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# Foreword

The interaction of health and environment is the grand challenge Helmholtz Zentrum München is addressing. Genetic makeup and environmental factors including diet, lifestyle and stress are key factors in the development of major common diseases and constitute the starting points for research at Helmholtz Zentrum München. We investigate the biological mechanisms that determine health and disease and analyze their interactions with internal and external influences. Our aim is to build on the results of our interdisciplinary basic research and to develop new therapy options for the benefit of patients.

Our research activities are focused on diabetes and metabolic syndrome, allergies and lung diseases. Over the last years we have systematically expanded our scientific capacities in these areas and have attained a leading position both nationally and internationally. In the area of diabetes we have thus become Germany's biggest diabetes research site.

From this position we are seeking to attract the world's best scientists, and we are setting standards in the promotion of the young generation of researchers. Scientific excellence and exemplary training are reflected in the top rankings for publication performance and grant acquisition. We bring our expertise to bear in international collaborations and national associations. Helmholtz Zentrum München is the only center of the Helmholtz Association to participate in all six German Centres for Health Research, which were founded to strengthen the translation of research results into clinical applications. With the founding of the Helmholtz Pioneer Campus for Innovative Biomedicine, we are taking a com-

pletely new approach. Top international scientists from biology, medicine, physics and the engineering sciences will work across disciplines on the most important biomedical challenges of our time. Out of this collaboration – in a creative research atmosphere – a crystallization point for scientific excellence is emerging beyond traditional academic hierarchies. Helmholtz Zentrum München is delivering a measurable societal impact on human health. Our research aims to directly or indirectly improve quality of life for the entire population.

Through its large epidemiological studies like KORA and its involvement in the NAKO-Health Study (German National Cohort) our Center cooperates with many citizens and provides multifaceted benefit to study participants. The Fr1da study for the early detection of type 1 diabetes in young children currently including more than 70 000 Bavarian children was able to prevent life-threatening complications at the onset of the disease. An ambitious goal is to eliminate new cases of type 1 diabetes. Therefore, our Center leads an international clinical vaccination study running until 2025 with significant funding by the Helmsley Charitable Trust.

We meet the demand for scientifically sound information on health and environment related topics with a broad range of services. The well-established online information services on diabetes and on lung diseases only recently got replenished by the new allergy information service.

In this brochure, we present our scientific mission and strategic orientation. For more information on research goals and achievements turn your browser to [www.helmholtz-muenchen.de](http://www.helmholtz-muenchen.de)

# 01 RESEARCH

**Advancement** of science  
for the **benefit** of society

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**1400** publications  
annually

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open  
access **50%**

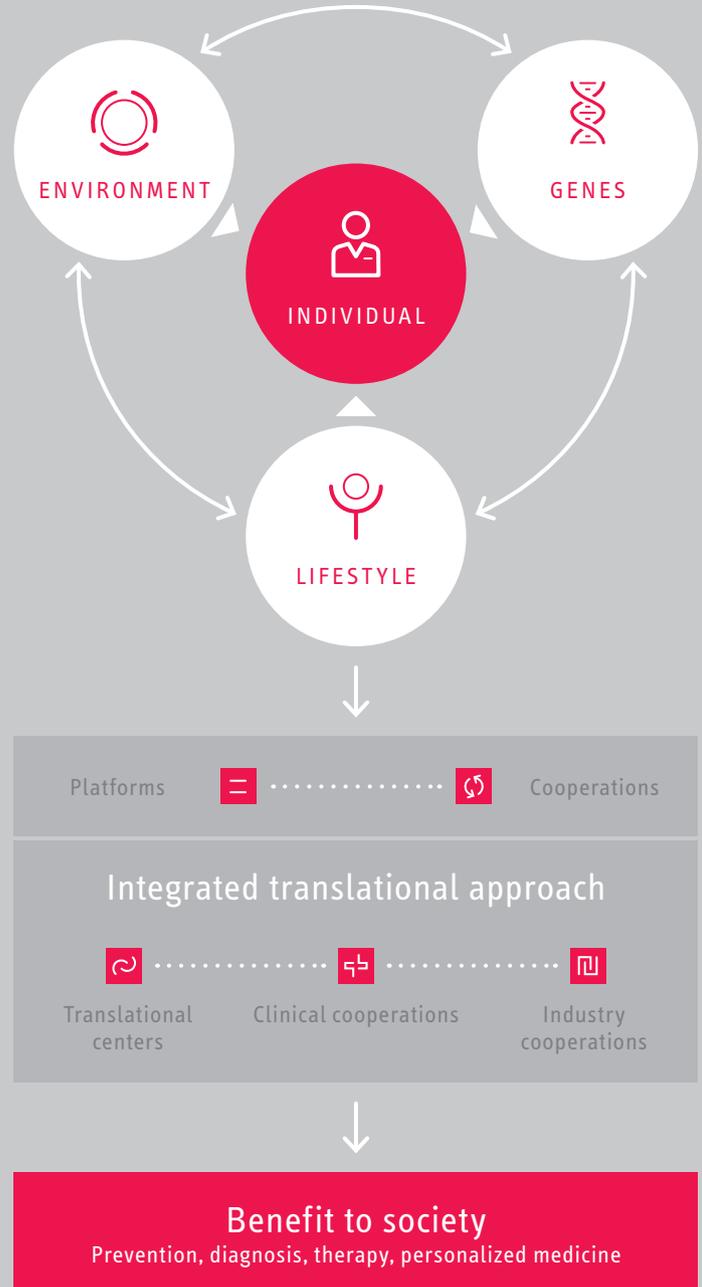
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# Helmholtz Zentrum München

Helmholtz Zentrum München studies the pathogenesis of major common diseases, placing special emphasis on diabetes mellitus, allergies and lung diseases. The focus of research is on the interaction between environmental and lifestyle factors and individual genetic makeup during disease development. Through this research to uncover the mechanisms underlying disease, the Center also contributes significantly to a better understanding of other common diseases such as immunological and neuropsychiatric diseases and cancer.

With its excellent basic research programs and top-level scientific and technical infrastructure, the Center develops innovative approaches to personalized diagnostics, therapy and prevention. International cooperative projects and the active promotion of young scientists make the Center an attractive employer. The collaboration with outstanding partners in research institutions, hospitals and industry enables the bidirectional translation of new insights from basic research to clinical practice and from clinical observations back again to the research laboratory. Through translational research centers, clinical cooperations and collaborations with industry, advances in knowledge bring about rapid benefits to society. The goal is to develop an approach to medicine that addresses the cause of disease and thus prevents, cures or alleviates disease.

Excellent Science  
with a focus on diabetes, allergies and lung diseases



# Performance

The research results of Helmholtz Zentrum München are published and cited in renowned international journals. 1448 peer-reviewed papers have been published in 2017, with almost 200 appearing in high-ranking journals with impact factors higher 10. Bibliographic data and abstracts of all publications can be publicly assessed and researched via the Helmholtz Zentrum München website. Of the 2016 and 2017 publications nearly 50 percent are open access. Center scientists attain top rankings in their specialty areas and are awarded prestigious scientific and clinical research prizes. In recent years Center scientists have received two Gottfried Wilhelm Leibniz Prizes of the German Research Foundation, three Erwin Schrödinger Prizes conferred by the Donors' Association for the Promotion of Sciences and Humanities in Germany, one Alexander von Humboldt professorship, four m<sup>4</sup> awards of the Munich elite cluster and the Roger de Spoelberch Prize 2016. Seven scientists have been elected members of the German National Academy of Sciences Leopoldina.

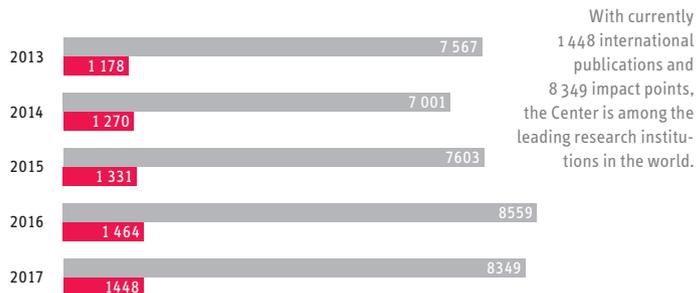
To implement and optimize innovative projects, the Center has been successful in acquiring third-party funding. With 12 starting grants, five consolidator grants and three advanced grants of the European Research Council (ERC), it is the leader in the Helmholtz Association. In addition, another three starting grants and two consolidator grants have been gained by recruitment of highly talented scientists, one advanced grant has been acquired jointly.

The Center engages in an active dialogue with the general public. With the online information services for diabetes, allergy and lung diseases, it places its expertise at the service of the public. With the Helmholtz Graduate School Environmental Health (HELENA) together with the Munich universities and the Postdoctoral Fellowship Program (PFP), the Center sets standards in the promotion of the young generation of scientists. Under rooftop at HELENA, four research schools in the areas of diabetes, epigenetics, radiation sciences and lung biology have been set up. Another two topic-specific research schools are becoming established in the area of epigenetics and data science. Of 22 junior research groups established at the Center, ten are headed by international scientists.

The prioritization of translational research and technology transfer leads to rapid benefits to society. Various established diagnosis and therapy procedures for the treatment of leukemia, bone cancer, cancer complications, lung diseases and diabetes in children are based on research carried out at Helmholtz Zentrum München.

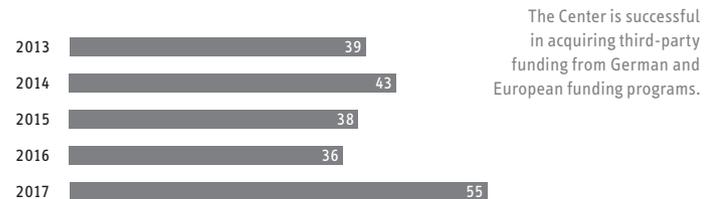
## Milestones of our publication performance

● Sum of the impact factors ● Number of publications



## Successful grant acquisition

Acquired grants in millions of euros



# Research at a Glance

As German Research Center for Environmental Health, Helmholtz Zentrum München pursues the goal of developing precision medical approaches for the prevention and therapy of major common diseases such as diabetes mellitus, allergies and lung diseases. To achieve this, it investigates the interaction of genetics, environmental factors and lifestyle.

One ultimate goal is to significantly decrease diabetes-related mortality. Research at the Center aims at novel precision medicines to prevent, treat and cure all types of diabetes. Several drug candidates for treatment of type 2 diabetes are currently in various stages of preclinical development and clinical trials. In the area of type 1 diabetes, the Center leads an international clinical vaccination study running until 2025 with the ambitious goal to eliminate new cases of type 1 diabetes.

Institutes at the center join forces to combine epidemiology, genomics and environmental research in humans with large-scale functional genomics in mouse models. Research has resulted in highlight findings, such as the identification of new disease-associated risk factors using large collections of patients and population-based cohorts, the discovery of almost 400 new disease models, and the identification of over 50 novel genes involved in metabolic diseases by systemic phenotype analysis of mutant mouse lines.

The environment is a major factor determining health and disease throughout life-course. Air-born nanoparticles, allergens, viruses and medical radiation can lead to harmful effects. Lung, skin and gut are the first-exposed barrier organs. Observational studies of general populations and patients together with an advanced characterization of environmental exposures have shed light on the complex interplay. Research has led to key findings on air pollution and health outcomes or on the role of microbiome in allergy.

Health of populations and individuals in general depends on natural resources and environmental conditions. Environmental conditions such as pollutants and microbes directly impact human physiology. Research at the Center aims at understanding fundamental molecular and ecological principles related to plant growth and microbiome interaction in soil, plants and humans.

To prevent or ameliorate diseases such as type 1 diabetes and neurodegenerative disorders, stem cell research at Helmholtz Zentrum München is devoted to elucidating stem cell treatment, self-renewal, differentiation and plasticity. It aims to utilize these findings for rescue of cells or replacement therapy. Stem cell research at the Center has generated landmark discoveries documenting the feasibility of neuronal replacement by the fully-adequate integration of transplanted neurons and the unprecedented efficiency in converting scar-forming glia into neurons upon inhibition of ferroptosis as well as novel mechanisms as to how retrotransposons regulate the potency of stem cells.

To meet the requirements of biomedical science research aims to advance technology in the context of individualized precision measurements and information processing. Innovative imaging methods have been brought to the stage of clinical testing. Combining interdisciplinary skill in natural sciences the center brings technology innovation and application to biology and medicine, from unravelling molecular mechanism of disease-linked pathways to translating biological knowledge into novel concepts and solutions for healthcare.

# Highlight Findings

## Epigenetic inheritance of obesity:

Diet-induced obesity and diabetes can be epigenetically inherited to the offspring via both the oocytes and the sperm. Offspring from obese and diabetic mice obtained solely through in vitro fertilization and carried and born by surrogate mothers showed severe obesity and high blood glucose levels. The results moreover provide an explanation for the rapid spread of diabetes worldwide throughout the past fifty years.

## Drug candidates for a new treatment paradigm of diabetes and obesity:

Prevalence of diabetes worldwide is escalating, driven by the obesity pandemic which accounts for more than 90 percent of the metabolic disease. To fight the epidemic the concept of unimolecular polypharmacology has been implemented and translationally developed. It is based on peptides designed to combine the beneficial effects of several key metabolic hormones into a single hormone entity. Dual-agonism at the receptors for GLP-1 and glucagon, synergistically corrects diet-induced obesity, glucose intolerance and leptin resistance in a series of pre-clinical models, has also provided the first promising success in clinical trials. In parallel studies, single molecules with balanced dual-agonism at the receptors for GLP-1 and GIP were created and demonstrated improved glucose as well as lipid metabolism across species.

## Prevention of Type 1 diabetes in children:

Type 1 diabetes is an increasingly frequent chronic disease start often in childhood that results from an immune-mediated destruction of the pancreatic  $\beta$ -cells leading to insulin deficiency. Our goal is to strengthen immune tolerance to the autoantigen insulin very early in the disease process. In a landmark joint publication, we showed how the presence of multiple  $\beta$ -cell autoantibodies defines pre-symptomatic disease. Around 80 percent of children presenting with this biomarker were developing clinical disease within ten years. The identification of a specific immune cell signature within the first year of life that is associated with the later development of  $\beta$ -cell autoantibodies in genetically susceptible infants indicates that the process of type 1 diabetes is pre-preprogrammed and identifiable close to birth. The Pre-POINT Randomized Clinical Trial demonstrated that oral insulin can reach the immune system and provided a rationale for primary prevention with oral insulin, which will be tested with a Phase IIb trial from 2018. The Global Platform for the Prevention of Autoimmune Diabetes coordinated by Helmholtz Center München has attracted 52 million US-dollar funding by the Helmsley Charitable Trust for the trial.

## Genetic component in restless leg syndrome:

Several studies deciphering the genetic architecture of Restless Legs Syndrome (RLS) have shed light on one of the most common neurological disorders, with prevalence increasing to up to ten percent in the elderly population. Starting from the first genome-wide association studies (GWAS), over large-scale targeted sequencing up to the first and to-date largest meta-analysis of GWAS on RLS, strong effects on disease risk were observed for variants in a tail homeobox transcription factor. Further analyses in mouse and man helped to dissect the gene's function and role in RLS. The genetic studies made an impact on the concept of RLS pathophysiology by suggesting that some disposition for the adult-onset, non-degenerative disorder is already set during embryological development of the nervous system, possibly affecting neurogenesis and neural circuit formation.

## Exposure to air pollution increases risk of heart attacks:

Long-term exposure to particulate matter is associated with increased risk of heart attack. This can already be observed at levels of exposure below current limit values. This are the results from evaluating the data of more than 100,000 participants of cohort studies in Finland, Sweden, Denmark, Germany, and Italy participating in the European Study of Cohorts for Air Pollution Effects (ESCAPE). The study supports the demand to lower the current particulate limits.

## How the intestinal microbiota prevents allergies:

The human body is inhabited by billions of symbiotic bacteria, carrying a diversity that is unique to each individual. This microbiota is involved in many physiological processes such as digestion and the defense against pathogens. A loss of bacterial symbionts promotes the development of allergies. This phenomenon has now been elucidated, revealing how the microbiota acts on the balance of the immune system: the presence of microbes specifically induces specific regulatory cells in the intestine which in turn can block immune cells responsible for triggering allergies.

## Deep learning predicts cell types:

An algorithm using deep learning methods is able to predict the development of hematopoietic stem cells in advance. The algorithm classifies light microscopic images and videos of individual cells by comparing these data with past experience from the development of such cells. Using the information on appearance and speed, the software 'memorizes' the corresponding behaviour patterns and then make its prediction. The work of the interdisciplinary cooperation provides important foundations for the Human Cell Atlas and was awarded the Erwin Schrödinger Prize 2017.

## Repetitive elements shape embryonic chromatin landscape:

Retrotransposons are repetitive elements that form almost half of the mammalian genome. Even though they are so common, they have previously been considered to be fairly insignificant. A joint study has shown that retrotransposons play an important role in embryonic development. They contribute to the regulation of chromatin accessibility which in turn is necessary for the correct developmental programme to take place.

## Fragment based screening against sleeping sickness:

A newly developed small molecule selectively kills the pathogen causing sleeping sickness and Chagas disease. Trypanosomes are protozoan parasites responsible for various diseases, particularly in Latin America and Africa. As key proteins to maintain the pathogen's sugar metabolism PEX14 and PEX5 were chosen as potential targets for pharmacological interference. Using nuclear magnetic resonance (NMR) the spatial structure of both proteins was determined. This provided a blueprint to optimize a substance that specifically binds to PEX14, thereby preventing the interaction with PEX5, which eventually kills the parasite.

## Label-free metabolism imaging:

Brown adipose tissue is able to burn energy from carbohydrates and fat, and is thus of great interest for interventions against obesity and diabetes. A new non-invasive method has been developed to measure the activity of brown adipose tissue. By means of multispectral optoacoustic tomography (MSOT) a relationship between the metabolic activation of the tissue and changes in oxygenated and deoxygenated hemoglobin (red blood pigment) could be demonstrated. The method is expected to become a key tool in measuring metabolic parameters in tissue.

# Translational Research

Translational research at Helmholtz Zentrum München makes scientific results available to patients. Scientists of the Center develop in close collaboration with university medicine partners in Munich, Tübingen, Hannover, Dresden and Leipzig new methods of prevention, diagnosis, and therapy. They combine scientific expertise from basic research and innovative technologies with clinical observations and needs.

The focus of the translational research is the development of personalized medicine approaches, especially in the areas of type 1 and type 2 diabetes, allergies, and lung diseases. Preventive and diagnostic biomarkers, diagnostic and therapeutic procedures and medical technology products are being developed for these specific purposes.

The implementation is carried out in three translational centers (diabetes, allergy, lung), clinical cooperation units, clinical cooperation groups and dynamic cooperation projects. Specific funding programs enable the testing of competitively selected, innovative ideas. A structured portfolio management optimizes the value creation process of developmental, preclinical, and clinical projects.

At the national level, the Center is involved in all German Centers for Health Research. It drives the development of molecular systems medicine in the Helmholtz Cross-Program Initiative Personalized Medicine (iMed) and contributes to comprehensive prevention research and new approaches to public health within the framework of the NAKO Healthstudy (German National Cohort).

# Innovation Management

Helmholtz Zentrum München transfers results from basic research into specific innovations. The Center patents its inventions, develops and licenses them for commercialization. Supported by an effective innovation management, findings from basic research are developed further for instance in collaborations with competent industrial partners into practical applications. Based on strategic partnerships with pharmaceutical companies, the Center develops new approaches for the treatment of obesity and diabetes. Spin-off foundation also plays a key role for a successful technology transfer. Therefore, the Center facilitates and supports entrepreneurship. In recent years, a total of 20 new companies have evolved out of Helmholtz Zentrum München to commercialize innovative therapeutic products, medical devices and software tools, thereby creating more than 350 new skilled jobs in life sciences. Revenues from commercialization are used to fund new innovative research projects.

In the area of drug development, the Center particularly promotes promising projects that are in the early stage of the value chain. These include drug discovery projects with innovative target structures and test systems in order to identify and develop safe and effective drugs for chronic diseases. The portfolio of Helmholtz Zentrum München currently encompasses development projects in the areas of diabetes, lung diseases, infectious diseases, autoimmune diseases, cancer and neurodegeneration. A fully integrated scientific platform supports all essential steps of drug discovery. State-of-the-art and complementary technologies are embedded in the respective institutes or core facilities of the Center.

## CONTACTS

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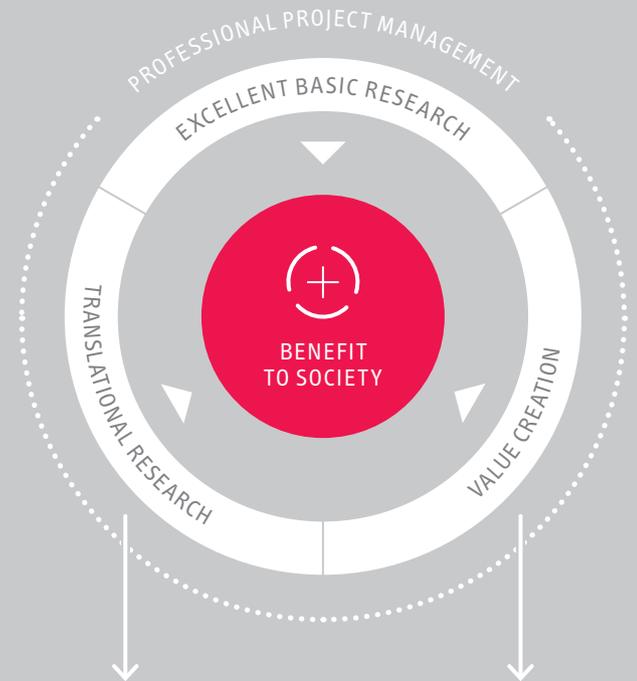
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# Benefit to Society

Helmholtz Zentrum München devotes its expertise to the service of society. Staff members of the Center contribute to national and international bodies in the fields of health and environment, and their competence is used as a decision aid by policymakers and legislators. The Center supports new ways of communication and the publication of scientific results.

- The journal “Molecular Metabolism”, which was founded together with international university partners, provides a platform for the rapid and direct dissemination of research insights into the molecular basis of metabolism.
- With the Diabetes Information Service and the Diabetes Study Platform, the Center promotes dialog between patients, self-help groups, research and the general public.
- On behalf of the Federal Ministry of Health, the Center has set up the allergy information service “The Allergy Portal”, which bundles scientifically sound health information and presents it in an easy-to-understand manner.
- The online portal “Lung Information Service”, which is offered in collaboration with the German Centre for Lung Research and its partners, informs the public about the prevention, diagnosis and therapy of lung diseases as well as new research results.

Through the excellent research, competence and expertise of the staff members as well as through work in translational structures and targeted innovation management, Helmholtz Zentrum München contributes to the benefit of society and to shaping the future.



Close contact between lab and clinic: New insights are transferred into innovative prevention, diagnostic and therapy options.

Spin-offs and collaborations enable the development of the market potential of the research results to market maturity. Via the Life Science Foundation, the Center has a share in the value creation and/or the license revenues from the research results – in this way innovative research projects are promoted.

# Technology Platforms

Helmholtz Zentrum München offers its scientists and cooperation partners a high-performance biomedical infrastructure for internationally competitive research. The offer ranges from access to large devices, routine examinations, introduction into the use of modern technologies, support during sample processing and even includes essential scientific and technical contributions. Helmholtz Zentrum München develops cutting-edge technologies as basis for personalized medicine and is a leader in the areas of mouse models, epidemiology and structural biology.

As central infrastructure for the NAKO Healthstudy (German National Cohort) Helmholtz Zentrum München operates a biorepository for the long-term storage of more than 20 million samples delivered by the 18 participating study centers.

With the European Mouse Mutant Archive (EMMA) and the German Mouse Clinic, the Center has a leading role in INFRAFRONTIER, the European infrastructure for phenotyping and archiving of model mammalian genomes.

Scientific platforms – like the Environmental Simulation Facility and the Phenotyping Platform of the German Plant Phenotyping Network – offer knowledge and equipment in the form of collaborations to scientific projects.

Aside from the large scale infrastructures and scientific platforms, Core Facilities are central to the Center's strategy: A Core Facility is – as a service unit – closely linked to a specific research unit with one common management.

The Core Facilities as centralized units offer state-of-the-art technologies due to a special focus on investments:

- Genomics – as part of the Genome Analysis Center – consists of several platforms and offers expertise in the field of genome sequencing, genotyping and microbiom analysis. Through the Genome Analysis Center, Helmholtz Zentrum München together with Technische Universität, Ludwig-Maximilians-Universität München and the Max Planck Institute for Psychiatry founded the Munich Sequencing Alliance.
- Proteomics offers state-of-the-art mass spectrometry to investigate biological systems and their specific disease associated disruptions on the level of proteins, their signature and their interactions.
- Metabolomics – as part of the Genome Analysis Center – stands out by standardized and validated performance in the area of targeted and non-targeted metabolomics. Different techniques of mass spectrometry are available for studies in humans, animal models, plants and bacteria.
- Excellent expertise and know-how in the fields of immunological analysis, stem cells as well as histology and microscopy are provided for scientific projects by the Core Facilities: Immunoanalytics, Monoclonal Antibodies, induced Pluripotent Stem Cells (iPSC) and Pathology&Tissue Analytics

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 Coordination Core Facilities

# 02 NETWORKS

## Discovery and knowledge for patients and society

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**80%** basic  
research

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translation  
in clinic and  
industry **20%**

# Cooperation with Universities and Clinics

Helmholtz Zentrum München is an important partner for research in Germany. In the Munich region, the center cooperates in four excellence clusters with the elite universities Ludwig-Maximilians-Universität (LMU) and Technische Universität München (TUM), Max Planck Institutes and industry partners on innovative projects in the areas of protein research, the use of photons in medical applications, nanosciences and neurological diseases. It develops new forms of strategic cooperation with universities and clinics in translational research centers and clinical cooperations. In the Munich biotech cluster “m<sup>4</sup> – Personalized Medicine and Targeted Therapies” the Center is represented with several development projects and pools its strength with partners from industry, universities and clinics.

In joint appointments with both Munich universities as well as the universities of Dresden, Hannover, Tübingen and Rostock, the Center bundles capacities to carry out research on urgent health and environmental issues. As part of a strategic partnership with the University of Leipzig, the new Helmholtz Institute for Metabolic, Adiposity and Vascular Research (HI-MAG) is being established there.

In the Helmholtz Graduate School Environmental Health (HELENA) and three research schools in the area of diabetes, epigenetics, radiation sciences and lung biology, the Center is involved in the training of outstanding young scientists within an excellent research environment. Another two topic-specific research schools on epigenetics and data science are further being established under the aegis of HELENA.

TUM
  LMU
  LMU and TUM
   
 other

## 31 JOINT APPOINTMENTS



## 5 CLINICAL COOPERATION UNITS



## 10 COLLABORATIVE RESEARCH CENTERS



## 6 GERMAN CENTRES FOR HEALTH RESEARCH



## 3 TRANSLATIONAL RESEARCH CENTERS



## 1 GRADUATE SCHOOL HELENA



## 3 RESEARCH SCHOOLS



# Networks within the Helmholtz Association

Helmholtz Zentrum München is part of the largest German scientific organization, the Helmholtz Association of German Research Centres, which comprises 18 legally independent centers with almost 38 000 employees and which has an annual budget of EUR 4.5 billion. The Helmholtz Association is dedicated to pursuing the long-term research goals of state and society, and to maintaining and improving the livelihoods of the population.

Helmholtz Zentrum München and the Helmholtz centers active in the research areas Health and Earth and Environment are linked via program-oriented funding of the Helmholtz Association and other networks:

- Helmholtz Zentrum München is linked in joint programs in the research area Health with the Helmholtz Centre for Environmental Research - UFZ, Leipzig and in the area Earth and Environment with UFZ and the Forschungszentrum Jülich (1 – 4 – 13).
- Together with five other Helmholtz health centers, Helmholtz Zentrum München takes part in the cross-disciplinary network Personalized Medicine with the aim of developing a molecular systems medicine that spans several indications (1 – 10 – 12 – 8 – 7 – 4).
- Helmholtz Zentrum München collaborates with all other Helmholtz health centers in eight different cross-program activities with a leading role in the activities “Drug Research” and “Structural Biology” (1 – 7 – 8 – 10 – 12).
- Helmholtz Zentrum München coordinates the Helmholtz Future Topic “Ageing and Metabolic Programming” (AMPro) and participates in the future topics “Immunology and Inflammation” and “Big Data in Medicine” (1 – 7 – 8 – 10 – 12)
- The Center participates in all German Centres for Health Research, which since 2009 have been linking scientists from university and non-university research institutions in a network to bring research findings quickly into medical practice. The Center is a partner in all newly founded centres and site of the head office of the German Center for Diabetes Research (A – F).

# Helmholtz Association of German Research Centres



- Helmholtz Zentrum München – German Research Center for Environmental Health | [www.helmholtz-muenchen.de](http://www.helmholtz-muenchen.de)
- Max Planck Institute for Plasma Physics (associated member) | [www.ipp.mpg.de](http://www.ipp.mpg.de)
- Helmholtz-Zentrum Dresden-Rossendorf (HZDR) | [www.hzdr.de](http://www.hzdr.de)
- Helmholtz Centre for Environmental Research (UFZ) | [www.ufz.de](http://www.ufz.de)
- Helmholtz-Centre Potsdam – GFZ German Research Centre for Geosciences | [www.gfz-potsdam.de](http://www.gfz-potsdam.de)
- Helmholtz-Zentrum Berlin für Materialien und Energie HZB | [www.helmholtz-berlin.de](http://www.helmholtz-berlin.de)
- Max Delbrück Center for Molecular Medicine (MDC) Berlin-Buch | [www.mdc-berlin.de](http://www.mdc-berlin.de)
- Helmholtz Centre for Infection Research (HZI) | [www.helmholtz-hzi.de](http://www.helmholtz-hzi.de)
- Karlsruhe Institute of Technology | [www.kit.edu](http://www.kit.edu)
- German Cancer Research Center (DKFZ) | [www.dkfz.de](http://www.dkfz.de)
- GSI Helmholtzzentrum für Schwerionenforschung | [www.gsi.de](http://www.gsi.de)
- German Center for Neurodegenerative Diseases (DZNE) | [www.dzne.de](http://www.dzne.de)
- Forschungszentrum Jülich | [www.fz-juelich.de](http://www.fz-juelich.de)
- DLR | [www.dlr.de](http://www.dlr.de)
- Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) | [www.awi.de](http://www.awi.de)
- Deutsches Elektronen-Synchrotron, a Research Centre of the Helmholtz Association (DESY) | [www.desy.de](http://www.desy.de)
- Helmholtz-Zentrum Geesthacht – Centre for Materials and Coastal Research | [www.hzg.de](http://www.hzg.de)
- GEOMAR Helmholtz Centre for Ocean Research Kiel | [www.geomar.de](http://www.geomar.de)
- Helmholtz Association, Bonn Office | [www.helmholtz.de](http://www.helmholtz.de)
- Helmholtz Association Berlin Office | [www.helmholtz.de](http://www.helmholtz.de)

## Cooperative Projects

Cooperation Program-Oriented Funding: 1 – 4 – 13  
 Cooperation Cross-sectional Association Personalized Medicine: 1 – 10 – 12 – 8 – 7 – 4  
 Cooperation in Cross-program Activities: 1 – 7 – 8 – 10 – 12

## German Centres for Health Research

- A German Consortium for Translational Cancer Research (DKTK)
- B German Centre for Infection Research (DZI)
- C German Centre for Cardiovascular Research (DZHK)
- D German Center for Lung Research (DZL)
- E German Center for Neurodegenerative Diseases (DZNE)
- F German Center for Diabetes Research (DZD)

# Global Networks

Helmholtz Zentrum München is closely connected in networks with the best scientists worldwide and maintains a variety of intense scientific collaborations with among others the following institutions:



- Germany:** Ludwig-Maximilians-Universität München; Technische Universität München; RWTH Aachen; Universität Bonn; Technische Universität Dresden; Universität Frankfurt a. M.; Universität Rostock; Universität Tübingen; Universität Göttingen
- Finland:** University of Helsinki; National Institute of Health and Welfare
- Sweden:** Karolinska Institutet Stockholm; Uppsala University; Lund University
- Norway:** University of Oslo
- Denmark:** Danish Stem Cell Center; University of Copenhagen; Technical University of Denmark; Geological Survey of Denmark and Greenland; Novo Nordisk
- The Netherlands:** University Medical Center Groningen; University Medical Center Utrecht; Erasmus University Rotterdam; University of Maastricht
- United Kingdom:** The Wellcome Trust-Sanger Institute; Medical Research Council; University College London; University of Oxford; University of Cambridge; King's College London; Imperial College London; EMBL-EBI
- Belgium:** University of Leuven; Ghent University; University of Bruxelles; Glaxo Smith Kline
- France:** Institut National de la Sante et de la Recherche Medicale (INSERM); Centre National de la Recherche Scientifique (CNRS); Institute Pasteur Paris, Commissariat a l'Energie Atomique et aux Energies Alternatives (CEA); Sorbonne Université, Université de Strasbourg
- Spain:** Autonomous University of Barcelona; Center for Genomic Regulation-Barcelona
- Switzerland:** Lausanne EPFL; Universität Basel; Universität Zürich; Eidgenössische Technische Hochschule Zürich
- Austria:** Universität Innsbruck; Universität Graz; Universität Linz; Universität Salzburg; Universität Wien; International Atomic Energy Agency (IAEA)
- Italy:** National Research Council (CNR); University of Rom; University of Florence; University of Pisa; European Molecular Biology Laboratory Monterotondo



- 14 **Canada:** University of Toronto; University of British Columbia; University of Alberta
- 15 **USA:** Joslin Diabetes Center; Harvard-Medical School; MIT Boston; Stanford University; UC Berkeley; Indiana University; University of Pennsylvania; Duke University; Scripps Research Institute; The Jackson Laboratory; National Institutes of Health (NIH); National Institute of Environmental Health Sciences (NI-EHS); U.S. Environmental Protection Agency (EPA); Yale University; Broad Institute of MIT and Harvard; Cornell University; Florida State University; University of California; Harvard University; Pittsburgh University Medical Center
- 16 **Brazil:** University of Rio de Janeiro
- 17 **Argentina:** University of Buenos Aires
- 18 **Israel:** The Hebrew University of Jerusalem; Technion – Israel Institute of Technology Haifa; Weizmann Institute of Science Rehovot; Tel Aviv University
- 19 **Qatar:** Weill Cornell Medical College Qatar, Doha
- 20 **India:** Bhaba Atomic Research Center; Indian Institute of Science Bangalore
- 21 **Russia:** Russian Academy of Sciences; Lomonosov Moscow State University
- 22 **China:** Chinese Academy of Sciences; Peking University; Tsinghua University; Hongkong University
- 23 **Japan:** RIKEN Center for Developmental Biology; RIKEN BioResource Center; Osaka University; University of Kyoto
- 24 **Australia:** University of Western Australia, Perth; Monash University; Australian National University Canberra; University of Queensland

# 03 TALENT MANAGEMENT

## Promoting the **next generation** of scientists

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**550** PhD students

---

**60%** female

---

international **41%**

# HELENA

## Helmholtz Graduate School Environmental Health

In order to ensure optimal promotion, Helmholtz Zentrum München – together with Ludwig-Maximilians-Universität München (LMU) and Technische Universität München (TUM) – opened the Helmholtz Graduate School Environmental Health (HELENA) on November 1, 2010. Due to its excellent research, training and networks, the Helmholtz Graduate School Environmental Health (HELENA) serves as an ideal springboard for graduate students considering careers in research, clinical practice, industry and management.

The orientation of HELENA is internationally unique: The focus is on the interaction of individual genetic predisposition, environmental factors and individual lifestyles and their impact on the pathogenesis of major common diseases. Under rooftop at HELENA offer excellent research, training and networks.

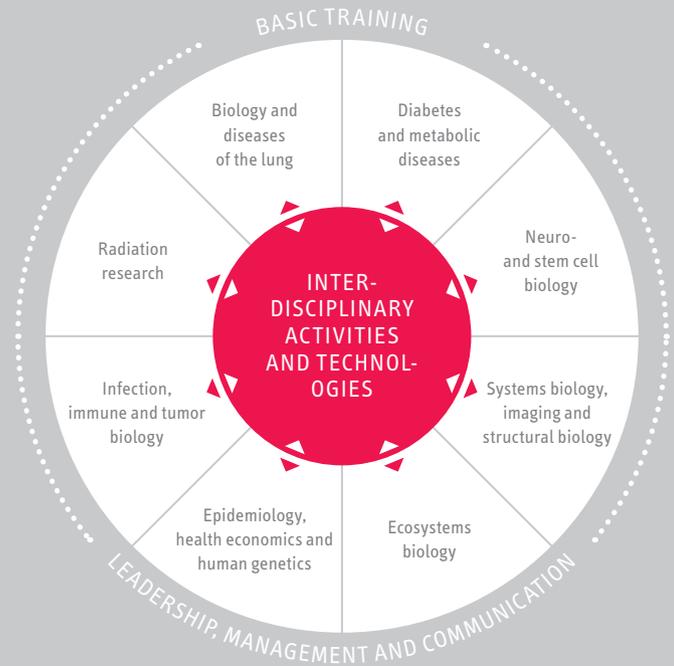
HELENA qualifies a new generation of internationally competitive graduate students. The interdisciplinary training and the additional focus on the promotion of leadership skills prepare HELENA graduate students to fill lead positions in research, management and administration.

### CONTACTS

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HELENA Speaker  
Director Institute of Diabetes and Cancer  
stephan.herzig@helmholtz-muenchen.de  
T +49 89 3187 1045

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HELENA Director  
Head Scientific Education and Training;  
Strategy, Programs, Resources  
monika.beer@helmholtz-muenchen.de  
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Dr. Kristin Dauner  
HELENA Coordinator  
Strategy, Programs, Resources  
krsitin.d aunerr@helmholtz-muenchen.de  
T+49 89 3187-49721



The Graduate School Environmental Health (HELENA), which was jointly founded by Helmholtz Zentrum München and the two Munich elite universities, offers doctoral students at the Center an interdisciplinary, individually tailored graduate program within eight thematic fields.

### The doctoral program at a glance

Dissertation in interdisciplinary research teams
Supervision and mentoring through a personal Thesis Committee
Intensive scientific training in one of eight thematic fields
Translational projects with close linkage to basic and clinical research
Access to cutting-edge platforms and the newest technologies
Promotion of international networks through the support of research stays and attendance at conferences
Doctoral degree from Ludwig-Maximilians-Universität München or Technische Universität München – both universities are among the winners of the excellence initiative

# Promoting the Next Generation

To recruit international top-talents and to support them in their development of a competitive scientific profile for a successful scientific career in academic research or industry, Helmholtz Zentrum München launched postdoctoral programs in 2014. A basic program for all post-docs at the Center provides training in leadership, communication and management combined with further mentoring and coaching opportunities.

The international Postdoctoral Fellowship Program (PFP) trains highly talented early-career scientists for leadership positions in health and environment research. It includes an individual career development plan, coaching and mentoring, support in grant applications, travel grants and joint training modules. Within the three-year-program, the fellows will develop their own scientific profile and visibility in their field of research chosen. Over three competitive international solicitations, 26 fellows have been recruited into the program so far, including 15 international and 16 female fellows.

With its program for junior research groups, Helmholtz Zentrum München aims to attract excellent researchers with their scientific expertise to the Center and to promote networking with universities. By leading their own research groups, young scientists have the chance to establish an own competitive research profile with an attractive five-year-resource package and intensive grant support. Training, coaching and mentoring is available to offer support in their leadership roles. Currently 22 young investigator groups are established at the Center with 41 % female and 46 % international group leaders. The program serves as an excellent career springboard: Over the years 11 starting and consolidators grants from the European Research Council (ERC) have been acquired by young investigator group leaders.

Talent management at the Center will be complemented by a Career Center funded by the Initiative and Networking Fund of the Helmholtz Association. The Career Center will become the central contact point for career guidance and counseling for graduate students and postdocs. It will also establish strategic national and international networks to other career centers and industry and support young researchers via the arrangement of internships or job-shadowing opportunities.

## CONTACTS

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Dr. Monika Beer  
Head Scientific Education and Training;  
Strategy, Programs, Resources  
monika.beer@helmholtz-muenchen.de  
T +49 89 3187-3929

# 04 STATISTICS

Building on the **expertise**  
of our staff

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**2300** Employees

---

in scientific  
areas

**70%**

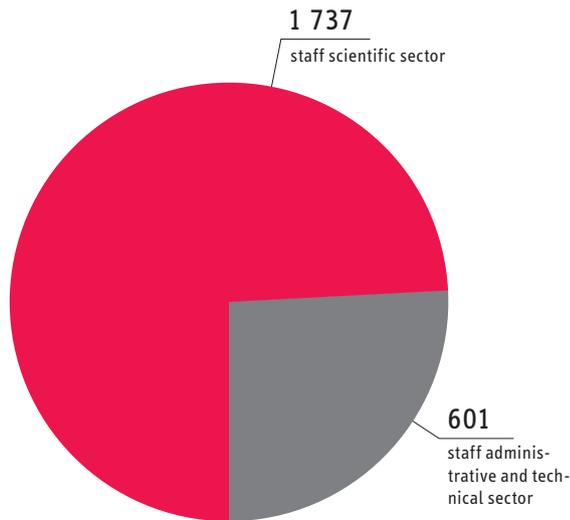
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# Staff

Helmholtz Zentrum München currently has approximately 2 340 employees who belong to 73 different nationalities. 70 percent of the employees work in scientific areas.

## Employees at the Center

As of December 31, 2017



-  Percentage of women (total) 60 %
-  Percentage of women in first level leadership positions 41%
-  Percentage of women in second level leadership positions 18%

# Working Conditions, Training and Qualification

## Development of the number of employees



Helmholtz Zentrum München is an attractive employer for a broad spectrum of scientific disciplines. Through optimal working conditions and a motivating work environment, the Center is in a position to compete for the most talented scientists – both for renowned researchers and promising young scientists.

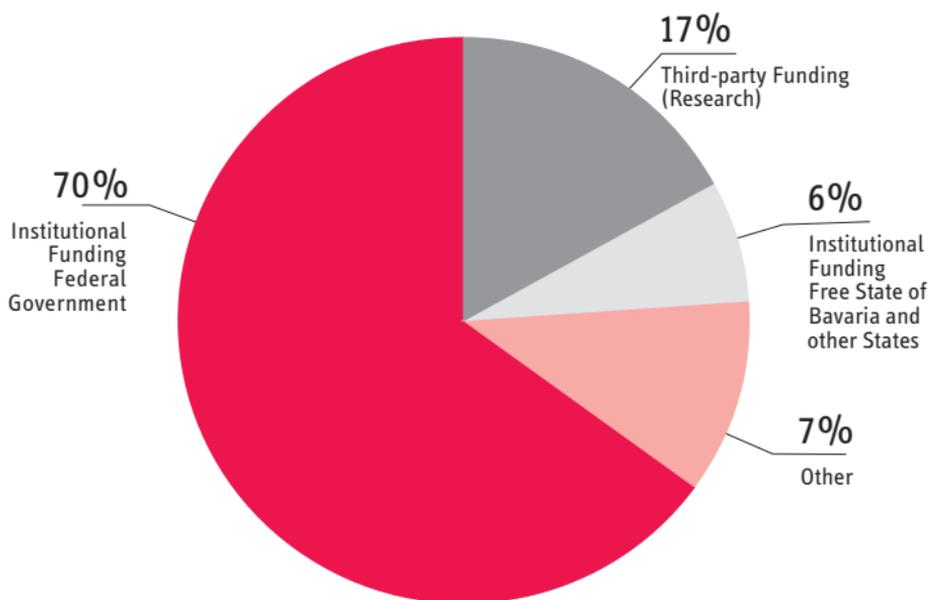
Besides promoting the young generation of scientists, the Center also offers a wide range of vocational training. 54 vocational training places are available in eight professions for technical-administrative trainees in research, industry and trade. The Department of Human Resources Development promotes the achievement potential of employees by offering further training courses especially geared to the career level and the professional situation. To improve the compatibility of work and family for young employees, the Center is continually expanding the offering of child care options for employees' children on the research campus. Helmholtz Zentrum München promotes the careers of female employees and creates the same framework conditions for professional success. For its commitment to equal opportunity, the Center has been awarded the Total Equality Prize for the fifth time. Since 2008 the Center has been a member of the Munich Dual Career Office.

# Finance

In 2017, the overall budget of Helmholtz Zentrum München amounted to approximately 278 million euros, with approximately 211 million euros coming from institutional funding provided by the German Federal Government and the Free State of Bavaria at a ratio of 90 : 10. Third-party research funding of national and international origin amounts to 45.9 million euros.

## Overall financing and source of funds

as of December 31, 2017



## Major Players in Third-Party Funding

awarded grants 2017 in millions of euros



Helmholtz Zentrum München is involved in a number of important national and international funding projects and in this context has been awarded third-party funding amounting to almost 55 million euros in 2017.

### Overview at a Glance:

- Partner in all six German Centers for Health Research and site of the head offices of the German Center for Diabetes Research
- Participation in numerous collaborative projects of the German Federal Ministry of Education and Research (for example, the photonics research alliance Sense4Life, the SME innovative alliance StabVacHepB, ferroptose inhibitors for prevention of neurodegenerative diseases Neuroprotekt and ComboMix – combinatorial micro RNA targeting for treatment of metabolic diseases)
- Integration into more than 40 cooperation projects from the EU framework programs FP7 and H2020
- Acquisition of 11 starting grants, five consolidator grants and three advanced grants of the European Research Council (ERC). Another three starting grants and two consolidator grants have been gained by recruitment, a fourth advanced grant has been acquired jointly.
- 28 subprojects in seven Collaborative Research Centers, three Transregios and seven Priority Programs of the German Research Foundation
- Coordination of the Fr1da early detection study for type 1 diabetes by the Helmsley Trust, JDRF and the Life Science Foundation
- Coordination of the Global Platform for Prevention of Auto-immune Diabetes (GPPAD) with funding by the Helmsley Trust
- Helmholtz Career Development Center for Researchers
- Initiative and Networking Fund: Helmholtz Young Investigator Group leader position 'Inhale Immunmodulation'

## Developing strategy and bundling potential

over

55

years research on health and environment

over

10

years focus on diabetes, allergy and lung disease

# Timeline

- 2018** Coordination Global Platform for the Prevention of Auto-immune Diabetes / Establishment of Helmholtz Institute for Metabolic, Obesity and Vascular Research (HI-MAG)
- 2017** Launch of German Allergy Informationservice / Roger de Spoelberch Prize
- 2016** Expansion of Drug Discovery / Establishment of Helmholtz Pioneer Campus
- 2015** Fr1da-Study for the early detection von Type 1 Diabetes in children is launched / Cornerstone laying ceremony of Helmholtz Diabetes Campus / Expansion of Stem Cell Research
- 2014** Paul-Martini and Ernst-Schering Award / Erwin Schrödinger Award / Postdoctoral Fellowship Program established
- 2013** Establishment of Helmholtz Diabetes Center / Expansion of program for young scientists / Launch of German National Cohort / ERC-Advanced and Consolidator Grants / Gottfried Wilhelm Leibniz Prize
- 2012** Helmholtz Alliance ICEMED / Launch of Diabetes Information Service Munich / Humboldt Professorship / Eight ERC Starting Grants at the Center
- 2011** Diabetes Research Department / Erwin Schrödinger Prize / Launch of Lung Information Service / Helmholtz Virtual Institute for Complex Molecular Systems in Environmental Health (HICE)
- 2010** Helmholtz Graduate School Environmental Health (HELENA) / Participation in all six German Centres for Health Research
- 2009** First therapeutic antibody for cancer treatment based on research of the Center
- 2008** Establishment of the lung translational center Comprehensive Pneumology Center (CPC) / Center is renamed: Helmholtz Zentrum München – German Research Center for Environmental Health

- 2007** World's first phase III study on hypothermia-chemotherapy / Helmholtz Alliance for Mental Health in Old Age (HelMa) / Gottfried Wilhelm Leibniz Prize / Erwin Schrödinger Prize
- 2005** Studies on the effects of particulate matter on the cardiovascular system
- 2004** First institute of stem cell research in Germany / Immune monitoring platform
- 2000** Erwin Schrödinger Prize / Expansion of molecular gene research
- 1999** Genome Analysis Center for genome studies, metabolomics, transcriptomics
- 1997** Establishment of clinical cooperation groups
- 1996** Beginning of the KORA population studies
- 1995** Research platform monoclonal antibodies
- 1992** Gottfried Wilhelm Leibniz Prize for molecular biological research
- 1990** as largest German center for environmental sciences, Center is renamed: GSF – Research Center for Environment and Health
- 1989** Philip Morris Research Prize / European prize for alternatives to animal testing
- 1988** Adoptive immunotherapy used successfully for the first time
- 1986** Beginning of lung research in Neuherberg
- 1985** External advisory board to control scientific success / Technology Transfer Prize
- 1984** Epidemiological research in the Augsburg region with WHO Cardiovascular Study
- 1982** Establishment of research on damage to Bavarian forests in cooperation with universities

**1979** Completion of the re-orientation regarding the environment and health care, outsourcing of biotechnological research

**1978** Models for assessment of the radiation-induced genetic risk

**1976** Method for laser treatment of skin diseases

**1975** Together with Munich clinicians, the first successful bone marrow transplantation in Germany

**1971** Health risk assessment of environmental chemicals / Microbe bank becomes the German Collection of Microorganisms

**1970** Studies on the use of holography and lasers for medical problems / immunological issues of bone marrow transplantation

**1969** World's first institute of ecological chemistry

**1968** Aerosol research: uptake and distribution of particles in the lung

**1967** New research approaches for groundwater protection

**1964** Independent Society for Radiation Research – Study of the biological effects of radiation and transfer behavior in the environment

**1960** Founding of test and training center for radiation protection – nucleus of today's Helmholtz Zentrum München

# 05 CONTACT INFORMATION

Placing our resources  
at the **service of research  
and society**

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**51** Scientific Institutes  
and Autonomous  
Research Units

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Clinical Cooperation Units **5**

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**13** Core Facilities

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# Institutes and Research Units

## GENETICS AND EPIDEMIOLOGY

### Institute of Epidemiology/ EPI

Assessment of genetic, environmental and lifestyle risk factors which jointly determine the occurrence of major chronic diseases. The focus is on metabolic, respiratory and allergic diseases, as well as heart diseases and mental health.

**Director: Prof. Dr. Annette Peters**  
peters@helmholtz-muenchen.de  
T + 49 89 3187 4566  
Professor of Epidemiology at LMU

**Research Unit Molecular Epidemiology/ AME** in the Institute of Epidemiology  
Analyses of population-based cohorts and case studies, using genomics, epigenomics, transcriptomics, proteomics, metabolomics and functional analyses. The aim is to decipher the molecular mechanisms of complex diseases like type 2 diabetes or obesity.  
**Head: Dr. Christian Gieger**  
christian.gieger@helmholtz-muenchen.de  
T + 49 89 3187 4106

### Independent Research Group Clinical Epidemiology/ KEPI

Patient-oriented research in close clinical cooperation for the early detection and secondary prevention of chronic diseases. The focus is on metabolic diseases, cardiovascular and respiratory diseases and their complications.

**Head: Prof. Dr. Jakob Linseisen**  
jakob.linseisen@helmholtz-muenchen.de  
T + 49 89 3187 3202  
Chair of Epidemiology at LMU

### Institute of Genetic Epidemiology / IGE

Planning, realization and analysis of genetic-epidemiological projects with the aim to contribute to the elucidation of genetic causes of complex diseases

**Director: Prof. Dr. Konstantin Strauch**  
strauch@helmholtz-muenchen.de  
T + 49 89 3187 2838  
Chair of Genetic Epidemiology at LMU

### Institute of Experimental Genetics / IEG

Elucidation of causes and pathogenesis of human diseases. The institute is a global leader in the systemic study of mouse models for human diseases and the elucidation of involved genes.

**Director: Prof. Dr. Martin Hrabě de Angelis**  
hrabe@helmholtz-muenchen.de  
T + 49 89 3187 3302  
Chair of Experimental Genetics at TUM

### Research Unit Molecular Endocrinology and Metabolism/ MEM

Investigating the the molecular mechanisms of metabolic diseases. The major focus is on the metabolism of steroid and lipids and their signal transduction pathways.

**Head: Prof. Dr. Jerzy Adamski**  
adamski@helmholtz-muenchen.de  
T + 49(89) 3187 3155

### Institute of Human Genetics/ IHG

Identification and functional characterization of genes related to disease. The aim is to achieve a better understanding of the genetic basis of multifactorial diseases like cardiovascular disorders, neurological disorders and energy metabolism disorders.

**Director: Prof. Dr. Thomas Meitinger**  
meitinger@helmholtz-muenchen.de  
T + 49 89 3187 3294  
Chair of Human Genetics at TUM

### Institute of Neurogenomics/ING

Identification of the genomic basis of neurological diseases. The aim is to improve diagnosis and ultimately provide tailored, personalized treatment.

**Director: Prof. Dr. Juliane Winkelmann**  
juliane.winkelmann@helmholtz-muenchen.de  
T + 49 89 3187 1884  
Chair of Neurogenomics at TUM

### Institute of Developmental Genetics/ IDG

Functional analysis of the mammalian genomes to investigate genetically determined diseases of the central nervous systems, the eye, and the skeletal system, and to elucidate the molecular mechanisms that control embryonal development.

**Director: Prof. Dr. Wolfgang Wurst**  
wurst@helmholtz-muenchen.de  
T + 49 89 3187 4110  
Chair of Developmental Genetics at TUM

### Research Unit Comparative Medicine/ AVM

Hygiene and microbiology of laboratory animals, animal welfare and reproduction biology as well as animal models for human diseases.

**Head: PD Dr. Markus Brielmeier**  
brielmeier@helmholtz-muenchen.de  
T + 49 89 3187 2837

### Institute of Health Economics and Health Care Management/IGM

Analysis of approaches to improve the effectiveness and efficiency of health care. Investigation of economic, socioeconomic and management at the level of health systems, of medical technologies and of care strategies.

**Director: Prof. Dr. Reiner Leidl**  
leidl@helmholtz-muenchen.de  
T + 49 89 3187 4168  
Chair of Health Economics and Health Care Management at LMU

### Institute of Translational Genomics/ ITG

Leverage big data in genetics and genomics for medically important human traits. The aim is to translate insights from genomics into mechanisms of disease development and progression.

**Director: Prof. Dr. Eleftheria Zeggini**  
E-Mail: eleftheria.zeggini@helmholtz-muenchen.de  
T + 49 89 3187 4989

## DIABETES

### Helmholtz Diabetes Centrum/ HDC

Scientific Director: Stephan Herzig

### Institute of Diabetes Research/ IDF

Elucidation of the pathogenesis and prevention of type 1 diabetes and gestational diabetes. The aim is to identify markers for early diagnosis and the development of prevention strategies and new treatments to cure diabetes.

**Director: Prof. Dr. Anette-Gabriele Ziegler**  
anette-g.ziegler@helmholtz-muenchen.de  
T + 49 89 3187 3405  
Chair of Diabetes and Gestational Diabetes at TUM

### Institute of Diabetes and Obesity/ IDO

Elucidation of the disease mechanisms of the metabolic syndrome with systems biological and translational approaches. The aim is the interdisciplinary development of innovative therapy approaches for the personalized prevention and treatment of obesity, diabetes and their concomitant diseases.

**Director (acting): Dr. Timo Müller**  
timo.mueller@helmholtz-muenchen.de  
T + 49 89 3187 2106

### Research Unit Neurobiology of Diabetes/ NBD

in the Institute of Diabetes and Obesity  
Unravel the role of the central nervous system in the etiology of metabolic disease. The focus is directed towards understanding the impact of hypothalamic inflammation for the development of obesity and type 2 diabetes.

**Head: Dr. Paul Pfluger**  
paul.pfluger@helmholtz-muenchen.de  
T + 49 89 3187 2104

### Institute of Diabetes and Cancer/ IDC

Investigating the molecular basis of severe metabolic disorders, including the Metabolic Syndrome and type 2 diabetes, and their roles in tumor initiation and progression.

**Director: Prof. Dr. Stephan Herzig**  
stephan.herzig@helmholtz-muenchen.de  
T + 49 89 3187 1045  
Chair of Molecular Metabolic Control at TUM

**Institute of Functional Epigenetics/ IFE**

Investigating the packing of genes within the cell nucleus and examining the connections between common diseases and distortions in DNA packing.

**Director: Prof. Dr. Robert Schneider**

robert.schneider@helmholtz-muenchen.de  
T +49 89 3187 3586

**Institute of Translational Stem Cell Research/ ITS**

Aims to develop safe approaches for up-scaled production of insulin-producing beta cells from human pluripotent stem cells (hPSCs). Objective is a safe and scalable stem cell therapy for type 1 diabetes.

**Director: Prof. Dr. Tor Henrik Semb**

henrik.semb@helmholtz-muenchen.de  
T +49 89 3187 49133

Professor of Human Stem Cell Biology at University of Copenhagen

**Research Unit Molecular Epigenetics/ MEG**

in the Institute of Functional Epigenetics Research focusses on investigating basic epigenetic mechanisms of gene regulation, thus creating the basis for a better understanding of the role of epigenetics in the etiology of diseases.

**Head: Prof. Dr. Dirk Eick**

eick@helmholtz-muenchen.de  
T +49 89 3187 1512

**Institute of Diabetes and Regeneration Research / IDR**

Research is focused on the biological and physiological study of the pancreas and the insulin-producing beta cells. The objective is to elucidate the pathogenesis of diabetes, to contribute to the discovery of new risk genes of the disease and to develop solutions for regenerative approaches to diabetes therapy.

**Director: Prof. Dr. Heiko Lickert**

heiko.lickert@helmholtz-muenchen.de  
T + 49 89 3187 3760

Chair of Diabetes Research / Beta Cell Biology at TUM

**Institute of Diabetes Research and Metabolic Diseases/ IDM**

Study of gene-environment interactions in type 2 diabetes for individualized prediction of diabetes risk, diabetes prevention and the personalized treatment of diabetes.

**Director: Prof. Dr. Hans-Ulrich Häring**

hans-ulrich.haering@helmholtz-muenchen.de  
T + 49 7071 298 3670

Medical Director of Medical Clinic IV of the University of Tübingen

**Institute of Pancreatic Islet Research, Paul-Langerhans-Institut Dresden / IPI**

Basic and clinical research on pancreatic beta cells, which are responsible for production and secretion of insulin.

**Director: Prof. Dr. Michele Solimena**

michele.solimena@helmholtz-muenchen.de  
T +49 351 7963 6612

Chair of Molecular Diabetology at TU Dresden

**HEALTH AND ENVIRONMENT****Institute of Lung Biology/ iLBD**

Elucidation of the cellular, molecular and immunological mechanisms of chronic lung diseases. The objective is to develop new diagnostic and therapeutic strategies.

**Head (acting, admin.): Dr. Antje Brand**

antje.brand@helmholtz-muenchen.de  
T + 49 89 3187 4670

**Research Unit Lung Repair and Regeneration/ LRR**

Deciphering the pathogenesis of chronic lung disease in order to develop new diagnostic tools and therapies. The unit also focuses on new methods to reduce the gap between pre-clinical research and its application on patients.

**Head: Prof. Dr. Dr. Melanie Königshoff**

melanie.koenigshoff@helmholtz-muenchen.de  
T +49 89 3187 4668

**Institute of Allergy Research/ IAF**

Study of the molecular developmental mechanisms underlying allergies and the build-up of allergy tolerance in the context of genetic predisposition, immune system and environmental factors. Objective is to develop individual prevention approaches and therapies.

**Director: Prof. Dr. Carsten Schmidt-Weber**

schmidt-weber@helmholtz-muenchen.de  
T + 49 89 3187 3081

Chair of Molecular Allergology and Environmental Research at TUM

**Institute of Environmental Medicine/ IEM**

Basic and translational research in environment-human-interaction with a main emphasis on allergic diseases to prevent chronic environmental diseases and to ensure a sustainable patient treatment.

**Director: Prof. Dr. Claudia Traidl-Hoffmann**

traidl-hoffmann@helmholtz-muenchen.de  
T +49 821 5986411

Chair of Environmental Medicine at TUM

**Institute of Asthma and Allergy Prevention/ IAP**

Characterization of asthma phenotypes and identification of protective microbial factors. The long term mission is to foster the prevention of asthma and allergies.

**Director: Prof. Dr. Erika von Mutius**

erika.von.mutius@med.uni-muenchen.de  
T +49 89 4400 57897

Professor of Pediatric Allergology at LMU

**Unit Molecular Immune Regulation/ AMIR**

Study of the molecular mechanisms of T-cell tolerance to understand the molecular programs in T cells that enable them to distinguish between endogenous and exogenous structures.

**Head: Prof. Dr. Vigo Heissmeyer**

vigo.heissmeyer@helmholtz-muenchen.de  
T + 49 89 3187 1214

**Institute of Virology/ VIRO**

Study of viruses that chronically infect humans and can lead to lifethreatening diseases such as HIV, endogenous retroviruses and hepatitis B and C viruses. Molecular studies identify new diagnostic and therapeutic concepts.

**Director: Prof. Dr. Ulrike Protzer**

protzer@helmholtz-muenchen.de  
T + 49 89 3187 3004

Chair of Virology at TUM

**Research Unit Gene Vectors/ AGV**

Study of the Epstein-Barr-Virus (EBV) and its interaction with human B-cells. The aim of this research is to achieve a detailed understanding of the EBV infection in the development of tumors and to put these insights to medical use.

**Head: Prof. Dr. Wolfgang Hammerschmidt**

hammerschmidt@helmholtz-muenchen.de  
T + 49 89 3187 1506

**Comprehensive Molecular Analytics/CMA**

Development and application of mass spectrometry-based analysis techniques in order to characterize complex molecular substance mixtures. Research focusses on the analysis of aerosols and their effects on health.

**Head: Prof. Dr. Ralf Zimmermann**

ralf.zimmermann@helmholtz-muenchen.de  
T + 49 89 31887 4544

Chair of Analytical Chemistry at Rostock University

**Research Unit Apoptosis in Hematopoietic Stem Cells /AHS**

Development of novel anti-cancer treatment strategies that eliminate leukemia stem cells. Research aims at discovering mechanisms that allow inducing apoptosis in tumor stem cells, in order to overcome treatment resistance and prevent disease relapse.

**Head: Prof. Dr. Irmela Jeremias**

irmela.jeremias@helmholtz-muenchen.de  
T +49 89 3187 1426

Mildred Scheel Research Professorship at LMU

#### Working Group Tissue Control of Immuncytes/ TCI

Analysis of immune cells in various tissue milieus in healthy and pathological conditions with the aim of designing immunotherapeutic strategies to efficiently mobilize the immune system to fight disease or maintain health.

**Head: Prof. Dr. Elfriede Nößner**  
noessner@helmholtz-muenchen.de  
T +49 89 3187 1303

#### Translational Molecular Immunology (TMI)

Investigates the basic mechanisms of the immune system and forms an interface between knowledge-oriented research and clinical application. The aim is to establish and to refine personalized therapeutic approaches, which are based on modulating the immune response.

**Head: Prof. Dr. Ralph Mocikat**  
mocikat@helmholtz-muenchen.de  
T +49 89 3187 1302

#### Department of Radiation Sciences/ DRS

Speaker: Prof. Dr. Stephanie Combs

#### Institute of Innovative Radiotherapy/ iRT

Clinically oriented research related to technical and biological issues of radiation therapy.

**Director: Prof. Dr. Stephanie Combs**  
stephanie.combs@helmholtz-muenchen.de  
T + 49 89 4140 4502  
Chair of Radiation Oncology at TUM

#### Institute of Radiation Biology/ IB5

Analysis of the effects of radiation exposure in the low-dose range; development of approaches to increase the effectiveness and specificity of the radiation therapy of tumors. Research aims at optimization of the medical use of radiation.

**Director: Prof. Dr. Michael Atkinson**  
atkinson@helmholtz-muenchen.de  
T + 49 89 3187 2983  
Chair of Radiation Biology at TUM

#### Institute of Radiation Protection/ ISS

Measurement and evaluation of occupational, medical and environmental radiation exposure and analysis of the related risks of cancer and cardiovascular diseases. Research aims at a better understanding of the effects of radiation and to optimize the use of radiation in industrial and medical settings.

**Director (acting): Prof. Dr. Werner Rühm**  
werner.ruehm@helmholtz-muenchen.de  
T +49 89 3187 3359

#### Research Unit Radiation Cytogenetics/ ZYTO

Study of radiation-induced chromosome aberrations and DNA damage in cell systems and human tumors. Objective is to find biomarkers to detect radiation-induced tumors for personalized radiation therapy.

**Head: Prof. Dr. Horst Zitzelsberger**  
zitzelsberger@helmholtz-muenchen.de  
T + 49 89 3187 3421

#### STEM CELLS

##### Institute of Stem Cell Research/ ISF

Elucidation of the basic molecular and cellular mechanisms for stem cell maintenance and stem cell differentiation. On this basis, approaches for the replacement of degenerated cell types are developed with the aim of self-renewal of injured or degenerated tissue.

**Director: Prof. Dr. Magdalena Götz**  
magdalena.goetz@helmholtz-muenchen.de  
T + 49 89 3187 3750

Chair of Physiological Genomics at LMU

##### Institute of Epigenetics and Stem Cells/ IES

Determinating stem cell origin and epigenetic principles of cellular plasticity and genome reprogramming. Objective is to understand the molecular mechanisms and their implications in regenerative medicine and disease.

**Director: Prof. Dr. Maria Elena Torres-Padilla**  
torres-padilla@helmholtz-muenchen.de  
T +49 89 3187 3317

Chair of Stem Cell Biology at LMU

#### Research Unit Sensory Biology and Organogenesis/ SBO

Study of the cellular, molecular and physiological reactions to mechanical stimuli and sensory interference using the zebrafish as a model system. Objective is to elucidate the control mechanisms of development, self-regulation and regeneration of the sensory system and the evolution of the sensory organs.

**Head: Dr. Hernán López-Schier**  
hernan.lopez-schier@helmholtz-muenchen.de  
T + 49 89 3187 2187

#### ENABLING TECHNOLOGY

##### Institute of Structural Biology/ STB

Elucidation of the spatial structure of biological macro molecules; analysis of their interaction of structure and dynamics; development of NMR spectroscopy methods to analyze the structure of complex biological systems. Aim is to elucidate the biological function of molecules and their involvement in diseases and to generate structural data for the design and development of small molecule inhibitors.

**Director: Prof. Dr. Michael Sattler**  
sattler@helmholtz-muenchen.de  
T + 49 89 289 13418

Chair of Biomolecular NMR Spectroscopy at TUM

##### Institute of Biological and Medical Imaging/ IBMI

Development of in-vivo imaging technologies for the biosciences. Research aims at providing innovative tools for the biomedical laboratory, for diagnosis and to monitor therapy of human diseases.

**Director: Prof. Dr. Vasilis Ntziachristos**  
v.ntziachristos@helmholtz-muenchen.de  
T + 49 89 3187 3852

Chair of Biological Imaging at TUM

#### Institute of Bioinformatics and Systems Biology/ IBIS

Analysis and interpretation of biological data to capture information on the etiology and progression of human diseases in rational models. The focus is on qualitative and quantitative modeling, interconnection of metabolic profiles with genetic variance, systematic interpretation of high throughput data and systems biology of small molecules.

**Director (acting): Dr. Gabriele Kastenmüller**  
g.kastenmueller@helmholtz-muenchen.de  
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#### Institute of Computational Biology/ ICB

Development of methods for the model-based abstraction of biological systems. Research aims to capture complex biological systems in their structure and dynamics using mathematical models.

**Director: Prof. Dr. Dr. Fabian Theis**  
fabian.theis@helmholtz-muenchen.de  
T + 49 89 3187 2211

Chair of Mathematical Modeling of Biological Systems at TUM

Research Unit Scientific Computing/ ASC in the Institute of Computational Biology Scientific computing and the management of the central data processing of Helmholtz Zentrum München. Research is aimed to develop and apply mathematical methods for numerical analyses and simulations in biological models.

**Head: PD Dr. Wolfgang Graf** zu Castell-Rüdenhausen  
castell@helmholtz-muenchen.de  
T + 49 89 3187 2946

#### Research Unit Protein Analytics/ PROT

Investigation of the composition of protein complexes and their integration into cellular processes and protein networks. Research aims at recognition of biological systems and disease-related disorders at the systemic level and thus to contribute to the molecular understanding of diseases.

**Head: Dr. Stefanie Hauck**  
hauck@helmholtz-muenchen.de  
T +49 89 3187 3941

**Institute of Medicinal Chemistry/ IMC**

Investigating chemical properties of new and old active substances, as well as the development of innovative therapeutic methods. The institute, based in Hanover, is an outstation of Helmholtz Zentrum München and is operated in co-operation with the Leibniz Universität Hannover.

**Director: Prof. Dr. Oliver Plettenburg**  
oliver.plettenburg@helmholtz-muenchen.de  
Institute of Organic Chemistry,  
Leibniz-Universität Hannover

**Research Unit Analytical Pathology/ AAP**

Translation of the findings of experimental and molecular pathology into methods of disease phenotyping. The objective is to develop predictive tissue diagnostics.

**Head: Prof. Dr. Axel Karl Walch**  
axel.walch@helmholtz-muenchen.de  
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**Institute of Molecular Toxicology and Pharmacology/ TOXI**

Study of basic reactions of the organism to chemical substances. Research aims at better understanding of active mechanisms and new insights into signaling networks and genetic programs for the development and progression of complex diseases.

**Director: Prof. Dr. Martin Göttlicher**  
martin.goettlicher@helmholtz-muenchen.de  
T + 49 89 3187 2446  
Chair of Toxicology and Environmental Hygiene at TUM

**Research Unit Cellular Signal Integration/AZS** in the Institute of Molecular Toxicology and Pharmacology Elucidation of signaling networks to understand the dysregulation of signaling complexes in the immune system in inflammatory diseases and the development of lymphomas and to target these pharmacologically.

**Head: Dr. Daniel Krappmann**  
daniel.krappmann@helmholtz-muenchen.de  
T + 49 89 3187 3461

**ENVIRONMENTAL SCIENCES**

**Department of Environmental Sciences/ DES**  
Speaker: Prof. Dr. Jörg Durner

**Institute of Biochemical Plant Pathology/ BIOP**

Exploration of defense mechanisms, growth and fitness of plants in response to environmental cues, with a focus on molecular mechanisms that allow plants to respond to biotic and abiotic factors. Research aims to find new procedures for sustainable agriculture and biotechnological use of plants, as well as to contribute to safeguarding the role of plants in the nourishment and health of human beings.

**Director: Prof. Dr. Jörg Durner**  
durner@helmholtz-muenchen.de  
T + 49 89 3187 3434  
Chair of Biochemical Plant Pathology at TUM

**Research Unit Experimental Environmental Simulation/ EUS** in the Institute of Biochemical Plant Pathology

Expertise and infrastructure for researching the influence of the global climate change on growth, yield and health of crops, energy plants, and on biodiversity. Research focuses on the biosphere-atmosphere exchange of biogenic volatile organic compounds.

**Head: Prof. Dr. Jörg-Peter Schnitzler**  
jp.schnitzler@helmholtz-muenchen.de  
T + 49 89 3187 2413

**Institute of Groundwater Ecology/ IGOE**

Study of the processes of self-cleaning and the transport of harmful substances in groundwater and develops ecological assessment criteria for groundwater ecosystems. Research on microbial processes that lead to self-cleaning of groundwater is aimed at preserving the most important source of drinking water.

**Director (acting): Dr. Christian Griebler**  
christian.griebler@helmholtz-muechen.de  
T +49 89 3187 2564

**Research Unit Environmental Organic Isotope Chemistry /EOIC** in the Institute of Groundwater Ecology

Investigation of degradation of chemicals in the environment and assessment of the behavior of organic substances in complex systems.

**Head: Dr. Martin Elsner**  
martin.elsner@helmholtz-muenchen.de  
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**Research Unit Analytical Biogeochemistry/ BGC**

Study of the molecular interactions of materials in biogeosystems. Objective is a precise spatial and temporal resolution analysis to better understand the molecular processes in ecosystems and determine biomarkers in organisms.

**Head: Prof. Dr. Philippe Schmitt-Kopplin**  
schmitt-kopplin@helmholtz-muenchen.de  
T + 49 89 3187 3246

**Research Unit Comparative Microbiome Analysis/ COMI**

The study of the structure and function of microbial communities in the soil and the identification of abiotic and biotic parameters, which drive the abundance, diversity and activity of the corresponding microbiomes. Objective is to make the genetic resources of soil microflora better utilizable for a sustainable bioeconomy.

**Head: Prof. Dr. Michael Schloter**  
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**Institute of Network Biology/ INET**

Research aims to understand the organizational and functional principles of protein interaction networks, particularly changes in response to environmental influences, microbial and endogenous substances, and due to evolutionary processes.

**Director: Prof. Dr. Pascal Falter-Braun**  
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T +49 89 3187 3180  
Professor of Microbe-Host-Interactions at LMU

**Research Unit Genome and Systems Biology of Plants/ PGSB**

Research focusses on the study of model plant genomes and large grain genomes. Objective is the systematic and functional analysis of plant genomes.

**Head: Dr. Klaus Mayer**  
k.mayer@helmholtz-muenchen.de  
T + 49 89 3187 3584

# Translational Research and Clinical Cooperation

## Translational Research Centers

### Treatment Center for Diabetes Prevention Studies

Head: Prof. Dr. Anette-Gabriele Ziegler  
anette-g.ziegler@helmholtz-muenchen.de  
T +49 89 3187 3405

### Center of Allergy and Environment/ZAUM

Head: Prof. Dr. Carsten Schmidt-Weber  
schmidt-weber@helmholtz-muenchen.de  
T + 49 89 4140 3081

Institute of Allergy Research; clinical partner:  
Department of Dermatology and Allergology  
of TUM, ZAUM – Center for Allergy and Envi-  
ronment

### Translational Center for Lung Research / CPC

Head: PD Dr. Anne Hilgendorff  
anne.hilgendorff@helmholtz-muenchen.de  
T +49 89 3187 4675

Institute of Lung Biology; clinical partner:  
Hospital of LMU, Asklepios Specialist Hospital,  
Munich-Gauting

## Clinical Cooperation Diabetes

### Biomarkers for the Subclassification of Type2 Diabetes Mellitus

Head: Prof. Dr. Jochen Seißler  
jochen.seissler@helmholtz-muenchen.de  
T +49 89 3187 3502

Institute of Experimental Genetics; clinical  
partner: Hospital of LMU, inner city campus

### Interaction of Diet and Genetics in Type 2 Diabetes Mellitus

Head: Prof. Dr. Hans Hauner  
hans.hauner@helmholtz-muenchen.de  
T +49 89 3187 3502

Institute of Experimental Genetics; clinical  
partner: Else Kröner Fresenius Center for  
Nutritional Medicine, TUM

## Allergy

### Clinical Allergology Unit

Head: Prof. Dr. Tilo Biedermann  
sekretariat.derma.med@tum.de  
T +49 89 4140 3170  
Clinic and Policlinic for Dermatology  
and Allergology at the Biederstein, TUM

## Innovative Therapies

### Personalized Radiation Therapy

Head: PD Dr. Anna Friedl  
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T + 49 89 3187 2447  
Research Unit Radiation Cytogenetics;  
Clinical partner: Department of Radiation  
Oncology of LMU; Hospital of LMU

### Clinical Pharmacology Unit

Head: Prof. Dr. Stefan Endres  
endres@lmu.de  
T +49 89 4400 57300  
Department of Clinical Pharmacology;  
Department of Internal Medicine IV  
Hospital of LMU

# Technology Platforms

## CORE FACILITIES

### Genome Analysis Center (GAC) –

metabolomics, genomics, transcriptomics.

**Prof. Dr. Jerzy Adamski**

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T +49 89 3187 3155

### Proteomics (PROT) –

development of qualitative and quantitative strategies for proteomics analyses.

**Dr. Stefanie Hauck**

proteomics@helmholtz-muenchen.de

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### Monoclonal Antibodies (MAB) –

design, production, purification, labelling and storage.

**Dr. Regina Feederle**

regina.feederle@helmholtz-muenchen.de

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### Comparative Medicine –

maintenance of small rodents for biological-medical research at the Center.

**PD Dr. Markus Brielmeier**

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### Immunoanalytics –

analytical methods for characterization, activation analysis and immuno-monitoring.

**Prof. Dr. Elfriede Nößner**

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**Dr. Thomas Hofer**

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### Induced Pluripotent Stem Cells (iPSC) –

generation and differentiation of human induced pluripotent stem (iPS) cells.

**Dr. Micha Drukker**

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### Pathology & Tissue Analysis –

deep tissue imaging, mass spectrometry, microscopy, image analyses.

**Dr. Anette Feuchtinger**

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### Statistical Consulting –

statistical advice and teaching.

**Prof. Dr. Christiane Fuchs**

christiane.fuchs@helmholtz-muenchen.de

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### Bioinformatics –

Bioinformatic analysis pipelines for NGS applications; interactive platform and training for follow-up analytics and visualizations.

**Dr. Matthias Heinig**

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## OTHER PLATFORMS

### Environmental Simulation –

exposure chambers, solar simulators, “green house” research.

**Prof. Dr. Jörg-Peter Schnitzler**

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T +49 89 3187 2413

### Distribution Center for Biomaterials (EU-COMM) –

targeting vectors and mutant ES cell lines produced in the EUComm and EUCommTOOLS consortia.

**Dr. Antje Bürger**

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### Comprehensive Metabolomics Platform –

targeted and non-targeted metabolomics in biological and medical research.

**Prof. Dr. Schmitt-Kopplin**

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### Inorganic Analytics –

analysis of minerals, trace elements and anions; mass spectrometry.

**Prof. Dr. Bernhard Michalke**

bernhard.michalke@helmholtz-muenchen.de

T +49 89 3187 4206

### Biorepository –

storage, analysis and data handling of biological samples.

**Dr. Christian Gieger**

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### German Mouse Clinic –

the world’s leading facility for phenotyping and diagnostics of mouse models for hereditary diseases.

**Prof. Dr. Martin Hrabě de Angelis**

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### European Mouse Mutant Archive EMMA –

European network for the systematic archiving of mouse mutants.

**Prof. Dr. Martin Hrabě de Angelis**

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### Fragment-Based Drug Discovery (FBDD) –

screening platform for molecule fragments with potential biological and therapeutic activity.

**Dr. Grzegorz Popowicz**

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### Protein Expression and Purification Facility –

overexpression and purification of proteins.

**Dr. Arie Geerlof**

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T +49 89 3187 4707

### Assay Development and Screening –

development of medium- and high-throughput cell-based assays.

**Dr. Kamyar Hadian**

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### X-ray Crystallography Platform –

high-resolution determination of large protein complexes.

**Dr. Robert Janowski**

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### Scientific Computing –

operation of central computer center, designing of methods for analysis and simulation of biological systems.

**PD Dr. Wolfgang Graf zu Castell-Rüdenhausen**

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# Contact Information

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## Central Library

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## HELENA – Helmholtz Graduate School

Environmental Health

Director: Dr. Monika Beer/SPR

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## Translational and Clinical Projects/TKP

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## Personal Monitoring Service/AWST

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## Staff Positions

### Head Office

Head: Dr. Markus Reuther

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### Scientific-Technical Infrastructure

#### Central Technical Services/ZT

Head: Andreas Pippig

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—

#### HSE – Infrastructure, Safety

Head: Dr. Andrea Kleinschmidt

britta.timm-hoffmann@helmholtz-muenchen.de

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#### HSE – Medical Services, Rescue, Fire Brigade

Head: Dr. Werner Kirchinger

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### Administrative Departments

#### Purchasing and Supply/EK

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#### Administrative Data Processing/KDV

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#### Human Resources Management/PA

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## HMGU Venture

Head: Gerolf Schmidl

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# Locations and Addresses

The campus of Helmholtz Zentrum München is located in Neuherberg to the north of Munich. Here are most of the institutes, research units and technology platforms. The institutes and research units located outside the main campus area are in continual contact with the campus institutes, and many are closely linked with hospitals.



**1** Helmholtz Zentrum München – German Research Center or Environmental Health Campus Neuherberg  
Ingolstädter Landstr. 1  
85764 Neuherberg, Germany

**2** Stem Cell Center  
Marchioninstr. 25  
81377 Munich, Germany

**3** CPC – Comprehensive Pneumology Center  
Max-Lebsche-Platz 31  
81377 Munich, Germany

**4** Institute of Diabetes and Obesity and Institute of Diabetes and Regeneration Research  
Business Campus Munich  
Parkring 11 – 13  
85748 Garching, Germany

**5** Diabetes Study Center  
Institute of Diabetes Research  
Research Unit Protein Science  
Ungererstr. 25  
80802 Munich, Germany

**6** Center of Allergy and Environment/ ZAUM  
Biedersteiner Str. 29  
80802 Munich, Germany

**7** Institute of Virology  
Trogerstr. 30  
81675 Munich/  
Schneckenburgerstr. 8  
81675 Munich, Germany

**8** KORA Study Center  
Beim Glaspalast 1  
86153 Augsburg, Germany

**9** Examination Center  
Augsburg  
German Health Study  
Klinikum Augsburg  
Stenglinstr. 2  
86156 Augsburg, Germany

**10** Official Personal Dosimeter Service  
Otto-Hahn-Ring 6  
81739 Munich, Germany

**11** Institute for Diabetes Research and Metabolic Diseases of Helmholtz Zentrum München at the University of Tübingen  
Otfried-Müller-Str. 10  
72076 Tübingen, Germany

**12** Institute of Medicinal Chemistry  
Schneiderberg 2b  
30167 Hannover, Germany

**13** Institute of Pancreatic Islet Research  
Fetscherstrasse 74  
01307 Dresden, Germany

**14** Helmholtz Institute for Metabolic, Adiposity and Vascular Research (HI-MAG) Leipzig

**15** Cooperation Group Comprehensive Molecular Analytics  
Gmunder Straße 37  
81379 München, Germany

# Helmholtz Zentrum München in Numbers

- 1 448** — publications in international journals (2017)
- 127** — patent families
- 20** — spin-offs since 1997
- 2 338** — employees (as of Dec. 31, 2017)
- >550** — doctoral students in joint programs with Munich universities, of these
- >350** — employed at Helmholtz Zentrum München
- 52** — apprenticeships in six vocational training disciplines
- 51** — institutes and autonomous research units
- 5** — clinical cooperation units
- 3** — translational research centers
- 22** — junior research groups
- 278** — million euros finance volume (2017)
- >700** — scientific cooperation contracts (2017)
- 31** — joint appointments with universities
- 3** — information services

# Organization

Helmholtz Zentrum München is a research institution of the Federal Republic of Germany and the Free State of Bavaria and belongs to the Helmholtz Association of German Research Centres. The partners of Helmholtz Zentrum München are the Federal Republic of Germany, represented by the Federal Minister of Education and Research, and the Free State of Bavaria, represented by the Bavarian State Minister of Finance.

The bodies of Helmholtz Zentrum München are the Assembly of Partners, the Supervisory Board and the Board of Directors. In scientific questions, the Center is advised by the Scientific Advisory Board, which consists of external members. Through the program and topic speakers, scientists are represented in the Management Committee. As expert body, the Scientific Review Committee advises the Board of Directors with regard to important scientific questions.

Helmholtz Zentrum München is made up of 51 scientific institutes and autonomous research units, which are linked through programs and topics. To transfer findings from basic research into medical applications, scientists of Helmholtz Zentrum München work closely in translational centers and clinical cooperation groups together with partners in the Munich clinics.

## IMPRINT

Published by:  
Helmholtz Zentrum München –  
Deutsches Forschungszentrum für  
Gesundheit und Umwelt (GmbH)  
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5th edition, 2018

Translated by:  
Carol Oberschmidt, Berlin

Graphic design:  
Anzinger | Wüschner | Rasp, Agentur  
für Kommunikation GmbH, Munich