Beutenberg-Campus Jena e.V.

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Beutenberg Campus Jena

Beutenberg Campus is a science and research site with an excellent reputation both nationally and internationally. It is situated in southern Jena. The campus currently hosts nine research institutes. These include two Leibniz Society institutes, two Max Planck Society institutes, one Fraunhofer Association institute, as well as Friedrich Schiller University institutes. Two start-up centres, the Technology and Innovation Park Jena and the Bioinstrumentation centre, host more than 50 companies. In addition, Wacker Biotech GmbH has recently established biotechnology production facilities on campus.

Beutenberg Campus offers an interdisciplinary knowledge and technology platform for work in innovative research. It is a competence centre for research in terms of the guidelines “Life Science meets Physics”. The areas of biology, natural product chemistry, environmental research and medicine complement the physics of optics, photonics and optical microsystems.

About 3000 people currently work on the Campus, more than 1500 are scientists. German and foreign students pursue their PhDs in association with one of the international research schools and in close cooperation with the Friedrich Schiller University of Jena.

This arrangement ensures excellent working conditions for both scientists and students.

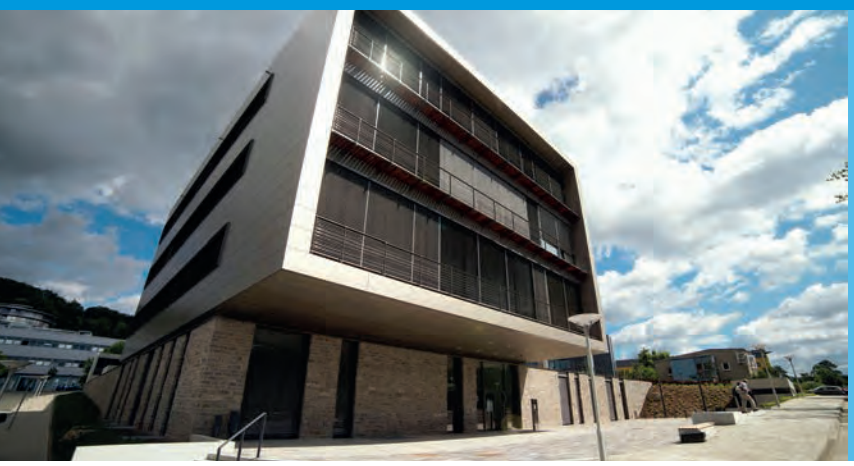
Beutenberg Campus Jena e.V.

In 1998 the Institutes on Campus organised themselves into the Campus Association “Beutenberg Campus Jena e.V.”. This non-profit Campus Association provides a platform for interdisciplinary cooperation, for representing campus activities to the outside world and for developing strategies for “added value” synergies between the members. For example, the Campus Association annually grants its most talented young scientists the Campus Award in Life Science and Physics.
The Association organises scientific talks by internationally renowned scientists, presents campus research activities to the public in an accessible manner and represents the interests of the members in relation to politicians and civil servants.

Abbe Center Beutenberg

Abbe Center of Photonics JENA
Friedrich-Schiller-Universität

Abbe Center of Photonics (ACP) and Abbe School of Photonics (ASP) of the Friedrich Schiller University Jena



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Interdisciplinary research in photonics

ACP is an interfaculty center for optics and photonics research and education, formed by more than 45 principal scientists of the Friedrich Schiller University.

Photonics is interdisciplinary – ACP's principal scientists come from various backgrounds spanning from physics, chemistry, and biology to medicine. In joint research projects, we cover both fundamental and applied topics in the three strategic domains: Ultra Optics, Strong Field Physics, and Biophotonics. International Master and doctoral programs are run by the center's integrated Abbe School of Photonics (ASP). In 2016, ACP was given a new home by a top-notch research building at the Beutenberg.

Ultra Optics

Ultra Optics was originally founded as a Center for Innovation Competence by the German Federal Ministry of Education and Research and addresses the generation and complete control of light in all its properties.

Strong Field Physics

Strong Field Physics is dedicated to the generation of light with extreme properties and at extraordinarily high intensities as well as the interaction of light with matter up to the relativistic domain. Equipped with outstanding facilities such as the POLARIS laser system, ACP scientists gain access to unclaimed science territories, such as ultra-short wavelengths, relativistic field strengths, and laser-driven particle acceleration.

Biophotonics

Biophotonics is a highly multidisciplinary research area, embracing a multitude of light-based technologies to develop optical solutions for the life and environmental sciences. Covering numerous aspects of applied photonics research, ACP enables strong synergies between medicine, the natural sciences, and engineering.

Abbe School of Photonics

Besides ACP's research efforts, the education of young research scientists, represented by its integrated Abbe School of Photonics (ASP), exhibits its fourth profile cornerstone which cross-connects all research areas. ASP offers an internationalized higher education photonics program on the Master's degree and doctoral (PhD) level.

Spatially resolved spectroscopy of a nanostructured material in one of the laboratories of the Abbe Center of Photonics. Photo: FSU/Kasper.

Center for Molecular Biomedicine Friedrich Schiller University of Jena

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The Center for Molecular Biomedicine (CMB) is an interfaculty association of institutes of the School of Medicine and the School of Biology and Pharmacy. This alliance strengthens the interdisciplinary research in the area of Biomedicine at the University of Jena.

Besides internal cooperation the research groups collaborate with institutes and clinics of both faculties as well as with institutes and companies located at the Beutenberg Campus. Joint initiatives on applied research are amongst others related to drug development and molecular diagnostics. Moreover, the centre develops interdisciplinary teaching concepts for molecular and cellular biomedicine.

The CMB comprises the Institute for Molecular Cell Biology and the Institute for Biochemistry and Biophysics, which includes the Department of Biochemistry, the Department of Biophysics, and the Laboratory of Cell Biology.

Molecular Cell Biology

The regulatory functions of selected signalling proteins in the nervous system, in the vascular system, and in tumours are core topics.
The results help to advance therapeutic strategies for inflammatory, neurodegenerative, and oncological diseases.

Biophysics

Research focuses on function and regulation of ion channels, which are essential for electrical signal processing in the body. The department studies defects in ion channel genes and contributes to the development of novel pharmaceuticals targeting ion channels, such as drugs for pain therapy.

Biochemistry

Gene regulation, signal transduction, photo-biophysics, and peptide chemistry are the central topics. Research focuses on factors involved in cell proliferation, cell death, and tumour development.

Cell Biology

Central topic is the modification of antibody-encoding genes via somatic hypermutation. This process contributes to fine-tuning of the antibodies and hence efficient defence against pathogens, but may also contribute to the development of lymphoma.

Leibniz Institute on Aging
Fritz Lipmann Institute (FLI)

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The Leibniz Institute on Aging – Fritz Lipmann Institute (FLI) is the first national research institute in Germany focusing on biomedical research on human aging.

The main aim of research at the FLI is to delineate how aging leads to the development of tissue dysfunction and diseases in the elderly. The main focus is to determine the influence of aging on adult stem cells and tissue maintenance which represent the main problems in aging. The FLI is the only institute in Germany dedicated to this question. It is the institute's vision to create a knowledge basis for the future development of new therapies designed to improve organ maintenance and health during aging.

Program area "Stem Cell Aging and Organ Maintenance"

Due to the diminishing regenerative capacity of aging stem cells, organ maintenance and regenerative capacity decrease in old age. This leads to impairments in organ function and to an increased risk of disease development. The FLI investigates the molecular causes for these aging-associated declines. The overall goal is to uncover new approaches for therapies aiming to preserve the functioning of the body's own stem cells and organs thereby reducing the risk of diseases and cancer during aging.

Program area "Accumulation of Molecular Damages and (Epi)Genetics of Aging"

A central phenomenon of cell and tissue aging is the accumulation of molecular damages in the DNA. The FLI focuses on the origin of the aging-induced increase in molecular damages and how this contributes to impairments in stem cell function and the evolution of diseases like cancer during aging. Interspecies comparison and the introduction of specific genetic changes in short- and long-lived model organisms are used to delineate genetic factors influencing the aging process as well as sequence variants and genes that determine the individual predispositions toward healthy aging or the development of age-related diseases in people.

Staff: more than 330 (2016)
Budget: 31.2 Mio € (2016)
External funding: 4.0 Mio € (2016)

Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute –

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Natural products – Mediators of biological communication

Research at the Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute (HKI) – combines the study of novel microbial natural products with infection biology of human pathogenic fungi. The results enable the development of systems biology of infection and lead to novel concepts in diagnosis and therapy.

Natural products are essential mediators of biological communication. Not only are they involved in the development of many infectious diseases, they also provide one of the most important sources for drugs, in particular antibiotics.

At the Hans Knöll Institute, natural product research and infection biology are tightly linked. On one hand, we aim to find out how microorganisms can produce substances that cause diseases, and on the other hand make pharmacologically relevant compounds. We are interested in the communication between microorganisms such as bacteria and fungi, as well as the interaction of pathogenic microorganisms – especially fungi – with their host. Novel microbial natural products are tested for their activity against fungal pathogens and structurally modified. Furthermore, we investigate strategies that are employed by microorganisms to overcome the host immune system.

All these studies pave the way for future development of novel diagnostic and intervention strategies. This is particularly important due to the increase in antibiotic resistant microorganisms. With our application-oriented fundamental research we would like to advance the development of new natural product-based therapeutics.

The HKI is initiator and core partner of large collaborative research projects such as the excellence graduate school Jena School for Microbial Communication, several Collaborative Research Centres, the Centre for Innovation Competence Septomics and InfectControl 2020 in the federally funded programme Zwanzig20. Furthermore, the HKI is home to the Jena Microbial Resource Collection and the National Reference Centre for Invasive Fungal Infections.

Platform technologies

- ✔ Bio pilot plant for cultivation and downstream processing of microorganisms with up to 3000 litre culture volume
- ✔ Proteomics lab with mass spectrometric fragment analysis
- ✔ *In vivo* infection models
- ✔ PET/CT for dynamic infection studies with reduced need for laboratory animals
- ✔ Molecular interaction studies based on surface plasmon resonance spectroscopy
- ✔ Systems biological approaches and modelling of large data sets

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Photonics for Life - From Ideas to Instruments

The Leibniz Institute of Photonic Technology (IPHT) researches photonic processes and systems of the highest sensitivity, efficiency, and resolution. In keeping with its "Photonics for Life" motto, IPHT develops custom solutions to problems in the fields of medicine and the life and environmental sciences that are based on this research.

The Science Council certified the IPHT an excellent research performance with national and international importance. Based on this evaluation, the institute was incorporated into the Leibniz Association in 2014. The IPHT is funded jointly by the Land of Thuringia and the federal government.

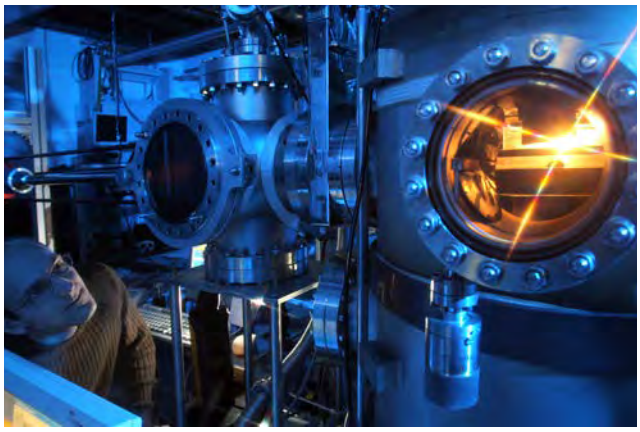
IPHT has gained strong partners in science and industry on regional, national and international level through its close association with research and education as well as the successful integration in efficient networks.

About 330 employees are currently working at IPHT.

Research Focuses

The internal research focus biophotonics links all research activities at IPHT. Together with the research focuses of fiber optics and photonic detection, new photonic methods can be transferred to innovative, application-oriented systems in line with the motto "From Ideas to Instruments."

IPHT rely on its unique technological position in the fields of micro and nanotechnology, as well as fiber technology and optical system technology. With its method and process research activities, IPHT makes significant contributions to sociopolitically relevant areas.



Institute of Applied Physics
Friedrich-Schiller-Universität Jena

Friedrich Schiller University Jena
Institute of Applied Physics

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Institute of Applied Physics, Friedrich Schiller University Jena

The Institute of Applied Physics practices basic and applied research in the fields of optical system design, micro- and nano-optics, fiber and waveguide optics and ultrafast optics. Collaborative projects with companies ensure practical relevance and feasibility.

Current research topics concern function, design and production of various micro- and nano-optical elements. Those include for instance resonant grating structures, metallic and dielectric polarizers and effective media to reduce reflection of surfaces. Also light propagation and nonlinear light-matter interaction in micro- and nano-structures, optical meta materials and photonic crystals are fundamentally examined. Further research fields are application of femtosecond laser pulses, e.g. for material processing and micro- and nano-structuring, development of new concepts for solid-state lasers such as ultrafast fiber lasers based on large mode area fibers, coherent addition of multiple emissions as well as pulse shaping. Within an endowed professorship, the design of optical systems including method development – currently in particular based on freeforms – is being expedite.

For the treatment of such complex tasks, the Institute has access to innovative technologies and excellent facilities (clean room with electron beam, photo and laser lithography, coating techniques, equipment for the reactive ion and ion beam etching as well as high resolution cross beam for nano-processing and analysis, etc.), whose further development is being driven constantly forward.

With these skills and by cooperating institutions (strong connection to the Fraunhofer IOF) and companies the IAP covers far parts of the innovation chain - from interdisciplinary basic research to the presentation of prototypes. This expertise offers remarkable contributions to solving issues in emerging fields like energy, environment, health and communication.

Excellence in research confirm European research projects (two ERC Grants) as a driver of innovation in the interdisciplinary research field of laser physics and nano-optics; as well as the establishment of the Competence Center ultra optics into the Abbe Center of Photonics (ACP).

An essential part of the concept is the training of young scientists at the interface of physics, chemistry and material science. For this purpose interdisciplinary international master and graduation programs have been integrated into the Abbe School of Photonics (ASP).

Fraunhofer IOF

Fraunhofer Institute for Applied Optics and Precision Engineering IOF

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Solutions with light – overcome challenges and offer opportunities

The Fraunhofer IOF conducts applied research in the field of photonics and develops innovative optical systems to control light - from the generation and manipulation to its application. The services offered by the Institute cover the entire photonic process chain from optomechanical and optoelectronical system design to manufacturing of custom-specific solutions and prototypes. Current focuses of our research activities include freeform technologies, micro- and nanotechnologies, fiber laser systems and optical technologies for human-machine interaction.

The core competencies of the Institute include:

- ✔ Design and Simulation
- ✔ Micro and Nano-Structuring
- ✔ Optics and Photonics Materials
- ✔ Coating and Surface Functionalization
- ✔ Diamond-Based Ultra-Precision Processing
- ✔ Materials Processing Using Ultrashort Laser Pulses
- ✔ Micro-Assembly and System Integration
- ✔ Laser Development and Non-Linear Optics
- ✔ Measurement Methods and Characterization

The further development in photonics is characterized by intelligent system solutions. The increasing fusion with semiconductor technology does not only lead to a further development of the photonic products, but especially to an intelligent networking and system integration.

The Fraunhofer IOF develops new optical solutions for the markets production, information, health, mobility, and aerospace. The high level of networking - especially with partners from Thuringia - contributes decisively to the regional development.

Metrology of a mirror module having two freeform surfaces and reference structures with a computer generated hologram.

Max Planck Institute for Biogeochemistry

MAX PLANCK SOCIETY

Max Planck Institute for Biogeochemistry

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Biogeochemical Interactions in the Earth System

Founded in 1997, the Max Planck Institute for Biogeochemistry is dedicated to the study of global element cycles; in particular how the biological, chemical and physical processes that exchange elements between atmosphere, land and ocean interact with changes in climate, land use and biodiversity.

Elements such as carbon, oxygen, hydrogen, nitrogen and phosphorus are essential for life on Earth. These elements undergo continuous biological, chemical and physical transformations as they move through the Earth system. Bound in varying chemical combinations, they are released, converted, transported, and distributed throughout the Earth's 'spheres' – the biosphere, the atmosphere, hydrosphere and, on long time scales, the geosphere. Such „global biogeochemical cycles" are extremely complex, and their regulation mechanisms are far from being understood.

Human activity is increasingly altering global biogeochemical cycles, as can be seen in the changing composition of the atmosphere and in the ecosystems that make up the land surface. These alterations both influence and react to climatic changes in ways that we cannot yet predict.

Researchers at the institute address such fundamental questions as "What processes control the flow of energy and matter between the different components of the Earth system?" "How can the complex dynamics of the biogeochemical cycles and their interactions with climate be represented by comprehensive theoretical and numerical models?" "Which regions and components of the Earth system are particularly sensitive to climate change and human impacts?"

Scientists approach these questions using a variety of approaches, including field and laboratory experiments, remote sensing and modeling, and developing methods for precise measurement of important atmospheric trace gases.

The research is highly interdisciplinary: biologists, physicists, meteorologists, geologists, chemists, computer specialists, and mathematicians work closely together in projects at regional, national and international scales.
The scientists groups are supported by central service facilities providing state-of-the-art analytical and technical support as well as computing services.

Max Planck Institute for Chemical Ecology

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Chemical Ecology, a young research discipline, is devoted to the study of …

… the role of chemical signals that mediate the interactions between living organisms and their environment. The overarching goal of the research is to gain new insights into the growth, development, behavior, reproduction, co-evolution, and diversity of the different life forms.

Basic ecological research on plants, insects and microbes

Toxins, feeding deterrents, slippery leaf surfaces: Even if these chemical defense mechanisms in plants are effective, they do not provide permanent protection against pests. Often, herbivores and pathogens arise that are resistant to these chemical agents. The fact that plants produce defense substances to attract the enemies of their enemies is one of the research topics in the institute. Predatory insects or carnivorous nematodes summoned for help can fend off herbivores; this communication is mediated by volatile substances released aboveground by the leaves, or belowground by the roots.

During evolution, insects have evolved mechanisms to avoid, detoxify, or excrete these compounds, or even to sequester and modify them for their own uses. Therefore, entomologists and insect physiologists study the genetics, the adaptive mechanisms, and the behavior of herbivores trying to overcome plant defenses in order to ensure nutrition and reproduction. Of special interest is the olfactory system of insects: How do insects perceive the odor vocabulary of plants and other insects and how does the perception of smells influence their behavior - when they search for food, sexual mates or the ideal place for laying their eggs?

Two flea beetles (Phyllotreta striolata) on a Brassica rapa leaf showing the typical feeding pattern. Male beetles produce a so-called aggregation pheromone (here the sesquiterpene (6R,7S)-Himachala-9,11-diene) to attract conspecifics. This causes a mass attack on the host plants.
Photo: Anna Schroll

What we provide

About 160 scientists are working in the institute. Their expertise is manifold: Methods in genetics, molecular biology, protein chemistry, ecology, analytics, synthesis and metabolic profiling are represented in the institute as well as neurobiology and behavioral studies. The institute has greenhouses, climate chambers, insect breeding facilities, odor detection systems, wind tunnels for behavioral assays, state-of-the art analytic facilities, and field stations.

Max-Planck-Institut
für Menschheitsgeschichte
Max Planck Institute
for the Science of Human History

Max Planck Institute for the Science of Human History


Source: Christoph Worsch/DAAD

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The Max Planck Institute for the Science of Human History (MPI-SHH) in Jena was founded in 2014 to target fundamental questions of human history and evolution since the Paleolithic.

From the vantage point of three interdisciplinary research departments – the Department of Archaeogenetics (Dir. Johannes Krause), the Department of Archaeology (Dir. Nicole Boivin), and the Department of Cultural and Linguistic Evolution (Dir. Russell Gray) – the MPI-SHH pursues an integrative approach to the study of human history that bridges the traditional divide between the natural sciences and the humanities. By assembling experts from research areas as diverse as palaeogenetics, proteomics, bioinformatics, anthropology, archaeology, history, and quantitative linguistics, the MPI-SHH seeks to join and advance a broad range of methods, approaches, and datasets to explore big questions of the human past.

Using state-of-the-art analytical techniques and technologies, the MPI-SHH tackles these and other topics:

- the settlement history of the world through past human migrations and genetic admixture events
- the spread and diversification of infectious diseases
- the impact of climatic and environmental change on human subsistence in different world regions
- human modification of ecosystems
- the rise of early forms of global trade systems and complex societies
- the spread and diversification of languages, cultures, and social practices
- the rise of agriculture
- the co-evolution of genes and culture

At the Pharmapark site, the institute has high-performance, technologically advanced laboratories for the extraction, reconstruction and analysis of aDNA and ancient proteins from thousands of years-old human remains such as bones or teeth. In addition, the laboratories contain state-of-the-art equipment for the investigation of archaeological findings using mass spectrometry.

Several research projects and independent junior research groups supported by the European Research Council, as well as an international research center with Harvard University, are located at the institute. An International Max Planck Research School in cooperation with FSU Jena is currently being developed.

The institute's campus is located at Kahlaische Straße 10. Beginning in mid-2018, substantial extensions and conversion measures are planned for the campus, including the construction of a new laboratory building.

Technology and
Innovation Park Jena

Space for ideas
Welcome to our incubator

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Jena is home to several incubators, the Technology and Innovation Park, the Bioinstrumentation Centre and the Innovation and Founders' Laboratory for New Materials and Processes.

The Technology and Innovation Park Jena present itself as ideal established incubator for start ups in the technology region of Jena. Since 1991 we have supported founders of new businesses and young entrepreneurs. We offer a dynamic environment and outstanding basic conditions for the starting and stabilization phase of technology oriented enterprises. It is our aim to implement business ideas from the early research through the pilot product development right up to the product launch.

We promote young enterprises especially in the fields of:

✔ Nano and microsystem technology
✔ Sensor technology and optics
✔ Automation technology
✔ Communication and software development
✔ Medical and environmental technology

Their ideas and corporate profiles include the automated manufacture of aspherical lenses, the microfabrication of superconductive sensors, the development of hardware and software systems for virtual factories, miniaturised technological solutions for chemical analysis, optical measurement technology and new medical engineering solutions for the production of patient-specific implants.

The proximity to the Friedrich Schiller University and the University of Applied Sciences, as well as to the many research institutes on the Jena science campus, provide the perfect preconditions for close cooperation between the region's scientific and industrial potential.

Founder's spirit creates economic power

Having benefited from a successful start-up phase in the Technology and Innovation Park, more than 70 enterprises decided to settle in Jena. These companies created more than 750 qualified jobs – an essential and sustainable contribution to the development of industrial clusters in Jena.

Our minds set on regional business development, we are consequently pursuing our objective of strengthening the exemplary innovation system established in Jena. Furthermore, we strive to remain the driving force for the development and expansion of competence networks as well as for the opening-up of new innovation potentials for founders and young enterprises.

With our competence network SpectroNet - a network of specialists for visual quality assurance with digital, colour and spectral imaging in research and industry, food and health care, environmental protection and administration - we offer knowledge transfer in real time and collaboration on demand. Our network partners solve complex quality problems conveniently, reliably and affordably.

Jena
University Hospital

Department of Virology and Antiviral Therapy Jena University Hospital

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The Departement of Virology and Antiviral Therapy at the Jena University Hospital of the Friedrich Schiller University Jena was founded in 2003. The tasks of the institute are focused on virological research, student teaching, and specific diagnostics.

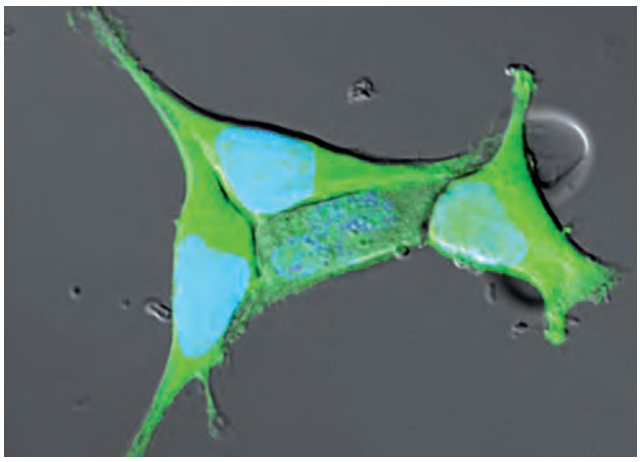
The scientific profile of the institute includes the exploration of different herpes-, influenza-, and picornaviruses.

Recent research projects − like e.g. the epidemiology of new influenza virus variants, the genotyping of Varicella Zoster Virus isolates, the monitoring of vaccine-associated chickenpox infections, the development and characterization of new antiviral compounds under *in vitro* and *in vivo* conditions, the improvement of DNA-vaccines against influenza virus infections, studies about the development of resistance against certain antiviral drugs as well as experiments to study the pathology and therapy of enterovirus-induced heart disease − are based on molecular, structural and cellular methods, which are investigated in close cooperation with national and international partners.

Student teaching activities include numerous lectures in the field of medicine, dentistry, biology, and biochemistry including seminars and practical courses about specific virological methods.

Constantly, a great number of under-graduate and graduate students are involved in all scientific activities of the institute.
A special molecular and serological virus diagnostic involves the analysis of patient samples.

Thereby, information about possible viral infections and necessary therapeutic procedures can be obtained.
The diagnostic spectrum includes many important viral pathogens. Moreover, the National Reference Center of α-herpes viruses offers an extensive analysis concerning special diagnostic, therapy, and prophylaxis of Herpes Simplex Virus- and Varicella Zoster Virus-infections.



Characterization of EGFP/VP2H310A1 expression by confocal laser scanning microscopy.

WACKER

Wacker Biotech GmbH

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Wacker Biotech GmbH is a full-service contract manufacturer of biopharmaceuticals in microbial systems. Along with its long track record in bioprocesses, Wacker Biotech also offers cutting-edge proprietary technologies like ESETEC® for the efficient and cost-effective production of therapeutic proteins.

Wacker Biotech's integrated service portfolio covers molecular biology, process and analytical development, and the GMP-compliant manufacturing of biologics for clinical trials and commercial supply. The multi-purpose facilities in Jena and Halle hold biomanufacturing certificates from the relevant authorities, and follows the ICH Q7A guidelines for GMP-compliant production of biologics. Since 2012, the facility in Halle is EMA-approved/ FDA-inspected for the commercial production of Reteplase (trade names Rapilysin®, Retavase®), a thrombolytic drug that is indicated to treat acute myocardial infarction. Very recently, the Jena plant received EMA-approval for manufacturing of the approved product Spectrila®, a recombinant L-asparaginase for treatment of childhood leukemia.

Proprietary Technologies

Wacker Biotech has developed and patented the ESETEC® expression and secretion system, which is based on an *Escherichia coli* bacterial strain that has the ability to transfer proteins in native conformation across the outer cell membrane into the culture medium. With ESETEC®, the recovery and purification of biologically active proteins during the production process is significantly easier and more effective than with conventional microbial systems. The ESETEC® secretion technology is ideally suited for the production of antibody fragments and scaffold proteins.
The combination of WACKER's ESETEC® secretion system and FOLDTEC® using rational experimental design in combination with a proprietary expression vector portfolio, WACKER provides solutions for complex and challenging in-vitro folding processes. Better folding efficiencies and smaller folding volumes render fully scalable manufacturing processes with superior productivity.

Our Expertise

Wacker Biotech's experience with therapeutic proteins dates back to the 1980s. Biopharmaceuticals have been developed and produced since 1999.
Back then, Wacker Biotech GmbH – formerly known as ProThera GmbH – was established as a spin-off from the state-owned Hans Knoell Institute in Jena. The company has been a wholly-owned subsidiary of Wacker Chemie AG since January 2005. WACKER has been working with industrial biotechnology processes for over 20 years, and has provided contract chemical synthesis services to the pharmaceutical industry for several decades.

SEPTOMICS

Center for Innovation Competence (ZIK) Septomics

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The Center for Innovation Competence (ZIK) Septomics is a cross-faculty research center of the Friedrich Schiller University Jena, the Jena University Hospital and the Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute. The ZIK combines interdisciplinary research in infection biology with clinical and translational sepsis infection research. Using this approach, we aim to overcome persistent stagnation in the field of sepsis diagnosis and therapy based on improved molecular understanding.

Four research groups, including two junior research groups funded by the German Ministry for Education and Science, complete Septomics:

Fungal Septomics (head: Prof. Dr. Oliver Kurzai) focuses on infection biology of systemic fungal infections, analyzing both variability of the pathogen and activation of the human immune response. The group has established infection models for many pathogenic fungi and hosts the German National Reference Center for Invasive Fungal Infections.

Host Septomics (head: Prof. Dr. Hortense Slevogt) focuses on the host response during severe infections and sepsis. To analyze host as well as the pathogen profiles, Host Septomics uses functional genomics, proteomics and the latest molecular- and cell biological techniques. With this the group defines the transcriptome and proteome patterns from healthy and infected cells and tissues in a systematic manner.

Host Fungal Interfaces (head: Dr. Slavena Vylkova) focuses on the pathogenesis of the yeast *Candida albicans*. The group aims to identify factors that are involved in the transformation of a harmless colonizer of the human into an aggressive pathogen. This includes biofilms caused by *C. albicans*, which are largely resistant to antifungals and lead to a variety of systemic infections.

Translational Septomics (head: Dr. Dr. Sina Coldewey) analyzes systemic and molecular mechanisms and the clinical significance of organ dysfunctions in an acute sepsis and sepsis survivors. This group bridges basic science and clinical studies and is focused on failure of the cardiovascular system and the function of signal lipids and metabolites.