  Dr. K. Sivaraj

Nürnberg
- **Paracelsus Medizinische Privatuniversität**
  Prof. G. Schulze-Tanzil

Osnabrück
- **Osnabrück University of Applied Sciences**
  Prof. R. Kreßmann

Regensburg
- **University of Regensburg**
  Prof. S. Grässel

Steinfurt
- **FH Münster University of Applied Sciences**
  Prof. K. B. Mittmann

Ulm
- **Ulm University**
  Prof. A. Ignatius

Würzburg
- **Julius-Maximilians-Universität Würzburg**
  Prof. A. Brandl
  Prof. E. Butt
  Prof. D. Docheva
  Prof. L. Meinel
  Prof. J. Vogel

FORSCHUNGSPARTNERSCHAFT WELTWEIT
SCIENTIFIC NETWORK GLOBAL

NORTH AMERICA

CANADA

- **Krembil Research Institute**
  Prof. M. Kapoor
  Toronto

USA

- **Cornell University**
  Prof. I. Brito
  Ithaca, NY
- **Harvard Medical School**
  Prof. G. Tsokos
  Boston, MA
- **MD Anderson Cancer Center**
  Prof. R. Behringer
  Houston, TX
- **National Cancer Institute, NIH**
  Prof. R. Nussinov
  Frederick, MD
- **University of California**
  Prof. G. Firestein
  Prof. N. Bottini
  San Diego, CA
- **Yale University**
  Prof. N. Palm
  Prof. E. Meffre
  New Haven, CT

EUROPE

UK

- **University of Aberdeen**
  Prof. C. De Bari
  Dr. A. Roelofs
  Aberdeen
- **University of Birmingham**
  Dr. A. Naylor
  Birmingham
- **Queen Mary University of London**
  Prof. F. Dell'Accio
  Dr. S. Eldridge
  London
- **University of Oxford**
  Prof. C. Buckley
  Oxford

FRANCE

- **Institut de Biologie et Chimie des Protéines**
  Dr. C. Moali
  Lyon
- **INSERM, Institute de Biologie Valrose (iBV)**
  Dr. A. Schedl
  Nizza

SPAIN

- **IDIBAPS August PI I Sunyer Biomedical Research Institut**
  Dr. R. Gasa
  Barcelona

NORWAY
- **University of Bergen**
  Prof. D. Gullberg
  Bergen

DENMARK
- **Aarhus University**
  Dr. A. Lodberg
  Aarhus

SWITZERLAND
- **University of Lausanne**
  Prof. N. Busso
  Dr. S. Nasi
  Lausanne
- **University Hospital Zurich**
  Prof. O. Distler
  Prof. S. Gay
  Zurich
- **University of Zurich**
  Prof. K. Basler
  Zurich
- **University of Basel**
  Prof. D. Finke
  Basel

AUSTRIA
- **University of Graz**
  Dr. B. Klösch
  Dr. N. Sommer
  PD Dr. A. Weinberg
  Graz
- **Clinic Hietzing**
  Prof. Dr. K. Redlich
  Wien
- **Medical University of Vienna**
  Prof. D Aletaha
  PD Dr. S. Blüml
  Prof. K. Kiener
  Dr. V. Saferding
  Prof. E. Wagner
  Wien

ITALY
- **UNIMORE UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA**
  Prof. M. De Luca
  Modena

ASIA

ISRAEL
- **Bar-Ilan University**
  PD Dr. N. Yissachar
  Ramat-Gan
- **Weizmann Institute of Science**
  Prof. E. Elinav
  Rehovot

JAPAN
- **Kobe University**
  Prof. Y. Minami
  Kobe

CHINA
- **Guangzhou Institutes of Biomedicine and Health Chinese Academy of Sciences**
  Dr. M.A. Esteban
  Guangzhou
- **The University of Hongkong**
  Prof. K. Cheah
  Hongkong

REPUBLIC OF KOREA
- **Seoul National University Hospital**
  Prof. Y-W Song
  Seoul

GASTWISSENSCHAFTLER
GUESTS

SINCE 2021	**MENGWEI NIU** *Department of Pathophysiology, Southern Medical University, Guangzhou, China*
2020	**DENISE BECKMANN** *Division of Rheumatology, Allergy & Immunology, UC San Diego, School of Medicine*
2019-2020	**SONIA NASI** *Lausanne University Hospital, Switzerland*
2019	**JESSICA BERTRAND** *Otto von Guericke University Magdeburg, Faculty of Medicine, Experimental Orthopedics*
2017-2021	**JIAN XING** *Yuncheng Huakang Hospital, Medical University, Yuncheng, Shanxi, China*
2014-2016	**MA WEI** *Hospital of Hangzhou, China*
2013	**JAN HUBERT** *University Hospital Hamburg-Eppendorf, Germany* **THELONIUS HAWELLEK** *University Hospital Hamburg-Eppendorf, Germany*
2012	**MARIA SZENTE-PASZTOI** *Semmelweis University, Department of Genetics, Cell- and Immunobiology, Hungarian Academy of Sciences, Budapest*
2011	**TAICHI SAITO** *Department of Orthopaedic Surgery, Okayama University Hospital, Okayama, Japan*
2010	**NAOKI TAKATA** *Department of Orthopaedic Surgery, Okayama University Hospital, Okayama, Japan* **YUSUKE YOKOYAMA** *Department of Orthopaedic Surgery, Okayama University Hospital, Okayama, Japan* **YASUTAKA KADOTA** *Okayama University, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan*
2009	**STEFFEN DRANGE** *Otto von Guericke University Magdeburg, Faculty of Medicine, Orthopedic University Hospital*
2008-2009	**STEPHAN ENDER** *University of Greifswald, University Medicine, Clinic and Polyclinic for Orthopedics and Orthopedic Surgery*

IMM SEMINARREIHE
IMM SEMINAR SERIES

2021

Speaker: Apl-Prof. Dr. Elke Butt
Experimentelle Biomedizin, Lehrstuhl II, Universitätsklinikum Würzburg
LASP1 – from a simple cytoskeleton protein to a sophisticated signaling molecule

Speaker: Prof. Elazar Zelzer
Department of Molecular Genetics, Faculty of Biochemistry, Weizmann Institute of Science, Israel
Old players new concepts: The function of the proprioceptive system in skeleton biology

Speaker: Prof. Grashoff
Institute of Molecular Cell Biology, Quantitative Cell Biology, Westfalian Wilhelms-University Münster
Molecular-Scale Analyses of Cell Adhesion

2019

Speaker: Dr. Amy Naylor
Centre for Translation Inflammation Research, University of Birmingham Research Laboratories, Queen Elizabeth Hospital, Birmingham
The bone: stromal cell interface in arthritis and ageing

Speaker: Prof. Dr. Jessica Bertrand
Otto-von-Guericke Universität Magdeburg, Medizinische Fakultät, Experimentelle Orthopädie
Role of Wnt signaling in cartilage degeneration during aging and OA

Speaker: Dr. Marcel Spaargaren
Lymphoma and Myeloma Center Amsterdam (LYMMCARE), Department of Pathology, Amsterdam University Medical Center
Microenvironment-dependence as the Achilles' heel of B-cell malignancies

Speaker: Dr. Richard Groen
Department of Hematology, Amsterdam UMC
Building human bone marrow-like models to study niche interactions

Speaker: Prof. Bernd Rolauffs
Department Chirurgie, Klinik für Orthopädie und Unfallchirurgie, Universitätsklinikum Freiburg
Engineering cellular geometry for controlling cellular function

2018

Speaker: Prof. Eric Hesse
Director of Research, Department of Trauma-, Hand and Reconstructive Surgery, University medical Center Hamburg-Eppendorf
Role of Tgif1 in bone health and disease

Speaker: Prof. Martin Humphries
Faculty of Biology, Medicine & Health, Manchester Academic Health Science Centre, University of Manchester
Reticular adhesions: a distinct class of cell-matrix adhesions that mediate attachment during mitosis

Speaker: Prof. Dirk Mielenz
Division of molecular Immunology, Nikolaus Fiebiger Center, Friedrich-Alexander-Universität Erlangen-Nürnberg
Cytoskeletal control of antibody affinity maturation and plasma cell differentiation

Speaker: Dr. Ronan Schweitzer
Oregon Health & Science University, Cell, Developmental and Cancer Biology, Shriners Hospital for Children -Portland
Regulation of Tendon Elongation and Tenocyte Maturation

Speaker: Prof. Densita Docheva
University Hospital Regensburg, Institute of Experimental Trauma Surgery
Mechanisms of tendon generation, degeneration and regeneration

Speaker: Prof. Sigmar Stricker
Free University Berlin, Institute of Chemistry and Biochemistry, Department of Biochemistry
Fate and Function of Fibro-Adipogenic Progenitors in Development and Regeneration

Speaker: Dr. Jeroen Geurts
Departments of Spine Surgery and Biomedical Engineering, University Hospital Basel
Unraveling and targeting of pathological bone and marrow in osteoarthritis

2017

Speaker: Prof. Anita Ignatius
Institute of Orthopaedic Research and Biomechanics, Centre for Trauma Research Ulm
New insights in bone fracture healing

Speaker: Prof. Ho-Ryun Chung
Max Planck Institute for Molecular Genetics, AG Epigenomics
The Epigenome of Synovial Fibroblasts in Rheumatoid Arthritis

Prof. Nunzio Bottini
UCSan Diego, School of Medicine, Rheumatology, Allergy & Immunology, in the Department of Medicine
Functional genetics of the phosphatase PTPN2 in rheumatoid arthritis

Speaker: Prof. Karl Kadler
Wellcome Trust Centre for Cell Matrix Research, Division of Cell Matrix Biology and Regenerative Medicine, University of Manchester
Circadian clock regulation of the secretory pathway for collagen homeostasis

Speaker: Dr. Sonia Nasi
University of Lausanne / UNIL – Division of Rheumatology, Physical Medicine and Rehabilitation
Hydrogen sulfide (H2S) pathway and calcification

Speaker: Prof. Hans Kiener
Department of Medicine III, Division of Rheumatology, Medical Univ. of Vienna/Austria
Insights into synovial fibroblasts tissue dynamics from the 3D organ culture model system

Speaker: Prof. Dirk Föll
Klinik für Pädiatrische Rheumatologie und Immunologie, UKM
Alarmins linking innate and adaptive immunity

IMM SEMINARREIHE
IMM SEMINAR SERIES

Speaker: Prof. Brian Johnstone
Oregon Health & Science University, Portland/ Oregon
Chondral cell differentiation for cartilage regeneration

2016

Speaker: Prof. Anthony Day
Wellcome Trust Center, Cell Matrix Centre for Cell-Matrix Research, Faculty of Life Sciences, University of Manchester
Harnessing the tissue protective properties of TSG-6:a potential therapy for osteoarthritis

Speaker: Dr. Blandine Poulet
Institute of Ageing and Chronic Disease, University Liverpool
Trauma – induced osteoarthritis in mice

Speaker: Prof. Paul Bishop
Institute of Human Development, Center of Ophalmology and Vision Sciences, University of Manchester
Opticin: From Discovery to Potential Therapeutic

Speaker: Prof. Jan Tuckermann
Institute of Comparative Molecular Endrocrinology, University Ulm
Glucocortoid receptor action revised – novel mechanisms in inflammation on and bone integrity

Speaker: Prof. Rik Lories
Skeletal Biology and Engineering Research Center, Leuven/Belgien
WNT signalling: key regulator of homeostasis and disease in the joint

Speaker: Prof. Jörg Distler
Department on Internal medicine 3, Rheumatology and Immunology, Universität Erlangen
Targeting aberrant fibroblast activation – implicates for antifibrotic therapies

Speaker: Prof. Jan de Boer
Merlin Institute, Department of Cell Biology-Inspired Tissue Engineering, Maastrich University
Bone engineering and back: The interplay between basic biology and technology

Speaker: Dr. Jean-Pierre David
Institut für Osteologie und Biomechanik, Universitätsklinikum Hamburg
Osteoporosis, arthritis or tumor, a life without Risk from teeth to toes

2015

Speaker: Dr. Catherine Moali
Institute de Biologie et Chimie des Protéines, University of Lyon
Exploring the roles and therapeutic potential of procollagen C-proteinases in tissue repair

Speaker: Prof. Christoph Becker-Pauly
Department of Biochemistry, University of Kiel
Meprin Metalloproteases in Connective Tissue Development

Speaker: Prof. Cosimo de Bari
School of Medicine, Medical Sciences and Nutrition, University of Aberdeen, Arthritis and Regenerative Medicine Laboratory, Institute of Medical Sciences
Mesenchymal stem cells find their niche in cell therapy for joint disorder

Speaker: Prof. Francesco Dell´Accio
Centre for Experimental Medicine & Rheumatology, William Hervey Research Institute, Barts and the London School of Medicine and Dentistry, John Vane Science Centre, London
Agrin an unexpected chondrogenic factor

Speaker: Prof. Gerjo van Osch
Dept. Orthopaedics & Dept. Otorhinolaryngology, Erasmus University Medical Center Rotterdam
Chondrogenesis of MSC´s and the effect on joint environment

Speaker: Dr. Birgit Leitinger
Faculty of Medicine, National Heart and Lung Institute, Sir Alexander Fleming Building, South Kensington Campus, London
How do discodin domain receptors transmit a signal across the membrane?

Speaker: Dr. Dirk Elewaut
Department of Internal Medicine, De Pintelaan185, Gent/Belgien
Immunobiology of spondylrarthritis

Speaker: Prof. Dr. Schulte-Merker
Institut für kardiovaskuläre Organogenese und Regeneration, Universitätsklinikum Münster
Not all bones are created equal – osteogenesis in zebrafish and mice

Speaker: Prof. Dr. Christa Maes
Laboratory for Skeletal Cell Biology and Physiology, Skeletal Biology and Engineering Research Center, Department of Development and Regeneration, KU Leuven
Coupling of angiogenesis and osteogenesis in endochondral bone development and repair

Speaker: Prof. Dr. John Loughlin
Institute of Cellular Medicine, Cathrine Cookson Building, The Medical School, Framlington Place, Newcastle University, UK
Functional and epigenetic analysis of osteoarthritis susceptibility loci

Speaker: Prof. Eric Hesse
Director of Research, Department of Trauma-, Hand and Reconstructive Surgery, University medical Center Hamburg-Eppendorf
Novel molecular mechanisms regulating bone remodeling and anabolic response

2014

Speaker: Prof. Reinhold Erben
Abteilung für Physiologie, Pathophysiologie und experimentelle Endokrinologie, Veterinärmedizinische Universität Wien
Marker tolerance technology. An animal model for unbiased cell tracking

Speaker: Prof. Christopher Buckley
Centre for Translation Inflammation Research, University of Birmingham Research Laboratories, Queen Elizabeth Hospital, Birmingham
The role of fibroblast in the persistence of inflammation

Speaker: Dr. Attila Aszodi
Ludwig-Maximilian-University Munich (LMU), Experimental Surgery and Regenerative Medicine Department of Surgery
Integrin signaling in cartilage physiology and pathophysiology

Speaker: Dr. Bent Brachvogel
Department of Pediatrics and Adolescent Medicine, University Hospital Cologne
Lost in translation-miRNAs in vascular and skeletal development

Speaker: Prof. Hans Kiener
Department of Medicine II, Division of Rheumatology, Medical University of Vienna
Taking synoviocytes to the third dimension: Molecular and cellular determinants for synovial tissue function

Speaker: Prof. Andrea Vortkamp
Centre for Medical Biotechnology, Department of Development Biology, University Duisburg-Essen
Heparan sulfate as a regulator of chondrocyte differentiation in development and disease

Speaker: Dr. Martin Cohen-Solal
Université Paris Didrot, France
The role of subchondral bone in the development of osteoarthritis

Speaker: Prof. Klaus von der Mark
Institute of Molecular medicine, University Hospital Erlangen
Cell fate analysis of hypertrophic chondrocytes reveals dual origin of trabecular osteoblasts

Speaker: Dr. Mona Dvir Ginzberg
Head Laboratory of Cartilage Biology, Institute of Dental Sciences, Faculty of Dental Medicine, Hebrew University of Jerusalem/Israel
Elucidating the Role of SirT1 in Chondrocyte Survival, Gene Expression and Osteoarthritis

2013

Speaker: Prof. Andrew Pitsillides
Royal Veterinary College, London/UK
Skeletal mechanobiology: development and disease

Speaker: Dr. Peter Westerhoff
IEMM Section of Biomechanics, UKM
Measurement of in vivo loadswith instrumented implants

Speaker: Dr. Frank Echtermeyer
Experimentelle Anästhesiologie, Medizinische Hochschule Hannover
Syndecan-4: a pluripotent molecule with various functions in different organs

2012

Speaker: Prof. Donald Gullberg
Department of Biomedicine, Universität of Bergen, Norway
The tantalizing alpha11beta1 integrin-a mesenchymal collage receptor of interest in biology and medicine

Speaker: Dr. György Nagy
3rd Department of Internal Medicine, Semmelweis University Medical School, Budapest, Hungary
Regulation of CD3-chain expression of human T lymphocytes

Speaker: Dr. Tom Grossmann
Max-Planck-Institut für molekulare Physiologie, Dortmund
Inhibition of canonical WNT signaling through direct targeting of ß-catenin

Speaker: Dr. Klaus-Peter Knobeloch
University Hospital Freiburg
In vivo functions of the Interferon-Stimulated-Gene 15 (ISG15) modification systems: Lesson from gene knockout mice

Speaker: Dr. Mark Morgan
Wellcome Trust Center for Cell-Matrix Research, Faculty of Life Sciences, University of Manchester
Syndecan-4 phosphorylation: A critical control point regulating integrin Trafficking and cell migration

Speaker: Dr. Thomas Vogel
Institute of Immunology, Universitätsklinikum Münster
Control of endogenous stress proteins S100A8 and S100A9 in innate and adaptive immunity

2011

Speaker: Prof. Dr. Thomas Kamradt
Institute of Immunology, University Hospital Jena
Adaptive and Innate Immune Mechanisms in the Pathogenesis of G6ÜI-induced Arthritis

Speaker: Dr. George Bou-Gharios
Reader in Matrix Biology, Kenned Institute of Rheumatology, University of Oxford
Making sophisticated mice for cell-specific delivery in connective tissue diseases

Speaker: Dr. Attila Aszodi
Ludwig-Maximilians-University Munich (LMU), Experimental Surgery and Regenerative Medicine, Department of Surgery
Regulation of skeletal morphogenesis by adhesive interactions and the actin cytoskeleton

Speaker: Dr. Hans Kiener
Klinische Abteilung für Rheumatologie, Universitätsklinik für Innere Medizin in Wien

Speaker: Dr. rer. nat. Bettina Sehnert
Zentrum für Chronische Immundefizienz, Universitätsklinikum Freiburg
Cell Type-specific NF-kB inhibition – a novel approach for the treatment of inflammatory diseases

Speaker: Dr. Andrea Augello
Musculoskeletal Research Programm, Institute of medical Sciences, University of Aberdeen
Mesenchymal Stem Cells in Health and Disease

2010

Speaker: Prof. Francesco Dell´Accio
Centre for Experimental Medicine & Rheumatology, Queen Mary University, London
Cartilage injury, regeneration, and injury-related molecular signaling

Speaker: Prof. Yeong-Wook Song
Division of Rheumatology, Dept. of Internal Medicine, Seoul National University Hospital
The novel function of a-enolase on the pathogenesis of rheumatoid arthritis via induction of TNF-a, IL-1a/ß, IFN-y and PGE2

HONORS & AWARDS

2021	**Avrion Mitchison Prize 2021, DRFZ** | *D. Beckmann*
	Lupus Insight Prize, Lupus Research Alliance, USA | *M. Kriegel*
SINCE 2021	**Research Officer AOTrauma Germany** | *R. Stange*
SINCE 2020	**Member of the review board (Fachkollegium) of the German Research Foundation (DFG)** | *T. Pap*
	Vorstandsmitglied der LipödemGesellschaft e.V. | *T. Hirsch*
2019	**Rudolf-Schoen Prize, German Society of Rheumatology (DGRh), Germany** | *M. Kriegel*
	Von-Langenbeck Preis der Deutschen Gesellschaft für Chirurgie 2018 | *T. Hirsch*
2018	**Lombardy is Research Award** | *T. Hirsch*
	Care for Rare Science Award | *T. Hirsch*
	Eurordis Rare Diseases Europe Scientifc Award | *T. Hirsch*
2017	**Drei-Länder Wundpreis Fondation Urgo** | *T. Hirsch*
2016	**Arthritis Foundation Awardee, Delivering on Discovery Grant Program, USA** | *M. Kriegel*
	Avrion Mitchison Prize 2016, DRFZ | *C. Wehmeyer*
2015	**Drei-Länder Wundpreis Fondation Urgo** | *T. Hirsch*
2015	**Novel Research Grant Awardee, Lupus Research Institute, USA** | *M. Kriegel*
2015-2019	**Spokesperson of the German Assembly of University Professors in Orthopedics and Trauma Surgery** | *T. Pap*

2014	**Jack and Vonnie Schlomer Memorial Scholar, Arthritis National Research Foundation, USA** | *M. Kriegel*
2012	**Wilhelm-Roux-Award of the Basic Research Society of the DGOU |** *R. Stange*
	Heisenberg Stipend awarded | *C. Hartmann*
2010	**Arthur-Vick-Award, Assoziation für Orthopädische Rheumatologie** | *T. Pap*
	Innovationspreis 2010 für mehr Lebensqualität in der Wundversorgung | *T. Hirsch*
2010-2013	**Chairman of the Scientific Platform (Competence Network) of the German Society of Rheumatology and Member of the Executive Board** | *T. Pap*
2009	**Pro Scientia-Award, Eckhart-Buddecke-Foundation** | *T. Pap*
	Teaching Fellowship Award, Brigham and Women's Hospital, Harvard Medical School, USA | *M. Kriegel*
2008-2013	**Honorary Professor at Kobe University Medical School** | *C. Hartmann*
2006-2007	**Deputy Dean, Dept. 5 (Medical Faculty), Westfälische Wilhelms- University of Münster** | *T. Pap*
2004	**Novartis Prize "Young Endocrinology", German Society of Endocrinology, Germany** | *M. Kriegel*
2003	**Emmy-Noether Stipendee, German Research Foundation (DFG), Germany** | *M. Kriegel*
2002	**Doctoral Thesis Award, Friedrich-Alexander University, Germany** | *M. Kriegel*
2001	**Emmy-Noether Stipendee, German Research Foundation (DFG), Germany |** *T. Pap*

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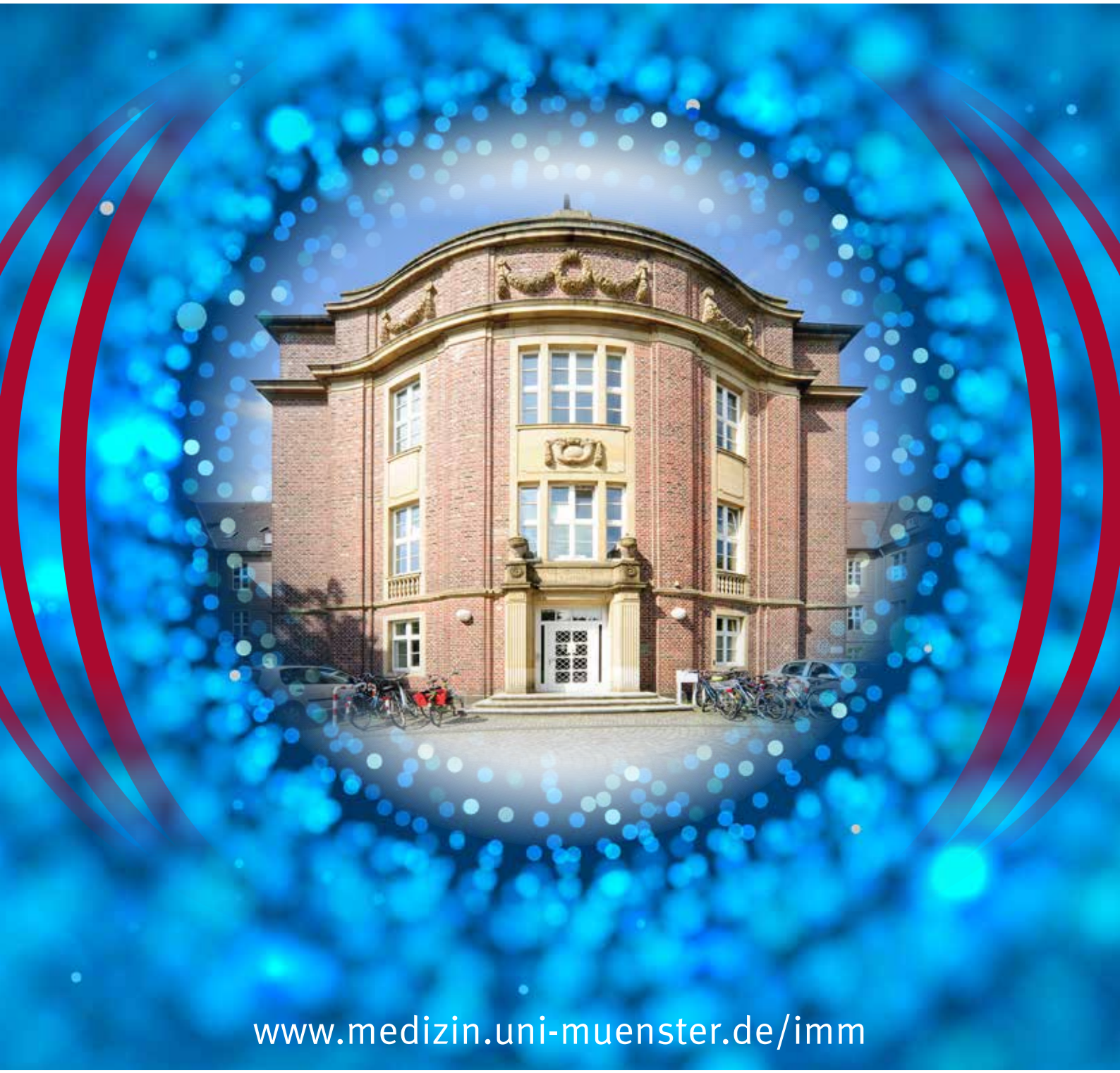

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Universitätsklinikum Münster

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