Presseworkshop des Helmholtz-Zentrum für Infektionsforschung

„Klimakrise und Krankheitserreger“

Agenda

2. Juli 2025 | 15:00 Uhr

Ort: Helmholtz KLIMA, Markgrafenstraße 22, Berlin

Teilnehmende:
ca. Presse und Medienvertreter*innen,
Vertreter Helmholtz-Klima, Helmholtz Berlin Kommunikation

15:00 Uhr – Begrüßung und Einführung

Susanne Thiele, Pressesprecherin HZI

- Willkommen & organisatorische Hinweise
- Ziel des Workshops: Wie Klimawandel und Infektionsgeschehen zusammenhängen – was Wissenschaft und Gesundheitsschutz leisten müssen

15:10 – 15:35 Uhr – Wissenschaftliche Inputs

1. Prof. Josef Penninger (Präsentation PPT, 5-7 Minuten)
Wissenschaftlicher Geschäftsführer, HZI
„Strategie des HZI in der internationalen Infektionsforschung mit Fokus auf Klima und Infektionen“

- Globale Verbreitung neuer Krankheitserreger
- Internationale Forschungskooperationen

2. Dr. Berit Lange (Präsentation PPT, 5-7 Minuten)
Leiterin der Abteilung Epidemiologie, HZI | Präsidentin der Deutschen Gesellschaft für Epidemiologie
„Bevölkerungsbasierte Forschung und Resilienz – Infektionsdynamik im Rahmen des Klimawandels verstehen und vorhersagen“

- Bedeutung großer Kohortenstudien
- Frühwarnsysteme und Modellierungen (u. a. im STIKO- und Modellierungsnetzwerk)
- EU-Projekt SUNRISE

3. Prof. Fabian Leendertz (Präsentation PPT, 5-7 Minuten)
Gründungsdirektor, Helmholtz-Institut für One Health (HIOH)
„One Health im Klimawandel – neue Wege im Umgang mit Zoonosen und globalen Infektionsrisiken“

- Zoonosen als Folge gestörter Ökosysteme
- Feldforschung und Kriseneinsätze in Zentralafrika, Côte d’Ivoire
- Interdisziplinäre Ansätze zur Pandemievorsorge

15:40 – 16:30 Uhr – Fragerunde und moderierte Diskussion:
Moderation: Susanne Thiele
Mit allen Referent:innen

- Fragen der Pressevertretenden
- Austausch mit den Expert:innen
- Pressematerialien & Kontakte

Get-together & Networking

- Informeller Austausch bei Snacks und Getränken

Ende gegen 17:00 Uhr

Akkreditierung der Medienvertreter:innen bis zum 28. Juni 2025 an:

susanne.thiele@helmholtz-hzi.de

HZI HELMHOLTZ Zentrum für Infektionsforschung

Krankheitserregern auf der Spur

Infektionen – immer noch unbesiegt

Die Wirksamkeit von traditionell hergestellten Impfstoffen und Medikamenten wie Antibiotika hat ihre Grenzen: Jeder vierte bis fünfte Todesfall weltweit geht auf eine Infektion zurück.

Weshalb Infektionsforschung?

- Unter Kontrolle geglaubte Krankheiten treten wieder vermehrt auf.
- Viele Bakterien sind gegen Antibiotika resistent geworden.
- Neue Infektionskrankheiten treten auf.
- Viele Krankheiten – darunter einige Krebsformen – lassen sich ursächlich auf Infektionen zurückführen.
- Das Immunsystem kann mit zunehmendem Alter Infektionen schlechter bekämpfen – ein wichtiger Aspekt einer alternden Gesellschaft.

Forschung am HZI

Am Helmholtz-Zentrum für Infektionsforschung (HZI) untersuchen Wissenschaftler:innen bakterielle und virale Infektionen sowie die Abwehrmechanismen des Körpers. Die Ergebnisse werden systematisch in die medizinische Anwendung übertragen und dienen als Basis für neue Diagnoseverfahren, neue Wirkstoffe und neue Therapien.

Neben dem Hauptcampus in Braunschweig umfasst das HZI die Standorte Braunschweig Integrated Centre of Systems Biology (BRICS), Helmholtz-Institut für Pharmazeutische Forschung Saarland (HIPS) in Saarbrücken, Helmholtz-Institut für RNA-basierte Infektionsforschung (HIRI) in Würzburg, Helmholtz-Institut für One Health (HIOH) in Greifswald, Zentrum für individualisierte Infektionsmedizin (CiiM), Studienzentrum (CRC) und TWINCORE in Hannover sowie Zentrum für strukturelle Systembiologie (CSSB) in Hamburg.

Fakten zum HZI

Rund 1100 Mitarbeitende aus verschiedenen Berufsfeldern und jährlich bis zu 200 Gastwissenschaftler:innen aus fast 50 Ländern arbeiten am HZI. Die Grundfinanzierung beträgt 89 Mio. Euro (90 % Bund, 10 % Länder), die durch etwa 41 Mio. Euro Drittmittel ergänzt werden (Stand 2024).

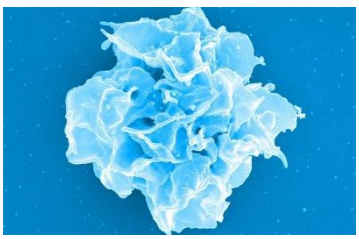
Patente und Publikationen

Forschungsergebnisse werden immer wieder als Patente angemeldet – 2024 existierte ein Bestand von 84 Patentfamilien. Zusätzlich weist das HZI eine Bilanz von rund 550 Publikationen (2024) in hochrangigen, internationalen Wissenschaftsmagazinen auf.

Standorte des HZI auf einen Blick

Bakterielle und virale Krankheitserreger

Immunsystem und Immunabwehr



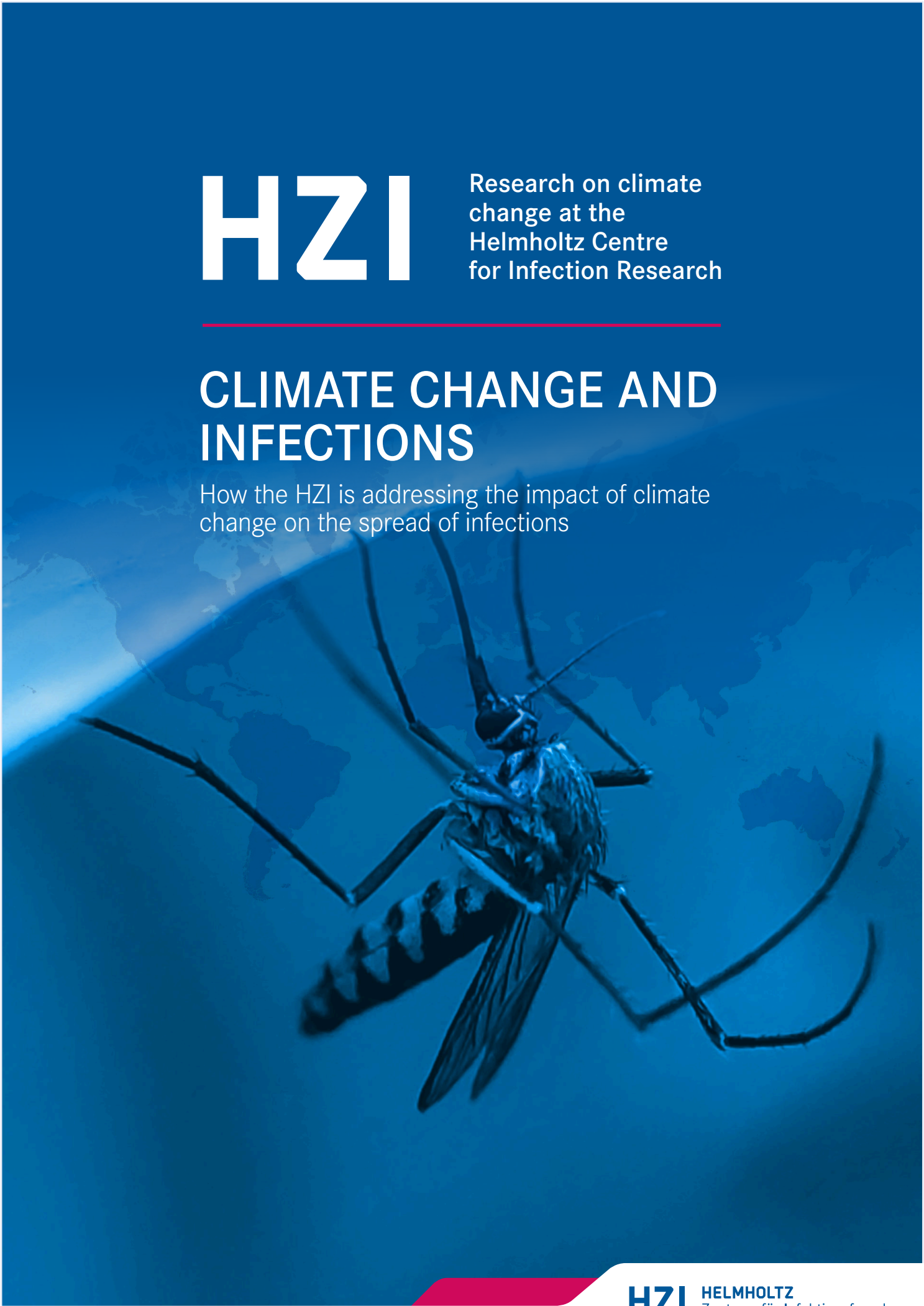
Neue Wirkstoffe

HZI

Research on climate change at the Helmholtz Centre for Infection Research

CLIMATE CHANGE AND INFECTIONS

How the HZI is addressing the impact of climate change on the spread of infections



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How climate change affects infections

CHALLENGE

Climate change, with rising average temperatures and increasing weather extremes, has a significant impact on humans, animals and ecosystems. The increase in average temperatures means that mosquitoes and ticks and the pathogens they transmit can survive and multiply in areas that were not warm enough for them in the past.

In addition, climate change is leading to changes in land use and the natural habitats of many animals in many places, which in turn can have effects on the life cycle and spread of infectious agents and their vectors (e.g. mosquitoes, ticks, small mammals). The shifting of distribution areas leads to species interacting with each other that have not previously encountered each other. The sometimes closer contact between humans and animals increases the risk of transmission of zoonotic pathogens from the large microbial diversity in wild animals and the environment to humans. In addition, the effects of climate change can lead to increased migration of people from particularly affected areas, which can promote the spread of infectious diseases.

Climate change also affects water and air quality. A deterioration in water quality favors the spread of waterborne infections. Poor air quality, for example due to increased dust caused by droughts, can irritate the respiratory tract and increase susceptibility to respiratory infections.

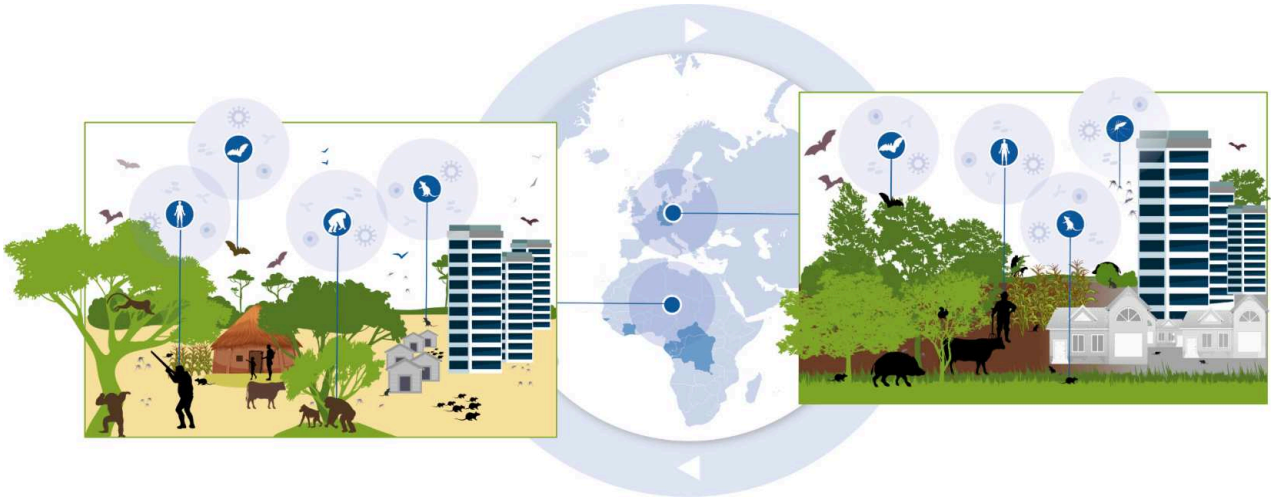
Climate change is accompanied by species extinction and thus a loss of biological diversity (biodiversity), which makes ecosystems more unstable and vulnerable overall and can therefore promote the spread of certain infectious diseases.

Climate change also has an indirect impact on healthcare structures and is associated with increased vulnerability of communities, which can lead to poorer healthcare and greater susceptibility to infectious diseases.

CONTRIBUTIONS OF THE HZI

One Health research in Greifswald and Africa

Following the One Health approach, according to which the health of humans, animals and the environment should be considered as a whole, the Helmholtz Institute for One Health (HIOH) in Greifswald brings together a large number of scientific disciplines and research focuses under one roof. One research focus is on the African tropics, as this region is a hotspot for the occurrence of infectious diseases and anti-microbial resistance. The studies in the focus areas are supplemented by further studies in additional high-risk areas, e.g. in Asia. The HIOH generates, analyzes and integrates comprehensive longitudinal health data as well as data on pathogens at the interface between humans and animals. Intact biodiversity also contributes to the protection of healthy ecosystems, while its loss can increase the risk of disease transmission because the "buffer effect" that biodiversity and intact ecosystems have is eliminated.



Investigation of climate-sensitive events and diseases in cohorts

The HZI's epidemiology department is investigating whether and which climate change-induced changes can already be recorded. To this end, the epidemiologists use samples and data from the NAKO health study and utilize the HZI's digital research infrastructure, the "Prospective Monitoring and Management App" (PIA).

Effects of the increase in extreme weather events on infections

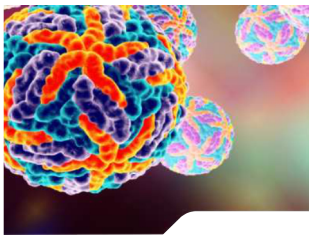
At the HZI, epidemiologists use large population-based cohort studies to analyze and quantify the impact of extreme weather events on infection dynamics and burden.

Epidemiological risk assessment of the climate crisis

Epidemiologists at the HZI are modeling the effects of future climate parameters on the spread of pathogens and the associated impact on infrastructures.

CONTRIBUTIONS OF THE HZI

Search for active substances for the treatment of "tropical" infectious diseases



Dengue and chikungunya viruses are transmitted by the Japanese bush mosquito, among others, and can cause severe febrile illnesses. Specific drugs are not yet available. Scientists at the HZI carry out high-throughput screenings to find active substances against dengue and chikungunya infections.

Research into TBE viruses, the pathogens that cause tick-borne encephalitis

TBE viruses are transmitted by ticks and are now widespread in many regions of Germany. Different TBE strains cause different symptoms and courses of the disease. Using genetic engineering and reporter systems, researchers at the HZI are investigating which host and pathogen factors influence virus replication and the course of the disease.

Biodiversity monitoring

Fungi are indicators of changes in ecosystems. The HZI participates in national and global initiatives for the taxonomic assessment of biodiversity, especially of fungi and their associated organisms (plants, insects). Biodiversity is important for the discovery of new active substances, as it provides a rich source of bioactive compounds from different organisms that can potentially be used for the development of drugs for the treatment of infectious diseases, among other things.

As part of an initiative launched jointly with the University of Pretoria (South Africa), the Technische Universität Braunschweig and the Julius Kühn Institute, researchers at the HZI Braunschweig and the Saarbrücken HZI site Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) are characterizing newly emerging forest pathogens that are introduced to Europe and investigating their metabolites for both harmful and beneficial activities.

CONTRIBUTIONS OF THE HZI

Activities of the HZI in national and international networks

- Population-based cohort research: adopting a population-based perspective through large-scale cohort studies, e.g. the NAKO Health Study, to assess the impact of changing living conditions including climate change (monitoring, quantification and modeling).
- Collaboration in national and international projects such as the EU project SUNRISE with the aim of making critical infrastructures more resilient to (poly)crises.
- Cooperation with partners in particularly affected areas such as the Central African Republic and the Republic of Côte d'Ivoire.
- Participation of the HZI in the Helmholtz Climate Initiative with the aim of finding systemic solutions to the climate crisis together with other Helmholtz centers from all research fields.

OUR EXPERTS

Dr. Stefanie Castell
Team leader "Climate, Cohorts and PIA" in the Department "Epidemiology" at the HZI

Prof. Fabian Leendertz
Founding Director of the Hemholtz Institute for One Health (HIOH) and Head of Department "Ecology and Emergence of Zoonoses"

Prof. Andrea Kröger
Head of the research group "Innate Immunity and Infection" at the HZI

Prof. Marc Stadler
Head of the Department "Microbial Drugs" at the HZI

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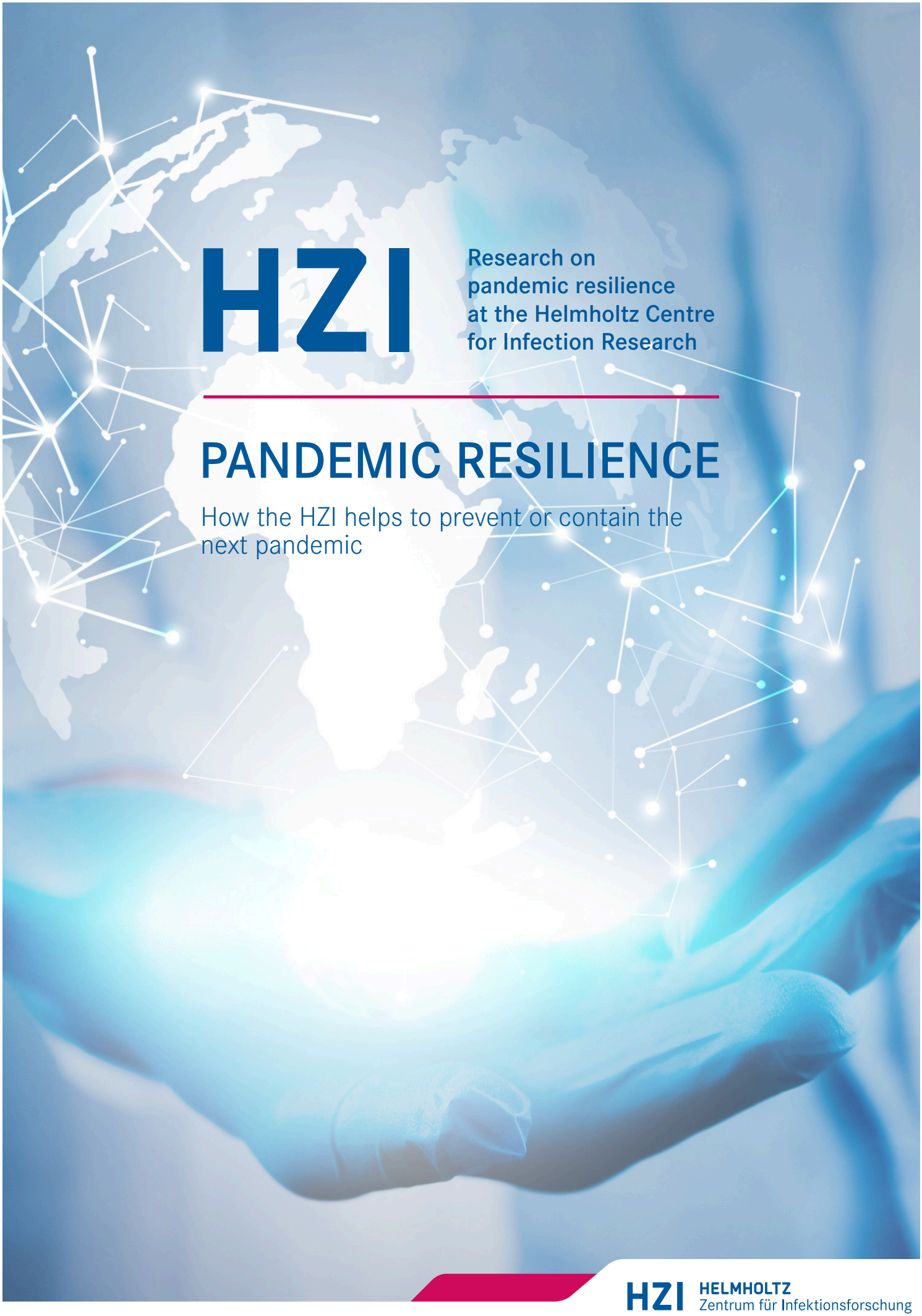


HZI

Research on pandemic resilience at the Helmholtz Centre for Infection Research

PANDEMIC RESILIENCE

How the HZI helps to prevent or contain the next pandemic

HZI HELMHOLTZ Zentrum für Infektionsforschung

What exactly is pandemic resilience?

DEFINITION

Pandemic resilience is the ability of a society and its healthcare system to prepare for a pandemic or epidemic, contain it at an early stage and manage it optimally or, at best, prevent it altogether.

The COVID-19 pandemic has shown that we are not yet optimally prepared for a pandemic. According to official figures, there have been almost 7 million deaths worldwide due to the SARS-CoV-2 coronavirus - the number of unreported cases is estimated to be significantly higher. These are frightening figures that need to be prevented for future pandemic outbreaks.

How does infection research contribute to pandemic resilience?

GOALS

Infection research is a central part of the necessary research on pandemic resilience and must always be closely interlinked with related fields, e.g. from the public health sector, clinical infectiology, pathogen-specific natural sciences, environmental and climate science and communication science.

Relevant **infection research-specific goals for the promotion of pandemic resilience** are:

- Establish sustainable, cross-linked and efficient **infection-specific research infrastructures** in order to quickly identify the dynamics and disease burden of epidemics and limit them in a targeted manner.
- **Pathogen-specific research for infectious diseases with high epidemic and pandemic potential**, their disease mechanisms and the identification of risk factors and transmission hotspots of zoonotic pathogens.
- Develop and evaluate **measures** at individual and population level that quickly and effectively limit the spread and disease burden of infectious agents during epidemics and pandemics.
- Develop **specific vaccines** that can at least reduce mortality and disease burden and, in the best case, contain the spread of infection.
- Develop **broadly effective antiviral drugs** that can be used quickly in the event of a pandemic and reduce mortality and the burden of disease.

CONTRIBUTIONS OF THE HZI

The HZI achieved a high level of national and international visibility during the COVID-19 pandemic and was represented in committees that contributed to political decision-making, e.g. in the Federal Government's Coronavirus Council of Experts. In addition, the HZI conducts ***excellent, internationally connected and competitive research*** *in all the areas mentioned and, as a* ***research institution of the Helmholtz Association****, guarantees the long-term perspective and sustainability of the structures established.*

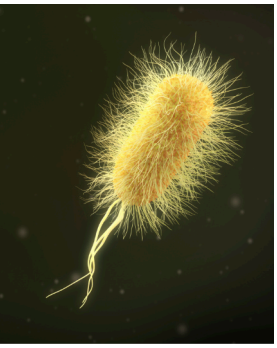
Pandemic-relevant research platforms at the HZI

The HZI establishes and coordinates sustainable and resilient research platforms that enable efficient and excellent infection research in times of peace and crisis:

- At the Helmholtz Institute for One Health (HIOH) in Greifswald, a site of the HZI, a **One Health Surveillance Core Unit** is being established to identify risk factors for epidemics. The HIOH also contributes to the coordination of the One Health platform.
- Together with the Clinical Research Center in Hannover, the HZI coordinates **large and adaptive population-based and clinical cohorts** that can quickly provide continuous estimates of infection incidence and burden and identify risk groups during epidemics.
- The HZI leads the **National Modeling Network for Major Infectious Diseases** (MONID) and **coordinates modeling initiatives for early warning systems, medical and public health applications**.
- **Efficient drug and vaccine platforms** exist at the HZI campus in Braunschweig, the HZI site Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) in Saarbrücken and the German Center for Infection Research (DZIF). In collaboration with the Lower Saxony **COFONI network**, a test platform for high-throughput testing of new active substances against highly pathogenic microorganisms has been established (up to 100,000 substances, S2 and S3 conditions). This is supported by the **platform for pharmacokinetics and pharmacodynamics** and, in future, by the **organoid platform** currently being established at the HZI.

Pandemic-relevant pathogen research at the HZI

The HZI conducts pathogen-specific research for infectious agents with high epidemic and pandemic potential at the highest level:

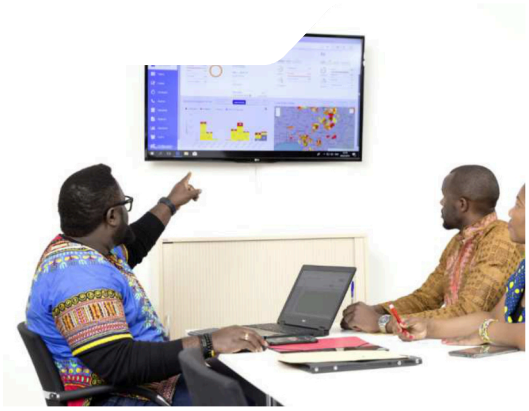


- The mechanisms by which **SARS-CoV-2 triggers disease processes** have been researched by scientists at the HZI together with six other Helmholtz centers and university hospitals as part of the CoViPa project since 2021. The findings will help to be better prepared for future pandemic outbreaks.
- Investigations into the dynamics and disease burden, adaptive modeling and early warning systems for **respiratory infections with RSV, influenza, Pseudomonas and pneumococci** are being carried out in projects such as RESPINOW and PCR4All.

- The DZIF has a high level of expertise in **vector-borne and blood-borne infections**, which also have a high epidemic potential, with the participation of researchers at the HZI.
- At the HZI Campus Braunschweig, research is being conducted into the **immune response induced by vaccination** and the optimization of this response for neutralizing the respective pathogen as efficiently as possible.
- Especially for the **human respiratory syncytial virus (RSV)** as an excellent application for respiratory epidemics, many of the activities at the HZI converge and lead to relevant progress, such as the recent identification of Lonafarnib as an effective drug.

Development of pandemic-related protective measures for the population

The HZI develops interventions that reduce the spread and burden of infection, leads them to proof of concept and contributes to their evaluation at the individual and population level:



- **Digital tools** for reducing the spread and burden of infection, infection surveillance and for conducting infection studies (e.g. SORMAS, PIA) are being developed and evaluated.
- At the HIPS in Saarbrücken and at the Braunschweig site, lead structure discovery and optimization of new anti-infectives is carried out by combining **synthetic and natural substance-based drug research**.
- **Antibodies against emerging viruses** were developed very quickly for clinical use during the COVID-19 pandemic, as demonstrated by the phase 1 product COR-101 (CORAT, Technische Universität Braunschweig, HZI). The HZI with TWINCORE and the TU Braunschweig as well as biotech companies based at the HZI campus, such as YUMAB GmbH, have the necessary expertise and capacity to quickly develop antibody biotherapeutics in the event of a pandemic.
- Together with the DZIF, the HZI is conducting research on **vaccines** and comparing different vaccination strategies at the individual and population level using modeling platforms.
- Development and evaluation of targeted **non-pharmaceutical measures** such as testing strategies are carried out in close cooperation with the above-mentioned population studies, e.g. in the Helmholtz project LOKI.
- Within various national and European initiatives (e.g. SUNRISE), the HZI develops and evaluates models, plans and strategies to coordinate **critical infrastructures** in pandemics and make them more resilient.

CONTRIBUTIONS OF THE HZI

1. The HZI is ideally positioned to conduct **high-level research in the field of pandemic resilience**. Relevant research infrastructures can also be set up here on a long-term and sustainable basis so that they can be quickly adapted to new pathogens.

2. Representation in the **national committees relevant to pandemic resilience** is ensured, and corresponding representation in international committees is sought. Personnel and institutional capacities are designed in such a way that it is possible to continue research tasks for pandemic resilience even under difficult conditions and with a high level of absenteeism.

3. The HZI is thus **agile and adaptive** in its structures in order to be able to act in different inter- and intra-pandemic phases and to react to variable stress, funding and political conditions.

OUR EXPERTS

Dr. Berit Lange
Acting Head of Department "Epidemiology" at HZI

Prof. Fabian Leendertz
Founding Director of the Hemholtz Institute for One Health (HIOH) and Head of Department "Ecology and Emergence of Zoonoses"

Prof. Dunja Bruder
Head of the research group "Immune regulation" at HZI

Prof. Michael Meyer-Hermann
Head of Department "Systems Immunology" at BRICS in Braunschweig

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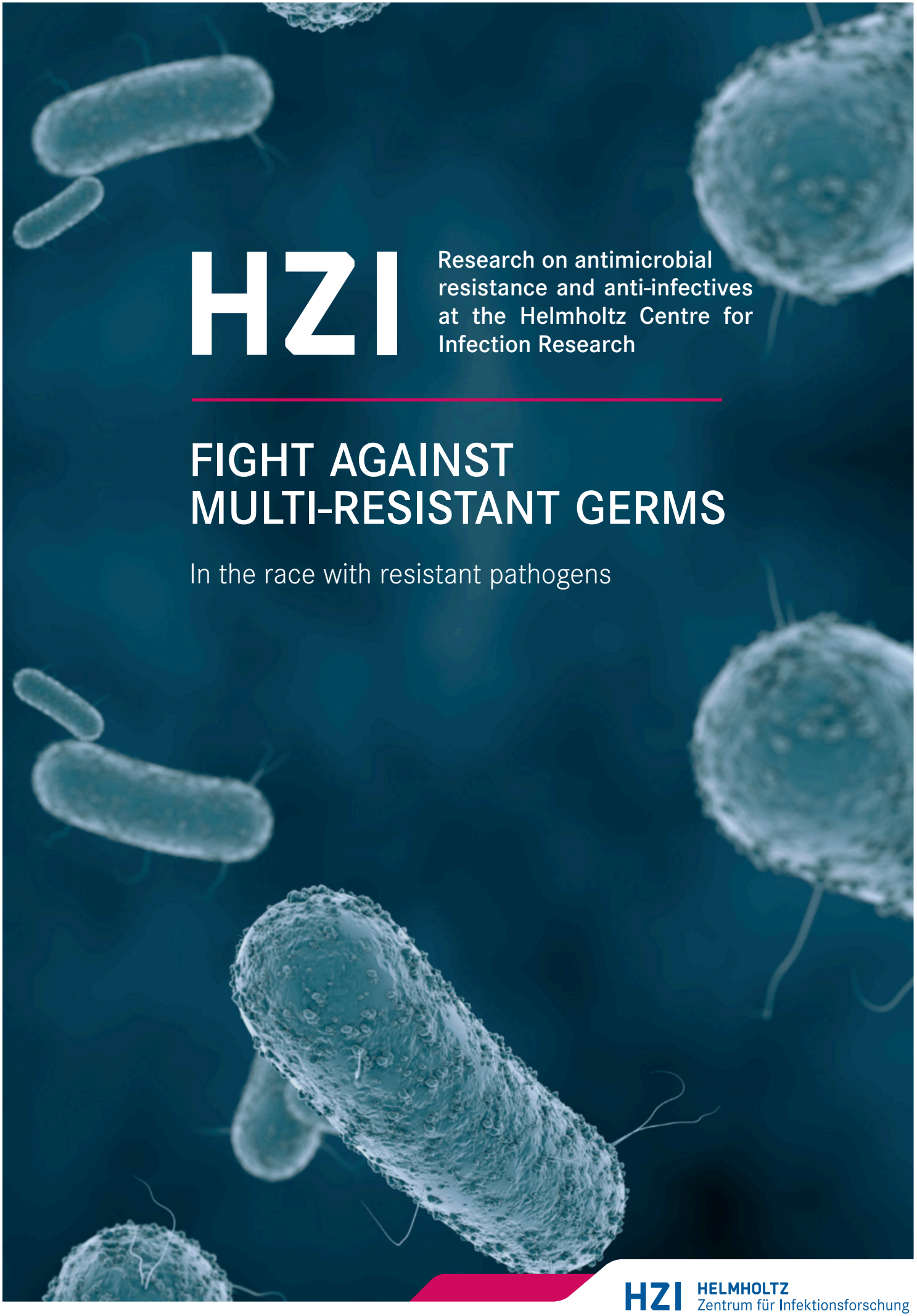


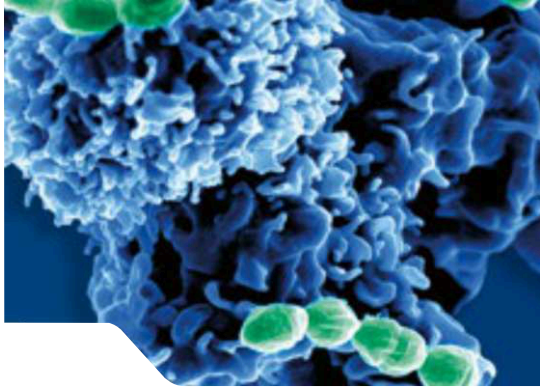
HZI

Research on antimicrobial resistance and anti-infectives at the Helmholtz Centre for Infection Research

FIGHT AGAINST MULTI-RESISTANT GERMS

In the race with resistant pathogens

HZI HELMHOLTZ Zentrum für Infektionsforschung



What is antimicrobial resistance?

DEFINITION

Antimicrobial resistance (AMR) is the term used when bacteria, viruses, fungi or parasites no longer respond to conventional medication. Antibiotic resistance in bacteria is a particularly serious problem. The formation of such resistance is a natural effect of evolution: Antibiotic-resistant bacteria develop through random mutations, and their reproduction and spread is promoted by the frequent use of antibiotics. As resistance genes can also be exchanged between different bacteria species, there are now bacteria against which almost no available antibiotic is effective. There are various reasons for the spread of resistance: For instance, antibiotics are often immoderately prescribed in human medicine even when their use is unnecessary or ineffective, they are taken for an insufficient time or are used excessively in industrial livestock farming.

In the race with germs - a global problem

CHALLENGE

Effective antibiotics are an indispensable pillar of modern medicine. Without them, both currently harmless treatments such as dental surgery and more complex procedures such as chemotherapy or organ transplants would only be possible with a high risk of infection - and therefore potentially life-threatening. Antibiotic resistance has been spreading for more than half a century, bringing humanity closer to a post-antibiotic era in which the known drugs have largely lost their effectiveness. The health, social and economic consequences would be disastrous.

The World Health Organization (WHO) now considers antibiotic resistance to be one of the **"greatest threats to global health and food security"**, particularly in view of the lack of new antibacterial drug candidates in drug research. They lead to longer hospital stays and therefore higher treatment costs as well as increased mortality. AMR is responsible for more than 1.2 million deaths worldwide every year. Without the development of novel, resistance-breaking antibiotics or alternative therapeutic approaches to treat infections caused by resistant pathogens, there could be no cure in a few years for diseases that are still treatable today.

Scientists at the Helmholtz Centre for Infection Research (HZI) are combining expertise from various fields and many years of experience in industry to meet these challenges with **a multi-pronged strategy**.

How do humans, animals and the environment interact in AMR?

One Health approach

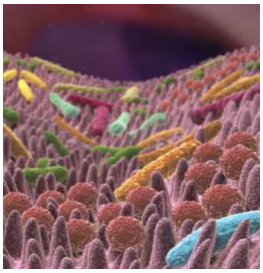
The health of humans, animals and the environment is closely interlinked and must be considered as a whole. The scientists at the HZI and especially at its Greifswald site, the Helmholtz Institute for One Health (HIOH), are dedicated to the question of how antimicrobial resistance develops and spreads. This includes not only the characterization of classical resistances and their epidemiological classification, but also the in-depth investigation of bacterial virulence and fitness determinants (e.g. biofilm formation). The main aim is to analyze, better understand and combat pandemic pathogens. In collaboration with national and international cooperation partners, the occurrence and transmission of AMR bacteria in humans, animals (e.g. wild birds) and the environment in the One Health context is being elucidated and the development of alternative therapeutic approaches is being sought.

Prof. Katharina Schaufler
Head of Department "Epidemiology and Ecology of Antimicrobial Resistance" at HIOH

Which strategies does our body have to combat antibiotic-resistant bacteria?

Mikrobiota-based therapies

The human gut is a reservoir for harmless, health-promoting, pathogenic and even multi-resistant bacteria. When microorganisms of the microbiome compete with each other or with invading germs, they develop strategies to contain other species. Microbiome researchers are trying to understand these strategies and use them to develop new therapies against antibiotic-resistant pathogens, for example the administration of pre- or probiotics, in order to establish a healthy and pathogen-containing balance.



Prof. Till Strowig
Head of Department "Microbial Immune Regulation" at HZI

How can AMR be detected early enough to take timely countermeasures?

Genetic analyses of bacteria and development of molecular test systems

Conventional antibiotic sensitivity tests of bacteria in the clinic are based on bacterial growth in the laboratory in the presence of antibiotics. This can take a long time (> 48 h) and provides only limited information about the resistance mechanisms and the origin of the pathogens. HZI researchers are working on faster and more specific systems for the diagnosis of infectious diseases, in particular through DNA analysis of pathogens. By searching for a correlation between antibiotic resistance and the genetic background in thousands of bacterial isolates, genetic markers and mechanisms that mediate resistance and virulence are identified. In this way, next-generation diagnostics can be developed.

Prof. Susanne Häußler
Head of Department "Molecular Bacteriology" at HZI

How do we find new active substances against resistant pathogens?

New anti-infectives from natural products

Most medically relevant antibiotics or their production precursors are produced by microorganisms such as bacteria and filamentous fungi. The biosynthetic potential of myxobacteria is being explored at the HZI site Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) in Saarbrücken. HIPS researchers are optimizing particularly promising natural products for clinical use in humans. Innovative genetic and bioin-formatic methods are used to identify the unique synthesis machines of bacteria and make them usable for us. New classes of ac-tive substances from fungi are developed, analyzed and tested for their efficacy at the HZI in Braunschweig. In addition, the HZI in Braun-schweig has one of the most modern and unique biotechnological production facilities for microbial antibiotics in Europe. This allows us to produce substances on a kilogram scale for late preclinical use as well as to develop GMP-compliant production processes for fer-mentation on an industrial scale.

Prof. Rolf Müller
Director of HIPS and Head of Department "Microbial Natural Products"

Prof. Marc Stadler
Head of Department "Microbial Drugs" at HZI

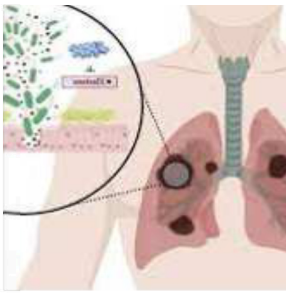
Optimization of drug candidates and development of pathoblockers

Substances with antibiotic activity are not automatically suitable for use in humans and must therefore be optimized with regard to various parameters. In order to deliver active substances to their target site in bacteria, HZI scientists are pursuing a molecular variant of the "Trojan horse" strategy: Antibiotic agents are coupled to nutrients important for bacteria, which are actively taken up by the bacteria together with the hidden toxic load.

The portfolio of drug candidates includes both classic antibiotics and pathoblockers. Pathoblockers are compounds that disarm pathogens instead of inhibiting their growth or killing them. As a result, pathogens are far less likely to develop resistance to the active ingredient used.

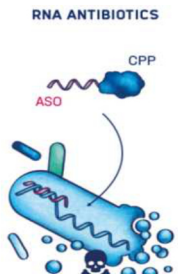
Prof. Mark Brönstrup
Head of Department "Chemical Biology" at HZI

Prof. Anna Hirsch
Head of Department "Drug Design and Optimization" at HIPS



Unconventional approaches - programmable RNA antibiotics

Ribonucleic acids (RNA) are a class of molecules that not only serve as a "cache" of genetic information, but also perform a variety of regulatory functions in the cell. For instance, RNA molecules play an important role in infection processes and interact with a large number of molecules of the host cell and the pathogen. Scientists at the Würzburg site, the Helmholtz Institute for RNA-based Infection Research (HIRI), are researching how RNA molecules can be used to specifically combat resistant pathogens. Programmable antibiotics, so-called antisense oligonucleotides (ASOs), are a promising new approach. ASOs bind to bacterial messenger ribonucleic acids (mRNA) within the cell and prevent the formation of new proteins that bacteria need to survive - ideally, the bacterium dies as a result. The adaptability of ASOs can counteract existing or newly developing resistances.



Prof. Jörg Vogel
Director of HIRI and Head of Department "RNA Biology of Bacterial Infection"

RECOMMENDATION FOR ACTION

Research into antibiotics needs new support and funding

Although the increasing spread of resistant germs is seen as one of the greatest global threats, pharmaceutical companies have largely stopped research into new antibiotics for economic reasons: If a new active substance against multi-resistant germs is found, it must be kept in reserve for those cases that do not respond to any other medication to prevent the development of resistance. This is not very lucrative - and yet the development of new antibiotics is essential. The special circumstances in this market segment require new instruments for research funding and reimbursement of new antibiotics: government involvement in basic research and in bridging the "translation gap" to enable projects to make the leap from the laboratory to clinical application, public-private partnership models for the development of drugs and reimbursement that is largely independent of sales volumes. All of this should be accompanied by improved diagnostics and antibiotic stewardship programs ensuring that doctors use new antibiotics strictly as indicated so that they remain effective for a long time.

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S.5: Canva.com (Kommerzielle Lizenz), HZI, HZI, HIPS, HIPS, HIRI, HIRI
S.6: Fotolia

HZI

Research on precision infection medicine at the Helmholtz Centre for Infection Research

PRECISION INFECTION MEDICINE

On the way to customized therapies

HZI HELMHOLTZ Zentrum für Infektionsforschung

What is precision infection medicine?

DEFINITION

Precision infection medicine is a branch of precision medicine that aims to optimize the prevention and treatment of infectious diseases for the individual. Medical measures are tailored to the individual characteristics of a person or group of people or the corresponding pathogen in order to achieve better results and minimize undesirable effects.

In the context of infectious diseases, precision medicine can consider various factors, for example:

- Genetic predisposition: Some individuals may have genetic variations that make them more susceptible to certain infections or affect their response to treatment.
- Medical history: Anyone who has had a serious illness in the past, such as cancer, may be more susceptible to infections.
- Composition of the microbiome: The composition of a person's microbiome - a collection of microorganisms that live in and on the body - can influence susceptibility to infection and response to treatment.
- Immune system function: Variations in the immune system, such as differences in immune response or immune function, and immune status can affect a person's ability to fight off infections and the response to vaccinations or antimicrobial therapies.
- Environmental factors: Precision infection medicine can also take into account environmental factors such as geographic location, dietary habits, occupation, travel history and exposure to pathogens that may influence infection risk and treatment strategies.
- Pathogen characteristics: Knowledge of the specific characteristics of the infectious agent, including its virulence, antibiotic resistance profile and strain variability, can help to tailor treatment approaches to individual cases.

Why will precision infection medicine become increasingly important in the future?

OPPORTUNITIES

By considering individual factors, clinicians can make more informed and targeted decisions about infection prevention, early detection and treatment strategies, leading to better outcomes for patients.

Modern medicine makes it possible to live longer. However, in our ageing society, there are also more and more people with concomitant illnesses who are particularly susceptible to infections and severe courses. Determining the risk factors, identifying the pathogens quickly and choosing the right treatment approach promptly is particularly crucial in these cases. This also applies to people with a suppressed immune system.

Precise prevention, diagnosis and treatment approaches allow resources to be used more efficiently by avoiding unnecessary, prolonged or ineffective treatments and enabling more targeted interventions. This can increase effectiveness and reduce side effects.

In addition, bacteria and viruses are increasingly developing resistance to conventional treatments such as antibiotics. Precise approaches can be used to determine the best therapy in each case and thus minimize the development of resistance.

What does successful precision infection medicine need?

CHALLENGE

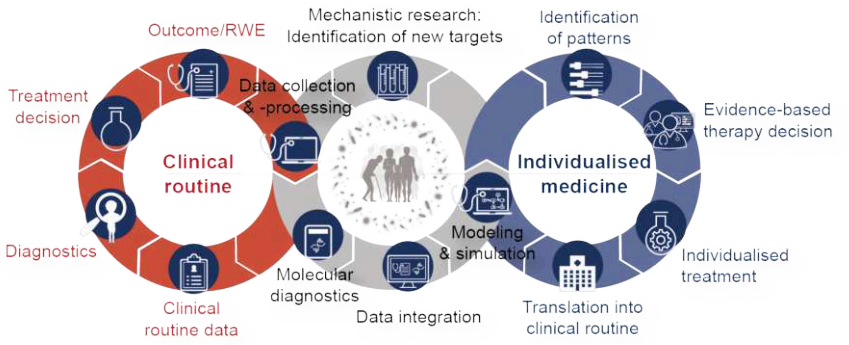
In order to treat patients in a targeted manner and prevent infections on an individual basis, a comprehensive understanding of how personal factors influence a disease is required. This requires extensive data collections containing information on molecular data (including the human genome and epigenome), immune system, microbiome composition and other relevant biological and clinical characteristics. These databases make it possible to identify patterns and correlations that can help select the best diagnostic markers and treatment options with the help of artificial intelligence (AI), among other things. This requires the development of appropriate AI methods.

Reliable (rapid) tests are needed to apply the findings and determine the individual characteristics of patients and infectious agents. Particularly in the case of acute infectious diseases, rapid diagnosis can determine the success of treatment. For example, determining the pathogen and its resistance profile is important for the sensible and conscious use of antibiotics in order to prevent the development of new antibiotic resistance.

Given the sensitive nature of health data, it is important to establish strict ethical standards and data protection guidelines to protect patient privacy while allowing information to be shared for research purposes.

A dedicated centre for individualised infection medicine

A few years ago, the Helmholtz Centre for Infection Research (HZI) recognized the importance of patient-centered infection medicine in the future and, together with the Hannover Medical School (MHH), established an institute specializing in this field: the Centre for Individualized Infection Medicine (CiiM).



At CiiM, interdisciplinary teams are investigating individual courses of infection. Existing routine data from the clinic is combined with newly collected molecular data from individual patients and their pathogens in order to determine predictive parameters for the course of infection and the success of treatment using computer-aided methods. This individual data is also analyzed in conjunction with similar data from other patients and healthy controls. Computer-assisted methods can then be used to identify patterns that are associated with certain disease progressions. The results obtained are analyzed in the laboratory to determine their causality. This enables the discovery of biomarkers that can be used for prognoses. This patient-centered and data-based approach of CiiM offers treating physicians an important guideline for tailored prevention and therapy, thus enabling individualized patient management and evidence-based medicine.

The realization of this vision requires interdisciplinary, patient-oriented bundling and transdisciplinary cooperation between different specialist areas from the clinical and research fields. The construction of a dedicated CiiM building in the direct vicinity of the MHH and the other research facilities at the biomedical location of Hannover plays a key role in this.

Analyzing and predicting diseases using a big data approach

The HZI with its various sites has access to large amounts of epidemiological, clinical and genetic data from patients as well as data on microbial communities and single genomes of bacteria. Data scientists at the HZI can use their expertise to process this data and draw conclusions about the development of diseases and possible treatment or prevention measures.

Identifying at-risk patients with statistical and computer-aided approaches

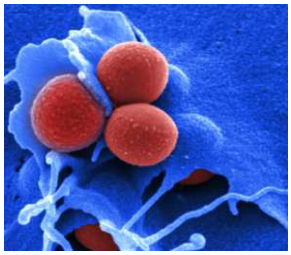
At CiiM, Yang Li's department investigates the influence of genetic background and environment on infections and immune-related diseases. The researchers focus on the application and development of computational methods such as artificial intelligence and statistical approaches to investigate different molecular levels (e.g. genes, genomes etc.), immunological parameters and functions as well as complex diseases. Their aim is to uncover the risk factors of those affected and thus improve the identification of patients at risk. These findings are crucial for the understanding and individualized prevention and treatment of infectious diseases.

Prof. Yang Li
Head of Department "Bioinformatics of Individualized Medicine" and Co-Director of the Centre for Individualized Infection Medicine (CiiM), HZI-part

Biomarkers for customized therapies for infectious diseases

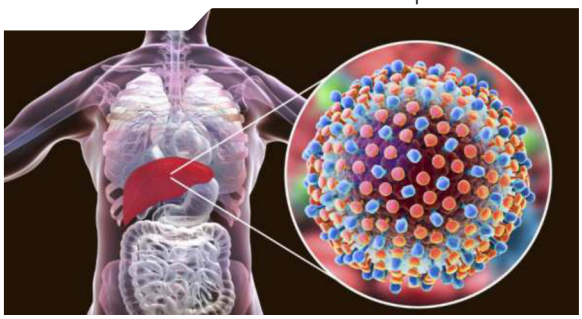
Hepatitis viruses of types A to E are a major health challenge worldwide. Acute infections with hepatitis B (HBV), C (HCV), D (HDV) or E (HEV) can develop into chronic hepatitis and lead to liver cirrhosis and hepatocellular carcinoma.

Prof. Markus Cornberg
Clinical Director of the HZI and Co-Director of the Centre for Individualized Infection Medicine (CiiM), MHH-part



Prof. Dr. Dr. Frank Pessler
Head of the research group "Biomarkers for Infectious Diseases" at TWINCORE

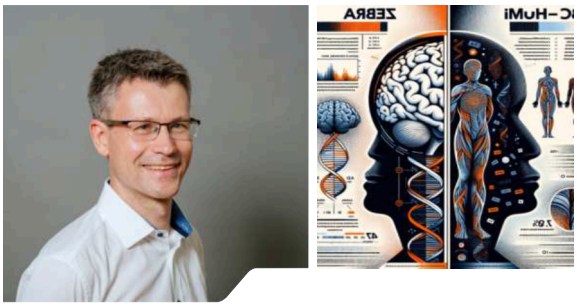
At CiiM, the MHH-research group of Markus Cornberg is focusing on understanding the immune responses to hepatitis viruses and developing biomarkers to better classify patients and provide tailored treatment. The aim is to develop new therapeutic strategies to modulate the patient's immune system and thus combat chronic viral hepatitis.



Also in Hannover, at the TWINCORE - Centre for Experimental and Clinical Infection Research - Frank Pessler's research group is looking for more precise diagnostic and prognostic biomarkers for infectious diseases and for improving the vaccination response. The clinical goals are the optimization and earliest possible selection of the most effective individualized treatment.

Machine learning, AI and databases for precision infection medicine

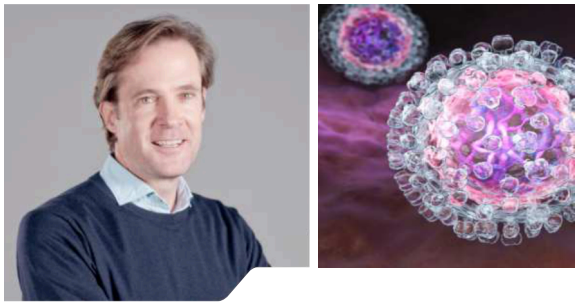
Modern pharmaceutical research generates huge amounts of data faster than ever before. Computer-aided methods are used at the HZI site Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) in Saarbrücken to make this data fully usable. Andreas Keller's department is concerned with analyzing molecular information using computer-aided methods such as artificial intelligence. The focus is on the spatially and temporally resolved investigation of processes in order to understand how bacteria interact with humans and how they can trigger or protect against diseases. The team is also investigating possible long-term consequences of infections, such as the question of why one person falls ill with long COVID and another does not. In addition, the researchers are creating databases that process research data in a structured way and make it accessible to the scientific community. In this way, they create the necessary basis for answering relevant questions in the field of precision infection medicine.



Prof. Andreas Keller
Head of Department "Clinical Bioinformatics" at HIPS

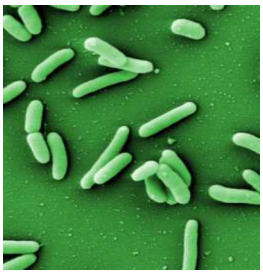
Predicting the course of RSV infection in young children

In healthy adults, an infection with respiratory syncytial virus (RSV) usually manifests itself in the form of a mild cold. However, RSV can also cause severe lower respiratory tract infections, especially in infants and young children. However, the factors that determine the severity of the disease are not yet fully understood. There are currently only a few treatment options and approved vaccines. Thomas Pietschmann's department is researching the mechanisms responsible for severe RSV infections in infants. Their aim is to develop new diagnostic procedures and antiviral therapies for particularly vulnerable patient groups. To this end, the researchers are investigating genetic variants and quantitative biomarkers that can predict the risk and severity of RSV disease progression. In addition, they are using substance libraries to identify new drugs against RSV.



Prof. Thomas Pietschmann
Head of Department "Experimental Virology" at TWINCORE

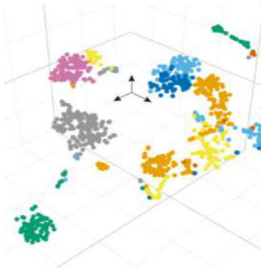
Bioinformatic approaches for predicting diseases, immune responses and antibiotic resistance



Prof. Alice McHardy Head of Department "Bioinformatics of Infection Research" at BRICS

Thanks to technological advances, large amounts of data can now be analyzed within a short period of time. This makes it possible to establish correlations between collected patient data and the development of a disease. Alice McHardy's department investigates the human microbiome, viral and bacterial pathogens and the development of individual patient cell lines by analyzing large biological and epidemiological data sets using computational methods. Based on metabolomics, population genomics and single-cell sequence data, the researchers generate hypotheses on genes or genetic changes that are responsible for the development of a disease, an effective immune response or the development of antibiotic resistance. The team is also involved in a project in which individual vaccination recommendations are to be generated using bioinformatics approaches, among other things.

Understanding differences in disease progression at individual cell level



Dr. Antoine-Emmanuel Saliba
Head of the research group "Single Cell Analysis" at HIRI

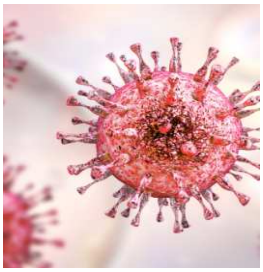
The latest technological advances enable scientists to map the entirety of all cells in the body, record their status and observe their reactions to infectious agents in unprecedented detail. However, what causes a host to contain the spread of a pathogen or what causes some of the pathogens to escape the host's immune surveillance is still largely unknown. The research group led by Emmanuel Saliba at the Würzburg site Helmholtz Institute for RNA-based Infection Research (HIRI) is dedicated to researching host-pathogen interactions in high resolution at the level of the individual cell. In order to determine the state of individual pathogens and thereby understand the individual differences in host reactions and disease progression, the team develops and combines approaches from single-cell analysis with imaging techniques and computer-assisted methods.

CRISPR-based technologies for the diagnosis and treatment of infections

The discovery of CRISPR-Cas immune systems in microorganisms has led to the development of revolutionary tools for genome editing and other applications with societal benefits. In infection biology, CRISPR tools can be used to study pathogens, the microbiota and human cells, as well as to diagnose and treat infections. Chase Beisel's research group at HIRI is exploring the functional diversity of CRISPR-Cas immune systems to develop new technologies that can be used to better understand, diagnose and treat infections. The team has already developed and optimized a number of important CRISPR-based technologies, such as the diagnostic technology LEOPARD, which is undergoing active commercialization. LEOPARD can detect multiple RNA and DNA biomarkers in a simple point-of-care test and is expected to help improve healthcare decisions in the future.

Prof. Chase Beisel
Head of Department "Synthetic RNA Biology" at HIRI

Individualized medicine for viral infections



Prof. Luka Cicin-Sain
Head of Department “Viral Immunology” at HZI

Luka Cicin-Sain's department focuses on analyzing the immune response to viral infections, with an emphasis on clinically relevant infections such as cytomegalovirus (CMV)"or SARS-CoV-2. CMV is a widespread opportunistic pathogen that persists latently in most people worldwide. Virus reactivation typically occurs in people with a weakened immune system, whether due to illness, immunosuppression following organ transplants or in older people with age-related immunodeficiency. The aim is to identify the cellular reservoirs of CMV latency, determine immune mechanisms that prevent viral reactivation and determine optimal antigenic targets for adoptive T-cell immunotherapy.

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Prof. Dr. Josef Penninger

Helmholtz-Zentrum für Infektionsforschung (HZI)

Expertise

- Infektionskrankheiten, Immunabwehr, Pandemien, Antimikrobielle Resistenzen
- Entwicklung Medikamente, Impfstoffe, innovative Therapien
- Individualisierte Medizin, Präzisionsmedizin
- Organoide, Human-on-a-chip

Profil

Prof. Dr. Josef Penninger ist wissenschaftlicher Geschäftsführer des Helmholtz-Zentrums für Infektionsforschung (HZI) in Braunschweig. Am HZI untersuchen Wissenschaftler:innen die Mechanismen von Infektionskrankheiten und der Immunabwehr mit dem Ziel, neue Medikamente oder Impfstoffe gegen Infektionskrankheiten zu entwickeln.

Als wissenschaftlicher Geschäftsführer ist Josef Penninger für die strategische Ausrichtung und wissenschaftliche Profilierung des HZI verantwortlich. Darüber hinaus leitet er am HZI eine Forschungsgruppe, die mit Hilfe eines hochmodernen Robotik-Systems eine der größten Produktionsstätten für Organoide entwickelt. Organoide sind dreidimensionale Miniaturmodelle menschlicher Organe, wie Herz, Gehirn oder auch Blutgefäße, die in Zellkulturen entwickelt werden. Entstehen soll eine Plattform für die Erforschung von Infektionen und Immunabwehr, zur Durchführung von Impfstofftests und für die Entwicklung innovativer Therapieansätze.

Neben seiner Forschungsarbeit am HZI ist Josef Penninger auch an der University of British Columbia in Kanada sowie am Institut für Molekulare Biotechnologie in Wien tätig. Im Bereich der Infektionsbiologie ist auf seine Entdeckung des Proteins namens ACE2 zurückzublicken, welches dem Pandemie-Virus SARS-CoV-2 den Eintritt ins Innere unserer Zellen ermöglicht. Ein weiteres Protein, das Penninger identifizierte, spielt eine wesentliche Rolle bei Osteoporose und Brustkrebs. Auf Grundlage seiner Entdeckungen hat Josef Penninger translationale Therapien für Krebserkrankungen, immunologische Störungen und virale Infektionen entwickelt.

Josef Penninger erhielt mehrere Forschungsförderungen in der EU und in Nordamerika und wurde für seine Arbeiten mehrfach ausgezeichnet, unter anderem mit dem Ernst-Jung-Preis für Medizin, dem Descartes-Preis und dem Wittgenstein-Preis ausgezeichnet. Bevor er 2023 ans HZI kam leitete er das Life Sciences Institute der University of British Columbia in Kanada.

Curriculum

- seit 2024 Honorarprofessor, Fakultät für Lebenswissenschaften, Technische Universität Braunschweig
- 2024 PhD in Medical Science, Tokyo Medical and Dental University, Japan
- seit 2023 Wissenschaftlicher Geschäftsführer, Helmholtz-Zentrum für Infektionsforschung, Braunschweig
- seit 2023 Professor für Präzisionsmedizin, Medizinische Universität Wien, Österreich
- 2018 - 2023 Direktor, Life Sciences Institute, University of British Columbia, Kanada
- seit 2018 Ordentlicher Professor, Department of Medical Genetics, University of British Columbia, Kanada
- 2002 - 2018 Gründungsdirektor, Institut für Molekulare Biotechnologie IMBA, Forschungsinstitut der Österreichischen Akademie der Wissenschaften, Wien, Österreich
- seit 2004 Ordentlicher Professor für Immunologie, Universität Toronto, Kanada

Auszeichnungen (Auswahl)

- 2021 Allen Distinguished Investigator
- 2020 Österreicher des Jahres, Kategorie Erfolg International
- 2020 Chosen #30 by OOOM 100: The Most Inspiring People in the World
- 2019 Ehrenprofessur, Qingdao University, China
- 2018 Österreichisches Ehrenzeichen für Wissenschaft und Kunst
- seit 2015 Mitglied, Europäische Akademie der Wissenschaften und Künste
- seit 2007 Mitglied, Österreichische Akademie der Wissenschaften
- seit 2004 Mitglied, Deutsche Akademie der Naturforscher Leopoldina
- 2014 Wittgenstein Preis
- 2007 Ernst-Jung-Preis für Medizin
- 2006 Descartes-Preis
- 2005 Benennung des Asteroiden 48801 als Penninger

Gremien und Mitarbeit (Auswahl)

- seit 2025 RESIST-Exzellenzcluster, Deutsche Forschungsgemeinschaft (DFG)
- seit 2015 Mitglied der European Academy of Sciences and Arts
- seit 2010 Mitglied der European Academy for Tumor Immunology (EATI)
- seit 2009 Mitglied des European Research Institute for Integrated Cellular Pathology (ERI – ICP)
- seit 2009 Mitglied der Academy of Europe (Academia Europaea)
- seit 2008 Mitglied der European Molecular Biology Organization (EMBO)
- seit 2004 Mitglied der Deutschen Akademie der Naturforscher Leopoldina

Zur Expert:innen-Datenbank von Helmholtz KLIMA

Dr. Berit Lange

Helmholtz-Zentrum für Infektionsforschung (HZI)

Expertise

- Infektionsepidemiologie, Klinische Infektiologie, Infektionskrankheiten
- Auswirkungen Klimawandel auf Infektionsdynamik
- Respiratorische Infektionen, Entwicklung Pandemien, pandemische Resilienz, Klimawandel und Pandemien
- Impf- und andere Infektionspräventionsstrategien, Gesundheitsschutz
- Erhebung von Resilienz in kritischen Infrastrukturen, Ausarbeitung von Stresstests
- Methoden der dynamischen Infektionsmodellierung, bevölkerungsbasierte Forschung und Resilienz, große Kohortenstudien

Profil

Dr. Berit Lange leitet am Helmholtz Zentrum für Infektionsforschung (HZI) das Team Klinische Epidemiologie und ist kommissarische Leiterin der Abteilung Epidemiologie. Die Abteilung beschäftigt sich mit der Verteilung und Ausbreitung von Infektionen, identifiziert Ursachen und Risikofaktoren und entwickelt Maßnahmen mit zur Prävention, Früherkennung und Therapie.

Erforscht werden Infektionen, die von Mensch-zu-Mensch oder von Tier-zu-Mensch übertragbar sind. Dazu gehören unter anderem Influenza, COVID-19, Borreliose, Sepsis sowie Erreger, die resistent sind gegen Antibiotika, wie MRSA. Ein Schwerpunkt von Berit Lange sind COVID-19-Infektionen. In Studien hat sie unter anderem SARS-CoV-2-Kontaktmuster in Deutschland untersucht sowie die Rolle der Schulen während der Pandemie.

Berit Lange untersucht auch die Folgen des Klimawandels auf Infektionsdynamiken. Am Deutschen Zentrum für Infektionsforschung (DZIF) ist sie am Brückenthema „Globale Gesundheit und Klimawandel“ beteiligt. Dort wird untersucht, wie Veränderungen von Temperatur und Wetterlagen die Ausbreitung und Dynamik von Infektionskrankheiten beeinflussen. Der Klimawandel ist wesentliche Ursache für die Ausbreitung von Infektionskrankheiten, da er Ökosysteme, Krankheitserreger und die Anfälligkeit von Menschen verändert.

Ein Arbeitsschwerpunkt von Berit Lange sind hierbei zukünftige Pandemien und pandemische Resilienz. Der Begriff steht für die Fähigkeit einer Gesellschaft und des Gesundheitssystems, sich auf eine Pandemie vorzubereiten, sie optimal zu managen oder bestenfalls zu verhindern. Dazu braucht man Infrastrukturen, die die Dynamik und Krankheitslast einer Pandemie schnell erfassen und begrenzen können, durch Frühwarnsysteme oder Wirkstoff- und Impfstoffplattformen.

Am HZI koordiniert Berit Lange das Netzwerk INFRALINK, das Forschungseinrichtungen und den Öffentlichen Gesundheitsdienst im Bereich der Infektionsforschung verbident. Sie ist zudem in der Politikberatung aktiv und berät Gremien zu Strategien bei Gesundheitskrisen, unter anderem als Mitglied der Ständigen Impfkommission (STIKO) und im Expert:innenrat „Gesundheit und Resilienz" der Bundesregierung. Ziel sind bessere Gesundheitsstrategien, um besser auf Infektionskrankheiten vorbereitet zu sein.

Curriculum

- seit 2023 Kommissarische Leitung, Abteilung Epidemiologie, Helmholtz-Zentrum für Infektionsforschung (HZI), Braunschweig
- seit 2019 Teamleitung Klinische Epidemiologie, Helmholtz-Zentrum für Infektionsforschung
- 2014 - 2018 Klinische Weiterbildung und wissenschaftliche Mitarbeiterin, Innere Medizin, Universitätsklinikum Freiburg
- 2012 - 2014 Studium der Epidemiologie und wissenschaftliche Mitarbeiterin, Abschluss Master of Science Epidemiology, London School of Hygiene and Tropical Medicine (LSHTM), London, UK
- 2009 - 2012 Mitarbeiterin, Medizin und Infektiologie, Abteilung Innere Medizin II, Universitätsklinikum Freiburg
- 2009 Studium der Humanmedizin in Freiburg, Madrid, Santiago de Chile, Lima

Gremien und Mitarbeit (Auswahl)

- seit 2025, Koordinatorin, Netzwerk INFRALINK, HZI
- 2024 - 2025 Mitglied, Expert:innen-Rat „Gesundheit und Resilienz", Bundesregierung
- seit 2024 Mitglied, Ständige Impfkommission (STIKO), Arbeitsgruppen: COVID-19, Pocken, Herpes zoster, Methodik, Pneumokokken, Respiratorische Synzytial-Viren, Sprecherin AG Influenza, Bundesgesundheitsministerium
- 2024/2025 Präsidentin, Deutsche Gesellschaft für Epidemiologie
- seit 2022 Sprecherin, Modellierungsnetzwerk für schwere Infektionskrankheiten
- 2017 - 2019 Leiterin, Forschungsgruppe für Infektionsepidemiologie und globale Gesundheit, Universität Freiburg
- seit 2017 Mitglied, Steering Committee, zuständig für Epidemiologie, Tuberculosis Network European Trialsgroup (TBnet)

HELMHOLTZ KLIMA
Dialog-Plattform

Expertise

Prof. Dr. Fabian Leendertz

Helmholtz-Zentrum für Infektionsforschung (HZI)

Expertise

- Zoonosen, zoonotische Infektionskrankheiten, Reservoire und Übertragung u.a. von Ebola, Mpox, Lepra und respiratorischen Erkrankungen
- Seuchenökologie, Epidemien, Pandemien, Coronavirus-Pandemie, Covid-19
- One Health-Ansatz, Zusammenspiel Mensch-Tier-Umwelt, Umweltfaktoren
- Prävention von Epidemien und Pandemien, Frühwarnsysteme, Gesundheits-Monitoring

Profil

Prof. Dr. Fabian Leendertz ist Gründungsdirektor des Helmholtz-Instituts für One Health (HIOH) in Greifswald. Das One Health-Konzept sieht die Gesundheit von Menschen, Tieren und Umwelt als ein großes Ganzes. Die Wissenschaftler:innen am HIOH erforschen grundlegende Mechanismen der Entstehung und Übertragung von Infektionskrankheiten. Drei Hauptforschungsbereiche stehen im Mittelpunkt: Ökologie und Entstehung von Zoonosen, Evolution von Krankheitserregern sowie Epidemiologie und Ökologie von Antibiotikaresistenzen.

Die Wissenschaftler:innen erforschen die Übertragung von Infektionserregern und mikrobiellen Resistenzen an der Schnittstelle zwischen Mensch, Tier und Umwelt und untersuchen dazu sowohl aktuelle als auch historische Proben. Daraus können sie gezielte Vorhersagen zur zukünftigen Verbreitung potentiell gefährlicher Erreger ableiten und so einen wichtigen Beitrag zur öffentlichen Gesundheit leisten.

Forschungsschwerpunkt von Fabian Leendertz sind Zoonosen. Er erforscht, unter welchen Bedingungen Krankheitserreger vom Tier auf den Menschen überspringen und wie das verhindert werden kann. Seine One Health-Forschung spielt eine zentrale Rolle bei der Prävention von Epidemien und Pandemien, denn viele dieser Krankheiten, darunter Ebola, SARS, MERS und COVID-19, sind zoonotischen Ursprungs.

2014 leitete Fabian Leendertz die Untersuchung zum Ursprung der Ebola-Epidemie in Westafrika und fand Hinweise, dass Fledermäuse als Reservoir für das Virus dienen könnten. Als Mitglied der WHO-Expertengruppe zur COVID-19-Pandemie erforschte er den möglichen Ursprung von SARS-CoV-2. Er berät Entscheidungsträger zur Bedeutung des Schutzes von Wildtieren und Ökosystemen, um das Überspringen von Bakterien und Viren auf den Menschen zu verhindern.

Als Gründungsdirektor hat er das Forschungskonzept des HIOH erarbeitet. Zentrales Leitmotiv ist eine interdisziplinäre, systemische und lösungsorientierte Forschung. Vor allem durch den One Health-Ansatz trägt seine Arbeit dazu bei, Frühwarnsysteme für neue Krankheitserreger zu entwickeln und Risikoquellen frühzeitig zu identifizieren, um zukünftige Pandemien zu verhindern.

Curriculum

- seit 2021 Gründungsdirektor des Helmholtz-Instituts für One Health (HIOH) in Greifswald und Leiter der Abteilung „Ökologie und Entstehung von Zoonosen"
- seit 2021 Professor für One Health, Universität Greifswald
- 2016 Habilitation in Mikrobiologie, Freie Universität (FU) Berlin
- 2012 - 2021 Leiter, Projektgruppe Epidemiologie hochpathogener Mikroorganismen, Robert Koch-Institut, Berlin
- 2011 Fachtierarzt für Mikrobiologie (FM)
- 2007 - 2012 Leiter, Nachwuchsgruppe „Emerging Zoonoses", Robert-Koch-Institut, Berlin
- 2005 - 2007 Postdoktorand, Gruppenleiter Primatenkrankheiten, Max-Planck-Institut für evolutionäre Anthropologie, Leipzig
- 2005 Doktor der Veterinärmedizin (DVM), FU Berlin
- 1996 - 2000 Studium der Veterinärmedizin, FU Berlin
- 1995 - 1996 Studium der Veterinärmedizin, Universität Budapest

Auszeichnungen (Auswahl)

- 2025 Korrespondierendes internationales Mitglied, Académie Nationale de Médecine, Paris
- 2023 Hamburger Wissenschaftspreis, Akademie der Wissenschaften Hamburg
- 2020 UN Champions of the Earth Award, Kategorie "Wissenschaft und Innovation"
- 2016 Außerordentliches internationales Mitglied, Académie Vétérinaire de France
- 2014 Förderpreis für Zoonose-Forschung, Akademie für Tiergesundheit
- 2006 Eugen Grimminger Preis für Zoonosenforschung, Grimmingerstiftung
- 2005 Nachwuchsförderpreis, Ursula und Heinz-Klös-Stiftung, Deutsche Veterinärmedizinische Gesellschaft

Gremien und Mitarbeit (Auswahl)

- Seit 2024 Mitglied der SAPEA (Science Advice for Policy by European Academies) Arbeitsgruppe zu One Health governance in der EU
- Seit 2023 Mitglied im Expertenpool zum Thema Pandemic Preparedness des Bundesministeriums für Bildung und Forschung (BMBF)
- Seit 2023 Standortleitung des Geschäftsstellenstandortes Greifswald der One Health Platform (ehemals Nationale Forschungsplattform für Zoonosen)
- 2023 Mitglied der STAR-IDAZ & GloPID-R collaborative Working Group on One Health
- 2021 Mitglied der 10-köpfigen WHO-Expertengruppe zur Erforschung des Ursprungs der Covid-19-Pandemie
- Seit 2020 Mitglied im Beirat der One Health-Initiative des Bundesministeriums für Zusammenarbeit und Entwicklung (BMZ), seit 2023 Sprecher der Initiative
- 2017 -2023 Gewähltes Mitglied im Beirat der Nationalen Forschungsplattform für Zoonosen
- seit 2016 Vize-Präsident, NGO „Une santé pour tous", Côte d'Ivoire
- 2014 Leitung der Untersuchung zum Ursprung der Ebola-Epidemie in Westafrika
- seit 2013 Mitglied, Wissenschaftlicher Beirat, Great Apes Survival Partnership (GRASP) des Umweltprogramms der Vereinten Nationen (UNEP)
- seit 2005 Mitglied, Wildlife Health Specialist Group, International Union for Conservation of Nature and Natural Resources (IUCN)

Zur Expert:innen-Datenbank von Helmholtz KLIMA