



RNA Faculty Würzburg

2025/26



Exterior view of the HIRI / IMIB. © Jürgen Landes | arturimages

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Welcome

Dear invited speaker

It is our great pleasure to welcome you to the *Würzburg Life Science Seminar* series, which is jointly organized by the Helmholtz Institute for RNA-based Infection Research (HIRI), the Collaborative Research Center DECIDE (DECisions in Infectious DisEases) and the following institutions of the University of Würzburg: the Institute of Molecular Infection Biology (IMIB), the Biocenter and the Institute of Virology and Immunobiology. This lecture series covers a wide range of topics, including the functions and structures of RNA in eukaryotic, prokaryotic and viral systems, and aims to discuss current and future discoveries in the life sciences.

Technological breakthroughs in the last decade have led to the discovery of numerous new classes of non-coding RNA that play crucial roles in many cellular pathways. RNA is a multi-talented player, able to alter gene expression and even the genome through gene editing. RNA medicines have the potential to treat and even cure rare genetic diseases, as well as fight

infections, cancer, and heart disease. We all know that the COVID-19 pandemic was a pivotal moment for RNA therapeutics, catapulting mRNA vaccines into the global spotlight.

In addition, RNA is becoming the most powerful proxy in single-cell studies to interpret the physiological state of individual cells. Single-cell RNA analyzes promise unprecedented spatio-temporal resolution of cellular heterogeneity, which determines the outcome of many pathological processes, including infections.

As you can see from the brief research overviews and CVs in this booklet, Würzburg has attained a critical mass in RNA research that is found in only a few other places. As interest in RNA-centred science continues to grow, we would like to draw the attention of students, postdocs and PIs in Würzburg to your exciting research.

Thank you again for coming to the *Würzburg Life Science Seminar*. We look forward to stimulating science and fruitful discussions.

The *Würzburg Life Science Seminar* selection committee



Jörg Vogel



Cynthia Sharma



Utz Fischer



Franziska Faber



Marienberg Fortress and Old Main Bridge by night. © Congress Tourismus Würzburg, A. Bestle

Würzburg

Würzburg is a picturesque city located on the river Main in the region of Franconia (Franken), which is part of the German Federal State of Bavaria. Historically, it was a former Celtic territory that was settled by the Franks in the 6th and 7th century. The city boasts many historic buildings with stunning architecture such as the Würzburg Residence, the Marienberg Fortress, and the Cathedral of St. Kilian.

The Würzburg Residence is one of Europe's most renowned baroque palaces and a registered UNESCO World Cultural Heritage Site. The palace was built by the renowned architect Balthasar Neumann (1687 - 1753) and includes a much-acclaimed staircase with awe-inspiring frescos by the Venetian artist Tiepolo.

The Marienberg Fortress is the most dominating feature of the city, towering above it, surrounded by vineyards. It is situated on the site of a Bronze Age refuge castle, with the construction of the fortress beginning around 1200 AD. From 1253 to 1719 AD it served as the seat of the Prince Bishops and was remodeled into a Renaissance castle by the Prince Bishop Julius Echter von Mespelbrunn in 1600. After the conquest by Gustav Adolf of Sweden in 1631, it was further expanded into a baroque fortress with royal gardens.

The city and region are inextricably linked to wine and are home to a number of famous vineyards and wineries in Germany. For example, the historic wine cellar "Staatlicher Hofkeller" (at the Würzburg Residence) has been in existence for close to 900 years, dating

back to the Bishop Embricho. The proceeds from the Juliuspital wine estate, which was founded in 1576 and currently is the second largest in Germany, have funded its social commitment to the city including a hospital that still operates today.

Local wine can be enjoyed in many of the wine taverns in the city and also on the Old Main Bridge "Alte Mainbrücke", which offers views of the Marienberg Fortress, the pilgrimage church "Käppele"—also built by Balthasar Neumann—and the famous vineyards.

A vibrant city

Today, Würzburg is home to several internationally recognized institutions in higher education and research such as the Julius-Maximilians-Universität, the Technical University of Applied Sciences and the University of Music as well as several non-university research institutions.

With more than 31,000 students and a total of 132,000 inhabitants Würzburg is demographically among the youngest cities in Germany and therefore the vibrant capital of the region of Lower Franconia.

Located close to the geographical center of Germany, the city offers excellent connections to all domestic and European economic regions via rail, motorway and the river Main. Frankfurt airport, which offers numerous direct flights to many international destinations, can easily be reached by train or car within about an hour.

www.wuerzburg.de

Helmholtz Institute for RNA-based Infection Research

The Helmholtz Institute for RNA-based Infection Research (HIRI) was established in May 2017 as a site of the Helmholtz Centre for Infection Research (HZI) in Braunschweig in cooperation with the Julius-Maximilians-Universität Würzburg (JMU). Located on the Würzburg medical campus, the HIRI is the first research institution of its kind worldwide to fully focus on the role of RNA in infection processes.

Rising antimicrobial resistance, chronic infections, and (re-)emerging pathogens are among the major challenges facing humanity. As a federal institute, the HIRI pioneers an integrative approach to exploit the vast potential of RNA as a diagnostic, drug, and therapeutic target for new strategies to combat infectious diseases.

Led by Director Jörg Vogel, the HIRI focuses on three central areas: Basic research on bacterial pathogens, on viruses and on the host response by the immune system. These three fields are complemented by applied research on diagnostics and RNA delivery for therapeutic purposes. The integration of emerging topics in RNA research, such as RNA modifications, will ensure a place for the HIRI at the forefront of infectious disease research. Core technologies, with a major focus on sequencing approaches, are harnessed for high-throughput exploration of RNA functions and will provide an opportunity to construct a systems-level view of the role of RNA during infection.

Integrated scientific concept

With its integrated scientific concept and cutting-edge infrastructure, the HIRI provides a vibrant research environment for both established and young scientists.

The natural synergy between this new institute and the infection research and translational competences at the University of Würzburg as well as at the HZI Braunschweig creates unique opportunities to effectively convert knowledge into applications.

This setting also stimulates collaborations with industry in the development of novel therapeutic and diagnostic strategies for the treatment of infectious diseases.

Major Goals of the HIRI

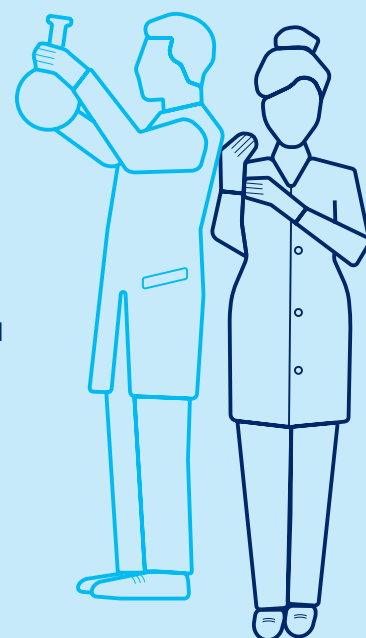
Resolve the complexity and heterogeneity of infection processes at the single-cell level

Identify novel regulatory RNAs with essential roles in pathogenesis

Understand RNA-based mechanisms in virulence and host defense

Develop innovative techniques for RNA-based interventions

Exploit RNA for new diagnostics, preventives, and anti-infectives



www.helmholtz-hiri.de

Helmholtz Centre for Infection Research

Scientists at HZI Braunschweig and at its various sites across Germany investigate the mechanisms of infectious diseases and the defense against them. The scientific questions HZI is trying to answer include: What transforms bacteria or viruses into pathogens? Why are some individuals particularly sensitive while others are resistant to infections?

To solve these problems, HZI scientists investigate pathogens that are clinically relevant or can be used as model systems. Understanding the mechanisms of infections contributes to the development of novel, patient-tailored solutions for diagnosis, prevention, treatment as well as surveillance and control of infectious diseases.

The HZI has implemented its competitive program "Infection Research". It puts particular emphasis on the transfer of research results to application, on individualised infection medicine and on data-driven approaches for infection research, including omics-technologies and machine learning.

www.helmholtz-hzi.de

Helmholtz

The Helmholtz Association is Germany's largest scientific organization with about 46,000 employees and an annual budget of more than six billion euros. It seeks to tackle major challenges facing society in six specific research areas: energy, earth & environment, health, information, aeronautics, space and transport, and matter.

Research in the area health is subdivided further into the research programs cancer research, systems medicine and cardiovascular diseases, neurodegenerative diseases, environmental and metabolic diseases, the national cohort health study and infection research.

Each research program is the focus of one Helmholtz Center; cancer research, for example, is based at the Deutsches Krebsforschungszentrum (DKFZ) in Heidelberg.

The Helmholtz Association aims to develop innovative technologies and thus preserve the foundations of human life. To do this, the association relies on infrastructures that are unique in the world: Helmholtz centers design and maintain numerous powerful large-scale facilities, such as the world's most powerful X-ray laser or supercomputers of the international top class.

Satellites, aircrafts and research vessels collect important data on behalf of Helmholtz. Acquired knowledge is made accessible, as Helmholtz works on behalf of society.

www.helmholtz.de

Julius-Maximilians-Universität

Founded in 1402, the Julius-Maximilians-Universität Würzburg (JMU) is an internationally acclaimed university with a tradition of more than 600 years.

Many eminent scholars and scientists have conducted their research in Würzburg. Among them 14 Nobel laureates, including Wilhelm Conrad Röntgen, who discovered X-rays here, and physicist Klaus von Klitzing, who received the award in 1985 for his discovery of the Quantum Hall effect. In addition, twelve scientists from the University of Würzburg have received a Leibniz Prize—the most prestigious German research prize.

Infectious disease research has long been a major part of the biomedical sciences program of JMU. Strong cross-faculty collaborations fostered a broad spectrum of research on human pathogens, including bacteria, fungi, parasites and viruses.

In 1993, the Research Center for Infectious Diseases (ZINF) was founded and integrated into the clinical environment. With the appointments of Jörg Vogel, Cynthia Sharma and others, the ZINF developed into a unique cluster of infection-related RNA research within Europe.

Facts & Figures

The JMU is one of the leading institutions of higher education in Germany, according to the rankings of domestic and international research organizations.

On an international level, the University of Würzburg ranks highly in many scientific disciplines including biology, medicine, physics, and psychology.

Today, the JMU is home to around 26,400 students, including over 2,700 from abroad. It offers 250 courses at 10 faculties.

Together with the University Hospital (UKW), JMU provides employment for a total of 12,400 people, including more than 4,600 academic staff including 483 professors.

www.uni-wuerzburg.de

Julius-Maximilians-Universität (JMU) Würzburg. © JMU, Press Office



Würzburg RNA Ecosystem

The scientific landscape in Würzburg is characterized by interdisciplinary research centers such as the Bio-center and the Single-Cell Center. Close cooperations and partnerships with the Max Planck and Fraunhofer Societies also foster local interdisciplinary research.



Film still (SciComLab). © HIRI, Single-Cell Center Würzburg

The Institute of Molecular Infection Biology

The Institute of Molecular Infection Biology (IMIB) at JMU is an interdisciplinary research institution of the Medical Faculty with strong links to the Faculty of Biology. Since 2009, Jörg Vogel has been director of the institute.

The internationally recruited scientists at IMIB investigate the molecular mechanisms of infections caused by bacteria, parasites and fungi. They aim to elucidate fundamental aspects of gene regulation of pathogens and to identify common strategies employed by the pathogens when interacting with host cells and the immune system.

Another focus of the institute lies in the analysis of small RNAs and other non-coding RNA molecules in infection. This is complemented by a research technology infrastructure that aims at developing new applications for sequencing-based approaches like single-cell RNA-seq, multi-organism-RNA-seq and tissue RNA-seq.

www.uni-wuerzburg.de/imib

Single-Cell Center Würzburg

In 2021, the HIRI co-founded the Single-Cell Center Würzburg (SCC) to further advance one of its core technologies. The Center is a joint venture with the Faculty of Medicine of JMU, the University Hospital Würzburg (UKW), and the Max Planck Research Group at the Würzburg Institute of Systems Immunology (WüSI).

The center's objective is to analyze and understand diseases at the level of individual cells. In the future, this will enable the earliest possible and most reliable prediction of a disease and how it can be treated in the best possible way. The center combines local scientific, clinical and methodological expertise relevant to innovative single-cell research and provides access to the full range of scRNA-seq technologies for both eukaryotes and microorganisms.

Starting from infection research, the Würzburg Single-Cell Center will also investigate cancer, neuro-degenerative disorders or cardiovascular diseases at the single-cell level. The broad method spectrum of RNA sequencing technologies is to be rapidly enhanced in this context.

www.single-cell-center.de



Check out our
Single-Cell Center Würzburg
animation

Core Unit SysMed

The Core Unit Systems Medicine (SysMed) is a joint institution of the JMU Medical Faculty and the University Hospital. It works closely with the HIRI and other research institutes. It provides scientists with the technology and bioinformatics support for RNA and DNA sequencing for biomedical research. They offer Bioinformatics analysis solutions for high-throughput sequencing, such as RNA-Seq, Dual/Multi RNA-Seq, ChIP-Seq and single cell experiments, including scRNA-seq and ATAC.

www.med.uni-wuerzburg.de/cu/sysmed/

The Biocenter University Hospital Würzburg

The Biocenter is an amalgamation of departments and chairs from the Faculties of Biology, Medicine and Chemistry, collaborating in research and teaching. It unites scientists who share the conviction that the great questions of biology and medicine can only be answered if they are tackled on each of the organizational levels of biology—from molecules, cells, organs and the whole organism, to interactions between organisms.

Consequently, researchers at the Biocenter are developing the latest methods in molecular biology, cell biology and organismic biology and applying them closely to their respective scientific research.

Research is being done using almost all important model organisms of the animal and plant kingdoms, including mouse, *Xenopus*, zebrafish, *Drosophila*, honey bees, *Arabidopsis* and yeast. Technologies at the interface of several disciplines—such as advanced microscopy, high-throughput screening, DNA sequencing and metabolome analysis—are organized as central facilities.

www.biozentrum.uni-wuerzburg.de

The Medical Faculty (JMU)

The JMU Medical Faculty has a strong connection to the University Hospital, founded on scientific research carried out in close cooperation with clinical institutes.

By transcending traditional clinical research areas and exchanging them for three novel complexity-oriented research foci, the faculty aims to represent itself in its entirety more effectively, to overcome borders between traditional disciplines, and to foster interdisciplinarity. The three newly defined research foci are: (i) cellular heterogeneity, (ii) complexity within organ tissues and (iii) system and network diseases. Focusing on these research foci does not dispense from the necessity of excellent discipline-specific research; they rather provide a cross-disciplinary framework for joint projects that may eventuate in collaborative research initiatives.

Research within the Medical Faculty is structurally supported by platform technologies such as microscopy, mass spectrometry, transgene technologies, and systems medicine.

www.med.uni-wuerzburg.de

The University Hospital Würzburg (UKW) is devoted to medical care, research and teaching, which facilitates progressive counseling and treatment of patients according to the highest current standards in medical care: First-class medicine and research that benefits all patients.

The hospital assumes a central role in providing high quality medical care to the people of Würzburg and the surrounding region. It consists of 19 clinics and three autonomous polyclinics as well as three clinical institutes. Each year, UKW takes care of about 75,000 stationary patients, plus almost 294,000 outpatient treatments.

In addition, the hospital is involved in several clinical research centers, where interdisciplinary cooperation takes the center stage: Amongst others these are the Comprehensive Cancer Center Mainfranken, the Interdisciplinary Center for Palliative Medicine and the Comprehensive Heart Failure Center.

UKW is an important resource for many scientists providing them with tissue samples for basic research again highlighting the local scientific network and support structures.

www.ukw.de

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Interior view of the *Würzburg Life Science Seminar* venue. © Jürgen Landes, arturimages

Venue and Contact

Seminar Venue

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Julius-Maximilians-Universität Würzburg
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www.helmholtz-hiri.de

www.uni-wuerzburg.de/imib

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Institute of Molecular Infection Biology

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Institute of Molecular Infection Biology

Prof. Dr. Utz Fischer

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Prof. Dr. Franziska Faber

Institute for Hygiene and Microbiology

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Find seminar venue
on Google maps

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Education

1999	Dr. rer. nat., Humboldt University, Berlin, Germany
1997	Diplom, Biochemistry, Humboldt University, Berlin, Germany
1994	Undergraduate, Biochemistry, Imperial College, London, UK

Positions

2017 – present	Director, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2009 – present	Director & Full Professor (W3), Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2004 – 2010	Max Planck Group Leader, Max Planck Institute for Infection Biology (MPI-IB), Berlin, Germany
2002 – 2003	EMBO Fellow, Hebrew University, Hadassah Medical School, Jerusalem, Israel
2000 – 2001	Postdoc, Department of Cell & Molecular Biology, Uppsala University, Sweden

Selected Committee Work

2024 – present	Chair, Committee on RNA-based Medicine, German National Academy of Sciences Leopoldina
2024 – present	Selection Committee Member, DFG Gottfried Wilhelm Leibniz Awards
2021 – present	Spokesperson, Bavarian ENB Graduate Program <i>RNAmed</i> – Future Leaders in RNA-based Medicine
2021 – 2025	President, European Academy of Microbiology
2019 – 2020	Board of Directors, RNA Society

Awards & Honors

Elected to Bavarian Academy of Sciences and Humanities (2023), Feldberg Prize (2019), Gottfried Wilhelm Leibniz Prize, DFG (2017), Honorary Professor, Imperial College London, UK (2016 – 2019), elected to European Academy of Microbiology (2015), elected to the German National Academy of Sciences Leopoldina (2013), American Academy of Microbiology (2013), EMBO Member (2011), DGHM Senior Scientist Award (2011), VAAM Research Award (2010)

Current Editorial Boards

Molecular Cell, EMBO Journal, Nucleic Acids Research, RNA, Molecular Microbiology, mBio, microLife

Selected Publications

Gerovac M, Buhlmann L, Zhu Y, Đurica-Mitić S, Rech V, Carien S, Gräfenhan T, Popella L, [Vogel J](#) (2025)

Programmable antisense oligomers for phage functional genomics

[Nature](#) DOI: 10.1038/s41586-025-09499-6 (Online ahead of print)

Westermann AJ, Förstner KU, Amman F, Barquist L, Chao Y, Schulte LN, Müller L, Reinhardt R, Stadler PF, [Vogel J](#) (2016)

Dual RNA-seq unveils noncoding RNA functions in host-pathogen interactions

[Nature](#) 529(7587):496–501

Papenfort K, Sun Y, Miyakoshi M, Vanderpool CK#, [Vogel J](#)# (2013)

Small RNA-mediated activation of sugar phosphatase mRNA regulates glucose homeostasis

[Cell](#) 153(2):426–437

Deltcheva E, Chylinski K*, Sharma CM*, Gonzales K, Chao Y, Pirzada ZA, Eckert MR, [Vogel J](#), Charpentier E (2011)

CRISPR RNA maturation by trans-encoded small RNA and host factor RNase III

[Nature](#) 471(7340):602–607

Sharma CM, Hoffmann S, Darfeuille F, Reignier J, Findeiß S, Sittka A, Chabas S, Reiche K, Hackermüller J, Reinhardt R, Stadler PF, [Vogel J](#) (2010)

*The primary transcriptome of the major human pathogen *Helicobacter pylori**

[Nature](#) 464(7286):250–255

Research Interests

RNA Biology of Bacterial Infections

The research group led by Jörg Vogel investigates the RNA world of microbes in the context of infections and the human microbiome. Using high-resolution RNA-seq methods, they seek to understand when, how and why bacteria use RNA-based mechanisms to regulate their genes. They strive to exploit this knowledge to develop RNA-based therapeutic approaches, in partic-

ular, programmable RNA antibiotics on the basis of antisense oligonucleotides (ASOs) for precision killing and modulation of bacteria, including their natural predators, phages.

Notes

Dr. Chase Beisel

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Education

2009 PhD, Chemical Engineering, California Institute of Technology, Pasadena, CA, USA
2004 BSc, BS, Chemical Engineering, Iowa State University, Ames, IA, USA

Positions

2025 - present Faculty Member, Botnar Institute of Immune Engineering, Basel, Switzerland
2023 - present Co-founder and Chief Scientific Officer, Leopard Biosciences, Martinsried, Germany
2021 - 2025 Full Professor (W3), Faculty of Medicine, University of Würzburg, Germany
2021 - present Department Head, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2019 - present Scientific Advisory Board Member, Benson Hill, St. Louis, MO, USA
2018 - 2021 Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2018 - 2021 Professor (W2), Faculty of Medicine, University of Würzburg, Germany
2017 - 2018 Associate Professor, Dept. of Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, USA
2015 - present Co-founder and Scientific Advisory Board Member, Locus Biosciences, Morrisville, NC, USA
2011 - 2017 Assistant Professor, Dept. of Chemical and Biomolecular Engineering, NCSU, Raleigh, NC, USA

Committee Work

2024 Speaker, Topic 1, Helmholtz Centre for Infection Research (HZI), Braunschweig, Germany
2023 Co-organizer, CRISPR Conference, Würzburg, Germany
2022 Instructor, Cold Spring Harbor Laboratory Synthetic Biology Summer School, NY, USA
2020 Deputy Speaker, Topic 1, Helmholtz Centre for Infection Research (HZI), Braunschweig, Germany
2019 Organizer, International Conference on CRISPR Technologies, Würzburg, Germany

Awards & Honors

RNA Society Mid-Career Award (2024), ERC Proof of Concept Grant (2024), University of Otago Chaffer Fellow (2023), Pettenkofer Prize (2022), Falling Walls Science Breakthrough of the Year (2021), Medical Valley Award (2020), ERC Consolidator Grant (2020), AIChE Program Development Service Award (2018), D.I.C. Wang Young Investigator Award (2018), Camille Dreyfus Teacher-Scholar Award (2017), Bay Area Lyme Foundation Emerging Leader Award (2016), Sigma Xi Faculty Research Award (2016), NCSU Faculty Scholar (2015 - 2016), NSF CAREER Award (2015)

Selected Publications

Jiao C, Reckstadt C, König F, Homberger C, Yu J, Vogel J, Westermann AJ, Sharma CM, Beisel CL (2023)
RNA recording in single bacterial cells using reprogrammed tracrRNAs
Nature Biotechnology 41(8):1107-1116

Dmytrenko O, Neumann GC, Hallmark T, Keiser DJ, Crowley VM, Vialetto E, Mougiakos I, Wandera KG, (...), Begemann MB#, Jackson RN#, Beisel CL# (2023)
Cas12a2 elicits abortive infection through RNA-triggered destruction of dsDNA
Nature 613(7944):588-594

Wimmer F*, Mougiakos I*, Englert F, Beisel CL (2022)
Rapid cell-free characterization of multi-subunit CRISPR effectors and transposons
Molecular Cell 82(6):1210-1224

Liao C, Sharma S*, Svensson SL*, Kibe A*, Weinberg Z*, Alkhnbashi OS, Bischler T, Backofen R, Caliskan N, Sharma CM, Beisel CL (2022)
Spacer prioritization in CRISPR-Cas9 immunity is enabled by the leader RNA
Nature Microbiology 7(4):530-541

Jiao C, Sharma S*, Dugar G*, Peeck NL, Bischler T, Wimmer F, Yu Y, Barquist L, Schoen C, Kurzai O, Sharma CM#, Beisel CL# (2021)
Noncanonical crRNAs derived from host transcripts enable multiplexable RNA detection by Cas9
Science 372(6545):941-948

Research Interests

RNA Synthetic Biology

The research group led by Chase Beisel works at the interface of CRISPR biology and technologies. They investigate the functional diversity of CRISPR-Cas immune systems and translate discoveries into new and improved technologies that can be employed to better understand, diagnose and treat human infections.

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Education

2009	PhD, Institut Curie, Paris, France
2005	MSc, MEng, Biotechnology and Biochemistry, INSA, Toulouse, France

Positions

2023 - present	Associate Professor (W2), Faculty of Medicine, University of Würzburg, Germany
2017 - present	Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2016 - 2017	Assistant Professor (Maître de Conférences), University of Strasbourg, France
2013 - 2016	Postdoc, RNA Biology, Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2009 - 2013	EIPOD (EMBL Interdisciplinary Postdoc) Fellow, Department of Structural & Computational Biology and Department of Cell Biology & Biophysics, EMBL Heidelberg, Germany

Committee Work

2024 - present	Board Member, Munich School of Data Sciences (MUDS)
2023 - present	Speaker, Single-Cell Center Würzburg, Germany
2022 - present	Speaker, Respiratory Viral Infection Research Foci, Helmholtz Centre for Infection Research (HZI), Braunschweig, Germany
2022 - present	Program Board Member, Helmholtz Centre for Infection Research (HZI), Braunschweig, Germany
2021 - present	Steering Committee Member, Single-Cell Center Würzburg, Germany

Awards & Honors

EMBO Young Investigator (2021), Member of the Administrative Council of the Foundation Georges Besse - Fondation de France (2014 - 2024), DGA (Ministry of Defense) PhD Fellowship (2005), INSA Toulouse Alumni Award (2005), Georges Besse Foundation Laureate (2004)

Selected Publications

Wendisch D*, Dietrich O*, Mari T*, von Stillfried S*, Ibarra IL, Mittermaier M, Mache C, Chua RL, (...), [Saliba AE#](#), Sander LE# (2021)
SARS-CoV-2 infection triggers profibrotic macrophage responses and lung fibrosis
[Cell](#) 184(26):6243-6261.e27

Da Viã MC, Dietrich O, Truger M, Arampatzi P, Duell J, Heidemeier A, Zhou X, Danhof S, Kraus S, Chatterjee M, (...), [Saliba AE](#), Rasche L (2021)
Homozygous BCMA gene deletion in response to anti-BCMA CAR T cells in a patient with multiple myeloma
[Nature Medicine](#) 27(4):616-619

Schulte-Schrepping J*, Reusch N*, Paclik D*, Baßler K*, Schlickeiser S*, Zhang B*, Krämer B*, Krammer T*, Brumhard S*, Bonaguro L*, De Domenico E*, Wendisch D*, (...), Schultze JL#, Aschenbrenner AC#, Li Y#, Nattermann J#, Sawitzki B#, [Saliba AE#](#), Sander LE# (2020)
Deutsche COVID-19 OMICS Initiative (DeCOI)
Severe COVID-19 is marked by a dysregulated myeloid cell compartment
[Cell](#) 182(6):1419-1440.e23

Imdahl F*, Vafadarnejad E*, Homberger C, [Saliba AE#](#), Vogel J# (2020)
Single-cell RNA-sequencing reports growth-condition-specific global transcriptomes of individual bacteria
[Nature Microbiology](#) 5(10):1202-1206

Erhard F*#, Baptista MAP*, Krammer T*, Hennig T, Lange M, Arampatzi P, Jürges CS, Theis FJ, [Saliba AE#](#), Dölken L# (2019)
scSLAM-seq reveals core features of transcription dynamics in single cells
[Nature](#) 571(7765):419-423

Research Interests

Single-Cell Analysis

The research group led by Emmanuel Saliba explores host-pathogen interactions in high resolution at the single-cell level. They develop and integrate single-cell genomics, imaging and computational approaches to decipher the microenvironments of individual pathogens and shed light on the heterogeneity of host responses and disease outcomes.

Notes

Jun-Prof. Dr. Jens Hör

Group Leader

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Education

2020	Dr. rer. nat., University of Würzburg, Germany
2013	MSc, Life and Medical Sciences, University of Bonn, Germany
2011	BSc, Molecular Biomedicine, University of Bonn, Germany

Positions

2024 - present	Junior Professor (W1), Faculty of Medicine, University of Würzburg, Germany
2024 - present	Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2021 - 2024	Postdoc, Weizmann Institute of Science, Rehovot, Israel
2020 - 2021	Postdoc, Institute of Molecular Infection Biology (IMIB), University of Würzburg, Germany
2013 - 2015	Academic Staff, Furtwangen University, Villingen-Schwenningen, Germany

Awards & Honors

ERC Starting Grant (2025), Fellowship from the Council for Higher Education and Israel Academy of Sciences and Humanities (CHE/IASH) Excellence Fellowship Program for International Postdoctoral Researchers (2023), Walter Benjamin Fellowship from the German Research Foundation (2021), PhD Award of the Lower Franconian Memorial Year Foundation for Science and the University of Würzburg (2021)

Selected Publications

Hör J, Wolf SG, Sorek R (2024)

Bacteria conjugate ubiquitin-like proteins to interfere with phage assembly

Nature 631(8022):850-856

Stokar-Avihail A, Fedorenko T, Hör J, Garb J, Leavitt A, Millman A, Shulman G, Wojtania N, Melamed S, Amitai G, Sorek R (2023)

Discovery of phage determinants that confer sensitivity to bacterial immune systems

Cell 186(9):1863-1876.e16

Hör J, Jung J, Đurica-Mitić S, Barquist L, Vogel J (2022)

INRI-seq enables global cell-free analysis of translation initiation and off-target effects of antisense inhibitors

Nucleic Acids Research 50(22):e128

Hör J, Di Giorgio S, Gerovac M, Venturini E, Förstner KU, Vogel J (2020)

Grad-seq shines light on unrecognized RNA and protein complexes in the model bacterium Escherichia coli

Nucleic Acids Research 48(16):9301-9319

Hör J, Garriss G, Di Giorgio S, Hack LM, Vanselow JT, Förstner KU, Schlosser A, Henriques-Normark B#, Vogel J# (2020)

Grad-seq in a Gram-positive bacterium reveals exonucleolytic sRNA activation in competence control

The EMBO Journal 39(9):e103852

Research Interests

Molecular Principles of RNA Phages

The research group led by Jens Hör investigates the dynamics of infection, host takeover, and anti-phage defense during the interaction between RNA phages and their hosts. They seek to understand the molecular principles underlying these processes to develop new and improved antibacterial strategies such as phage therapy.

Notes

Prof. Dr. Franziska Faber

Group Leader | HIRI-associated
Institute for Hygiene and Microbiology (IHM) | University of Würzburg
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Education

2011 Dr. rer. nat., Technical University Braunschweig, Germany
2001 - 2007 Diploma, Biology, Martin-Luther-University, Halle-Wittenberg, Germany

Positions

2023 - present Associate Professor (W2), Institute for Hygiene and Microbiology (IHM), Würzburg, Germany
2021 - 2023 Junior Professor (W1), Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2021 - present Associated Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2018 - 2021 Young Investigator Group Leader, Research Center for Infectious Diseases (ZINF), Würzburg, Germany
2017 - 2018 Postdoc, Helmholtz Centre for Infection Research (HZI), Braunschweig, Germany
2011 - 2017 Postdoc, University of California, Davis, USA

Committee Work

2023 - present Steering Committee, Collaborative Research Center DECIDE (SFB1583)
2023 - present Organizer, Würzburg Life Science Seminar
2021 - present Board Member, DGHM Study Section "Gastrointestinal Infections"
2020 - present Section Speaker "Infection and Immunity", Graduate School of Life Sciences, University of Würzburg, Germany
2019 - present Co-organizer, Infection & Immunity intensive course, HIRI graduate program "RNA & Infection"

Awards & Honors

Rise up! Recipient, Boehringer Ingelheim Foundation (2025), DGHM (German Association for Hygiene and Microbiology) Förderpreis (2018)

Selected Publications

Lenče T*, Sulzer J*, Andress K, Gribling-Burrer A-S, Lamm-Schmidt V, Barquist L, Smyth RP, Faber F (2024)
The conserved noncoding RNA ModT coordinates growth and virulence in Clostridioides difficile
[PLoS Biology](#) 22(12):e3002948

Fuchs M, Lamm-Schmidt V, Lenče T, Sulzer J, Bublitz A, Wackenreuter J, Gerovac M, Strowig T, Faber F (2023)
A network of small RNAs regulates sporulation initiation in C. difficile
[EMBO Journal](#) 42(12):e112858

Fuchs M*, Lamm-Schmidt V*, Sulzer J, Ponath F, Jenniches L, Kirk JA, Fagan RP, Barquist L, Vogel J, Faber F (2021)
An RNA-centric global view of the clinically important bacterium Clostridioides difficile reveals broad activity of Hfq in a Gram-positive species
[PNAS](#) 118(25):e2103579118

Lamm-Schmidt V, Fuchs M, Sulzer J, Gerovac M, Hör J, Dersch P, Vogel J, Faber F (2021)
Grad-seq identifies KhpB as a global RNA-binding protein in Clostridioides difficile that regulates toxin production
[microLife](#) 2:uqab004

Faber F, Tran L, Byndloss MX, Lopez CA, Velazquez EM, Kerrinnes T, Nuccio SP, Wangdi T, Fiehn O, Tsolis RM, Bäuml AJ (2016)
Host-mediated sugar oxidation promotes post-antibiotic pathogen expansion
[Nature](#) 534(7609):697-699

Research Interests

RNA Biology

of Gram-positive Bacteria

The research group led by Franziska Faber seeks to understand the molecular mechanisms of RNA-based virulence gene regulation during interactions of the enteric pathogen *Clostridioides difficile* with the intestinal microbiota. The goal is to leverage this knowledge for the development of novel RNA-based antimicrobials.

Notes

Prof. Dr. Utz Fischer

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Education

1992 Dr. rer. nat., Biochemistry, Freie Universität Berlin (FU), Berlin, Germany

1988 Diplom, Biochemistry, Freie Universität Berlin (FU), Berlin, Germany

Positions

2018 - present Associate Director, Cancer Therapy Research Center (CTRC)

2014 - 2018 Research Scientist, Dept. of Radiation Medicine & Applied Sciences, UC San Diego, CA, USA

2003 - present Full Professor (W3) & Chair of Biochemistry, Faculty of Chemistry & Pharmacy, University of Würzburg, Germany

2010 - 2015 First Director of RNA-based Disease Therapy, Genelux, San Diego, CA, USA

1997 - 2003 Max Planck Young Investigator (ass. professor level), MPI Biochemistry, Martinsried, Germany

Committee Work

2021 - present Member, DFG Senate Committee on Collaborative Research Centers (Senatsausschuss f. die Sonderforschungsbereiche)

2017 - present Advisor, Molecular Medicine Partnership Unit (MMPU), European Molecular Biology Laboratory (EMBL) / University of Heidelberg, Germany

2015 - present Speaker (together with Dr. N. Gehring), DFG funded priority program SPP1935

2011 - 2013 Dean of the Faculty of Chemistry and Pharmacy, University of Würzburg, Germany

Awards & Honors

Gerhard Hess Award, DFG (1999), Rhone-Poulenc Rorer Research Award (1998), AIDS Scholar at HHMI, University of Pennsylvania, Philadelphia, USA (1995 - 1997), Falcon Research Award, German Society of Cell Biology (1993), Dissertation Award of Hoechst Industries (1989)

Current Boards

Advisory Board Behring-Röntgen-Foundation in Marburg, External Advisor Molecular Medicine Partnership Unit in Heidelberg

Selected Publications

Grimm C*, Bartuli J*, Böttcher B, Szalay AA, Fischer U# (2021)

Structural basis of the complete poxvirus transcription initiation process

Nature Structural & Molecular Biology 28(10):779-788

Grimm C*, Hillen HS*, Bedenk K, (...), Szalay AA, Cramer P#, Fischer U# (2019)

Structural Basis of Poxvirus Transcription: Vaccinia RNA Polymerase Complexes

Cell 179(7):1537-1550.e19

Hillen HS*, Bartuli J*, Grimm C, Dienemann C, Bedenk K, Szalay AA, Fischer U#, Cramer P# (2019)

Structural Basis of Poxvirus Transcription: Transcribing and Capping Vaccinia Complexes

Cell 179(7):1525-1536.e12

Chari A, Golas MM, Klingenhäger M, Neuenkirchen N, Sander B, Englbrecht C, Sickmann A, Stark H, Fischer U (2008)

An assembly chaperone collaborates with the SMN complex to generate spliceosomal SnRNPs

Cell 135(3):497-509

Fischer U, Huber J, Boelens WC, Mattaj IW, Lührmann R (1995)

The HIV-1 Rev activation domain is a nuclear export signal that accesses an export pathway used by specific cellular RNAs

Cell 82(3):475-483

Research Interests

RNA Metabolism

and Macromolecular Machines



The Fischer group studies the functional dynamics of macromolecular machines acting on RNA using a combination of biochemical, structural and systems biology approaches. By combining basic RNA research with biomedical approaches we also investigate how RNA-based pathways and networks are changed in different disease settings and in viral infections.

Notes

Prof. Dr. Dominic Grün

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Education

2003 - 2006	PhD, University of Cologne, Germany
2003 - 2004	Visiting Researcher, New York University, USA
1998 - 2003	Studies, Theoretical Physics, University of Cologne, Germany

Positions

2021 - present	Full Professor (W3) and Director, Institute of Systems Immunology, Würzburg, Germany
2015 - 2021	Independent Group Leader, Max Planck Institute of Immunobiology and Epigenetics (MPI-IE), Freiburg, Germany
2012 - 2015	Postdoc, Hubrecht Institute Utrecht, Netherlands
2010 - 2012	Postdoc, Max-Delbrück-Center Berlin, Germany
2007 - 2010	Risk management consulting in finance industry (scientific career break)

Editorial Boards

Cell Reports

Awards & Honors

Clarivate Highly Cited Researcher (2023 and 2022), GlaxoSmithKline Prize "Medizinische Grundlagenforschung" (2020), ERC Consolidator Grant „ImmuNiche“ (2018)

Selected Publications

Rosales-Alvarez RE, Rettkowski J, Herman JS, Dumbović G, Cabezas-Wallscheid N, Grün D (2023)

VarID2 quantifies gene expression noise dynamics and unveils functional heterogeneity of ageing hematopoietic stem cells
[Genome Biology](#) 24(1):1

Nusser A*, Sagar*, Swann JB*, Krauth B, Diekhoff D, Calderon L, Happe C, Grün D#, Boehm T# (2022)

Developmental dynamics of two bipotent thymic epithelial progenitor types
[Nature](#) 606(7912):165-171

Grün D (2020)

Deciphering the Regulatory Landscape of $\gamma\delta$ T Cell Development by Single-Cell RNA-Sequencing
[Nature Methods](#) 17(1):45-49

Aizarani A, Saviano A*, Sagar*, Mailly L, Durand S, Herman JS, Pessaix P, Baumert TF#, Grün D# (2019)

A human liver cell atlas reveals heterogeneity and epithelial progenitors
[Nature](#) 572(7768):199-204

Grün D*, Lyubimova A*, Kester L, Wiebrands K, Basak O, Sasaki N, Clevers H, van Oudenaarden A (2015)

Single-cell mRNA sequencing reveals rare intestinal cell types
[Nature](#) 525(7568):251-255

Research Interests

Quantitative Single-Cell Biology of the Immune System



Cell fate decision is essential for the emergence of a complex multicellular organism starting from a single pluripotent zygote, and perpetually occurs during adult life to maintain organ tissues. The robustness of cell fate decision is remarkable given the stochastic interaction of hundreds of thousands of molecules in each cell. It has remained a central open question how signals from the microenvironment are integrated

with stochastic processes in a cell to control cell fate decision in normal tissues and upon perturbations due to disease or tissue damage. Our lab investigates these questions in the context of immune cell differentiation by combining single-cell sequencing and spatial transcriptomics methods with computational approaches involving machine learning, artificial intelligence, and mathematical modeling.

Notes

Prof. Dr. Claudia Höbartner

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Education

2004 Dr. rer. nat., Organic Chemistry, University of Innsbruck, Austria
2001 Diplom (MSc), Chemistry, TU Wien, Vienna, Austria

Positions

2017 – present Full Professor (W3) & Chair of Organic Chemistry I, Institute of Organic Chemistry, Würzburg, Germany
2014 – 2017 Professor (W2), Institute of Organic and Biomolecular Chemistry, GAU Göttingen, Germany
2008 – 2015 Max Planck Research Group Leader, Max Planck Institute for Biophysical Chemistry (MPI-BPC), Göttingen, Germany
2005 – 2007 Postdoctoral Fellow, University of Illinois at Urbana-Champaign, IL, USA

Selected Committee Work

2024 – present DFG Review Board Biological and Biomimetic Chemistry
2024 Co-chair, International Symposium on Chemical Biology (EFMC-ICMS), Switzerland
2023 – present Board Member, GDCh Division Biochemistry
2023 Organizer and Chair, XI. German Nucleic Acid Chemistry Symposium

Awards & Honors

Gottfried Wilhelm Leibniz Prize, DFG (2023), elected to the German National Academy of Sciences Leopoldina (2022), Hansen Family Award (2023), Falling Walls Winner in Life Science (2023), ASEM-DUO India fellowship for Professors (2020), Austrian Academy of Sciences (Corresponding Member Abroad, 2019), ERC Consolidator Grant (2016), Hellmut Brederbeck Foundation Award (2013), Research Award of the Peter and Traudl Engelhorn Foundation (2011), European Young Chemist Award (EuCheMS, Silver Medal) (2010), Hertha Firnberg Fellowship, FWF, Austria (2007), Erwin Schrödinger Postdoctoral Fellowship, Austrian Science Fund (FWF) (2005), Roche Symposium Award (Leading Chemists of the next decade), Switzerland (2004)

Editorial Boards

RSC Chemical Biology (Associate Editor), ChemBioChem (Wiley-VCH)

Selected Publications

Bessi I*, Stiller C*, Schroeder T, Schäd B, Grüne M, Dietzsch J, Höbartner C (2024)

The Tautomeric State of N4-Hydroxycytidine within Base-Paired RNA

ACS Central Science 10(5):1084–1093

Seitz F, Jungnickel T, Kleiber N, Kretschmer J, Dietzsch J, Adelman J, Bohnsack KE, Bohnsack MT, Höbartner C (2024)

Atomic mutagenesis of N6-methyladenosine reveals distinct recognition modes of human m6A reader and eraser proteins

Journal of the American Chemical Society 146(11):7803–7810

Okuda T, Lenz AK, Seitz F, Vogel J, Höbartner C (2023)

A SAM analogue-utilizing ribozyme for site-specific RNA alkylation in living cells

Nature Chemistry 529(7585):231–234

Scheitl CPM*, Mieczkowski M*, Schindelin H, Höbartner C (2022)

Structure and mechanism of the methyltransferase ribozyme MTR1

Nature Chemical Biology 18(5):547–555

Scheitl CPM, Ghaem Maghami M, Lenz AK, Höbartner C (2020)

Site-specific RNA methylation by a methyltransferase ribozyme

Nature 587(7835):663–667

Research Interests

Organic and Biomolecular Chemistry



The research group led by Claudia Höbartner investigates the chemical biology of RNA modifications and nucleic acid catalysis. Their areas of expertise include:

- Chemical biology of natural RNA/DNA modifications
- Nucleic acid chemistry
- DNA catalysis
- Ribozymes and aptamers
- Biomolecular label chemistry
- Structure and mechanism of functional nucleic acids and RNA protein complexes

Notes

Prof. Dr. Julian König

Chair of Biochemistry and RNA Biology

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Education

2003 – 2008 Doctorate, Marburg, Germany

1997 – 2003 Biology, Munich, Germany

Positions

2024 – present Chair of Biochemistry and RNA Biology, Würzburg, Germany

2013 – 2024 Group Leader, Mainz, Germany

2008 – 2013 Postdoc, Cambridge, UK

Committee Work

2024 Organizer, "RNA Modification and Processing" Meeting at IMB, Mainz, Germany

2024 Organizer, EMBO Practical Course on iCLIP at ITT, Genova, Italy

2022 Organizer, Meetings "RNA: Beyond its Genetic Code" and "RNA Transport Meeting"

2021 – present Steering Committee Member, CRC TRR 319 "RNA Modification and Processing", Germany

2017 – 2024 Organizer, "RNA Salon" Meeting Series for the Rhein-Main Universities, Germany

Awards & Honors

Awarded Member of the Heisenberg Program (2023), Human Frontier Science Program (HFSP) Fellowship (2004)

Selected Publications

Zhou Y*, Čorovič M*, Hoch-Kraft P*, Meiser N, Mesitov M, Körtel N, Back H, Naarmann-de Vries IS, Katti K, Obrdlík A, Busch A, Dieterich C, Vaňáčová Š, Hengesbach M, Zarnack K#, König J# (2024)

m6A sites in the coding region trigger translation-dependent mRNA decay

[Molecular Cell](#) 84(23):4576–4593.e12

Ebersberger S*, Hipp C*, Mulorz MM*, Buchbender A, Hubrich D, Kang HS, Martínez-Lumbreras S, Kristofori P, Sutandy FXR, Llacsahuanga Allcca L, Schönfeld J, Bakisoglu C, Busch A, Hänel H, Tretow K, Welzel M, Di Liddo A, Möckel MM, Zarnack K, Ebersberger I, Legewie S, Luck K#, Sattler M#, König J# (2023)

FUBP1 is a general splicing factor facilitating 3' splice site recognition and splicing of long in-trans

[Molecular Cell](#) 83(15):2653–2672.e15

Rücklê C*, Körtel N*, Basilicata MF, Busch A, Zhou Y, Hoch-Kraft P, Tretow K, Kielisch F, Bertin M, Pradhan M, Musheev M, Schweiger S, Niehrs C, Rausch O, Zarnack K, Keller Valsecchi CI, König J (2023)

RNA stability controlled by m6A methylation contributes to X-to-autosome dosage compensation in mammals

[Nature Structural & Molecular Biology](#) 30(8):1207–1215

Cortés-López M*, Schulz L*, Enculescu M*, Paret C, Spiekermann B, Quesnel-Vallières M, Torres-Diz M, Unic S, Busch A, Orekhova A, Kuban M, Mesitov M, Mulorz MM, Shraim R, Kielisch F, Faber J, Barash Y, Thomas-Tikhonenko A, Zarnack K#, Legewie S#, König J# (2022)

High-throughput mutagenesis identifies mutations and RNA-binding proteins controlling CD19 splicing and CART-19 therapy resistance

[Nature Communications](#) 13(1):5570

Zarnack K*, König J*, Tajnik M, Martincorena I, Eustermann S, Stévant I, Reyes A, Anders S, Luscombe NM, Ule J (2013)

Direct competition between hnRNP C and U2AF65 protects the transcriptome from the exonization of Alu elements

[Cell](#) 152(3):453–466

Research Interests

RNA Modification and Regulation



The research group led by Julian König works on deciphering how RNA processing is controlled by RNA-binding proteins and RNA modifications. By integrating transcriptomic, biochemical, and functional genomics approaches, the group seeks to decode the RNA regulatory code. Their ultimate goal is to translate insights from fundamental research into an understanding of human physiology and disease.

Notes

Prof. Dr. Katharina Markmann

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Education

2008 Dr. rer. nat., Biology, Ludwig-Maximilians-University Munich, Germany
2003 Diploma, Biology, Philipps University Marburg, Germany

Positions

2022 – present Full Professor (W3) of Plant Ecophysiology, Faculty of Biology, University of Würzburg, Germany
2022 – present Director, Würzburg Botanical Garden, University of Würzburg, Germany
2021 – 2022 Associate Professor (W2) of Molecular Genetics, Martin-Luther-University Halle-Wittenberg, Germany
2017 – 2021 Group Leader, Center for Plant Molecular Biology (ZMBP), Tübingen, Germany
2008 – 2017 Postdoc / Group Leader, Centre for Carbohydrate Recognition and Signaling (CARB), Aarhus University, Denmark

Committee Work

2023 Co-organizer, Workshop “Plant signal transduction pathways in nitrogen-fixing symbioses” (ENFC 2023, Naples, Italy)
2023 Member, Scientific Advisory Board, European Nitrogen Fixation Conference (ENFC) 2020/23
2023 Member, Review Panel, IS-MPMI Early Career and Outstanding Achievements Awards
2022 – present Member, Equality Commission (Faculty of Biology, University of Würzburg, Germany)
2020 – 2021 Co-organizer, Virtual Seminars in Symbiosis

Awards & Honors

Young Investigator Award of the International Society of Plant-Microbe Interactions (IS-MPMI) (2019), Athene Fellowship (Tübingen University Excellence-Initiative) (2017–2019), Invitation to speak as ‘Best female scientist of the year’ (Aarhus University, Department of Molecular Biology & Genetics) (2016 and 2009)

Selected Publications

Sexauer M*, Bhasin H*, Schön M, Roitsch E, Wall C, Herzog U, [Markmann K](#) (2023)

A micro RNA mediates shoot control of root branching

[Nature Communications](#) 14:8083

Sexauer M, Shen D, Schön M, Andersen TG#, [Markmann K](#)# (2021)

Visualizing polymeric components that define distinct root barriers across plant lineages

[Development](#) 148(23):dev199820

Tsikou D*, Yan Z*, Holt DB, Abel NB, Reid DE, Madsen L, Bhasin H, Sexauer M, Stougaard J, [Markmann K](#) (2018)

Systemic control of legume susceptibility to rhizobial infection by a mobile microRNA

[Science](#) 362(6411):233–236

[Markmann K](#), Giczey G, Parniske M (2008)

Functional adaptation of a plant receptor kinase gene paved the way for the evolution of intracellular root symbioses with bacteria

[PLOS Biology](#) 6:e68

Gherbi H*, [Markmann K](#)*, Svistoonoff S, Estevan J, Autron D, Giczey G, Auguy F, Péret B, Laplace L, Franche C, Parniske M, Bogusz D (2008)

SymRK defines a common basis for plant root endosymbioses with AM fungi, rhizobia and Frankia bacteria

[PNAS](#) 105:4928–32

Research Interests

Small RNAs in Systemic Control of Plant Symbiosis and Development



The research group led by Katharina Markmann seeks to understand the molecular mechanisms underlying systemic control of plant root endosymbioses with bacteria and fungi, and the role of regulatory small RNAs therein. They further analyze the role of systemically mobile small RNAs in controlling plant developmental responses to biotic and abiotic stimuli.

Notes

Prof. Dr. Dr. Lorenz Meinel

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Education

2007	Habilitation, Pharmaceutics, ETH Zürich, Switzerland
2005	Dr. rer. med., Department of Orthopedics, University of Frankfurt, Germany
2002	Dr. sc. nat., Drug Formulation and Delivery, ETH Zürich, Switzerland

Positions

2010 - present	Full Professor (W3) & Chair, Drug Formulation and Delivery, Institute for Pharmacy & Food Chemistry, University of Würzburg, Germany
2005 - 2010	Director, Dept. of Technical Research, Development & Translational Medicine, Novartis Pharmaceuticals, Basel, Switzerland
2004 - 2005	Lab Head, Drug Formulation and Delivery, ETH Zürich, Switzerland
2002 - 2004	Postdoc, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA

Committee Work

2023 - present	Chair of the Expert Group 12 "Dosage forms and dosage form methods", European Pharmacopoeia, European Directorate for the Quality of Medicines & HealthCare (EDQM)
2021 - present	Chair of the Expert Group "Pharmaceutical technology and biologics", German Pharmacopoeia, Federal Institute for Drugs and Medical Devices
2016 - 2022	Chair of the Expert Group 13H "Fatty oils and derivatives, polymers", European Pharmacopoeia, EDQM

Awards & Honors

Medical Valley Award (2016), Phoenix Price for Pharmaceutical Sciences (2004), Feodor Lynen Stipend of the Alexander von Humboldt Foundation (2002), Leonardo Price, Pharmacia Pharmaceuticals (2001)

Current Boards

ACS Biomaterial Science and Engineering

Selected Publications

Hauptstein N, Dirauf M, Wittwer K, Cinar G, Siering O, Raschig M, Lühmann T, Scherf-Clavel O, Sawatsky B, Nischang I, Schubert US, Pfaller CK, [Meinel L](#) (2022)

PEtOxylated Interferon-α2a Bioconjugates Addressing H1N1 Influenza A Virus Infection
Biomacromolecules 23(9):3593-3601

Schlauersbach J*, Hanio S*, Lenz B, Vemulapalli S, Griesinger C, Pöppler AC, Harlacher C, Galli B, [Meinel L](#) (2021)
Leveraging bile solubilization of poorly water-soluble drugs by rational polymer selection
Journal of Controlled Release 330:36-48

Wiest J, Saedtler M, Balk A, (...), Raccuglia M, Walid E, Picard F, Stopper H, Dekant W, Lühmann T, Sottriffer C, Galli B, Holzgrave U, [Meinel L](#) (2017)
Mapping the pharmaceutical design space by amorphous ionic liquid strategies
Journal of Controlled Release 268:314-322

Ritzer J*, Lühmann T*, Rode C, Pein-Hackelbusch M, (...), Schlottig F, Merli M, Dawe H, Karpíšek M, Wyrwa R, Schnabelrauch M, [Meinel L](#) (2017)
Diagnosing peri-implant disease using the tongue as a 24/7 detector
Nature Communications 8(1):264

Schwameis M, Kündig T, Huber G, von Bidder L, [Meinel L](#), (...), Jilma B (2017)
Topical azithromycin for the prevention of Lyme borreliosis: a randomised, placebo-controlled, phase 3 efficacy trial
The Lancet Infectious Diseases 17(3):322-323

Research Interests

Drug Formulation and Delivery



Biological interfaces:

- Bioresponsive systems (diagnostics and therapy)
- Pharmaceutical functionalization of biomaterials
- Formulation of proteins, chemical drugs and therapeutic gases

Chemical-physical interfaces:

- Transformation of drugs into ionic liquids

Notes

Prof. Dr. Thomas Rudel

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Education

2001 Habilitation, Molecular Biology, Freie Universität Berlin (FU), Berlin, Germany
1989 - 1994 Dr. rer. nat., Max Planck Institute for Infection Biology (MPI-IB), Berlin, Germany
1983 - 1989 Studies in Biology at the University of Tübingen, Germany

Positions

2008 - present Full Professor (W3) & Chair of Microbiology at the Biocenter, Faculty of Biology, University of Würzburg, Germany
2003 Associate Professor, Max Planck Institute for Infection Biology, Berlin, Germany
1997 Group Leader, Max Planck Institute for Infection Biology, Berlin, Germany
1995 - 1996 Research Fellow, Scripps Research Institute, Department of Immunology & Cell Biology, San Diego, CA, USA
1995 Research Scientist, Max Planck Institute for Biology, Tübingen, Germany

Committee Work

2023 - present Spokesperson, Collaborative Research Center DECIDE (SFB1583)
2022 - present Member, ERC Review Panel Advanced Grants, LS6 Immunity, Infection and Immunotherapy
2004 Member, Biological-Medical Section and the Scientific Council, Max Planck Society

Awards & Honors

Elected to European Academy of Microbiology (2024), elected to American Academy of Microbiology (2023), ERC Advanced Grant (2019), Indian National Science Academy Award PC Ray Chair for distinguished scientists (2017), Main Prize of the German Society for Hygiene and Microbiology (DGHM) (2008), DFG Fellowship (1997), Dissertation Award of the Association for General and Applied Microbiology (VAAM) (1995)

Selected Publications

Hennig T*, Prusty AB*, Kaufer BB*, Whisnant AW, Lodha M, Enders A, Thomas J, Kasimir F, Grothey A, Klein T, Herb S, Jürges C, Sauer M, Fischer U, **Rudel T**, Meister G, Erhard F, Dölken L#, Prusty BK# (2022)

Selective inhibition of miRNA processing by a herpesvirus-encoded miRNA
Nature 605(7910):539-544

Chowdhury SR, Reimer A, Sharan M, Kozjak-Pavlovic V, Eulalio A, Prusty BK, Fraunholz M, Karunakaran K, **Rudel T** (2017)
Chlamydia preserves the mitochondrial network necessary for replication via microRNA-dependent inhibition of fission
Journal of Cell Biology 216(4):1071-1089

Remmele CW*, Xian Y*, Albrecht M*, Faulstich M, Fraunholz M, Heinrichs E, Dittrich MT, Müller T, Reinhardt R, **Rudel T** (2014)
Transcriptional landscape and essential genes of Neisseria gonorrhoeae
Nucleic Acids Research 42(16):10579-10595

Albrecht M, Sharma CM, Dittrich MT, Müller T, Reinhardt R, Vogel J, **Rudel T** (2011)
The transcriptional landscape of Chlamydia pneumoniae
Genome Biology 12(10):R98

Karlas A*, Machuy N*, Shin Y, Pleissner KP, Artarini A, Heuer D, Becker D, Khalil H, Ogilvie LA, Hess S, Mäurer AP, Müller E, Wolff T, **Rudel T**, Meyer TF (2010)
Genome-wide RNAi screen identifies human host factors crucial for influenza virus replication
Nature 463(7282):818-822

Research Interests

Bacteria-Host Interaction



We study molecular mechanisms how the major human pathogenic bacteria *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Staphylococcus aureus* cause diseases.

Our research focuses on the interaction of these pathogens with different host cells and how this disturbs the normal function of the cell and the innate immune and cell autonomous defense. One particular

aspect in this context is the role of bacterial (sRNAs) and human regulatory RNAs (microRNAs) during the infection process.

We aim to understand invasive (*S. aureus* sepsis; disseminating gonococcal infection) and chronic diseases (Chlamydia ovarian cancer connection) by employing new infection models on the basis of engineered human three dimensional tissues.

Notes

Prof. Dr. Cynthia Sharma

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Education

2009 Dr. rer. nat., University of Bielefeld, Germany
2004 - 2009 Graduate Student, Max Planck Institute for Infection Biology (MPI-IB), Berlin, Germany
1998 - 2004 Diplom, Biology, Heinrich Heine University, Düsseldorf, Germany

Positions

2017 - present Full Professor (W3) & Chair of Molecular Infection Biology II (MIB II), Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2016 - 2017 W3-Professor Representative "MIB II" (Vertretungsprofessur), University of Würzburg, Germany
2010 - 2016 Junior Group Leader, Research Center for Infectious Diseases (ZINF), Würzburg, Germany
2010 Visiting Researcher, National Institutes of Health, Bethesda, MD, USA
2009 - 2010 Postdoc, Max Planck Institute for Infection Biology (MPI-IB), Berlin, Germany

Committee Work

2023 Co-organizer, CRISPR Conference, Würzburg, Germany
2023 - present Board Member, Bio^M Biotech Cluster Development GmbH Consulting Committee
2018 - present Spokesperson, Research Center for Infectious Diseases (ZINF), Würzburg, Germany
2015 - 2022 Board Member, DGHM Study Section "Gastrointestinal Infections"
2014 - present Board Member, GBM Study Section "RNA Biochemistry"

Awards & Honors

Elected to the German National Academy of Sciences Leopoldina (2025), Momentum Grant VolkswagenStiftung (2023), DGHM (German Society for Hygiene and Microbiology) Hauptpreis (2023), Pettenkofer Prize (2022), ERC Consolidator Grant (2022), Falling Walls Science Breakthrough of the Year (2021), Heinz Maier-Leibnitz Preis, DFG (2015), DGHM Förderpreis (2013), Postdoc Award in Microbiology, Robert-Koch-Foundation (2011), Ingrid zu Solms-Naturwissenschaftspreis (2011)

Current Boards

F1000 Member (Bacterial Infections)

Selected Publications

König F, Svensson SL, Sharma CM (2024)

Interplay of two small RNAs fine-tunes hierarchical flagella gene expression in Campylobacter jejuni
Nature Communications 15(1):5240

Jiao C, Sharma S*, Dugar G*, Peeck NL, Bischler T, Wimmer F, Yu Y, Barquist L, Schoen C, Kurzai C, Sharma CM#, Beisel CL# (2021)
Noncanonical crRNAs derived from host transcripts enable multiplexable RNA detection by Cas9
Science 372(6545):941-948

Eisenbart SK*, Alzheimer M*, Pernitzsch SR, Dietrich S, Stahl S, Sharma CM (2020)
A Repeat-Associated Small RNA Controls the Major Virulence Factors of Helicobacter pylori
Molecular Cell 80(2):210-226.e7

Dugar G, Leenay RT*, Eisenbart SK*, Bischler T*, Aul BU, Beisel CL#, Sharma CM# (2018)
CRISPR RNA-dependent binding and cleavage of endogenous RNAs by the Campylobacter jejuni Cas9
Molecular Cell 69(5):p893-905.e7

Sharma CM, Hoffmann S, Darfeuille F, Reignier J, Findeiß S, Sittka A, Chabas S, Reiche K, Hackermüller J, Reinhardt R, Stadler PF, Vogel J (2010)
The primary transcriptome of the major human pathogen Helicobacter pylori
Nature 464(7286):250-255

Research Interests

Deep Sequencing Approaches to Pathogenesis



Our research focuses on how bacterial pathogens adapt to changing environments and control their virulence. We aim to elucidate mechanisms and functions of gene regulation via small RNAs (sRNAs) and associated RNA-binding proteins (RBPs) as well as small proteins. Our main model organisms are the gastric pathogen *Helicobacter pylori* and the related foodborne pathogen *Campylobacter jejuni*. We have been developing and employing diverse deep-sequencing approaches (e.g. RNA-seq, Ribo-seq, RIP-seq) for global transcriptome and translome analysis and to study RNA-protein complexes.

Using genomics, genetics, and biochemical approaches we aim to identify and characterize RNA and protein factors, such as RBPs and ribonucleases, involved in post-transcriptional regulation in bacterial pathogens. Using three-dimensional (3D) infection models based on tissue engineering as well as organoids, we are investigating the roles of sRNAs, small proteins, and RBPs in virulence of *H. pylori* and *C. jejuni*. Moreover, we are exploring mechanisms and functions of bacterial CRISPR-Cas immune systems, leading to new biotechnological applications.

Notes

Prof. Dr. Alexander Westermann

Group Leader

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Education

2015	Dr. rer. nat., Molecular Infection Biology, University of Würzburg, Germany
2010	MSc, Molecular Biosciences, University of Heidelberg, Germany
2008	BSc, Biology, University of Heidelberg, Germany

Positions

2023 - present	Associate Professor (W2), Chair of Microbiology, Biocenter, University of Würzburg, Germany
2023 - 2025	Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2018 - 2023	Junior Professor (W1), Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2018 - 2023	Junior Group Leader, Helmholtz Institute for RNA-based Infection Research (HIRI), Würzburg, Germany
2018	EMBO Fellow, MRC Centre for Molecular Bacteriology & Infection, Imperial College, London, UK
2017 - 2018	Visiting Researcher, Department of Medical Microbiology & Immunology, UC Davis, CA, USA
2015 - 2017	Postdoc, RNA Biology, Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2009	Visiting Researcher, Department of Chemistry and Department of Molecular Cell Biology, UC Berkeley, CA, USA

Committee Work

2022 - present	Member of the Flex Funds Review Board NFDI4 Microbiota (National Research Data Infrastructure)
2020 - present	Reviewer for the Alexander von Humboldt Foundation

Awards & Honors

ERC Starting Grant (2022), Postdoc Award in Microbiology, Robert-Koch-Foundation (2016), Dissertation Prize of the German Center for Infection Research (DZIF) of the German Society for Hygiene and Microbiology (DGHM) (2016), PhD Stipend, Elite Network of Bavaria (2012)

Editorial Boards

eLife, Infection & Immunity

Selected Publications

Ryan D, Bornet E, Prezza G, Varshini Alampalli S, Franco de Carvalho T, Felchle H, Ebbecke T, Hayward R, Deutschbauer AM, Barquist L, [Westermann AJ](#) (2024)

An expanded transcriptome atlas for Bacteroides thetaiotaomicron reveals a small RNA that modulates tetracycline sensitivity
[Nature Microbiology](#) 9(4):1130-1144

Prezza G, Liao C, Reichardt S, Beisel CL, [Westermann AJ](#) (2024)

CRISPR-based screening of small RNA modulators of bile susceptibility in Bacteroides thetaiotaomicron
[PNAS](#) 121(6):e2311323121

[Westermann AJ](#)#, Vogel J# (2021)

Cross-species RNA-seq for deciphering host-microbe interactions
[Nature Reviews Genetics](#) 22(6):361-378

Ryan D, Jenniches L, Reichardt S, Barquist L, [Westermann AJ](#) (2020)

A high-resolution transcriptome map identifies small RNA regulation of metabolism in the gut microbe Bacteroides thetaiotaomicron
[Nature Communications](#) 11(1):3557

[Westermann AJ](#), Förstner KU, Amman F, Barquist L, Chao Y, Schulte LN, Müller L, Reinhardt R, Stadler PF, Vogel J (2016)

Dual RNA-seq unveils noncoding RNA functions in host-pathogen interactions
[Nature](#) 529(7587):496-501

Research Interests

Host-Pathogen-Microbiota Interactions



The research group led by Alexander Westermann investigates molecular RNA-based mechanisms underlying the interplay between the host, invading pathogens and the host microbiota. They seek to identify potential molecules and metabolic pathways to target in diagnostics and therapeutics.

Notes

Prof. Dr. Kathi Zarnack

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Education

- 2003 – 2007 Dr. rer. nat., Biology, Max Planck Institute for Terrestrial Microbiology & Philipps University Marburg, Germany
1997 – 2002 Diploma, Biology, Ludwig Maximilians University (LMU) Munich, Germany

Positions

- 2024 – present Full Professor (W3) & Chair of Bioinformatics II, Faculty of Biology, University of Würzburg, Germany
2014 – 2024 Independent Research Group Leader, Goethe University Frankfurt, Germany
2013 – 2014 Postdoc, Cancer Research UK (CRUK) London Research Institute, UK
2009 – 2013 EMBL Interdisciplinary Postdoc (EIPD) Fellow, EMBL European Bioinformatics Institute (EBI), Hinxton, Cambridge, UK
2008 – 2009 Postdoc, Max Planck Institute for Terrestrial Microbiology, Marburg, Germany

Committee Work

- 2023 – present DFG Review Board Member (2.11-07 Bioinformatics & Theoretical Biology)
2019 – 2023 Steering Committee Member, DFG Collaborative Research Center TRR 267

Awards & Honors

Educator Fellowship, Foundation Polytechnical Society Frankfurt (2015 – 2017), Marie Curie Actions Cofund EMBL Interdisciplinary Postdoc Fellowship (2010 – 2013), PhD Fellowship, International Max Planck Research School (2003 – 2006)

Current & Editorial Boards

DFG Fachkollegium (2.11-07 Bioinformatics & Theoretical Biology)

Selected Publications

Zhou Y*, Ćorović M*, Hoch-Kraft P*, Meiser N, (. . .), Vaňáčová Š, Hengesbach M, [Zarnack K#](#), König J# (2024)
m6A sites in the coding region trigger translation-dependent mRNA decay
[Molecular Cell](#) 84(23):4576–4593.e12

Molitor L*, Klostermann M*, Bacher S, Merl-Pham J, Spranger N, Burczyk S, Ketteler C, Rusha E, Tews D, Pertek A, Proske M, Busch A, Reschke S, Feederle R, Hauck SM, Blum H, Drukker M, Fischer-Posovszky P, König J, [Zarnack K#](#), Niessing D# (2023)
Depletion of the RNA-binding protein PURA triggers changes in posttranscriptional gene regulation and loss of P-bodies
[Nucleic Acids Research](#) 51(3):1297–1316

Körtel N*, Rücklê C*, Zhou Y*, Busch A, Hoch-Kraft P, Sutandy FXR, Haase J, Pradhan M, Musheev M, Ostareck D, Ostareck-Lederer A, Dieterich C, Hüttelmaier S, Niehrs C, Rausch O, Dominissini D, König J#, [Zarnack K#](#) (2021)
Deep and accurate detection of m6A RNA modifications using miCLIP2 and m6Aboost machine learning
[Nucleic Acids Research](#) 49(16):e92

Braun S*, Enculescu M*, Setty ST*, Cortês-López M, de Almeida BP, Sutandy FXR, Schulz L, Busch A, Seiler M, Ebersberger S, Barbosa-Morais NL, Legewie S#, König J#, [Zarnack K#](#) (2018)
Decoding a cancer-relevant splicing decision in the RON proto-oncogene using high-throughput mutagenesis
[Nature Communications](#) 9(1):3315

[Zarnack K*](#), König J*, Tajnik M, Martincorena I, Eustermann S, Stévant I, Reyes A, Anders S, Luscombe NM, Ule J(2013)
iCLIP reveals the function of hnRNP particles in splicing at individual nucleotide resolution
[Cell](#) 152(3):453–66

Research Interests

Bioinformatics of RNA Regulation and Gene Expression



Our research focuses on understanding the molecular mechanisms of RNA regulation in human cells and how their dysregulation contributes to disease. Using transcriptomic data and advanced bioinformatics, we explore the intricate interplay of RNA-binding proteins, RNA modifications and additional factors in nuclear and cytoplasmic processes, including alternative splicing, 3' end processing, nuclear surveillance, and RNA decay.

Notes

Dr. Carmen Aguilar

Junior Group Leader

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Education

2010 - 2014	PhD degree in Biosciences and Agri-food Sciences, University of Cordoba, Spain
2009 - 2010	Master of Science in Molecular, Cellular and Genetic Biotechnology, University of Cordoba, Spain
2004 - 2009	Studies in Biology at the University of Cordoba, Spain

Positions

2022 - present	Junior Group Leader, Institute of Molecular Infection Biology (IMIB) / Research Center for Infectious Diseases (ZINF), Würzburg, Germany
2015 - 2021	Postdoc, Institute of Molecular Infection Biology (IMIB), Würzburg, Germany

Awards & Honors

GSLS PostDoc Plus Grant (2018), Group Leader "Host pathways in urinary tract infections" (Research Group funded by BMBF) (2022)

Selected Publications

Aguilar C*, Pauzuolis M*, Pompaiah M, Vafadarnejad E, Arampatzis P, Fischer M, Narres D, Neyazi M, Kayisoglu Ö, Sell T, Blüthgen N, Morkel M, Wiegner A, Germer CT, Kircher S, Rosenwald A, Saliba AE#, Bartfeld S# (2022)

Helicobacter pylori shows tropism to gastric differentiated pit cells dependent on urea chemotaxis

Nature Communications 13(1):5878

Aguilar C, Susana C, Maudet C, Vivek-Ananth RP, Zaldívar-López S, Garrido JJ, Samal A, Mano M, Eulalio A (2021)

Reprogramming of microRNA expression via E2F1 downregulation promotes Salmonella infection both in infected and bystander cells

Nature Communications 12(1):3392

Aguilar C*, Cruz AR*, Rodrigues Lopes I, Maudet C, Sunkavalli U, Silva RJ, Sharan M, Lisowski C, Zaldívar-López S, Garrido JJ, Giacca M, Mano M#, Eulalio A# (2020)

Functional screenings reveal different requirements for host microRNAs in Salmonella and Shigella infection

Nature Microbiology 5(1):192-205

Tawk C, Nigro G, Lopes I, Aguilar C, Lisowski C, Mano M, Sansonetti P, Vogel J, Eulalio A (2018)

Stress-induced host membrane remodeling protects from infection by non-motile bacterial pathogens

EMBO Journal 37(23):e98529

Sunkavalli U*, Aguilar C*, Silva R, Sharan M, Cruz AR, Tawk C, Mano M, Eulalio A (2017)

Analysis of Host MicroRNA Function Uncovers a Role for miR-29b-2-5p in Shigella Capture by Filopodia

PLoS Pathogens 13(4):e1006327

Research Interests

Host Pathways

in Urinary Tract Infections



Urinary tract infections (UTIs) caused by Gram-negative uropathogenic *Escherichia coli* (UPEC) are among the most common and recurrent infections worldwide. Up to now, most of the anti-infective research has been focused on combating the bacterial side. However, whether a person is susceptible to infection by UPEC is also decided by host factors. Hence, host-based therapeutics represent an innovative approach to fight infections.

Our research group aims to obtain a better understanding of the host pathways controlling UPEC infection and persistence in the bladder. We use adult stem

cell derived-organoids and organoid-based models to closely mimic the natural infection site. We combine these infection models with miRNome profiling (global analysis of host microRNA expression), single-cell RNA-sequencing, and gain/loss-of-function approaches in order to identify and functionally characterize specific host factors and/or pathways that are required for UPEC to infect and persist in the human bladder epithelium. Based on this knowledge, new host-based therapeutic approaches could be designed to prevent or treat UTIs.

Notes

Dr. Simone Backes

Junior Group Leader

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Education

2008 Dr. rer. nat., Virology, Institute for Virology, Helmholtz Munich, Germany

2005 Diploma, Virology, Institute for Virology, Technical University of Munich (TUM), Munich, Germany

Positions

2018 - present Junior Group Leader, Institute for Virology and Immunobiology, Würzburg, Germany

2016 - 2017 Junior Group Leader, Institute for Virology, University Medical Center Freiburg, Germany

2010 - 2014 Postdoctoral Researcher, Microbiology Department, Icahn School of Medicine at Mount Sinai, New York, USA

2008 - 2010 Postdoctoral Researcher, Institute for Virology, Helmholtz Munich, Germany

Awards & Honors

Research Fellowship, DFG (2012)

Selected Publications

Jungblut M, Backes S, Streit M, Gasteiger G, Doose S, Sauer M#, Beliu G# (2023)

Re-Engineered Pseudoviruses for Precise and Robust 3D Mapping of Viral Infection

ACS Nano Journal 17(21):21822-21828

Varble A, Albrecht RA, Backes S, Crumiller M, Bouvier NM, Sachs D, Garcia-Sastre A, tenOever BR (2014)

Influenza A virus transmission bottlenecks are defined by infection route and recipient host

Cell Host Microbe 16(5):691-700

Backes S, Langlois RA, Schmid S, Varble A, Shim JV, Sachs D, tenOever BR (2014)

The mammalian response to virus infection is independent of small RNA silencing

Cell Reports 8(1):114-125

Backes S, Shapiro JS, Sabin LR, Pham AM, Reyes I, Moss B, Cherry S#, tenOever BR# (2012)

Degradation of host microRNAs by poxvirus poly(A) polymerase reveals terminal RNA methylation as a protective antiviral mechanism

Cell Host Microbe 12(2):200-210

Backes S*, Sperling KM*, Zwilling J*, Gasteiger G, Ludwig H, Kremmer E, Schwantes A, Staib C#, Sutter G# (2010)

Viral host-range factor C7 or K1 is essential for modified vaccinia virus Ankara late gene expression in human and murine cells, irrespective of their capacity to inhibit PKR-mediated phosphorylation of eukaryotic translation initiation factor 2

Journal of General Virology 91(2):470-482

Research Interests

Roles of RNAs During Virus Infection



My group is interested in studying RNA-based mechanisms in virulence, virus replication and host defense.

Notes

Dr. Irene Beusch

Junior Group Leader

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Education

2012 - 2018	Dr. sc., Structural Biology and Biophysics, ETH Zurich, Switzerland
2010 - 2011	MSc Biology, ETH Zurich, Switzerland
2006 - 2009	BSc Biology, ETH Zurich, Switzerland

Positions

2024 - present	Junior Group Leader, Institute of Molecular Infection Biology (IMIB), Würzburg, Germany
2019 - 2024	Postdoc, University of California, San Francisco (UCSF), USA

Committee Work

2019 - 2024	Co-organizer, Women in Life Science, University of California San Francisco, USA
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Awards & Honors

Postdoc.Mobility Fellowship, Swiss National Science Foundation (SNSF) (2021), Early.Postdoc.Mobility Fellowship, SNSF (2020)

Selected Publications

Beusch I, Madhani HD (2024)

Understanding the dynamic design of the spliceosome

Trends in Biochemical Sciences 49(7):583-595

Damberger FF, Krepl M, Arora R, Beusch I, Maris C, Dorn G, Šponer J, Ravindranathan S, Allain FHT (2024)

N-terminal domain of polypyrimidine-tract binding protein is a dynamic folding platform for adaptive RNA recognition

Nucleic Acids Research 52(17):10683-10704

Beusch I, Rao B, Studer MK, Luhovska T, Šukytė V, Lei S, Osés-Prieto J, SeGraves E, Burlingame A, Jonas S, Madhani HD (2023)

Targeted high-throughput mutagenesis of the human spliceosome reveals its in vivo operating principles

Molecular Cell 83(14):2578-2594

Sales-Lee J, Perry DS, Bowser BA, Diedrich JK, Rao B, Beusch I, Yates JR III, Roy SW, Madhani HD (2021)

Coupling of spliceosome complexity to intron diversity

Current Biology 31(22):4898-4910

Beusch I*, Barraud P*, Moursy A, Cléry A, Allain FHT (2017)

Tandem hnRNP A1 RNA recognition motifs act in concert to repress the splicing of survival motor neuron exon 7

eLife 6:e25736

Research Interests

Regulation and Mechanisms in RNA Splicing



The Beusch group studies regulatory mechanisms which steer the assembly of the spliceosome but also allow it to handle its very diverse substrate pool. We tackle this problem with an interdisciplinary approach by combining genetics and genomics with molecular biology and biochemistry. By gaining a detailed mechanistic understanding of splicing and its regulation within the cell, we can not only understand fundamental eukaryotic biology but also how its dysregulation impacts human disease.

Notes

Dr. Dimitrios Papadopoulos

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Education

2017	Dr. rer. nat., University of Giessen, Germany
2014	MSc, Biology, University of Giessen, Germany
2013	Diploma, Biology, National and Kapodistrian University of Athens, Greece

Positions

2023 – present	Junior Group Leader, Chair of Biochemistry & Molecular Biology, University of Würzburg, Germany
2018 – 2023	Postdoctoral Researcher, University of Würzburg, Germany

Awards & Honors

ERC Starting Grant (2024), Young Investigator Award of the German Cancer Society AEK (2023)

Selected Publications

Papadopoulos D*, Ha SA*, Fleischhauer D*, Uhl L, Russell TJ, Mikicic I, Schneider K, Brem A, Valanju OR, Cossa G, Gallant P, Schuelein-Voelk C, Maric HM, Beli P, Büchel G, Vos SM#, Eilers M# (2024)

The MYCN oncoprotein is an RNA-binding accessory factor of the nuclear exosome targeting complex
[Molecular Cell](#) 84(11):2070–2086.e20

Papadopoulos D, Uhl L, Ha SA, Eilers M (2024)

Beyond gene expression: how MYC relieves transcription stress
[Trends in Cancer](#) 9(10):805–816

Solvie D*, Baluapuri A*, Uhl L*, Fleischhauer D, Endres T, Papadopoulos D, Aziba A, Gaballa A, Mikicic I, Isaakova E, Giansanti C, Jansen J, Jungblut M, Klein T, Schüle-Völck C, Maric H, Dose S, Sauer M, Beli P, Rosenwald A, Döbelstein M, Wolf E#, Eilers M# (2022)

MYC multimers shield stalled replication forks from RNA polymerase
[Nature](#) 612(7938):148–155

Papadopoulos D, Solvie D, Baluapuri A, Endres T, Ha SA, Herold S, Kalb J, Giansanti C, Schüle-Völck C, Ade CP, Schneider C, Gaballa A, Vos S, Fischer U, Döbelstein M, Wolf E, Eilers M (2022)

MYCN recruits the nuclear exosome complex to RNA polymerase II to prevent transcription-replication conflicts
[Molecular Cell](#) 82(1):159–176.e12

Papadopoulos D, Scheiner-Bobis G (2017)

Dehydroepiandrosterone sulfate augments blood-brain barrier and tight junction protein expression in brain endothelial cells
[Biochimica et Biophysica Acta \(BBA\) – Molecular Cell Research](#) 1864(8):1382–1392

Research Interests

RNA-based Mechanisms of Tumor Maintenance



Our research focuses on understanding the molecular mechanisms that maintain aggressive human cancers. We are particularly interested in the MYC oncoprotein family and how their newly discovered RNA-binding functions mitigate DNA damage and prevent immune recognition in rapidly proliferating cancer cells.

Notes

Dr. Karl Petri

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Education

2017 Dr. med., NCT & DKFZ, Heidelberg, Germany
2014 State Examination Medicine, Heidelberg, Germany

Positions

2023 – present Emmy Noether-Group Leader, University Hospital Würzburg, Germany
2017 – 2023 Postdoc, Harvard Medical School & Massachusetts General Hospital, Boston, USA
2015 – 2017 Resident, Medical Oncology, University Hospital Heidelberg, Heidelberg, Germany

Awards & Honors

Emmy Noether Program, DFG (2023), Translational Research Award, International Myeloma Society (2022), Travel Award, American Society of Gene and Cell Therapy (2019), Research Stipend, DFG (2018), Travel Award, American Society of Gene and Cell Therapy (2014), Scholarship, German Academic Exchange Service (2013), Mildred Scheel Research Grant, German Cancer Aid (2012), Scholarship, German Academic Scholarship Foundation (2008)

Selected Publications

Petri K, D'Ippolito E, Künkele A, Köhl U, Busch DH, Einsele H, Hudecek M (2025)

Next-generation T cell immunotherapies engineered with CRISPR base and prime editing: challenges and opportunities
Nature Reviews Clinical Oncology DOI: 10.1038/s41571-025-01072-4 (Online ahead of print)

Zhang W, Petri K, Ma J, Lee H, Tsai C-L, Joung JK, Yeh J-R J (2024)
Enhancing CRISPR prime editing by reducing misfolded pegRNA interactions
eLife 12:RP90948

Petri K*, Zhang, W*, Ma J*, Schmidts A*, Lee H, Horng JE, Kim DY, Kurt IC, Clement K, Hsu JY, Pinello L, Maus Mv, Joung JK, Yeh J-R J (2022)
CRISPR prime editing with ribonucleoprotein complexes in zebrafish and primary human cells
Nature Biotechnology 40(2): 189-193

Petri K*, Gabriel R*, Agundez L*, Fronza R, Afzal S, Kaeppl C, Linden RM, Henckaerts E, Schmidt M (2015)
Presence of a trs-like motif promotes Rep-mediated wildtype adeno-associated virus type 2 integration
Journal of Virology 89(14)

Petri K, Fronza R, Gabriel R, Käppel C, Nowrouzi A, Linden RM, Henckaerts E, Schmidt M (2014)
Comparative next-generation sequencing of adeno-associated virus inverted terminal repeats
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Research Interests

Innovating RNA-guided Genome Engineering
for Cancer-Directed Cellular Immunotherapy



The goal of my group is to deploy novel RNA-guided gene editing technology to enhance immune cell therapies. To do this, we a) develop new RNA-guided editing tools, b) evaluate their safety using state-of-the-art molecular methods, and c) apply them to enhance immune cell therapies. With a particular focus on oncologic diseases, we aim to streamline the application and safety-validation of RNA-guided gene editing tools to generate and enhance immune cell products for cancer patients.

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