Molecular pharmacology is concerned with the way in which molecules interact and communicate chemically with each other in cells, in organs or in the organism as a whole, and how these processes are regulated by external factors. Small molecules such as hormones bind, for example, to protein molecules on cell surfaces and instruct cells to perform certain tasks for the organism as a whole.

A detailed knowledge of the basic processes of these interactions and the molecules involved is the first step towards influencing them. If disturbances in the functioning of certain molecules or in the interplay between them occur due to disease, it may be possible to find and produce active substances capable of alleviating such disturbances. These would be the first steps towards a novel medicine or a new therapy, which could then be further developed by pharmaceutical and medical specialists.

Our life scientists study the functioning of molecules and their interaction in the complex environment of the cell and the organism. Our structural biologists present the spatial structure of these molecules in detail and show where and how they bind to each other. Finally, our chemists are able to produce molecules that, as active substances, intervene in the molecular interplay. A constant dialogue between these disciplines ensures a highly efficient approach to describing conditions of health and disease and discovering ways of influencing them.
DEAR READER,

What is it that actually makes us sick? What »obstacles« does a medicine have to overcome? How does it get to the correct site of action in the body and, conversely, how can we prevent viruses or bacteria from getting into cells?

At the FMP, we are investigating biochemical processes in the body and the molecular causes of diseases. On the basis of these findings, we then search for active substances to create the basis for the medicines of tomorrow.

Here, scientists from different disciplines such as biochemistry, biology, chemistry, physics, pharmacology, and medicine work closely together and form interdisciplinary teams in a working environment that is nearly unique in the world – this has also been certified by the international experts of the external Leibniz Evaluation, who gave top marks to our research groups in 2014.

FMP scientists use and develop sophisticated technologies that range from nuclear magnetic resonance spectroscopy, via high-resolution light and electron microscopy for the observation of cells and tissues, to mass spectrometric analytical procedures, up to high-throughput active substance screens among tens of thousands of compounds.

A further important factor for the success of research at the FMP are the numerous national and international co-operations with top institutions and universities throughout the world. The FMP plays a leading role in the European infrastructure project »EU-OPENSCREEN«, through which the search for active substances is coordinated across Europe. Our research groups regularly host visitors from all over the world and are constantly expanding their co-operations. Thus, 185 scientists from almost 30 countries are working at the FMP today.

On the following pages we will take you on a journey through our world of the molecules of life as well as the active substances of tomorrow and will present you with examples of some of our research activities. If you would like to learn more, please visit our website or – even better – ask us directly!

Wishing you enjoyable and stimulating reading,
Yours, Volker Haucke
The scenario envisaged takes us to a day when patients will inhale a non-toxic inert gas so that it can be taken up into the lungs and distributed throughout the body in the bloodstream. At the same time, the patient will be injected with tailor-made biosensors that can, for example, adhere to certain tumour cells depending on the information required,« says Leif Schröder.

Dr. Leif Schröder is a physicist. He heads the working group Molecular Imaging.

Chemistry meets physics – Research can be conducted on glycans by means of xenon magnetic resonance imaging (MRI): A cage-like molecule that captures xenon atoms was attached to the sensor that reacts to the azide group in the sialic acid of a glycan. The marked cells light up in the xenon MRI and are clearly differentiated from other cells in the contrast image.
Taking a scan of a patient and finding specific disease-relevant molecules and cells – that’s what Leif Schröder and his research group are working on. The combination of novel xenon magnetic resonance imaging and tailor-made biosensors may make it possible to detect the source of a disease in the body at a very early stage. Cells with certain sugar compounds have now been successfully localised. This may open up the possibility of detecting the onset of cancer and inflammation in the deepest tissue layers.

Standard magnetic resonance imaging exploits the fact that hydrogen atoms interact with magnetic fields and then emit a measurable signal. In contrast, the xenon magnetic resonance imaging developed by Leif Schröder uses the hyperpolarised inert gas xenon as a signal transmitter, which emits 100,000-fold stronger signals than hydrogen and in combination with biosensors can detect specific changes in cells.

A further step has now been successfully taken through a collaboration with the chemist Christian Hackenberger. It has been shown that xenon magnetic resonance imaging is also suitable for detecting glycans. These complex sugar molecules are located on the surface of the cells and change when cancer develops. This would make it possible to start treating the disease at a very early stage.

Since 2009, Leif Schröder’s research group has been funded by the European Research Council (ERC) with a five-year starting grant to the amount of almost two million euros.
The biophysicists Philipp Selenko and Andrew Plested were awarded the prestigious »Consolidator Grant« of the European Research Council (ERC) for their research work in 2015. They were successful in their application for one of the most prominent and coveted programmes offered by the European Commission.

Philipp Selenko is receiving funding amounting to almost two million euros over a period of five years for his research with high-resolution in-cell NMR spectroscopy. His research group is investigating the structural and functional properties of proteins within living cells. In-cell NMR spectroscopy enables the direct observation of proteins »in action«, i.e. while they are performing their biological functions.

»Our method can be compared to a microscope with atomic resolution,« says Philipp Selenko. »We are investigating early stages of neurodegenerative diseases and the onset of abnormal changes that lead to cancer.«

This has enabled Philipp Selenko to gain new insights into previously unknown aspects of these diseases, and his findings open up new paths for active substance research and therapeutic interventions.
Andrew Plested is receiving funding for his research on the glutamate receptor in the brain from the ERC, amounting to almost two million euros over a period of five years. This receptor is responsible for signal transmission in many synapses in our brain. When a signal reaches a nerve terminal, it secretes a small amount of glutamate – the neurotransmitter then binds to the receptors of the adjacent cell. Glutamate receptors are essential for our brain to function, and might play an important role in diseases such as epilepsy as well as cognitive and neurodegenerative disorders. The research group led by Andrew Plested is interested in the dynamic structure of the fastest glutamate receptor in the brain, the so-called »AMPA receptor«, and is working with targeted mutations to understand its molecular machinery.

»Our long-term goal is to investigate the role of the AMPA receptor in the living brain,« says Andrew Plested. »We would like to understand the role it plays in learning and in memory. This may also be important for the treatment of certain disorders, such as stroke: Here, dangerous amounts of glutamate are secreted which leads to cell death.«
Researchers led by Thomas Jentsch have unravelled the mystery of the pressure valve in the cell. This finding may help us to better treat various common diseases.

(Published in SCIENCE)

THE FINELY ADJUSTED VOLUME OF CELLS – WHERE IT IS REGULATED

It is vital for the body’s cells to be able to regulate their volume, for instance when they come into contact with liquids of different salt concentrations, in the case of cell division and cell growth, but also in diseases such as cancer, stroke or a heart attack. The researchers have now discovered that a previously unknown gene forms the so-called »volume-regulated anion channel« (VRAC).

»For decades, the protein LRRC8A has been the great unknown in the question of how cells regulate their volume«, says Thomas Jentsch, head of the research group. »Now we know that this protein forms the anion channel with at least one of its relatives and we have learned a lot about its functions.«

This knowledge is important: Cells take up water for different reasons, be it during natural growth processes, or in the course of disease. In the worst case, a swollen cell can even burst. To prevent this from happening, a mechanism comes into force that all healthy cells possess: The pressure valve VRAC opens up and flushes negatively charged ions (anions) out of the cell. As a result, the swelling of the cell recedes, thus ensuring its survival. It has yet to be fully clarified how the opening of the channel is regulated in detail, but the new findings are already of great benefit.

For his research on ion channels, Thomas J. Jentsch has been funded by the European Research Council (ERC) with an »Advanced Grant« amounting to 2.5 million euros since 2012.
Prof. Dr. Dr. Jentsch is a physicist and medical doctor. He heads the Department of Physiology and Pathology of Ion Transport.

Components of the volume-regulated anion channel (VRAC) in the plasma membrane of the cell. The protein LRRC8A (stained red) together with at least one of the other five family members (here LRRC8E, stained green, and present as a complex in yellow).

Dr. Felizia Voß and Dr. Tobias Stauber, co-authors of the publication, in the laboratory.

Thomas Jentsch: »There is evidence that the anion channel might play an important role in stroke and myocardial infarction, but also in the development of cancer, and we have good reason to believe that the findings we have now gained will contribute to the development of new therapeutic approaches.«
In order to be able to take up substances from its surroundings and transport them to their intracellular destinations, animal cells invaginate their surrounding membrane to pinch off tiny vesicles in a process called »endocytosis«. The team led by Volker Haucke has succeeded in showing how a simple biochemical reaction regulates the formation of endocytic vesicles in cells – a fundamental process for cell growth and communication between cells.

(Published in NATURE)
Of decisive importance in this process are special lipid molecules that serve as identification markers. These so-called phosphoinositides can be modified by enzymes in the blink of an eye and thus dictate the direction of the reaction cascade of vesicle formation. After a complicated search for evidence, using chemical probes and high-resolution fluorescence microscopy, researchers led by Volker Haucke managed to determine an important physiological function of phosphatidylinositol 3,4-bisphosphate, a previously virtually unknown phosphoinositide lipid, in endocytosis as well as the factors involved in this reaction and characterised it in detail by live microscopic imaging of cells in action.

During endocytosis, the cell membrane invaginates and a vesicle is pinched off. This is how nutrients, but also viruses, get into the cell.

»We can now quite precisely determine which endocytotic proteins and enzymes and how many of them are to be found at a particular time and place,« explains Volker Haucke. »We suspect that the enzymes that produce or break down the phosphoinositides also serve as a sensor, in order to ensure the supply of nutrients to the cell and react appropriately. This could provide a starting point for the development of new active substances for the treatment of cancer or diabetes.«

Among other things, this sensor function determines whether a cell grows and divides, which is of importance in the development of cancer. At the same time, the phosphoinositides also influence the communication between cells, for example in the brain, or the breakdown of clumped protein molecules, a central cause of neurodegenerative diseases such as Alzheimer’s.
Using novel imaging procedures, researchers probe ever-finer structures and can even make out complex structural elements in bacteria. *(Published in the journal PNAS)*

»This work is just the start of our research into bactofilin,« says Adam Lange. »We now want to refine the structure down to the atomic detail. Since bactofilin exclusively occurs in bacteria, it is an interesting target for the development of urgently needed novel antibiotics,« adds Lange.
For a long time, it was assumed that bacteria do not possess any form of stabilising cytoskeleton like that encountered in animals and plants. However recently, not only have analogous elements been found but also skeleton-like structures that occur exclusively in the realm of the bacteria. Using NMR (nuclear magnetic resonance) spectroscopy, Adam Lange and his team discovered that individual bactofilin molecules are wound up in a spiral shape to form a so-called »beta helix« and are then aligned molecule for molecule into filaments. This structural motif is stabilised by recurrent hydrophobic areas, which were conserved in the bactofilin molecules by evolution. The extremely fine protofilaments can then accumulate further into thicker bundles or tissue-like structures. Such a beta helix has yet to be found in any other cytoskeletal element. The bactofilin filaments play a role in shaping the bacteria. In the case of Helicobacter pylori, they are involved in the development of the typical screw-shaped form that enables them to bore into the gastric mucosa. Protected against the caustic gastric juices, they are responsible for the majority of the gastric and duodenal ulcers experienced by humans.
In *Caulobacter* bacteria (blue), the bactofilin filaments (see zoom) play an important role in the development of the stalk, a thin protrusion of the cell body involved in cell attachment and nutrient acquisition. Bactofilins also give *Helicobacter* bacteria their typical screw shape that enables them to bore into the gastric mucosa. *Helicobacter*-bacteria can cause inflammations and ulcers there. The structural elucidation of bactofilin may provide a starting point for the development of urgently needed new antibiotics.
True viral influenza remains one of the most dangerous infections today. In severe influenza years, there are several thousand deaths in Germany alone.

Influenza viruses change their genetic make-up and thus their surface incredibly quickly, which means that vaccines rapidly become ineffective. The research group of Jens von Kries is therefore focused on alternative options: During the infection, the virus requires certain proteins on or in the human cell, in order to penetrate it and reproduce there. This turns the cell into a host cell. The plan now is to prevent both the reproduction and the penetration using medicinal products, so that the infection cannot become established.

This is an ambitious plan that can only be achieved with colleagues from multiple international research groups. The
Dr. Jens Peter von Kries (p. 14 in the picture on the left) is a biologist. For over ten years he has directed the FMP’s Screening Unit, which has the capacity to test thousands of substances using high-throughput methods. Here, together with Dr. Martin Neuenschwander and Dr. Silke Radetzki, he is preparing a test series.

»In fact, a virus is not a living organism, but a software package within a protein bag,« explains Jens von Kries. »As soon as it gets into the cell, the viral genetic program forces the human host cell to produce countless randomly modified copies of the virus. The cell ends up dying and releases thousands or millions of those viral variants into the bloodstream. The project ANTIFLU is searching for ways of obstructing the program at the very start, targeting host cell factors to block viral growth and variation.«

The research group of Professor Thomas F. Meyer, Director at Berlin’s Max-Planck-Institut für Infektionsbiologie, has sifted through 24,000 genes and has now fished out 300 that contain the blueprints for proteins required by viruses for reproduction. Meyer is coordinating this from the EU-funded project »ANTIFLU«. With the help of the Screening Unit at the FMP, headed by Jens von Kries, thousands of substances have so far been tested for their suitability to block the proteins selected by the Max-Planck researchers. Many of these active substances for potential therapies are already crystallised at Israel’s Hebrew University in Jerusalem and can thus be optimised so that they block the proteins even more effectively. The Max-Planck group validated these substances for efficacy using cells infected with influenza and will subsequently test them on mice.
Every day, all of us make use of active substances in one way or another, whether it is to shake off morning tiredness with a cup of coffee or to get rid of a headache as quickly as possible with a tablet. On average it takes more than a whole decade before a new medicinal product can help. Among thousands of potential active substances, one might make it through to marketing authorisation. But how are new active substances found and what contribution does the FMP make to this process?

For many diseases and in particular for the rare ones, the causes are not yet known on a molecular level. Accordingly, there is no information available about receptors, nor about active substances that might bind to them. The scientists at the FMP do not develop new medicinal products, but they pave the way for potential novel active substances and therapies by researching into the molecular processes in the body as well as potential ways of influencing them. In recent years, unique prerequisites have been created at the FMP to facilitate this search for active substances. As early as 2003, the »Screening Unit« for searching compound collections comprising tens of thousands of substances was established at the Institute under the direction of Jens Peter von Kries. In order to incorporate this even more effectively into the research of biological questions, and also so that it might be in a position to devise and produce novel active substances, a joint, integrated technology platform was established along with the Medicinal Chemistry research group led by Marc Nazaré, in which scientists from different scientific disciplines work together.
FROM THE SCREEN TO THE LAB

The first selection is made virtually: The research group around Ronald Kühne has developed and continuously improves databases with ultra-rapid search methods. Using the substance library, thousands of substances are thus pre-selected for a screening project.

In the team led by Jens von Kries’ at the Screening Unit, biological test methods are developed and carried out by robots in high-throughput procedures – more than 35,000 tests a day. The very latest technologies are applied, which means that von Kries and his colleagues can analyse thousands of microscopic images of cell cultures with special image recognition software.

An active substance screening always turns up a whole series of interesting substances, so-called »hits«, although they rarely have the desired properties for a future drug candidate. The research group Medicinal Chemistry headed by Marc Nazaré, an experienced chemist from the pharmaceutical industry, optimises these substances by designing and synthesising new derivatives around these hits.

Thereafter, it is still a long way to market approval of the drug candidate. Biotechnology companies and pharmaceutical companies develop the potential drug further and test it in initial animal models all the way to clinical trials, a process that takes many years.

In co-operation with the Screening Unit, the working group of Volker Haucke has succeeded in identifying an active substance that is capable of inhibiting uptake processes in cells. This new active substance is called a »pitstop«, because it is able to freeze dynamic membrane pits, which are responsible for cellular uptake, in a very short time. Its specific derivatives may one day help to alleviate tolerance processes or, for instance, inhibit the uptake of pathogens (such as viruses) into the cell.
An estimated 1.2 million people are suffering from Alzheimer’s disease in Germany today. The course of the disease leads to the demise of increasing numbers of nerve cells, with the tau protein playing a key role. Considerable neurotoxic deposits of this protein are found in patients. In order to investigate this protein, which forms fragmented plaques, it is produced synthetically in Christian Hackenberger’s department.

»Unravelling the molecular mechanism of Alzheimer’s disease is one of the most daunting yet challenging tasks in the life sciences. We aim to contribute to this field by the chemical synthesis of the tau protein to understand the impact of protein modifications on the outbreak and progression of this devastating disease.«
It is important to know that the structure, functionality and activity of tau protein are regulated by enzymes that attach chemical groups such as phosphate and sugar residues to the tau protein. In the case of disease, excessively strong phosphorylation leads to disturbances and insoluble fibrils of tau protein form, which are deposited between nerve cells in the brain. The deposits interfere with the communication between the nerve cells and ultimately destroy them.

Prof. Hackenberger and his team would now like to find out which phosphorylation patterns exactly are responsible for the development of the disease. To this end, they are using a technique called »semi-synthesis«, in which one part of the protein is produced in bacteria and another part is generated synthetically in the laboratory. The two parts are then connected together by means of a chemical reaction.

This method makes it possible for researchers to install phosphate residues at precise positions in the tau protein and analyse their influence on the structure and functionality, and particularly the aggregation behaviour of the protein. The ultimate purpose of these investigations is the development of new active substances and diagnostic methods and they thus make a contribution to the battle against Alzheimer’s disease.
In every cell, an enormous communications network is humming, which controls precisely the cellular actions: Which proteins are needed when and where? When are nutrients taken up or stored? And when is a good time for cell growth? This communication takes place in a »chemical language« in which chemical messenger substances are specifically synthesised or proteins are chemically modified. One group of messenger molecules that Dorothea Fiedler’s group is focussing on are the so-called »inositol pyrophosphates'. These molecules occur in a number of similar configurations, but they send different signals depending on their phosphorylation patterns. Genetic experiments have demonstrated that the inositol pyrophosphates influence a large number of different cellular processes.

The research group of Prof. Dr. Dorothea Fiedler is investigating the »chemical language« within cells, in order to develop novel therapeutic approaches for treating diabetes and obesity. The renowned researcher is moving from Princeton University to the FMP in 2015 and will continue her research here. She will be the first female Director at the FMP and in the Forschungsverbund Berlin.

Prof. Dr. Dorothea Fiedler heads the Department of Chemical Biology I
In particular, they play a critical role in insulin secretion and weight gain in mice and humans.

Many of the essential and decisive junctures in the network of the inositol pyrophosphates have been difficult to determine up to now. A detailed molecular picture, however, will be absolutely necessary to be able to develop novel therapeutic agents to treat the endemic diseases diabetes and obesity in the long run. Therefore, this research group is employing various techniques in chemical biology – such as organic synthesis, peptide synthesis, chemical genetics, and proteomics – in order to crack the code of the inositol pyrophosphates.

»Nobody doubts that the inositol pyrophosphates constitute a central group of cellular messengers. To decode the molecular steps in detail, however, we had to develop a wide range of tools and methods. We are now putting these tools to work using an interdisciplinary approach. That’s why I’m really looking forward to moving to the FMP with its unique collaborative atmosphere.«
Like few other technologies, NMR spectroscopy enables us to look into the very heart of matter, creating close-ups in atomic resolution. In a powerful magnetic field, some atomic nuclei contained in the samples are turned into small magnets themselves and become aligned in accordance with the outer field. Depending on the chemical environment, they then absorb the energy of radio waves, from which it is possible to determine the structure of biological molecules, using complicated methods of calculation. Since this technology is very complex with its enormous supraconducting magnets and requires considerable expertise, it makes sense to open up the leading centres in Europe to biologists from other countries, in order to take a joint approach to solving particularly interesting research questions.

The European infrastructure project »i NEXT«, which replaced the project »Bio-NMR« set up in September 2010, is based on this idea. In particular, the FMP gives access to the solid-state NMR instruments, which allow measurements on very complex samples, such as the unique in-cell NMR of Philipp Selenko’s research group, in which samples are labelled with isotopes within living cells. Interested scientists must submit an application, but are supported by NMR experts at the FMP. However, a condition for the EU funding is that the scientists who apply belong to groups established outside of Germany.

Complex technology should be available to all scientists who have good ideas. The EU project »i NEXT« is therefore supporting researchers from throughout Europe, who will now be given access to the NMR devices at the FMP.
»Bio-NMR was a success story that is now continuing. The EU wants to ensure that more scientists gain access to the large devices,« explains Hartmut Oschkinat, head of the Department of Structural Biology. »We receive money for making our measuring time available. In turn, we can then channel the European funding into investments – that makes it a win-win situation.«

»Bio-NMR was a success story that is now continuing. The EU wants to ensure that more scientists gain access to the large devices,« explains Hartmut Oschkinat, head of the Department of Structural Biology. »We receive money for making our measuring time available. In turn, we can then channel the European funding into investments – that makes it a win-win situation.«

Through joint appointments and participation in common projects, the FMP is closely linked to the universities of Berlin, the Humboldt-Universität zu Berlin, the Freie Universität Berlin and the Charité-Universitätsmedizin Berlin. The FMP and the Max-Delbrück-Centrum für Molekulare Medizin (MDC) are neighbours on the Campus Berlin-Buch and work together closely on many different projects.

Nationally and internationally, the Institute is involved in numerous co-operations. In addition, the FMP is preparing the high-technology research association »EU-OPEN-SCREEN«, through which the search for active substances is to be coordinated across Europe.

The Institute is also a member of »Instruct« and research institutes involved in the technically complex elucidation of biological structures have joined forces in this European network. As a result of its particular expertise in this field, the FMP is the competence centre for solid-state NMR spectroscopy within Instruct. Furthermore, the Institute has been involved in the EU project »i NEXT« since 2015.
A bacterial surface with adhesions, sticky lolly structures with which bacteria adhere to their host cells. *Yersinia enterocolitica* is a pathogenic bacterium that causes fever and diarrhoea. With the aid of a protein anchored in its membrane, it attaches itself to host cells and infects them. Researchers at the Max-Planck-Institut für Entwicklungsbiologie in Tübingen and the FMP have elucidated the structure of an important component of this membrane protein and have gained information about its biogenesis.
The furtherance of young, talented scientists is a central concern at the Leibniz-Institut für Molekulare Pharmakologie. The Institute has had its own graduate school since 2013.

The new FMP Graduate School supports young doctoral students and prepares them for their professional career. It is focussed on promoting scientific exchange with other study colleagues at the FMP, as well as with participants in the graduate schools at the Max-Delbrück-Centrum für Molekulare Medizin (MDC) and the universities of Berlin, and specialist supervision at the FMP: A team of three group leaders, consisting of the supervisor of the doctoral thesis and two further group leaders, regularly discuss the progress of the project and give important advice towards a successful completion of the doctoral work. »Excellent doctorates are our aim, but it goes beyond that,« according to Prof. Dr. Christian Hackenberger and Katrin Wittig, the two coordinators at the FMP Graduate School. »It’s nothing new: If you want to get on professionally, you not only need specialist knowledge but also the so-called »soft skills‘. Therefore, we offer courses such as science management, patent law, self-marketing and science journalism.«

The schoolchildren of today are the scientists of tomorrow

In the FMP schoolchildren’s laboratory known as »ChemLab«, schoolchildren assume the role of chemists. Under the instruction of FMP doctoral students, they independently carry out experiments. Whole-day courses on the topics of caffeine, pigments, synthetics, and fragrances are on offer and are held in the »Gläsernes Labor«, the educational centre on the Campus Berlin-Buch. Besides courses offered as part of the ChemLab, other subjects such as genetics and biotechnology are covered. More than 12,500 schoolchildren attend every year.
# All Research Groups

## Molecular Physiology and Cell Biology

**Departments**
- Physiology and Pathology of Ion Transport
  - Thomas Jentsch
- Molecular Pharmacology and Cell Biology
  - Volker Haucke

**Research Groups**
- Protein Trafficking
  - Ralf Schülein
- Molekulare Zellphysiologie
  - Ingolf E. Blasig

**Junior Research Groups**
- Molecular Neuroscience and Biophysics
  - Andrew Plested
- Membrane Traffic and Cell Motility
  - Tanja Maritzen
- Proteostasis in Aging and Disease
  - Janine Kirstein

**Core Facilities**
- Cellular Imaging
  - Burkhard Wiesner / Dmytro Puchkov
- Animal Facility
  - Natali Wisbrun

## Structural Biology

**Departments**
- NMR-Supported Structural Biology
  - Hartmut Oschkinat

**Research Groups**
- Structural Bioinformatics and Protein Design
  - Gerd Krause

**Junior Research Groups**
- In Cell-NMR
  - Philipp Selenko
- Molecular Imaging
  - Leif Schröder

**Core Facility**
- NMR
  - Hartmut Oschkinat / Peter Schmieder
**CHEMICAL BIOLOGY**

**DEPARTMENTS**

**Chemical Biology I**
Dorothea Fiedler

**Chemical Biology II**
Christian Hackenberger

**RESEARCH GROUPS**

**Solution NMR**
Peter Schmieder

**Computational Chemistry/Drug Design**
Ronald Kühne

**Mass Spectrometry**
Eberhard Krause

**Medicinal Chemistry**
Marc Nazaré

**Peptide-Lipid-Interaction/Peptide Transport**
Margitta Dathe

**CORE FACILITIES**

**Peptide Chemistry**
C. Hackenberger/R. Volkmer

**Screening Unit**
Jens Peter von Kries
**STAFF**
The FMP has 285 members of staff: 108 scientists, 77 doctoral students and 55 technical employees. Administrative employees, technicians and IT specialists support the work of the scientists.

**FINANCING AND THIRD-PARTY FUNDING**
The FMP receives its basic financing in equal parts from the German government and the state of Berlin (16.2 million euros in 2014). Third-party funds come on top of this (6.3 million euros in 2014). These funds, mainly procured from the European Union and the Deutsche Forschungsgemeinschaft, flow exclusively into research work. They are used to finance positions for scientists, technical staff and doctoral students, as well as materials.

**THE LEIBNIZ ASSOCIATION**
The Leibniz Association connects 89 independent research institutions that range in focus from the natural, engineering and environmental sciences via economics, spatial and social sciences to the humanities. Leibniz Institutes address issues of social, economic and ecological relevance. They conduct knowledge-driven and applied basic research, maintain scientific infrastructure and provide research-based services. Due to the institutes' importance for the country as a whole, they are funded jointly by the Federation and the Länder, employing some 18,100 individuals, including 9,200 researchers. The entire budget of all the institutes is approximately 1.64 billion euros.

**FORSCHUNGSVERBUND BERLIN**
The FMP belongs to the Forschungsverbund Berlin e.V. (FVB), a research association comprising eight natural science, life science and environmental science institutes in Berlin, which employ a total of more than 1,500 members of staff. The research association was founded in 1992 in a unique historical situation from the former Academy of the Sciences of the German Democratic Republic.

**CAMPUS BERLIN-BUCH**
The Campus Berlin-Buch is a science, health and biotechnology park in the north of Berlin. The Leibniz-Institut für Molekulare Pharmakologie (FMP) and the Max-Delbrück-Centrum für Molekulare Medizin (MDC) are neighbours on the campus and also work together closely on common themes.
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