GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN / GERMANY

International Max Planck Research School

Molecular Biology

MSc/PhD Program

YEARBOOK 2008 / 2009

Yearbook 2008/2009

MSc/PhD Molecular Biology Program

at the University of Göttingen

International Max Planck Research School

Index / Imprint

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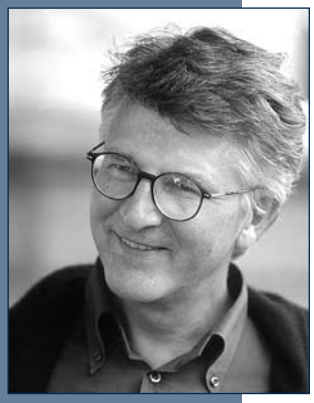


Letter from the President

The international Master's / PhD Programs Molecular Biology and Neurosciences were established by the Georg August University Göttingen, together with the Max Planck Society for the Advancement of Science, in the year 2000 to attract excellent students from all over the world and provide them with an outstanding, research-oriented graduate program. Both programs are taught in English by internationally renowned scientists and offer a high level of services and individual support.

Several hundred students from all over the world apply for the 20 study places available in each of the programs every year. Both programs have introduced and combined elements of international recruitment, competitive admission procedures, advanced curricula, research training, social integration programs, extracurricular support and evaluation procedures into successful working structures. They have achieved excellent recommendations in several external evaluations and have been awarded the 2004 prize for excellent support services for foreign students by the German Federal Foreign Office. For the newly established Georg August University School of Science (GAUSS) and other graduate schools in Göttingen, the Molecular Biology and Neuroscience Programs are considered exemplary and serve as best practice models.

In October 2006, the two programs were awarded the label „Top 10 International Master‘s Degree Courses made in Germany“ by the „Stifterverband für die Deutsche Wissenschaft“ and the German Academic Exchange Service (DAAD) in a national contest, in which 121 Master‘s programs of 77 universities participated. The Göttingen Molecular Biology and Neuroscience programs were the only Master‘s programs in the natural sciences and medicine which received this award. Both programs are members of the Göttingen Graduate School for Neurosciences and Molecular Biosciences (GGNB), which was successful in the recent Excellence Competition by the German Federal and State Governments to promote science and research at German universities.

Five Göttingen University faculties, three Göttingen Max Planck Institutes as well as the German Primate Center participate in the programs. International guest lecturers are also involved. The Max Planck Society contributes through its newly established International Max Planck Research Schools. Both programs keep close contacts with the relevant industries to further enhance the chances of the graduates for a successful professional career.

I would very much like to thank all scientific bodies and institutions for their committed support in establishing these international programs and, last but not least, the German Academic Exchange Service (DAAD), the Lower Saxony Ministry of Science and Culture and the various generous donors.

The Georg August University of Göttingen is proud of its long-standing international experience the two attractive and innovative programs have already become an integral part of. The university will continue to support these programs within the setting of Göttingen's lively urban, cultural and social life, in itself a prerequisite for creative teaching and research.

Prof. Dr. Kurt von Figura
(President of the Georg August University Göttingen)

Letter from the Max Planck Society

The mission of the Max Planck Society is to conduct basic research in science and humanities at the highest level. More than 80 Max Planck Institutes are located on scientific campuses across Germany, most of them close to universities.

Scientific ties between Max Planck Institutes and universities are traditionally strong. In 1998, during the 50th year celebration of the Max Planck Society in Göttingen, the Max Planck Society, together with the Hochschulrektorenkonferenz, launched the International Max Planck Research Schools as a new joint program to further intensify cooperation.

The goals of the International Max Planck Research Schools are

- to attract excellent students from all around the world to intensive Ph.D. training programs in Germany, preparing them for careers in science,
- to integrate Max Planck scientists in top-level scientific training of junior scientists,
- to intensify the ties to the universities owing to the participation of internationally renowned Max Planck scientists in joint teaching activities, and
- to strengthen international relationships by providing individual support to each student and by exposing foreign students to German culture and the German language.

By now, 51 International Max Planck Research Schools have been established involving 65 Max Planck Institutes, 48 German universities with 70 participating faculties and more than 15 universities abroad. More than 1900 (mostly PhD) students from 87 countries are presently enrolled. Approximately 850 PhD students have graduated to date from an International Max Planck Research School.

Since their foundation in the year 2000, the Göttingen International Max Planck Research Schools in Molecular Biology and Neurosciences have met with extraordinary success. Every year, the programs receive hundreds of applications, with the quality of the students consistently being very high. Most students graduated so far have moved on to postdoctoral positions, many at prestigious international institutions. In the past years, the Göttingen Schools received unanimous acclaim during external evaluations and won national awards. For instance they are the only Life Science Programs within Germany that were selected for the “Top Ten International Master’s Degree Courses”. The Schools have also reshaped the local scientific community, strengthening the ties between the participating institutions, and initiated new scientific collaborations that augment the international reputation of Göttingen as a center of scientific excellence. Furthermore, the Schools served as role models and founding members of the Göttingen Graduate School for Neurosciences and Molecular Biosciences, thus were being instrumental for the success of the University in the German Excellence Initiative. We hope that in the years to come the students of the International Max Planck Research Schools will be successful in their professional careers. We also hope that they will remember their training period in Göttingen as an exciting and stimulating phase in their lives.

Peter Gruss
President
Max Planck Society

Reinhard Jahn
Dean of the IMPRS
Molecular Biology

Overview

This yearbook is intended to provide information on the International MSc/PhD Molecular Biology Program in Göttingen, Germany, which was established in 2000. In addition to general information on the program, the yearbook introduces the current year's students, the faculty members, the program committee and the coordination team.

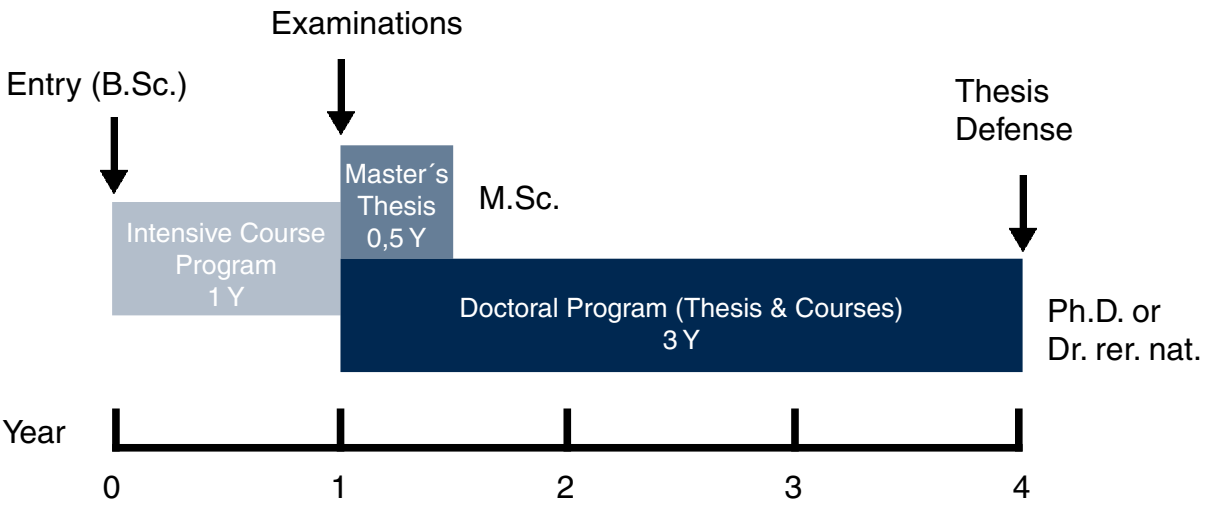
The program is member of the recently founded Göttingen Graduate School for Neurosciences and Molecular Biosciences (GGNB), which is funded by the Excellence Initiative of the German Federal and State Governments. It is offered by the Göttingen Center for Molecular Biosciences (GZMB), a newly established scientific center of excellence at the University of Göttingen, the Max Planck Institute for Biophysical Chemistry, the Max Planck Institute for Experimental Medicine, and the German Primate Center. Further to their active participation in the Molecular Biology Program and the research activities of the GZMB, the above-mentioned partners closely cooperate in several research alliances, collaborative research centers and interdisciplinary doctoral programs. An example for cooperation with research institutes abroad are joint activities and student exchange with the Feinberg Graduate School at the Weizmann Institute of Science in Rehovot, Israel.

The intensive, research-oriented curriculum of the International MSc/PhD Molecular Biology Program qualifies students for professional work in the fields of molecular and cellular biosciences. The program is open to students from Germany and from abroad, who hold a Bachelor's degree (or equivalent) in the biosciences, chemistry, medicine, or related fields. Scholarships are available. All courses are held in English. The academic year starts in October and is preceded by three week orientation program. Applications may be submitted until January 15 of the year of enrollment. To ensure a high standard of individual training, the number of participants is limited to 20 students per year.

All students initially participate in one year of intensive course work. This first segment of the program comprises lectures, tutorials, seminars, methods courses, and individually supervised research projects (laboratory rotations). The traditional German structure of academic semesters is not followed. The condensed schedule allows students to accumulate 90 credits (ECTS) within one year, which would normally require three semesters.

Subsequently, two separate segments are offered:

- **PhD Program:** Good to excellent results after the first year qualify for direct admission to a three-year doctoral project in one of the participating research groups. The Master's thesis requirement is waived in this case. After successful defense of a doctoral thesis, the degree *Doctor of Philosophy* (Ph.D.) or the equivalent title *Doctor rerum naturalium* (Dr. rer. nat.) is conferred.
- **MSc Program:** Alternatively, students may conclude the program with a Master's thesis, based on six months of experimental scientific research. The degree Master of Science (MSc) is awarded upon successful completion of the Master's thesis.



Funding of the Program

The Neuroscience Program thanks the following institutions and funding initiatives, who contributed to the success of the Neuroscience Program:

DAAD

German Academic Exchange Service (DAAD), Bonn, Germany, http://www.daad.de

International Degree Programs - Auslandsorientierte Studiengänge (AS)

IPP made in Germany

International Postgraduate Programs – Internationale Promotionsprogramme (IPP)

Max Planck Society for the Advancement of Science, Munich, Germany, http://www.mpg.de

International Max Planck Research Schools

Niedersächsisches Ministerium für Wissenschaft und Kultur

Ministry of Lower Saxony for Science and Culture, Hannover, Germany, http://www.mwk.niedersachsen.de/home/

Innovationsoffensive

Doctoral Programs - Promotionsprogramme

Stifterverband für die Deutsche Wissenschaft

Stifterverband für die Deutsche Wissenschaft, Essen, Germany, http://www.stifterverband.org

Exzellenzstiftung zur Förderung der Max-Planck-Gesellschaft, http://www.exzellenzstiftung.de

Donors

The Molecular Biology Program thanks the following companies for their donations, which were used to financially support students during the first year of studies:

Bayer AG, Leverkusen, Germany

Carl Zeiss Lichtmikroskopie, Göttingen, Germany

Degussa AG, Düsseldorf, Germany

DeveloGen AG, Göttingen, Germany

Heka Elektronik GmbH, Lambrecht / Pfalz, Germany

Hellma GmbH & Co. KG, Müllheim / Baden, Germany

KWS Saat AG, Einbeck, Germany

Leica Microsystems GmbH, Bensheim, Germany

Luigs & Neumann, Ratingen, Germany

Olympus Deutschland GmbH, Hamburg, Germany

Roche Diagnostics GmbH, Penzberg, Germany

Sartorius AG, Göttingen, Germany

Solvay Pharmaceuticals, Hannover, Germany

Springer Verlag, Heidelberg, Germany

Vossius & Partner, München, Germany

Intensive Course Program (First Year)

Throughout the first year, current topics in molecular biology are covered by

- lectures
- tutorials
- methods courses
- laboratory rotations
- seminars

Lectures and Tutorials

A comprehensive lecture series is offered in a sequence of 8-11 week units. The following topics are taught on an advanced level throughout the first year (36 weeks, 4 hours per week):

A. Biochemistry and Structural Biology

- The Prokaryotic and Eukaryotic Cell
- Enzyme Mechanisms and Regulation
- Energy Metabolism, Lipid Metabolism
- Metabolic Networks
- Protein Modification and Degradation
- Protein Structure and Folding, NMR, Crystallography

B. Molecular Genetics

- DNA and Chromatin Structure
- DNA Replication and Repair
- Transcription
- RNA-processing and Translation
- Signal Transduction
- Genomics, Bioinformatics

C. Functional Organization of the Cell / Neurobiology / Immunology

- Nucleocytoplasmic Transport
- Protein Sorting and Processing
- Vesicular Transport, Organelle Biogenesis
- Cytoskeleton
- Cell Adhesion
- Nervous Systems, Sensory Systems
- Immunology
- Infectious Diseases, Principles of Pathogenicity
- Cell Cycle, Apoptosis, Cancer

D. Model Systems of Molecular Biology/Biotechnology

- Prokaryotes
- Biotechnology
- Fungi
- *Arabidopsis*
- *Drosophila, C. elegans*
- *Xenopus*, Zebrafish
- Chicken, Mouse
- Human Genetics

Each lecture is accompanied by a tutorial session, where students meet with a tutorial in small groups. Tutorials involve exercises, review of lecture material, and discussion of related topics.

Methods Courses

During the first months of the Molecular Biology Program, students participate in a series of methods courses to introduce them to principles and practical aspects of basic scientific techniques and the handling of model organisms. The methods comprise 18 two-day experiments in small groups.

A. Proteins

- Protein preparation and characterization by gel electrophoresis and Western blot
- Chromatographic protein separation
- NMR spectroscopy
- Structural analysis of proteins and protein structure validation
- Proteomics
- Microarrays
- Analysis of protein-protein and nucleic acid-protein interaction

B. Nucleic Acids

- Purification and electrophoresis of nucleic acids
- Polymerase chain reaction I
- cDNA-synthesis, cloning
- DNA sequence analysis and bioinformatics
- Chemical and enzymatic analysis of RNA structure
- Spectroscopic characterization of nucleic acids

C. Cell Biology and Genetics

- Light microscopy
- Electron microscopy
- Biochemical cell fractionation
- Cell culture
- Expression analysis

Laboratory Rotations

Starting in January, every student conducts three independent research projects (laboratory rotations) in the participating departments. Each project is individually supervised. These involve seven weeks of experimental work, followed by one week for data analysis and presentation. For each project, a report must be completed in the format of a scientific publication. The laboratory rotations must cover three different subjects.

Seminars

Seminars start in March. The class meets weekly for two hours to discuss two student presentations. The presentations are research reports based on work from the laboratory rotations.

Examinations

After the first year of intensive training, all students take one written and two oral Master's examinations. The Master's examinations explore the students' theoretical background in topics covered by lectures and tutorials. Each oral examination investigates the qualification in two of the following disciplines:

- biochemistry
- structural biology
- genetics
- microbiology
- cell biology
- immunology
- developmental biology

PhD Program

Students who have passed the Master's examinations with good or excellent results qualify for direct admission to a three-year doctoral project in one of the participating research groups without being required to complete a Master's thesis first.

The PhD program emphasizes independent research on the part of the students. Doctoral students select three faculty members as their doctoral thesis committee which closely monitors progress and advises students in their research project. Laboratory work is accompanied by seminars and lecture series, a wide variety of advanced methods courses, training in scientific writing and oral presentation skills, courses in intercultural communication, bioethics and research ethics, elective courses, and participation in international conferences or workshops.

Doctoral students of the program organize the international PhD student symposium "Horizons in Molecular Biology" every year with great success, outstanding speakers and, by now, more than 300 participants from all over the world. The meeting was designed by the students to promote scientific exchange between young researchers from different disciplines.

At the end of the PhD training program, a doctoral thesis is submitted either in the traditional format, or as a collection of scientific publications in internationally recognized journals along with a general introduction and a discussion of the results. The degree PhD or, alternatively, Dr. rer. nat. will be awarded after the successful defense of the doctoral thesis.

Master's Program

After the first year of intensive training, students may conclude the program with a six-month thesis project, leading to a Master of Science degree. The thesis project involves experimental work under the supervision of faculty member of the Molecular Biology Program. Students have the opportunity to conduct their Master's thesis project at a research institution abroad.

Orientation, Language Courses, Social Activities

A three-week orientation prior to the program provides assistance and advice for managing day-to-day life in Germany, including arrangements for bank account, health insurance, residence permit, housing, and enrolment. Students have the opportunity to meet faculty members and visit laboratories of the participating institutions. In addition, the orientation program informs students about computing and library facilities, the city and university of Göttingen, sports facilities, and cultural events.

Prior to the start of lectures and courses, basic knowledge in mathematics, chemistry and physics is refreshed in a one-week crash course, the so-called "Week Zero".

An intensive basic language course in German is offered in cooperation with *Lektorat Deutsch als Fremdsprache* to facilitate the first weeks in Göttingen. Additional language courses and social activities accompany the program.

Application, Selection and Admission 2008

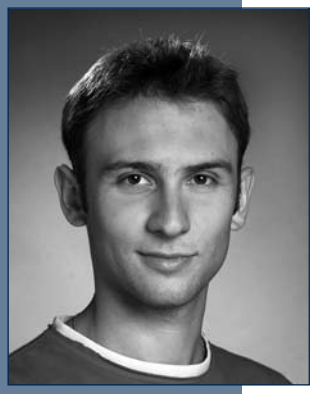
Applicants must hold a Bachelor's degree or equivalent in biology, biochemistry, chemistry, medicine, or related fields. Applicants who are not native speakers of English should demonstrate adequate competence of the English language by acceptable results in an internationally recognized test.

In the year 2008, the Molecular Biology program received 382 applications from 54 countries.

Continent	Applications	Admissions
Europe (total)	**94**	**14**
Germany	44	6
other West Europe	16	1
East Europe	34	7
America (total)	**19**	**3**
North America	15	1
Central/South America	4	2
Africa (total)	**44**	**0**
North Africa	25	0
Central/South Africa	19	0
Asia (total)	**224**	**3**
Near East	25	1
Central Asia/ Far East	199	2
Australia	1	0

Students 2008/2009

Name		Home Country
Ilian	Atanassov	Bulgaria
Julia	Cajan	Germany
Hema	Chug	India
Carlos Eduardo	da Cunha	Brazil
Iris	Finci	Croatia
David	Haselbach	Germany
Fatemeh	Javadi Zarnaghi	Iran
Oleksandra	Karpiuk	Ukraine
Koray	Kirli	Turkey
Elisabeth	Koers	Netherlands
Nadiia	Kondratiuk	Ukraine
Wen-ti	Liu	Taiwan
Helena	Magliarelli	Brazil
Sinem	Saka	Turkey
Christian	Schulz	Germany
Hanno	Sjuts	Germany
Caroline	von Spee	Germany
Christopher	Spencer	USA
Olena	Steshenko	Ukraine
Barbara	Waldmann	Germany



Bulgaria

Ilian Atanassov

EDUCATION

College / University

Jacobs University, Bremen, Germany

Highest Degree

B.Sc.

Major Subjects

Biochemistry, Cell Biology and Molecular Biology

Lab Experience

Various cell and molecular biology techniques

Projects / Research

02/2008 – 05/2008 Generation of recombinant CathepsinK-EGFP. Jacobs University, Bremen, Germany

09/2007 – 01/2008 Generation of recombinant MHC class I – EGFP/ Dendra. Jacobs University, Bremen, Germany

06/2007 – 09/2007 Elucidation of the role of cysteines in the function of IRX 3 and a study of the relation between cellulose contents and the level of IRX 3 expression. The University of Manchester, Manchester, United Kingdom

07/2006 – 08/2006 Expression of deletion mutants of cellulose synthase gene and characterization of transgenic plants. The University of Manchester, Manchester, United Kingdom

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

Germany

Julia Cajan

EDUCATION

College / University

2005 – 2008 Philipps-Universität Marburg, Germany

Highest Degree

B.Sc.

Major Subjects

Molecular Genetics and Developmental Biology

Lab Experience

Techniques in molecular biology and biochemistry. Basic work with *D. melanogaster*

Projects / Research

02/2008 – 06/2008 Molecular Characterization of the primary fatty acid synthase in *U. maydis* (Bachelor's Thesis)

10/2007 – 12/2007 & 07/2008 – 8/2008 Establishment of transgenic fly lines, Expression pattern for several genes in *Drosophila* embryos

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

India

Hema Chug

EDUCATION

College / University

2006 – 2008 School of Biotechnology, Jawaharlal Nehru University, New Delhi, India

2003 – 2006 Gargi College, University of Delhi, New Delhi, India

Highest Degree

M.Sc.

Major Subjects

Microbiology and Biotechnology

Lab Experience

Techniques in molecular biology, immunology and microbiology

Projects / Research

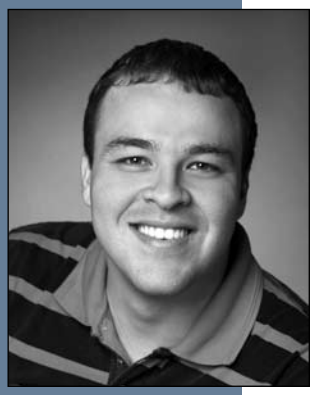
07/2007 – 05/2008 Identification and Characterization of Immunodominant B-Cell Epitopes of Protective Antigen of *Bacillus anthracis*. School of Biotechnology, JNU, India

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2006 – 2008 Scholarship from Department of Biotechnology, Govt. of India

2005 – 2006 University Medal from University of Delhi, India



Brazil

Carlos Eduardo da Cunha

EDUCATION

College / University

Federal University of São Paulo – Medical College, São Paulo, Brazil

Highest Degree

B.Sc.

Major Subjects

Biochemistry, Biophysics and Bioinformatics

Lab Experience

Techniques in biochemistry, biophysics, bioinformatics, and organic chemistry

Projects / Research

01/2007 – 12/2007 Biochemical characterization of oligopeptidase A of *E.coli* and an approach on its predicted structure when comparing to homologues proteins

06/2006 – 12/2006 Biochemical characterization of dipeptidylcarboxypeptidase from *E.coli* and a structural study on its inhibition mechanism

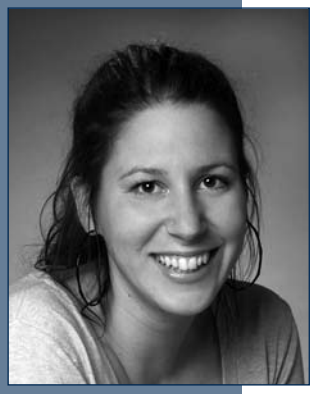
07/2005 – 05/2006 Characterization of a serine-thiol protease from *Paracoccidioides brasiliensis* and its organic derivative inhibitor

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

07/2005 –12/2007 Scholarship from Brazil National Council of Scientific and Technological Development

2007 Nomination for the Young Scientific Student Research Award, Brazil



Croatia

Iris Finci

EDUCATION

College / University

2005 – 2008 Faculty of Natural Sciences, University of Zagreb, Croatia

Highest Degree

B.Sc.

Major Subjects

Molecular Biology

Lab Experience

Different techniques in molecular biology

Projects / Research

11/2007 – 4/2008 Assesment of genotoxic effects of radiofrequency radiation in coelomocytes from earthworms and in tobacco leaves by the Comet assay

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2005 – 2008 National scholarship from Croatian Ministry of Science, Education and Sport

Germany

David Haselbach

EDUCATION

College / University

2005 – 2008 University of Potsdam

Highest Degree

B.Sc

Major Subjects

Biochemistry and Molecular Biology

Lab Experience

Optical techniques like dynamic light scattering, CD spectroscopy and fluorescence spectroscopy; Protein purification and techniques of molecular biology

Projects / Research

04/2008–08/2008 Detection of single stranded DNA using DNAzymes (Bachelor's Thesis), Max Planck Institute for Molecular Genetics, Berlin

12/2007–04/2008 Investigation on starch binding proteins, University of Potsdam, Steup group, Dept. of Plant Physiology, Potsdam

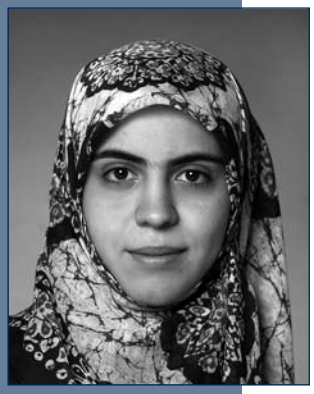
08/2007 Purification of PRP4 Kinase, Max Planck Institute for Biophysical Chemistry, Lührmann group, Dept. of Cellular Biochemistry, Göttingen

10/2006 –11/2007 Investigation on the aggregation process of the SH3 domain of PI3K, University of Potsdam, Seckler group, Dept. of Physical Biochemistry, Potsdam

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

2005 – present Studienstiftung des Deutschen Volkes (German National Academic Foundation)



Iran

Fatemeh Javadi Zarnaghi

EDUCATION

College / University

2003 – 2008 University of Tehran, Dept. of Biotechnology, Faculty of Science, Tehran, Iran

Highest Degree

M.Sc.

Major Subjects

Molecular Biology, Biotechnology and Human Genetics

Lab Experience

Acquaintance with basic techniques in molecular biology, biochemistry, biotechnology and genetics

Projects / Research

Analyzing Fibrinogen genes related STRs polymorphism in Iranian population to achieve fast method for prenatal diagnosis and carrier detection

Scholarships / Awards

2008 –2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2007 – 2008 National Foundation of Elites stipend, Iran

2003 – 2008 Ministry of Science, Research and Technology Stipend for Exceptional Talents

2003 – 2008 University of Tehran Stipend (for Scientific Olympiad Awardees and high ranking students in national Entrance Exam)

Ukraine

Oleksandra Karpiuk

EDUCATION

College / University

National Taras Shevchenko University of Kiev

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Spectrofluoromethrical and spectrophotomethrical methods, Western-blot analysis, work with animal models of human diseases

Projects / Research

Glutathione content and activity of glutathione-peroxidase during hepatitis development in rats

Investigation of glutation-dependent enzymes content and Bcl-2 and Bax proteins concentrations in parietal cells during chronic atrophic gastritis in rats

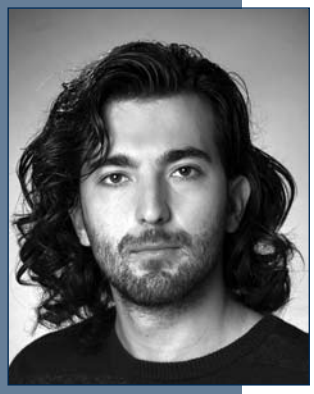
All project were performed at the National Taras Shevchenko University of Kiev, Faculty of Biology, Laboratory of Biochemistry

Scholarships / Awards

2008 –2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2006 – 2007 O. Palladin scholarship for excellent studying

Koray Kirli



Turkey

Koray Kirli

EDUCATION

College / University

2003 – 2008 Middle East Technical University (METU)

Highest Degree

B.Sc.

Major Subjects

Molecular Biology & Genetics

Lab Experience

Various techniques in microbiology, molecular biology and molecular genetics

Projects / Research

01/2007 – 07/2008 Combining phototaxis, hydrogen pumping bacteriorhodopsin, and metal binding domain abilities in *E. coli*, to create functional metal carrier bacteria. iGEM'07 Team, Middle East Technical University,USA

06/2007 – 09/2007 Generation counter by oscillating fusion proteins in mammalian cell nucleus, Silver Lab, Harvard Medical School, USA

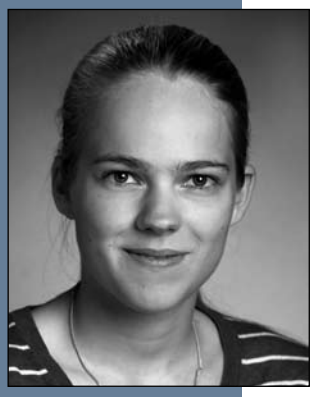
Scholarships / Awards

2008 –2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2003 – 2008 Republic of Turkey General Directorate of Higher Education Credit and Hostels Institution Education and Tax Credit, Turkey

10/2007 Bronze medal in Internationally Genetically Engineered Machines iGEM'07 Competition, MIT, USA

Elisabeth Koers



Netherlands

Elisabeth Koers

EDUCATION

College / University

2005 – 2008 University of Utrecht, Utrecht, Netherlands

Highest Degree

B.Sc.

Major Subjects

Structural Biology, Molecular Biology, Physical Chemistry

Lab Experience

Liquid and solid state NMR, molecular and cell biology techniques

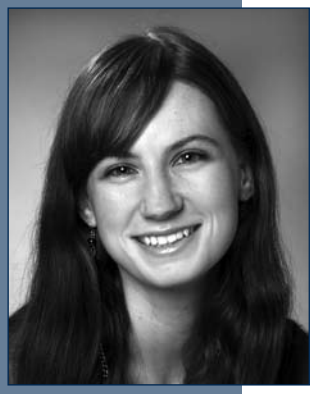
Projects / Research

04/2007 – 06/2007 Protein-protein interactions of IUP's (Intrinsically Unfolded Proteins) Bijvoet Center, NMR spectroscopy, Utrecht

04/2008 – 06/2008 Electrostatic interactions of model peptides and membranes, Biochemistry of Lipids, Utrecht University

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society



Ukraine

Nadiia Kondratiuk

EDUCATION

College / University

National Taras Shevchenko University of Kyiv

Highest Degree

B.Sc.

Major Subjects

Biology, Biochemistry

Lab Experience

Various techniques in molecular biology and biochemistry

Projects / Research

05/2006 – 08/2006 Construction of plasmid pGEM-T Easy+AssocII for the study of properties of AP insulin-like growth factor-2 associated protein, IGF-2. Institute for Molecular Biology, Department of Nucleic Acids, Kyiv, Ukraine

09/2006 – 05/2007 Study of Mg^{2+}-affinity of truncated form of eukaryotic elongation factor 1A, ΔeEF1A. Institute for Molecular Biology, Department of Mechanisms of Translation, Kyiv, Ukraine

05/2007 – 06/2008 Study of impact of tea polyphenolics on the expression of nuclear transcription factor NF-kB in model Walker-256 tumor in rats. Institute for Experimental Oncology, Department of Tumor Biochemistry, Kyiv, Ukraine

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

Taiwan

Wen-ti Liu

EDUCATION

College / University

2003 – 2007 National Taiwan University, Taiwan

Highest Degree

B.Sc.

Major Subjects

Biochemical Science and Technology

Lab Experience

Various techniques in biochemistry, cell and molecular biology

Projects / Research

Cloning and Expression of Gamma-parvin

The Interaction of Gamma-parvin and TRB2 in Apoptosis in BaF3 Cell Line

Applying Recombineering-Based Method to Generate TRB1, 2, 3 Triple Conditional Knockout Mice

All project have been performed in Dr. Jeffrey Jong-young Yen's Lab, Institute of Biomedical Science, Academia Sinica, Taipei, Taiwan

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2005 Fellowship for college students' research project, National Science Council, Taiwan

Brazil

Helena Magliarelli

EDUCATION

College / University

2004 – 2007 Federal University of São Paulo – Medical College, São Paulo, SP, Brazil

Highest Degree

B.Sc.

Major Subjects

Biochemistry, Cellular Biology, Biophysics and Molecular Biology

Lab Experience

Various techniques in cellular biology (cell culture, confocal microscopy, flow cytometry), molecular biology (recombinant DNA technology, PCR) and biochemistry (western blot and protein expression, purification and characterization)

Projects / Research

01/2007 – 12/2007 The role of cathepsins B, L and S in melanoma murine B16F10-Nex2 angiogenesis

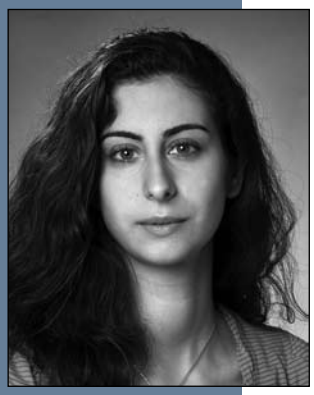
06/2006 – 12/2006 Cloning, expression and characterization of Dcp (dipeptidyl-carboxypeptidase) from *E.coli*

07/2005 – 05/2006 Characterization of oligopeptidase A from *E.coli*

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

07/2005 – 12/2007 Scholarship from Brazil National Council of Scientific and Technological Development



Turkey

Sinem Saka

EDUCATION

College / University

2004 – 2008 Middle East Technical University (METU) , Ankara, Turkey

Highest Degree

B.Sc.

Major Subjects

Molecular Biology and Genetics

Lab Experience

Recombinant DNA techniques, various techniques in microbiology, molecular biology, and genetics

Projects / Research

01/2008 – 07/2008 Creation of a controlled metal bioremediation system using E. coli, iGEM team, METU, Turkey

06/2007 – 09/2007 Design and creation of a novel fusion protein to obtain an oscillation synchronized with the cell division in eukaryotes, Harvard Medical School, USA

Scholarships / Awards

2007 – 2008 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2007 Bronze medal in International Genetically Engineered Machines Competition - iGEM 2007, MIT, USA

2001 – 2004 TED Ankara College Highest Honor Prize and Scholarship

Christian Schulz

Germany

Christian Schulz

EDUCATION

College / University

2005 – 2008 Dresden University of Technology, Germany

Highest Degree

B.Sc.

Major Subjects

Molecular Biotechnology

Lab Experience

Experience in cell culture, gene silencing, cell biology, protein biochemistry and molecular biology

Projects / Research

08/2007 – 10/2007 Resequencing of low quality regions in the genome assembly of *Wolbachia pipientis* (strain wRi). Uppsala University, Sweden

03/2008 – 09/2008 Bachelor's thesis: Silencing of the human mitochondrial assembly factor SURF1. Dresden University of Technology, Germany

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

Hanno Sjuts

Germany

Hanno Sjuts

EDUCATION

College / University

2005 – 2008 Universität zu Lübeck, Germany

Highest Degree

B.Sc.

Major Subjects

Biochemistry, Cell Biology

Lab Experience

Various techniques in biochemistry, cell biology, molecular biology and biophysical chemistry

Projects / Research

08/2006 – 09/2006 Overexpression and purification of RiV proteins. Universität zu Lübeck, Germany

04/2008 – 08/2008 Characterization of complex formation between cellpenetrating peptides and oligonucleotides. Bachelor's thesis, Universität zu Lübeck, Germany

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

Germany

Caroline von Spee

EDUCATION

College / University

Since 2004 Georg August University Göttingen, Germany

08/2006 – 07/2007 Karolinska Institute Stockholm, Sweden

Highest Degree

B.Sc.

Major Subjects

Molecular Medicine

Lab Experience

Techniques in molecular biology, biochemistry and cell culture

Projects / Research

01/2007 – 03/2007 Detection of autoantibodies to citrullinated antigens in patients with rheumatoid arthritis. Karolinska Institute Stockholm, Sweden

04/2008 – 07/2008 Monitoring the dimerization of serotonin and dopamine receptors using split-TEV (Bachelor's Thesis). Max Planck Institute for Experimental Medicine, Göttingen, Germany

Publications

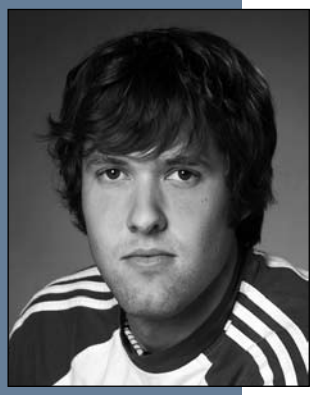
Snir O, Widhe M, von Spee C, et al. (2008) Multiple antibody reactivities to citrullinated antigens in sera from rheumatoid arthritis patients - association with HLA-DRB1 alleles [Internet]. Ann Rheum Dis, July 17, 2008

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

04/2006 – 09/2009 Scholarship Bischöfliche Studienförderung Cusanuswerk

08/2006 – 07/2007 Socrates/Erasmus Scholarship



USA

Christopher Spencer

EDUCATION

College / University

2003 – 2007 Arizona State University, Tempe, USA

Highest Degree

B.Sc.

Major Subjects

Biology

Lab Experience

SDS-PAGE, western blotting, immunocytochemistry and confocal microscopy, MALDITOF mass spectrometry, PCR, DNA gel electrophoresis, cell transformation/transfection, chemotaxis assays, etc.

Projects / Research

05/2007 – 12/2007 Analysis and characterization of sperm chemoattractants in mouse and frog species

Publications

Burnett LA, Boyles SA, Spencer CD, Bieber AL, Chandler DA (2008) *Xenopus tropicalis* allurin: Expression, purification, and characterization of a sperm chemoattractant that exhibits cross-species activity, Dev Biol

Scholarships / Awards

2008 – 2009 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2003 – 2007 ASU University Scholarship

2003 – 2007 ASU President's Scholarship

Olena Steshenko

Ukraine

Olena Steshenko

EDUCATION

College / University

2004 – 2008 National Taras Shevchenko University of Kyiv

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Major techniques in biochemistry and molecular biology

Projects / Research

2005 – 2008 Biochemical approach in development of stomach ulcer, immunological aspect of this disease, several enzymes (2',5'-OAS, ODK) and SH-radicals, as markers of functional state of immune system during stomach ulcer (Bachelor's thesis)

07/2007 – 10/2007 Investigation of the impact of heavy-metal doted technical nanoparticles to embryos of zebrafish, influence of nanoparticles on the expression of several genes (mmp9, mmp13, ABCB1) – project in UFZ Leipzig-Halle (Germany)

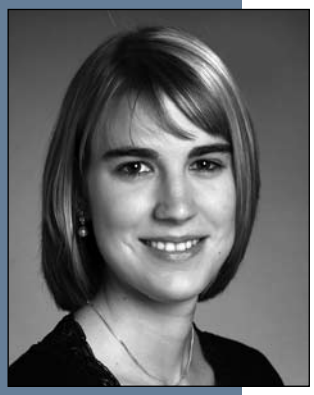
03/2008 – 04/2008 Research of impact of medicine on the zebrafish – project in University of Konstanz (Germany)

Scholarships / Awards

2007– 2008 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2007 DAAD scholarship for young researchers

Barbara Waldmann



Germany

Barbara Waldmann

EDUCATION

College / University

2005 – 2008 Philipps University Marburg

Highest Degree

B.Sc.

Major Subjects

Biology, Molecular Biology and Microbiology

Lab Experience

Various techniques in molecular biology and microbiology

Projects / Research

07/2004 – 08/2004 Summer project at the Biotech Company Inologic: Effect of different compounds on breast cancer cells

07/2007 – 08/2007 Summer project at the Max Planck Institute for Infection Biology, Berlin in the Department of Prof. Dr. Arturo Zychlinsky: Effect of ions on the ability of histones to kill bacteria

08/2007 – 09/2007 Summer project at the Wellcome Trust Biocentre in Dundee in the Department of Prof. Dr. Mike Ferguson: Cloning of genes coding for surface proteins of *Trypanosoma brucei*

01/2008 – 06/2008 Bachelor thesis: Identification of proteins interacting with the hybrid-histidine-kinase RodK in *Myxococcus xanthus*

Scholarships / Awards

2008 – 2009 International Max Planck Research School support

Faculty

Name		Institute	
Mathias	Bähr	Neurology	U Göttingen
Botho	Bowien	Microbiology	U Göttingen
Gerhard H.	Braus	Molecular Microbiology	U Göttingen
Bertram	Brenig	Molecular Biology of Livestock	U Göttingen
Nils	Brose	Molecular Neurobiology	MPI em
Matthias	Dobbelstein	Molecular Oncology	U Göttingen
Detlef	Doenecke	Biochemistry	U Göttingen
Stefan	Eimer	Molecular Neurogenetics	ENI
Wolfgang	Engel	Human Genetics	U Göttingen
Dirk	Fasshauer	Neurobiology	MPI bpc
Ivo	Feußner	Plant Biochemistry	U Göttingen
Ralf	Ficner	Molecular Structural Biolog	UGöttingen
Wolfgang	Fischle	Chromatin Biochemistry	MPI bpc
Christiane	Gatz	General and Developmental Physiology of the Plant	U Göttingen
Dirk	Görlich	Cellular Logistics	MPI bpc
Christian	Griesinger	NMR-based Structural Biology	MPI bpc
Uwe	Groß	Bacteriology	U Göttingen
Jörg	Großhans	Developmental Biochemistry	U Göttingen
Heidi	Hahn	Human Genetics	U Göttingen
Claudia	Höbartner	Nucleic Acid Chemistry	MPI bpc
Herbert	Jäckle	Molecular Developmental Biology	MPI bpc
Reinhard	Jahn	Neurobiology	MPI bpc
Michael	Kessel	Molecular Biology	MPI bpc
Dieter	Klopfenstein	Biochemistry	U Göttingen
Wilfried	Kramer	Molecular Genetics	U Göttingen
Volker	Lipka	Plant Cell Biology	U Göttingen
Reinhard	Lührmann	Cellular Biochemistry	MPI bpc
Ahmed	Mansouri	Molecular Developmental Genetics	MPI bpc
Frauke	Melchior	Biochemistry	U Göttingen
Burkhard	Morgenstern	Bioinformatics	U Göttingen
Klaus-Armin	Nave	Neurogenetics	MPI em
Erwin	Neher	Membrane Biophysics	MPI bpc
Tomas	Pieler	Developmental Biochemistry	U Göttingen
Stefanie	Pöggeler	Genetics of Eukaryotic Organisms	U Göttingen
Peter	Rehling	Biochemistry	U Göttingen
Silvio	Rizzoli	STED Microscopy of Synaptic Function	ENI
Marina	Rodnina	Physical Biochemistry	MPI bpc
Reinhard	Schuh	Molecular Organogenesis	MPI bpc
Halyna	Shcherbata	Gene expression and signaling	MPI bpc
George Michael	Sheldrick	Structural Chemistry	U Göttingen
Mikael	Simons	Biochemistry and Molecular Cell Biology	MPI em
Holger	Stark	3D Electron Cryomicroscopy	MPI bpc
Jörg	Stülke	General Microbiology	U Göttingen
Michael	Thumm	Molecular Cell Biology	U Göttingen
Kai	Tittmann	Bioanalytics	U Göttingen
Henning	Urlaub	Bioanalytical Mass Spectrometry	MPI bpc
Markus	Wahl	X-Ray Crystallography	MPI bpc
Lutz	Walter	Primate Genetics	DPZ
Jürgen	Wienands	Immunology	U Göttingen
Ernst	Wimmer	Developmental Biology	U Göttingen
Andreas	Wodarz	Stem Cell Biology	U Göttingen

U Göttingen = Georg August University, MPI bpc = Max Planck Institute for Biophysical Chemistry, MPI em = Max Planck Institute for Experimental Medicine, DPZ = German Primate Center

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Mathias Bähr

Professor of Neurology

- 1985 MD, University of Tübingen Medical School, Training in Neurology at University Hospitals in Tübingen and Düsseldorf
- DFG and Max Planck Fellow at the Max Planck Institute for Developmental Biology Tübingen and at the Department of Anatomy and Cell Biology, Washington University St.Louis
- Schilling-Foundation Professor for Clinical and Experimental Neurology, University of Tübingen
- Director at the Department of Neurology, University of Göttingen since 2001

Major Research Interests

We are interested to understand 2 basic questions in cellular and molecular neurobiology:
1. Which factors support survival of adult CNS neurons?
2. What kills these cells under pathological conditions?

Up to now, only little is known about the mechanisms that support survival of a postmitotic cell like a human neuron for eventually more than 100 years under physiological conditions. However, by examining the molecular regulation of cell survival and cell death during development and in the lesioned adult CNS, one may get some clues to answer this question.
In our group, several *in vitro* and *in vivo* model systems are used which allow examination of neuronal de- and regeneration. Our basic model is the rodent retino-tectal projection. Here, we can study development, de- and regeneration of the respective projection neurons, the retinal ganglion cells (RGCs) in single cell cultures, explants or *in vivo*. Transection or crush-axotomy of the optic nerve induces retrograde death more than 80% of RGCs within two weeks. This secondary cell loss is mainly apoptotic and involves specific changes in gene expression pattern of transcription factors (e.g. c-jun or ATF-2), pro- and anti-apoptotic genes (e.g. bcl-2 or bax) and growth-associated genes (like GAP-43). Thus, long term survival and initiation of regeneration programmes of RGCs critically depends on inhibition of apoptotic cell death. To that end, we have used a variety of techniques to interfere with the cell death cascades that follow lesions of the optic nerve in adult rats. Inhibition of neuronal apoptosis can be afforded by pharmacological administration of trophic factors or by gene therapy approaches using adeno- or adeno-associated virus vectors that can deliver neurotrophic or anti-apoptotic factors directly into neurons or into surrounding glial cells. These, and other new strategies like using peptide-transduction-domains to deliver anti-apoptotic proteins across the blood-brain-barrier are now used to develop new experimental therapy strategies in animal models of human neurological disorders like stroke, trauma, multiple sclerosis or neurodegenerative diseases (e.g. Alzheimer´s or Parkinson´s disease).

Selected Recent Publications

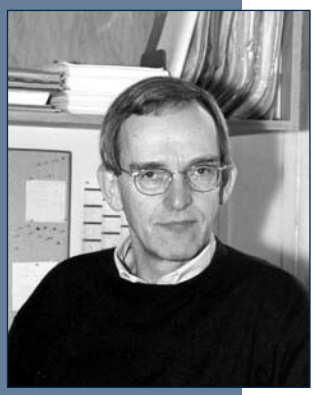
Lingor P, Tönges L, Pieper N, Bermel C, Barski E, Planchamp V, Bähr M (2008) ROCK inhibition and CNTF interact on intrinsic signalling pathways and differentially regulate survival and regeneration in retinal ganglion cells. Brain 13 131 (Pt 1): 250-63

Ganesan S, Rohde G, Eckermann K, Sroka K,Schaefer MKE, Dohm CP, Kermer P, Haase G, Wouters F, Bähr M, Weishaupt JH (2008) Mutant SOD1 detoxification mechanisms in intact single cells. Cell Death & Diff. 15(2): 312-21

Koeberle PD, Bähr M (2007) The Upregulation of GLAST-1 is an indirect anti-apoptotic mechanism of GDNF and Neurturin in the adult CNS. Cell Death & Diff. 15(3): 471-83

Meuer CK, Suppanz IE, Lingor P, Planchamp V, Göricke B, Fichtner L, Braus GH,Dietz GPH, Jakobs S, Bähr M, Weishaupt JH (2007) Cyclin-dependent kinase 5 is an upstream regulator of mitochondrial fission during neuronal apoptosis. Cell Death & Diff. 14(4): 651-61

Liman J, Ganesan S, Dohm CP, Krajewski S, Reed JC, Bähr M, Wouters F, Kermer P (2005) Interaction of BAG1 and Hsp70 mediates neuroprotectivity and increases chaperone activity. Mol Cell Biol. 25(9): 3715-25



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Botho Bowien

Professor of Microbiology

- Dr. rer. nat., Georg-August-Universität Göttingen, 1970
- Postdoc, Case Western Reserve University, Cleveland, Ohio, USA, 1973 - 1975
- Habilitation (Microbiology), Georg-August-Universität Göttingen, 1978
- Professor of Microbiology, Georg-August-Universität Göttingen, 1983

Major Research Interests

Carbon dioxide (CO_2) is an essential gas for all organisms. Assimilation of CO_2 by autotrophs such as the photosynthetic higher plants, algae and cyanobacteria constitutes the primary biosynthetic activity in the biosphere. In addition to these organisms there is a great diversity of photo- and/or chemoautotrophic bacteria and archaea. Such organisms are often facultative autotrophs, i.e. they are able to grow either autotrophically or heterotrophically. The mutual shift between autorophy and heterotrophy requires a sophisticated regulation on the metabolic as well as genetic level.
Ralstonia eutropha H16 is an aerobic, facultatively chemoautotrophic bacterium that assimilates CO_2, like the majority of autotrophs, via the Calvin-Benson-Bassham (CBB) carbon reduction cycle. A main interest of our laboratory concerns the transcriptional control of the *cbb* operons encoding most of the CBB enzymes in *R. eutropha*. The regulatory components of the cbb system, their response to metabolic signals and the interlocking of the *cbb* control with larger regulatory networks are the prime research subjects. The recently elucidated genome sequence of the organism provides an excellent basis to study these questions.
Functional genomics of *R. eutropha* H16 with the goal of assessing and developing the metabolic potential of the organism for future biotechnological applications – particularly under autotrophic growth conditions- is another field of research. The genetics and control of sugar and sugar acid utilization in *R. eutropha* H16 are also being investigated.

Selected Recent Publications

Pohlmann A, Fricke WF, Reinecke F, Kusian B, Liesegang H, Cramm R, Eitinger T, Ewering C, Pötter M, Schwartz E, Strittmatter A, Voß I, Gottschalk G, Steinbüchel A, Friedrich B, Bowien B (2006) Genome sequence of the bioplastic-producing "Knallgas" bacterium *Ralstonia eutropha* H16. Nature Biotechnol 24: 1257-1262

Pötter M, Müller H, Reinecke F, Wieczorek R, Fricke F, Bowien B, Friedrich B, Steinbüschel A (2004) The complex structure of polyhydroxybutyrate (PHB) granules: four orthologous and paralogous phasins occur in *Ralstonia eutropha*. Microbiology 150: 2301-2311

Kusian B, Sültemeyer D, Bowien B (2002) Carbonic anhydrase is essential for growth of *Ralstonia eutropha* at ambient CO2 concentrations. J Bacteriol 184: 5018-5026

Bowien B, Kusian B (2002) Genetics and control of CO2 assimilation in the chemoautotroph *Ralstonia eutropha*. Arch Microbiol 178: 85-93

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Further Information

http://wwwuser.gwdg.de/~molmibio/

Gerhard H. Braus

Professor of Microbiology and Genetics

- Diploma (Biology), Albert-Ludwig University, Freiburg i. Br. (Germany), 1983
- Dr.sc.nat., Swiss Federal Institute of Technology (ETH), Zürich (Switzer land), 1987
- Habilitation (Microbiology), Swiss Federal Institute of Technology (ETH), Zürich (Switzerland), 1991
- Associate Professor of Biochemistry, Friedrich Alexander University, Erlangen (Germany), 1993 - 1996
- Since 1996 Professor of Microbiology (since 2001 Professor of Microbiology and Genetics) in Göttingen

Major Research Interests

The major focus of the laboratory is on the control of developmental programs, protein turnover, pathogenicity and the interplay between development and primary and secondary metabolism. Our models are eukaryotic microorganisms (yeasts and filamentous fungi): (i) We are interested how light coordinates fungal development with fungal secondary metabolism and toxin production. (ii) Nedd8 is a ubiquitin-like protein which is involved in the control of protein turnover. We study the Nedd8-system including the COP99 signalosome using fungi as model systems. (iii) We are interested in the molecular control (protein turnover and translation) of adhesion as initial step in infection and biofilm formation. (iv) We study fungi as models for Parkinson (yeast), fungi as pathogens of immunocompromised patients (*A. fumigatus*) and as plant pathogens (*V. longisporum*).

Selected Recent Publications

Padmanabhan N, Fichtner L, Dickmanns A, Ficner R, Schulz JB, Braus GH (2009) The Yeast HtrA orthologue Ynm3 is a protease with chaperone activity that aids survival under heat stress. Mol Biol Cell 20: 68-77

Streckfuss-Bömeke K, Schulze F, Herzog B, , Scholz E, Braus GH (2009) Degradation of yeast transcription factor Gcn4 requires a C-terminal nuclear localization signal in the cyclin Pcl5. Euk Cell 8: 496-510

Bayram Ö, Krappmann S, Ni M, Bok JW, Helmstaedt K, Valerius O, Braus-Stromeyer S, Kwon NJ, Keller NP, Yu JH, Braus GH (2008) VelB/VeA/LaeA complex coordinates light signal with fungal development and secondary metabolism. Science 320: 1504-1506

Bayram Ö, Biesemann C, Krappmann S, Galland P, Braus GH (2008) More than a repair enzyme: *Aspergillus nidulans* photolyse-like CryA is a regulator of sexual development. Mol Biol Cell 19: 3254-3262

Valerius O, Kleinschmidt M, , Rachfall N, Schulze F, Marin SL, Hoppert M, Streckfuss-Bömeke K, Fischer C, Braus GH (2007) The *S. cerevisiae* homolog of mammalian RACK1, CPC2/ASC1, is required for FLO11 dependent adhesive growth and dimorphism. Mol Cell Proteomics 6: 1986-1979

Busch S, Schwier EU, Nahlik K, Bayram Ö, Draht OW, Helmstaedt K, Krappmann S, Valerius O, Lipscomb WN, Braus GH (2007) An eight-subunit COP9 signalosome with an intact JAMM motif is required for fungal fruit body formation. Proc Natl Acad Sci USA 104: 8125-8130

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Bertram Brenig

Full Professor of Molecular Biology of Livestock

- Director of the Institute of Veterinary Medicine
- Dr. med. vet., University of Munich, Munich 1987

Major Research Interests

The main interest of the laboratory is in the structural and functional analysis of mammalian genes and genomes. We are investigating the cause of different economical important genetic defects in livestock and other domesticated animals. So far our main focus was on porcine genes and their function, e.g. we are currently analysing the molecular origin of porcine hernia inguinalis and scrotalis. Using a whole genome scan we have identified several chromosomal regions that are linked to this disorder. Fine mapping, positional cloning and candidate gene analysis are used for further elucidation. However, in recent years we have also started to look at genes in other species, e.g. cattle, dog, sheep, and buffalo. Especially, in cattle, we are interested in the molecular analysis of bovine spongiform encephalopathy (BSE). The differences in oral uptake of prion protein between cattle and pig is studied *in vivo* and *in vitro*. We have identified humoral microvesical encapsulated nucleic acids that are altered
during a prion infection and can be used as diagnostic tool. Humoral nucleic acids are also studied in several other diseases, e.g. liver carcinoma in dog and pancreatic neoplasias in cat.

Selected Recent Publications

Knorr C, Beuermann C, Beck J, Brenig B (2007) Characterization of the porcine multicopy ribosomal protein SA/37-kDa laminin receptor gene family. Gene 395: 135-143

Thomzig A, Schulz-Schaeffer W, Wrede A, Wemheuer W, Brenig B, Kratzel C, Lemmer K, Beekes M (2007) Accumulation of pathological prion protein PrPSc in the skin of animals with experimental and natural scrapie. PLoS Pathog 3: e66

Beck J, Bornemann-Kolatzki K, Knorr C, Täubert H, Brenig B (2006) Molecular characterization and exclusion of porcine GUSB as a candidate gene for congenital hernia inguinalis/scrotalis. BMC Vet Res 2: 14

Chen K, Knorr C, Bornemann-Kolatzki K, Huang L, Rohrer GA, Brenig B (2006) Characterization of the PGK2 associated microsatellite S0719 on SSC7 suitable for parentage and QTL diagnosis. Anim Biotechnol 17: 43-49

Drögemüller C, Giese A, Martins-Wess F, Wiedemann S, Andersson L, Brenig B, Fries R, Leeb T (2006) The mutation causing the black-and-tan pigmentation phenotype of Mangalitza pigs maps to the porcine ASIP locus but does not affect its coding sequence. Mamm Genome 17: 58-66

Schütz E, Scharfenstein M, Brenig B (2006) Genotyping of ovine prion protein gene (PRNP) variants by PCR with melting curve analysis. Clin Chem 52: 1426-1429

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Nils Brose

Professor, Director at the Max Planck Institute for Experimental Medicine

- Dr. rer. nat. (Ph.D.) 1990, Ludwig Maximilians University Munich
- Appointed as Director at the Max Planck Institute for Experimental Medicine 2001

Major Research Interests

Research in the Department of Molecular Neurobiology focuses on the molecular mechanisms of synapse formation and function in the vertebrate central nervous system. Typically, synapses are formed between cellular processes of a sending and a receiving nerve cell. They are the central information processing units in the vertebrate brain where some 1012 nerve cells are connected by 1015 synapses to form an elaborate and highly structured neuronal network that is the basis for all forms of behaviour. Signal transmission at synapses is mediated by the regulated release of signal molecules (neurotransmitters) which then diffuse to the receiving nerve cell and change its physiological state. In the Department of Molecular Neurobiology, we combine biochemical, morphological, mouse genetic, behavioural, and physiological methods to elucidate the molecular basis of synapse formation and transmitter release processes. Our synaptogenesis research concentrates on synaptic cell adhesion proteins and their role in synapse formation. Studies on the molecular mechanisms of neurotransmitter release focus on components of the presynaptic active zone and their regulatory function in synaptic vesicle fusion.

Selected Recent Publications

Jamain S, Radyushkin K, Hammerschmidt K, Granon S, Boretius S, Varoqueaux F, Ramanantsoa N, Gallego J, Ronnenberg A, Winter D, Frahm J, Fischer J, Bourgeron T, Ehrenreich H, Brose N (2008) Reduced social interaction and ultrasonic communication in a mouse model of monogenic heritable autism. Proc Natl Acad Sci USA 105: 1710-1715

Jockusch W, Speidel D, Sigler A, Sørensen J, Varoqueaux F, Rhee J-S, Brose N (2007) CAPS-1 and CAPS-2 are essential synaptic vesicle priming proteins. Cell 131: 796-808

Varoqueaux F, Aramuni G, Rawson RL, Mohrmann R, Missler M, Gottmann K, Zhang W, Südhof TC, Brose N (2006) Neuroligins determine synapse maturation and function. Neuron 51: 741-754

Reim K, Wegmeyer H, Brandstätter JH, Xue M, Rosenmund C, Dresbach T, Hofmann K, Brose N (2005) Structurally and functionally unique Complexins at retinal ribbon synapses. J Cell Biol 169: 669-680

Junge H, Rhee J-S, Jahn O, Varoqueaux F, Spiess J, Waxham MN, Rosenmund C, Brose N (2004) Calmodulin and Munc13 form a Ca2+-sensor/effector complex that controls short-term synaptic plasticity. Cell 118: 389-401

Roßner S, Fuchsbrunner K, Lange-Dohna C, Hartlage-Rübsamen M, Bigl V, Betz A, Reim K, Brose N (2004) Munc13-1-mediated vesicle priming contributes to secretory APP processing. J Biol Chem 279: 27841-27844

Rhee J-S, Betz A, Pyott S, Reim K, Varoqueaux F, Augustin I, Hesse D, Südhof TC, Takahashi M, Rosenmund C, Brose N (2002) b Phorbol ester- and diacylglycerol-induced augmentation of transmitter release is mediated by Munc13s and not by PKCs. Cell 108: 121-133

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Matthias Dobbelstein

Professor of Molecular Oncology

- Dr. med., University of Munich, 1993
- Postdoctoral fellow, Princeton University, USA, 1993 - 1996
- Group leader, University of Marburg, 1997 - 2004
- Professor of Molecular Oncology, University of Southern Denmark, Odense, since 2004
- Head of the Department of Molecular Oncology, Georg-August-Universität Göttingen, since 2005

Major Research Interests

We are focussing our research on the tumor suppressor p53, trying to elucidate its mechanisms of action, its regulation and its suitability as a target for cancer therapy. p53 operates as a transcription factor and prevents uncontrolled cell proliferation. This activity is regulated through a sophisticated regulatory network that responds to DNA damage. Despite our knowledge concerning the molecular biology of p53, an integrated concept of its regulation, and its translation into rational diagnostics and therapy, are still in their infancy. The tumor suppressor gene TP53 is mutated or deleted in approximately 50% of malignant tumors. However, this does not mean that p53 is active in the remaining cases. It appears that in the vast majority of the remaining 50% of tumors, p53 is inactivated through malfunction of its modulators, such as Mdm2, p14ARF, deltaNp73, and others. We are therefore pursuing the unique opportunity to re-establish p53‘s “dormant” tumor-suppressive activity by targeting its modulators as a potential avenue to therapy.

Selected Recent Publications

Kranz D, Dohmesen C, Dobbelstein M (2008) BRCA1 and Tip60 determine the cellular response to ultraviolet irradiation through distinct pathways. Journal of Cell Biology 182: 197-213

Kranz D, Dobbelstein M (2006) Non-genotoxic p53 activation protects cells against S phase specific chemotherapy. Cancer Research, in press

Schürmann M, Dobbelstein M (2006) Adenovirus-induced ERK phosphorylation during the later phase of infection enhances viral protein levels and virus progeny. Cancer Research 66: 1282-1288

Roth J, Lenz-Stöppler C, Contente A, Löhr K, Koch P, Dobbelstein M (2003) Reactivation of mutant p53 by a one-hybrid adaptor protein. Cancer Research 63, 3904-3908

Contente A, Dittmer A, Koch MC, Roth J, Dobbelstein M (2002) A polymorphic microsatellite that mediates induction of PIG3 by p53. Nature Genetics 30: 315-320

Roth J*, Dobbelstein M*, Freedman D, Shenk T, Levine AJ (1998) Nucleo-cytoplasmic shuttling of the hdm2-oncoprotein regulates the levels of the p53 protein via a pathway used by the human immunodeficiency virus rev protein. EMBO Journal 17: 554-564 (*equal contributors)

Dobbelstein M*, Roth J*, Kimberly WT, Levine AJ, Shenk T (1997) Nuclear export of the adenoviral oncoproteins E1B-55 kD and E4-34 kD. EMBO Journal 16: 4276-4284 (*equal contributors)

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Detlef Doenecke

Professor of Biochemistry

- MD, 1967, University Saarland Medical School
- Postdoc at the Universities of San Francisco (UCSF) and Marburg
- Professor of Biochemistry, 1987, University of Göttingen
- Head of the Department of Molecular Biology at the Institute of Biochemistry and Molecular Cell Biology

Major Research Interests

The main interest of the laboratory is in the structure, function and regulation of synthesis of nuclear proteins including chromosomal proteins and other protein factors involved in the control of transcription. DNA replication during the S-phase of the cell cycle requires the coordinate synthesis of histones in stoichiometric amounts for the assembly of chromatin on replicated DNA. The major human histone gene cluster has been mapped to chromosome 6p21.1-6p22.2, and more than 50 histone genes were identified and sequenced within that gene cluster. Several S-phase independent histone genes map as solitary genes to other chromsomes. Current work in this project area deals with the function and of individual H1 histone subtype genes. A second major project deals with the factors mediating the transport of histone-related transcriptional regulators from the cytoplasm to the cell nucleus. This work concentrates on the differential role of nuclear import receptors and specific protein-protein interactions during the nuclear transport of these proteins. The third topic of research deals with the structural transitions of chromatin during programmed cell death and with the regulation of factors involved in apoptotic chromatin cleavage and histone modification.

Selected Recent Publications

Stoldt S, Wenzel D, Schulze E, Doenecke D, Happel N (2007) G1 phase dependent nucleolar accumulation of human histone H1x. Biol Cell 99: 541-552

Goebel W, Obermeyer N, Bleicher N, Kratzmeier M, Eibl HJ, Doenecke D, Albig W (2007) Apoptotic DNA fragmentation is not related to the phosphorylation state of histone H1. Biol Chem 388: 197-206

Kahle J, Baake M, Doenecke D, Albig W (2005) Subunits of the heterotrimeric transcription factor NF-Y are imported into the nucleus by distinct pathways involving importin b and importin 13. Mol Cell Biol 25: 5339-5354

Schliephake T, Meinl A, Kratzmeier M, Doenecke D, Albig W (2004) The telomeric region is excluded from nucleosomal fragmentation during apoptosis, but the bulk nuclear chromatin is randomly degraded. Cell Death Differ 11: 693-703

Bäuerle M, Doenecke D, Albig W (2002) The requirement of H1 histones for a heterodimeric nuclear import receptor. J Biol Chem 277: 32480-32489

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Stefan Eimer

Group Leader Molecular Neurogenetics / Neurodegeneration

- Ph.D. 2003 at the Gene Center of the Ludwig-Maximilian University (LMU in Munich
- 2003 Postdoc at the Ecole Normale Superieure in Paris, France
- since Oct 2005 independent group leader of the Center for Molecular Physiology of the Brain (CMPB) at the European Neuroscience Institute (ENI) in Göttingen

Major Research Interests

Neuotransmitter gated ion channels are involved in a large subset of neuronal events ranging from fast synaptic transmission to the modulation of neuronal circuits that lead to memory formation and cognition. En route to the cell surface these multimeric receptors have to undergo multiple assembly, quality control, and sorting steps to eventually reach the synapse.
Our group aims to understand the mechanisms and rules that control the trafficking and sorting of ligand gated ion channels within the secretory apparatus. In particular, we are focusing on the nicotinic acetylcholine receptor family of ligand gated ion channels, which have been implicated in numerous neurological and neurodegenerative diseases.
To find new molecules involved in these processes, we take advantage of the nematode *Caenorhabditis elegans* as a main model system, and use a combination of genetic, cell biological, and biochemical approaches as well as electro-physiology and electron-microscopy. As our main model system were are studying cholinergic neurotransmission at the neuro-muscular junction (NMJ) of *C. elegans*. Through genetic screens we have identified novel evolutionary conserved integral membrane proteins that regulate nAChR sorting at the Golgi-Endosomal interface. Further studies have implicated these molecules in the regulation and activation of small GTPases at Golgi complex. Based on these findings we have also started to study systematically how these GTPases are required for structure and function of the Golgi apparatus and how their activity affects the trafficking and neurotransmission at the NMJ of *C. elegans*.

Selected Recent Publications

Marza E, Long T, Saiardi A, Sumakovic M, Eimer S, Hall DH, Lesa GM (2007) Polyunsaturated fatty acids influence synaptojanin localization to regulate synaptic vesicle recycling. Mol Biol Cell, in press

Eimer S, Gottschalk A, Richmond JE, Hengartner M, Schafer W, Bessereau J-L (2007) Regulation of nicotinic receptor trafficking by the transmembrane Golgi protein UNC-50. EMBO J 26: 4313-23

Yamasaki A, Eimer S, Okochi M, Smialowska A, Kaether C, Baumeister R, Haass C, Steiner H (2006) The GxGD motif of presenilin contributes to catalytic function and substrate identification of gamma-secretase. J Neurosci 26: 3821-8

Gally C, Eimer S, Richmond JE, Bessereau J-L (2004) A transmembrane protein required for acetylcholine receptor clustering in *C. elegans*. Nature 431: 578-582

Eimer S, Lakowski B, Donhauser R, Baumeister R (2002) Loss of spr-5 bypasses the requirement for the presenilin sel-12 by stage-specific derepression of hop-1. EMBO J 21: 5787-5796

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Wolfgang Engel

Professor of Human Genetics

- Dr. med., Universität Freiburg, 1967
- Physician, Hospital Schorndorf, 1966 - 1968
- Postdoc, Institute of Human Genetics and Anthropology, Universität Freiburg,1968 - 1977
- Habilitation (Human Genetics), Universität Freiburg, 1974
- Professor of Human Genetics and Director of the Institute, Universität Göttingen, 1977

Major Research Interests

Our research is focussed on the molecular analysis of normal human variability and genetic disturbances of development and differentiation.
Isolated genes are being analysed in detail with respect to their functional properties by animal models (transgenic and knock-out-mice). For suitable genetic diseases therapeutic strategies (substitution; gene therapy) are being developed and initial evaluation of such strategies is done in the mouse. - We are working on the genotype – phenotype correlations in neurological and cardiovascular diseases (e. g. Spastic paraplegia, Rett syndrome, mental retardation by subtelomeric microdeletions, molybdenum cofactor deficiency; cardiomypathies, Noonan syndrome) and several genetically determined malformation syndromes (e.g. Townes-Brocks syndrome, Okihiro syndrome, Morbus Osler).We are also engaged in the molecular and cellular basis of initiation events of cancer, specifically in prostate cancer, medulloblastoma and rhabdomyosarcoma. - One main interest in our institute is the analysis of structure, expression and function of genes involved in differentiation of male gametes. The knowledge of the function of those genes can help us to clarify the genetic causes of male infertility.
We have isolated spermatogonial stem cells (SSCs) from adult mouse testis and demonstrated that these cells are as pluripotent as embryonic stem cells (ESCs). Our main interest is now to isolate and proliferate SSCs from adult human testis. These cells would be of great interest for regenerative medicine.

Selected Recent Publications

Nayerniaa K, Lee JH, Drusenheimer N, Nolte J, Wulf G, Dressel R, Gromoll J, Engel W (2006) Derivation of male germ cells from bone marrow stem cells. Laboratory Investigation 86: 654-663

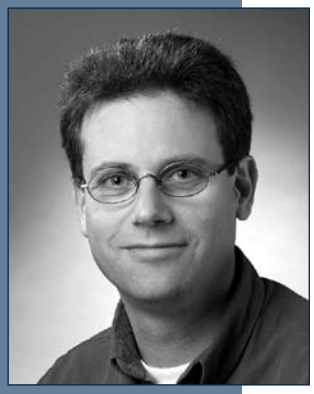
Nayernia K, Nolte J, Michelmann HW, Lee JH, Rathsack K, Drusenheimer N, Dev A, Wulf G, Ehrmann IE, Elliott DJ, Okpanyi V, Zechner, Haaf T, MeinhardtA, Engel W (2006) *In vitro*-differentiated embryonic stem cells give rise to male gametes that can generate offspring mice. Developmental Cell 11: 125-132

Lee JH, Engel W, Nayernia K (2006) Stem cell protein Piwil2 modulates expression of murine spermatogonial stem cell expressed genes. Molecular Reproduction and Development 73: 173-179

Guan K, Nayernia K, Maier LS, Wagner S, Dressel R, Lee JH, Nolte J, Wolf, F, Li M, Engel W, Hasenfuß G (2006) Pluripotency of spermatogonial stem cells from adult mouse testis. Nature 440, 1199-1203

Lee HJ, Göring W, Ochs M, Mühlfeld C, Steding G, Paprotta I, Engel W, Adham IM (2004) Sox 15 is required for skeletal muscle regeneration. Molecular and Cellular Biology 19: 8428-8436

Nayernia K, Li, M, Jaroszynski L, Khusainow R, Wulf G, Schwandt I, Korbiowska M, Michelmann HW, Meinhardt A, Engel W (2004) Stem cells based therapeutical approach of male infertility by teratocarcinoma derived germ cells. Human Molecular Genetics 13: 1451-1460



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Dirk Fasshauer

Independent Research Group Leader - Structural Biochemistry

- 1994 Doctoral degree (Dr. rer. nat.) University of Göttingen
- 1995-97 Postdoctoral fellow, Yale University
- since 1997 Postdoctoral fellow, Dept. for Neurobiology, Max Planck Institute for Biophysical Chemistry, Göttingen
- since 2002 Group leader within the Dept. for Neurobiology, Max Planck Institute for Biophysical Chemistry, Göttingen
- since 2006 Independent Research Group Leader, Structural Biochemistry, Max Planck Institute for Biophysical Chemistry, Göttingen

Major Research Interests

The mechanism by which eukaryotic cells transport material between intracellular organelles is of fundamental importance in cell biology. Transport is mediated by vesicles that bud from a donor organelle and afterwards fuse with a target organelle. Currently, it is becoming clear that the underlying molecular machineries involved in the principal aspects of vesicular trafficking are highly conserved among all eukaryotes. Key players during the final step in vesicle trafficking, the fusion of a vesicle with its acceptor membrane, are the so-called SNARE proteins. SNARE proteins are thought to assemble into a tight complex between the fusing membranes, pulling them together (the 'zipper' model). To come to a better understanding of the molecular events during vesicular fusion, we focus on a detailed structural, kinetic, thermodynamic, and phylogenetic characterization of the underlying protein-protein interactions. In particular, we want to investigate how SNARE assembly takes place, how this process is controlled and catalyzed by other factors. Next to standard biochemical techniques, we employ spectroscopic (Circular Dichroism and Fluorescence Spectroscopy) and calorimetric (Isothermal Titration Calorimetry) methods

Selected Recent Publications

Kloepper TH, Kienle CN, Fasshauer D (2007) An elaborate classification of SNARE proteins sheds light on the conservation of the eukaryotic endomembrane system. Mol Biol Cell 18: 3463-71

Pobbati A, Stein A, Fasshauer D (2006) N- to C-terminal SNARE complex assembly promotes rapid membrane fusion. Science 313: 673-6

Soerensen JB, Wiederhold K, Müller EM, Milosevic I, Nagy G, de Groot BL, Grubmüller H, Fasshauer D (2006) Sequential N- to C-terminal 'zipping-up' of the SNARE complex drives priming and fusion of secretory vesicles. EMBO J 25: 955-66

Pobbati A, Razeto A, Böddener M, Becker S, Fasshauer D (2004) A structural basis for the inhibitory role of tomosyn in exocytosis. J Biol Chem 279: 47192-200

Fasshauer D, Antonin W, Subramaniam V, Jahn R (2002) SNARE assembly and disassembly exhibit a pronounced hysteresis. Nat Struct Biol 9: 144-151

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Ivo Feußner

Professor of Biochemistry

- Diploma (Chemistry), Philipps-University, Marburg (Germany), 1990
- Dr. rer. nat., Philipps-University, Marburg (Germany), 1993
- Leader of an independent research group at the Institute for Plant Biochemistry (IPB), Halle/Saale (Germany), 1997 - 1999
- Habilitation (Biochemistry), Martin-Luther-University, Halle/Saale (Germany), 2000
- Leader of an independent research group at Institute for Plant Genetics and Crop Plant Research (IPK), Gatersleben (Germany), 2000 - 2002
- Since 2002 Professor for Biochemistry, Georg-August-University, Göttingen (Germany)
- Award: Habilitation-Prize of the Ernst Schering Research Foundation (2001)

Major Research Interests

Plant Metabolic Pathways: Our laboratory is currently studying the primary metabolism of plants with main focus on the metabolism of lipids. For this purpose, different approaches ranging from analytical
chemistry to biochemistry and molecular biology were used.
Plant Lipid Metabolism: We are interested in physiological functions of specific lipoxygenases, i.e. their involvement in the degradation of storage lipids during germination and in the destruction of organellar membranes during stress. Another research topic is the analysis of their catalytic mechanism. In addition, lipid peroxidation reactions were analysed in general by metabolomic approaches and by studying the biosynthesis of aldehydes (fruit aromas), hydroxy fatty acids and divinyl ether fatty acids (plant defence). Moreover, enzymes which introduce new functionalities (i.e. conjugated double bonds) in the fatty acid backbone were isolated and characterized in order to obtain new seed oils for biotechnological and medical purposes. In relation to that we are manipulating the primary metabolism and organelle development of seeds in order to increase the oil content of seeds.
Metabolic transport processes: Another research topic is the analysis of the mechanism and regulation of transport processes across the peroxisomal membrane. The biochemistry of phosphoinositides and the transfer of enzymes facilitate the metabolic pathways for lcPUFAs from donor organisms into plants.

Selected Recent Publications

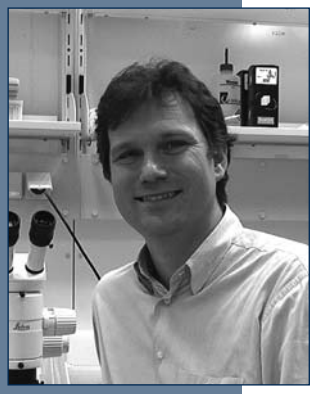
Hoffmann M, Hornung E, Busch S, Kassner N, Ternes P, Braus GH, Feussner I (2007) A Small Membrane-peripheral Region Close to the Active Center Determines Regioselectivity of Membrane-bound Fatty Acid Desaturases from *Aspergillus nidulans*. J Biol Chem 282: 26666-26674

Stumpe M, Göbel C, Demchenko K, Hoffmann M, Klösgen RB, Pawlowski K, Feussner I (2006) Identification of an allene oxide synthase (CYP74C) that leads to formation of a-ketols from 9-hydroperoxides of linoleic and linolenic acid in below ground organs of potato. Plant J 47: 883-896

Ochsenbein C, Przybyla D, Danon A, Landgraf F, Göbel C, Imboden A, Feussner I, Apel K (2006) The role of EDS1 (Enhanced Disease Susceptibility) during singlet oxygen-mediated stress responses of Arabidopsis. Plant J 47: 445-456

Liavonchanka A, Hornung E, Feussner I, Rudolph MG (2006) Structure and mechanism of the *Propionibacteriumacnes* polyunsaturated fatty acid isomerase. Proc Natl Acad Sci USA 103: 2576-2581

Senger T, Wichard T, Kunze S, Göbel C, Lerchl J, Pohnert G, Feussner I (2005) A multifunctional lipoxygenase with fatty acid hydroperoxide cleaving activity from the moss *Physcomitrella patens*. J Biol Chem 280: 7588-7596



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Ralf Ficner

Professor of Structural Biology

- Dr. rer. nat. (1992) and Postdoc (1993), Max Planck Institute for Biochemistry, Martinsried
- Postdoctoral fellow, EMBL Heidelberg, 1994 - 1996
- Junior Group Leader, University of Marburg, 1997 - 2000
- Appointed 2001 as Head of the Department of Molecular Structural Biology at the University of Göttingen

Major Research Interests

In order to understand the relationship between the three-dimensional structure and the cellular function of biological macromolecules we determine the structures of proteins and protein-RNA complexes by means of X-ray crystallography. Our current projects concern proteins involved in the splicing and modification of RNA and, as well, proteins required for the nucleocytoplasmic transport, and enzymes of the polysialic acid metabolism.

Selected Recent Publications

Strasser A, Dickmanns A, Lührmann R, Ficner R (2005) Structural basis for m3G-cap-mediated nuclear import of spliceosomal UsnRNPs by snurportin1. EMBO J 24: 2235-43

Dierks T, Dickmanns A, Preusser-Kunze A, Schmidt B, Mariappan M, von Figura K, Ficner R, Rudolph MG (2005) Molecular basis for multiple sulfatase deficiency and catalytic mechanism for formylglycine generation of the human formylglycine generating enzyme. Cell 121 541-552

Stummeyer K, Dickmanns A, Mühlenhoff M, Gerardy-Schahn R, Ficner R (2005) Crystal structure of endosialidase NF - the polysialic acid degrading tailspike of bacteriophage K1F. Nature Struct Mol Biol 12: 90-96

Rudolph MG, Kraus I, Dickmanns A, Eickmann M, Garten W, Ficner R (2003) Crystal structure of the Borna Disease Virus nucleoprotein. Structure 11, 1219-1226

Vidovic I, Nottrott S, Hartmuth K, Lührmann R, Ficner R (2000) Crystal structure of the spliceosomal 15.5kD protein bound to a U4 snRNA fragment. Mol Cell 6: 1331-1342

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- Dr. rer. nat. (PhD), University of Tübingen, Germany, 2001
- Graduate Research Fellow, The J. David Gladstone Institute (UCSF), San Francisco, CA, USA, 1997 - 2001
- Postdoctoral Fellow, The Rockefeller University, New York, NY, USA, 2001 - 2005
- Damon Runyon Cancer Research Fellow, 2002 - 2005
- Independent Group Leader, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, since 2005

Major Research Interests

Chromatin is the physiological template of genetic information controlling the capacity of a cell's genome to store, release, and inherit biological information. The fundamental unit of chromatin is the nucleosome: a stretch of DNA wrapped around a core of histone proteins (H2A, H2B, H3 and H4). Post-translational modifications of histones have emerged as key for regulating chromatin structure and are thought to crucially control chromatin dynamics and genome activity. Whereas more and more histone modification marks are being identified that alone or in combination could mediate distinct biological conditions of a cell and while correlative studies have begun to establish unambiguous links between several states of chromatin, various histone modifications, and diverse biological processes, our knowledge of how certain histone modifications exert their biological effects on a molecular/biochemical level is still very li-mited.
Due to their long-term stability, histone lysine methyl-marks are of particular interest to us, since they might be involved in establishing and maintaining durable and inheritable gene expression profiles (so called 'epi-genetic' regulation). Current projects include the study of Polycomb, HP1, and MBT proteins that bind to and act as effectors of distinct histone lysine methyl-marks. We are especially interested in the interplay of these factors and their cognate histone marks in regulating chromatin organization and dynamics. Furthermore, we are trying to identify and characterize novel binding proteins of various other histone modifications.
The long-term goal of our research is to gain mechanistic insight(s) into the signaling mechanisms and biological role of single but also combinations of histone modification marks and to understand how certain states of chromatin regulate the functionality of a cells genome. To this end, we aim to reconstitute chromatin-signaling pathways in recombinant and cell free systems and study their epi-genetic regulatory circuits in various biological model systems (i.e. *Xenopus laevis*, mice, tissue culture).

Selected Recent Publications

Fischle W, Tseng BS, Dormann H, Ueberheide BM, Garcia BA, Shabanowitz J, Hunt DF, Funabiki H, Allis CD (2005) Regulation of HP1-chromatin binding by histone H3 methylation and phosphorylation. Nature 438: 1116-22

Yamada T, Fischle W, Allis CD, Grewal SIS (2005) The nucleation and maintenance of heterochromatin by a histone deacetylase in fission yeast. Molecular Cell 20: 1-13

Fischle W, Wang Y, Allis CD (2003) Binary switches and modification cassettes in histone biology and beyond. Nature 425: 475-479

Fischle W, Wang Y, Jacobs SA, Kim Y, Allis CD, Khorasanizadeh S (2003) Molecular basis for the discrimination of repressive methyl-lysine marks in histone H3 by Polycomb and HP1 chromodomains. Genes & Development 17: 687-698

Fischle W, Dequiedt F, Hendzel M, Guenther MG, Lazar MA, Voelter W, Verdin E (2002) Enzymatic activity associated with class II HDACs is dependent on a multiprotein complex containing HDAC3 and SMRT/N-CoR. Molecular Cell 9: 45-57

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Christiane Gatz

Professor of Plant Molecular Biology

- Dr. rer. nat. (1985) at the Institute for Biochemistry, Technical University Darmstadt
- Postdoctoral fellow at the University of Wisconsin, Madison, USA (1985 - 1987)
- Habilitation in Molecular Genetics at the Freie Universität Berlin in 1992
- Professor at the University of Bielefeld (1993 – 1995)
- Alfried Krupp von Bohlen und Halbach-Award for young university professors (1994)
- Professor at the University of Göttingen since 1996

Major Research Interests

Our laboratory is interested in signal transduction pathways that regulate plant defense. Our research is focused on two main topics: 1) The molecular genetic basis of defense responses against bacteria and fungi 2) The molecular mechanism of volatile emission upon herbivore feeding.

Defense responses against bacteria and fungi.
Plants have developed multiple layers of defense responses against pathogens. In general, infection of *Arabidopsis* plants with biotrophic pathogens (pathogens that exploit resources of living cells) leads to the activation of salicylic acid (SA)-mediated defense responses, whereas infection with necrotrophic pathogens (pathogens that kill cells to obtain access to nutrients) elicits (jasmonic acid/ethylene) JA/ET-dependent responses (Glazebrook, 2005). Transcription factors that have been identified as essential regulators for both responses are proteins of the TGA family. These proteins reside in the cell in an inactive state before pathogen infection. We are interested in the SA- and JA/ET-mediated mechanisms that activate the function of TGA factors. More recent results indicate that redox signaling plays a major role in these processes. Moreover, we are interested in the cross-talk between both pathways.

Volatile emission upon herbivore feeding
When insects feed on plants, plants emit volatiles to attract the enemies of the insect. We are interested in the transcriptional regulation of biosynthetic genes leading to the synthesis of volatiles. Again, the JA/ET pathway plays a major role in this response.

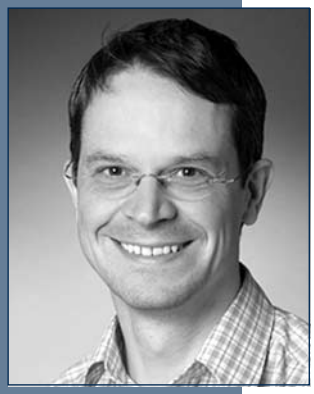
Selected Recent Publications

Ndamukong I, Al Abdallat A, Thurow C, Fode B, Zander M, Weigel R, Gatz C (2007) SA-inducible *Arabidopsis*glutaredoxin interacts with TGA factors and suppresses JA-responsive PDF1.2 transcription. Plant J 50: 128-139

Butterbrodt T, Thurow C, Gatz C (2006) Chromatin immunoprecipitation analysis of the tobacco PR-1a- and the truncated CaMV 35S promoter reveals differences in salicylic acid-dependent TGA factor binding and histone acetylation. Plant Mol Biol 61: 665-674

Weigel RR, Pfitzner UM, Gatz C (2005) Interaction of NIMIN1 with NPR1 modulates PR gene expression in *Arabidopsis*. Plant Cell 17: 1279-1291

Thurow C, Schiermeyer A, Krawczyk S, Butterbrodt T, Nickolov K, Gatz C (2005) Tobacco bZIP transcription factor TGA2.2 and related factor TGA2.1 have distinct roles in plant defense responses and plant development. Plant J 44: 100-113



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Dirk Görlich

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- 1989 Diploma (Biochemistry), Martin-Luther-Universität in Halle
- 1990 - 1993 Graduate studies (Laboratory of T.A. Rapoport, Berlin)
- 1993 Dr. rer. nat. (Biochemistry) Humboldt-Universität Berlin
- 1993 Postdoc (Laboratory of T.A. Rapoport, Berlin)
- 1993 - 1995 Postdoc (Laboratory of R.A. Laskey, Cambridge, England)
- 1996 - 2007 Research group leader at the ZMBH Heidelberg
- 2001 - 2007 Professor for Molecular Biolology (Universität Heidelberg)
- 2001 - 2006 Deputy Director of the ZMBH
- 2005 - Director, Dept. Cellular Logistics, MPI for Biophysical Chemistry, Göttingen

Major Research Interests

- Nuclear transport
- Importins and Exportins
- RanGTPase-system
- Nuclear pore complexes (NPCs), NPC-assembly, Mechanism of NPC-passage
- Hydrogels
- Integral membrane proteins, Translation
- Systems biology
- Spermiogenesis

Selected Recent Publications

Frey S, Görlich D (2007) A saturated FG-repeat hydrogel can reproduce the permeability-properties of nuclear pore complexes. Cell 130: 512-523

Bohnsack MT, Stüven T, Kuhn C, Cordes VC, Görlich D (2006) A selective block of nuclear actin export stabilizes the giant nuclei of *Xenopus* oocytes. Nat Cell Biol 8: 257-263

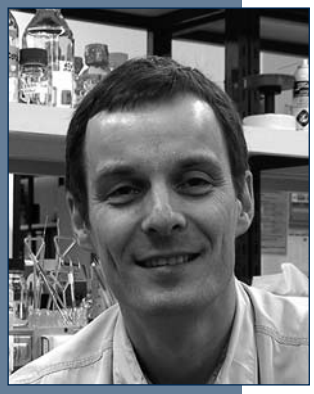
Frey S, Richter RP, Görlich D (2006) FG-rich repeats of nuclear pore proteins form a three-dimensional meshwork with hydrogel-like properties. Science 314: 815-817

Mingot JM, Bohnsack MT, Jäkle U, Görlich D (2004) Exportin 7 defines a novel general nuclear export pathway. EMBO J 23: 3227-3236

Görlich D, Seewald MJ, Ribbeck K (2003) Characterization of Ran-driven cargo transport and the RanGTPase system by kinetic measurements and computer simulation. EMBO J 22: 1088-1100

Jäkel S, Mingot JM, Schwarzmaier P, Hartmann E, Görlich D (2002) Importins fulfil a dual function as nuclear import receptors and cytoplasmic chaperones for exposed basic domains. EMBO J 21: 377-386

Ribbeck K, Görlich D (2001) Kinetic analysis of translocation through nuclear pore complexes. EMBO J 20: 1320-1330



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- Dr. phil. nat. University of Frankfurt (1986, Prof. Dr. H. Kessler)
- Postdoctoral Fellow at Lab. for Physical Chemistry, ETH Zürich (1986 - 1989, Prof. Dr. R. R. Ernst)
- Full Professor for Organic Chemistry at the University of Frankfurt (1990 - 2000)
- Appointed as Director at the Max Planck Institute for Biophysical Chemistry (1999)

Major Research Interests

Our group focuses on the structure and dynamics of biomolecules and their complexes. We use to this end nuclear magnetic resonance (NMR) spectroscopy as well as X-ray crystallography. We apply solution state and solid state NMR spectroscopy to biomolecules and their complexes in their physiological environment, be it water for cytosolic proteins or lipids for membrane proteins. The methods developments are pursuing the following goals:
Relaxation compensated methods to increase the molecular weight of biomolecules that are amenable for NMR investigations. This is tackled by new NMR pulse techniques, novel schemes for labelling the biomolecules with isotopes and the usage of optimized expression schemes. New NMR derived parameters that allow to define biomolecular structure and dynamics better are derived and applied e.g. to DNA binding proteins, spliceosomal RNA, a bacterial sensor and proteins involved in signal transduction and apoptosis and for the investigation of enzyme mechanisms.
Development of NMR methods to assign and determine the structure of isotopically labeled membrane-proteins and peptides with solid state NMR spectroscopy on oriented samples or using magic angle sample spinning on several systems including a 150 kD membrane-Protein and the complex of a peptide and a G-protein coupled receptor.

Selected Recent Publications

Reif B, Hennig M, Griesinger C (1997) Direct measurement of angles between bond vectors in high resolution NMR. Science 276: 1230-1233

Marino JP, Schwalbe H, Griesinger C (1999) J-coupling restraints for structural refinements of RNA. Acc Chem Res 32: 614-632

Bartoschek S, Johannson M, Geierstanger BH, Okun JG, Lancaster CRD, Humpfer E, Yu L, Yu CA, Griesinger C,

Brandt U (2001) Three molecules of ubiquinone bind specifically to mitochondrial cytochrome bc1 complex. J Biol Chem 276: 35231-35234

Peti W, Meiler J, Brüschweiler R, Griesinger C (2002) Model free analysis of protein backbone motion from residual dipolar couplings. J Am Chem Soc 124: 5822-5833

Carlomagno T, Blommers MJJ, Meiler J, Jahnke W, Schupp T, Petersen F, Schinzer D, Altmann K-H, Griesinger C (2003) The high-resolution solution structure of epothilone a bound to tubulin: An understanding of the structure-activity relationships for a powerful class of antitumor agents. Angew Chem 115: 2615-2619, Angew Chem Int Ed 42: 2511-2515

Pappalardo L, Janausch IG, Vijayan V, Zientz E, Junker J, Peti W, Zweckstetter M, Unden G, Griesinger C (2003) The NMR structure of the sensory domain of the membrancous two-component fumarate sensor (histidine protein kinase) DcuS of *Escherichia coli*". J Biol Chem 278: 39185 - 39188

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Uwe Groß

Professor of Medical Microbiology

- M.D., University of Hamburg 1987
- Postdoctoral fellow, UC Los Angeles, California, 1987 - 1989
- Professor of Medical Parasitology, University of Würzburg 1998/1999
- Appointed 1999 as head of the Department of Medical Microbiology, University of Göttingen

Major Research Interests

The protozoan parasite *Toxoplasma gondii* usually causes asymptomatic infections in immunocompetent adults leading to lifelong persistence especially in the brain and in muscle tissue. Life-threatening reactivation of such infection might occur in immuno-compromised individuals (i. e. patients suffering from AIDS). This parasite serves as a model organism for studying evasion mechanisms of intracellular pathogens.
We are interested in the cross-talk between the parasite and its host cell on a molecular level. We could demonstrate that the parasite (i) modulates the host cell capacity for MHC-restricted antigen presentation and (ii) inhibits apoptosis of the infected cell. Both mechanisms allow intracellular persistence. Vice versa, the host´s immune response determines the fate of the parasite by direct interference with differentiation processes of *Toxoplasma gondii.* The precise molecular events for these strategies of intense interplay between both partners are currently under our investigation.
Recently, we also started to investigate host-pathogen interactions of *Campylobacter jejuni*. This pathogen is the most prominent bacterial species that causes diarrhoea followed eventually by the development of neurological complications. Currently, we are focusing on how the pathogen is inducing host-cell apoptosis, thereby promoting disease of epithelial-layered tissues, such as the intestine.
In addition, we are appointed the National Reference Center for Systemic Mycoses. In this respect, we are inverstigating fungal factors and mechanisms that are involved in pathogenesis of mycoses; i.e. cell wall structure and differentiation processes.

Selected Recent Publications

Vutova P, Wirth M, Hippe D, Groß U, Schulze-Osthoff K, Schmitz I, Lüder CGK (2007) /Toxoplasma gondii/ inhibits Fas/CD95-triggered cell death by inducing aberrant processing and degradation of caspase 8. Cell Microbiol 9:1556-70

Fleige T, Fischer K, Ferguson DJ, Groß U, Bohne W (2007) Carbohydrate metabolism in the Toxoplasma gondii apicoplast: localization of three glycolytic isoenzymes, the single pyruvate dehydrogenase complex and a plastid phosphate translocator. Eukaryot Cell 6:984-96

Holpert M, Groß U, Bohne W (2006) Disruption of the bradyzoite-specific P-type (H^+)-ATPase /PMA1/ in *Toxoplasma gondii* leads to decreased bradyzoite differentiation after stress stimuli but does not interfere with mature tissue cyst formation. Mol Biochem Parasitol 146:129-33

Fasshauer V, Groß U, Bohne W (2005) The parasitophorous vacuole membrane of *Encepalitozoon cuniculi* lacks host cell membrane proteins immediately after invasion. Eukaryot Cell 4: 221-224

Lüder CGK, Groß U (2005) Apoptosis and its modulation during infection with Toxoplasma gondtii: molecular mechanisms and role in pathogenesis. Curr Topics Microbiol Immunol 289: 219-238

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Jörg Großhans

Professor of Developmental Biochemistry

- Diplom Biochemistry, Tübingen 1993
- Promotion Genetics, Dr rer nat, Max-Planck-Institut für Entwicklungsbiologie, Tübingen, 1996
- post-doc with E. Wieschaus, Princeton, USA, 1997 - 2001
- ZMBH and Emmy-Noether research group leader, Heidelberg, 2002 - 2008
- Habilitation, Molekularbiologie, 2007
- Professor, Universitätsmedizin Göttingen, 2009

Major Research Interests

morphogenetic processes in the fly embryo
- Rho signalling
- formins, actin filaments
- nuclear lamina, nuclear shape
- laminopathies, ageing
- membrane polarisation
- cell cycle control

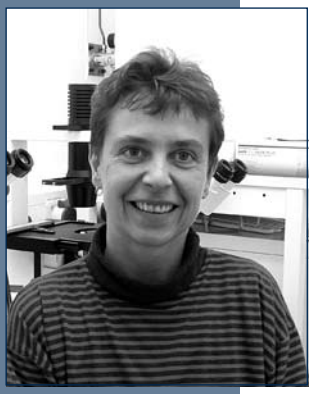
Selected Recent Publications

Brandt A, Krohne G, Großhans J (2008) The farnesylated nuclear proteins Kugelkern and Lamin B promote aging-like phenotypes in *Drosophila* flies. Aging Cell 7: 541-551

Gawlinski P, Nikolay R, Goursot C, Lawo S, Chaurasia B, Herz HM, Kußler-Schneider Y, Ruppert T, Mayer M, Großhans J (2007) The *Drosophila* mitotic inhibitor Frühstart specifically binds to the hydrophobic patch of Cyclins. EMBO rep 8: 490-496

Brandt A, Papagiannouli F, Wagner N, Wilsch-Bräuninger M, Braun M, Furlong EE, Loserth S, Wenzl C, Pilot F, Vogt N, Lecuit T, Krohne G, Großhans J (2006) Developmental control of nuclear size and shape by kugelkern and kurzkern. Curr Biol 16: 543-552

Großhans J, Wenzl C, Herz HM, Bartoszewski S, Schnorrer F, Vogt N, Schwarz H, Müller A (2005) RhoGEF2 and the formin Dia control the formation of the furrow canal by directed actin assembly during *Drosophila* cellularisation. Development 132: 1009-1020



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- Dr. med., University of Würzburg, 1992
- Postdoctoral Fellow, National Institutes of Health, Bethesda, Maryland, USA (1993 - 1998)
- Junior Group Leader (BioFuture), Technical University of Munich (1999 - 2000)
- Professor of Molecular Developmental Genetics, University of Göttingen since 2001

Major Research Interests

Hedgehog (Hh) signaling molecules play a key role in the patterning of numerous tissues during development. Hh signaling is initiated by binding of Hh to its receptor Patched (Ptch). This binding suspends the inhibitory action of Ptch on its signaling partner Smo. Smo is activated and the signaling pathway is turned on. The pathway can also be activated by mutational inactivation of Ptch or by activating mutations in either Hh or Smo and we were able to show that this pathological activation results in developmental defects and in tumor formation in humans and mice.
The goal of our group is to characterize the role of the Hh signaling pathway in the diseased state by identification of its cellular targets and by characterization of its interaction with other signaling pathways. This is achieved by the application of modern genetic techniques (e.g. microarray analysis) to human and murine tumors and cell lines with mutations in one or more components of the pathway. This approach should help to develop molecular diagnostics for Hh-related malignancies as well as to identify targets for therapeutic interventions.

Selected Recent Publications

Chang-Claude J, Dunning A, Schnitzbauer U, Galmbacher P, Tee L, Wjst M, Chalmers J, Zemzoum I, Harbeck N, Pharoah PDP, Hahn H (2003) The Patched Polymorphism Pro1315Leu (C3944T) may modulate the association between use of oral contraceptives and breast cancer risk. Int J Cancer 103(6): 779-83

Kappler R, Bauer R, Calzada-Wack J, Rosemann M, Hemmerlein B, Hahn H (2004) Profiling the molecular difference between Patched1- and p53-dependent rhabdomyosarcoma. Oncogene 23(54): 8785-95

Koleva M, Kappler R, Vogler M, Herwig A, Fulda S, Hahn H (2005) Pleiotropic effects of sonic hedgehog on muscle satellite cells. Cell Mol Life Sci 62(16): 1863-1870

Pazzaglia S, Tanori M, Mancuso M, Rebessi S, Leonardi S, Di Majo V, Covelli V, Atkinson MJ, Hahn H, Saran S (2006) Linking DNA damage to medulloblastoma tumorigenesis in Patched heterozygous mice. Oncogene 25(8): 1165-73

Uhmann A, Dittmann K, Nitzki F, Dressel R, Koleva M, Frommhold A, Zibat A, Binder C, Adham I, Nitsche M, Heller T, Armstrong V, Schulz-Schaeffer W, Wienands J, Hahn H (2007) The Hedgehog receptor Patched controls lymphoid lineage commitment. Blood 110(6): 1814-23

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Claudia Höbartner

Group Leader at the Max Planck Institute for Biophysical Chemistry

- Dr. rer. nat. (PhD), University of Innsbruck, Austria, 2004
- Erwin Schrödinger postdoctoral Fellowship, FWF (Austrian Science Fund),
- University of Illinois at Urbana-Champaign, USA, 2005 - 2007
- Hertha Firnberg Fellowship, funded by FWF & bmwf (federal ministry of science and research), University of Innsbruck, Austria, 2007 - 2008
- Independent Research Group Leader, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, since 2008

Major Research Interests

The work in our group is focused on the chemistry and biochemistry of natural and artificial nucleic acids, with special emphasis on functional and structural properties of catalytic DNA and modified RNA.
The catalytic potential of artificial single-stranded DNA (deoxyribozymes) was first reported in 1994. Deoxyribozymes are identified by in vitro selection from random-sequence DNA pools. The most prominent and widely used deoxyribozymes catalyze the site-specific cleavage of phosphodiester bonds in RNA substrates. More recently, deoxyribozymes that catalyze the sequence-specific ligation of RNA have been gaining increasing importance. All catalytically active DNA molecules must fold into complex, three-dimensional structures that form the basis for their sophisticated functions. However, very little is currently known about the molecular details of these structures and the mechanistic principles of DNA catalysis.
We seek molecular level insights into the function and mechanism of DNA catalysts and approach these fundamental questions by a variety of chemical and biophysical methods. In this context, we develop reliable probing methods for the identification of critical molecular features for DNA catalysis.
Other objectives are to demonstrate that DNA has the potential for novel chemical and biochemical catalysis and to apply deoxyribozymes in the laboratory for practical use. We explore the diversity of DNA-catalyzed reactions in as-yet unaddressed areas and develop nucleic acids as tools for post-synthesis modifications, such as site-specific attachment of biophysical probes onto nucleosides within DNA and RNA.
In the field of RNA chemistry, we study natural RNA modifications, such as nucleobase and ribose methylations and we use artificial nucleoside analogs, such as selenium-containing nucleosides, spin-labeled and caged nucleosides as probes for the investigation of RNA structure and function. We apply synthetic organic chemistry for generating modified nucleoside building blocks and use solid-phase synthesis, post-synthesis derivatization, enzymatic synthesis of RNA fragments and chemical and enzymatic ligation strategies for the preparation of complex RNA targets. The structural and biophysical properties of highly functionalized RNAs and their interactions with proteins are studied in collaboration with several other research groups at the Max Planck Institute for Biophysical Chemistry

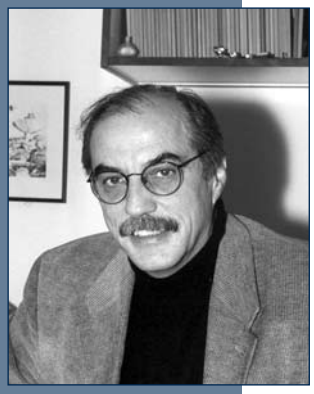
Selected Recent Publications

Pradeepkumar PI , Höbartner C, Baum DA, Silverman SK (2008) DNA-catalyzed formation of nucleopeptide linkages. Angew Chem Int Ed 47: 1753-1757

Höbartner C, Silverman SK (2007) Engineering a Selective Small-Molecule Substrate Binding Site into a Deoxyribozyme. Angew Chem Int Ed 46: 7420-7424

Höbartner C, Silverman SK (2005) Modulation of RNA tertiary folding by incorporation of caged nucleotides. Angew Chem Int Ed 44: 7305-7309

Höbartner C, Rieder R, Kreutz C, Puffer B, Lang K, Polonskaia A, Serganov A, Micura R (2005) Syntheses of RNAs with up to 100 nucleotides containing site-specific 2'-Se-methyl labels for use in X-ray crystallography. J Am Chem Soc 127: 12035-12045



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Professor, Director at the Max Planck Institute for Biophysical Chemistry

- Faculty member at the EMBL, Heidelberg (1980 - 1982)
- Head of the group (associate professor), Max Planck Institute for Develop mental Biology, Tübingen (1982 - 1988)
- Professor and Chairman, Dept. of Genetics and Microbiology, Univ. of Munich (1988 - 1991)
- Director, Dept. of Molecular Developmental Biology, Max Planck Institute for Biophysical Chemistry, Göttingen
- Vice-President of the Max Planck Society

Major Research Interests

Our research interest is focussed on molecular processes and the mechanisms involved in the phenonenon of biological pattern formation during Drosophila embryogenesis. Aim of my studies is a better understanding of the biochemical pathways and the molecular characterization of the regulatory networks leading to the establishment of the segmental organization of the embryo, organ formation and cell behaviour underlying morphogenesis. Recent work concerns the genetic basis for energy homeostasis in cells.

Selected Recent Publications

Chung H-R, Löhr U, Jäckle H (2007) Lineage-specific expansion of the zinc finger associated domain. ZAD Mol Biol Evol 24(9): 1934-1943

Grönke S, Müller G (Sanofi-Aventis Pharma Deutschland GmbH, DG Metabolic Diseases, 65926 Frankfurt, Germany), Hirsch J, Fellert S, Andreou A, Haase T, Jäckle H, Kühnlein R P (2007) Dual lipolytic control of body fat storage and mobilization in *Drosophila*. PLoS Biol 5(6): 1248-1256

Jauch R, Cho M-K, Jäkel S, Netter C, Schreiter K, Aicher B, Zweckstetter M, Jäckle H, Wahl M C (2006) Mitogen-activated protein kinases interacting kinases are autoinhibited by a reprogrammed activation segment. EMBO J 25: 4020-4032

Grönke S , Mildner A, Fellert S, Tennagels N, Petry S, Müller G, Jäckle H, and Kühnlein R P (2005) Brummer lipase is an evolutionary conserved fat storage regulator in *Drosophila* Cell Metabolism 1: 323-330

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- Dr. rer. nat. 1981, University of Göttingen
- Assistant Professor, The Rockefeller University, New York (USA) 1985
- Junior Group leader, Max Planck Institute for Psychiatry, Martinsried, 1986
- Associate Professor of Pharmacology and Cell Biology, Yale University, and Investigator, Howard Hughes Medical Institute, New Haven (USA) 1991
- Professor of Pharmacology and Cell Biology, Yale University, New Haven, 1995
- Director, Max Planck Institute for Biophysical Chemistry, Göttingen, 1997

Major Research Interests

Our group is interested in the mechanisms of membrane fusion, with the main emphasis on regulated exocytosis in neurons. Since recent years it is known that intracellular membrane fusion events are mediated by a set of conserved membrane proteins, termed SNAREs. For fusion to occur, complementary sets of SNAREs need to be present on both of the fusing membranes. The neuronal SNAREs are among the best characterized. They are the targets of the toxins responsible for botulism and tetanus. To understand how these proteins make membranes fuse, we studied their properties in detail using biochemical and biophysical approaches. We found that they assemble into a tight complex which ties the membrane closely together and thus probably initiates bilayer mixing.
In our current approaches, we study membrane fusion at the level of isolated proteins as well as in semi-intact and intact cells. Thus, we are investigating conformational changes of the SNARE proteins before and during fusion. Furthermore, we use reconstitution of membrane fusion in cell-free assays and in proteoliposomes. Other projects of the group include the study of neurotransmitter uptake by synaptic vesicles and the function of Rab-GTPases in neuronal exocytosis

Selected Recent Publications

Zwilling D, Cypionka A, Pohl W, Fasshauer D, Walla PJ, Wahl MC, Jahn R (2007) Early endosomal SNAREs form a structurally conserved SNARE complex and fuse liposomes with multiple topologies. EMBO J 26: 9-18

Takamori S, Holt M, Stenius K, Lemke EA, Grønborg M, Riedel D, Urlaub H, Schenck S, Brügger B, Ringler P, Müller SA, Rammner B, Gräter F, Hub JS, De Groot BL, Mieskes G, Moriyama Y, Klingauf J, Grubmüller H, Heuser J, Wieland F, Jahn R (2006) Molecular anatomy of a trafficking organelle. Cell 127: 831-846

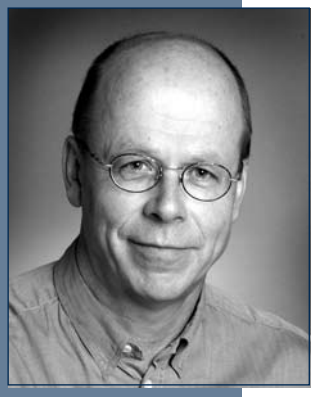
Jahn R, Scheller RH (2006) SNAREs – engines for membrane fusion. Nature Reviews Mol Cell Biol 7: 631-643

Willig KI, Rizzoli SO, Westphal V, Jahn R, Hell S (2006) STED-microscopy reveals that the synaptic vesicle protein synaptotagmin remains clustered after exocytosis. Nature 440: 935-939

Graf C, Riedel D, Schmitt HD, Jahn R (2005) Identification of functionally interacting SNAREs using complementary substitutions in the conserved '0' layer. Mol Biol Cell 16: 2263-2274

Schuette CG, Hatsuzawa K, Margittai M, Stein A, Riedel D, Küster P, König M, Seidel CAM, Jahn R (2004) Determinants of liposome fusion mediated by synaptic SNARE proteins. Proc Natl Acad Sci 101: 2858-2863

Jahn R, Lang T, Südhof TC (2003) Membrane fusion. Cell 112: 519-533



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Michael Kessel

Professor of Molecular Biology

- Until 1981 Biochemical Institute, Kiel University
- 1981 - 1983 National Cancer Institute, NIH, Bethesda,USA
- 1983 - 1986 Center for Molecular Biology (ZMBH), Heidelberg University
- Since 1987 Max Planck Institute for Biophysical Chemistry, Göttingen

Major Research Interests

The group studies patterning processes in chick and mouse embryos. We apply biochemical, genetic and embryological techniques, including expression analysis, transplantation in embryo culture, *in vivo* gene transfer by electroporation, and gene knock-out technology.

We identified the Geminin protein as a mediator between cell cycle progression and the control of axial specification. Geminin regulates homeodomain proteins of the Hox family both on a transcriptional and a chromatin level. We are currently studying a conditional mouse knock-out model.

We further analyze the homeobox gene Hesx1 and its role during the development of the pituitary. Hesx1 protein interacts with Mad2l2, a regulator of the APC/C complex, and a subunit of translesion DNA polymerase zeta. We study the involvement of Mad2l2-Hesx1 in the progression of the cell cycle in conditional knock-out mice.

Our goal is an understanding of the coordination between proliferation and pattern formation.

Selected Recent Publications

Luo L, Uerlings Y, Happel N, Asli NS, Knoetgen H Kessel M (2007) Regulation of geminin functions by cell cycle dependent nuclear-cytoplasmic shuttling. Molecular and Cellular Biology 27: 4737-4744

Pitulescu M, Kessel M, Luo L (2005) The regulation of embryonic patterning and DNA replication by Geminin. Cellular and. Molecular. Life Science 62: 1425-1433

Luo L, Kessel M (2004) Geminin coordinates cell cycle and developmental control. Cell Cycle 3: 711-714

Luo L, Yang X, Takihara Y, Knoetgen H, Kessel M (2004) The cell-cycle regulator geminin inhibits Hox function through direct and polycomb-mediated interactions. Nature 427: 749-53

Spieler D, Baumer N, Stebler J, Koprunner M, Reichman-Fried M, Teichmann U, Raz E, Kessel M, Wittler L (2004) Involvement of Pax6 and Otx2 in the forebrain-specific regulation of the vertebrate homeobox gene ANF/Hesx1. Developmental Biology 269: 567-79

Wittler L, Kessel M (2004) The acquisition of neural fate in the chick. Mechanisms of Development 121: 1031-42

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Dieter Klopfenstein

Junior Group Leader at the Centre for Molecular Physiology of the Brain, University of Göttingen

- Dr. phil. nat. (Ph.D.) University of Basel, 1999
- Postdoctoral fellow at the University of California San Francisco, 1999 - 2003
- Since 2003 head of an independent Junior Research Group

Major Research Interests

The long-range transport of membrane organelles in neurons depends primarily upon microtubules and motor proteins that move unidirectionally along these tracks. One type of microtubule-based motor proteins powering membrane transport is the kinesin superfamily. We are interested in how these motors achieve specificity in cargo binding, elicit membrane transport, and the regulation of transport activity. One example of a kinesin motor is UNC-104/KIF1A, which specifically transports presynaptic vesicle to the synaptic terminal and binds with its tail domain directly to membrane lipids in vitro. This unique cargo-interaction mechanism help us to understand how lipids and their membrane environment contribute to cargo transport, how motor-lipid interaction could be regulating transport, and how accessory proteins contribute to membrane motility. Using fluorescently tagged motor and vesicle markers we investigate these questions in the nervous system of the nematode *C. elegans* serves us as a model system for microscopic tools (confocal, TIRF, FRET FLIM) and biochemical transport assays *in vitro*.

Selected Recent Publications

Klopfenstein DR, Vale RD (2004) The Lipid Binding Pleckstrin Homology Domain in UNC-104 Kinesin is Necessary for Synaptic Vesicle Transport in *Caenorhabditis elegans*. Mol Biol Cell 15(8): 3729-39

Al-Bassam J, Cui Y, Klopfenstein D, Carragher BO, Vale RD, Milligan RA (2003) Distinct conformations of the kinesin Unc104 neck regulate a monomer to dimer motor transition. J Cell Biol 163(4): 743-53

Tomishige M, Klopfenstein DR, Vale RD (2002) Dimerization triggers fast, processive movement of single Unc104/KIF1A kinesin motor along microtubules. Science 297(5590): 2263-2267

Klopfenstein DR, Tomishige M, Stuurman N, Vale RD (2002) Role of phosphatidylinositol(4,5)bisphosphate organization in membrane transport by the Unc104 kinesin motor. Cell 109(3): 347-58

Klopfenstein DR, Vale RD, Rogers SL (2000) Motor protein receptors: Moonlighting on other jobs. Cell 103(4): 537-40

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- Dr. rer. nat., University of Cologne, Germany, 1986
- Postdoctoral Fellow, University of California, Berkeley, USA, 1986 - 1989
- Habilitation in Molecular Biology and Genetics, University of Göttingen, Germany, 2000
- At the Dept. of Molecular Genetics since 1989

Major Research Interests

Besides being fast and highly accurate, the most important demand on replication of DNA is that is has to be completed. While this may sound trivial on first glance, many obstacles like protein-DNA complexes and damaged nucleotides on the template strand can prevent replication fork progression. It is estimated that at least one fork arrest occurs per replication round in *E. coli.* Therefore, all organisms analysed so far in detail possess several pathways to reactivate stalled replication forks. We discovered that the baker´s yeast Mph1 protein defines a hitherto unknown pathway for replication restart, which is apparently also operating in higher eukaryotes including humans. One question we are interested in is the exact mechanism, by which this pathway works. We are also interested in positioning this pathway within the complex cellular network of replication reinitiation mechanisms, where two principle possibilities for fork reactivation can be found: one being quite safe, but acting on the expense of replicational fidelity, whereas the other is error-free, but bears the inherent danger of genomic rearrangements. Therefore, we are also interested in the regulatory mechanisms that guide the choice of the cell for one or the other possibility as well as the conditions that are sensed by the regulatory proteins.

Selected Recent Publications

Rudolph C, Schürer KA, Kramer W (2005) Facing stalled replication forks: The intricacies of doing the right thing. In: Genome Dynamics and Stability: Facets of Genome Integrity. Lankenau DH (Ed). Springer Verlag Heidelberg. in press (Review)

Prakash R, Krejci L, van Komen S, Schürer KA, Kramer W, Sung P (2005) *Saccharomyces cerevisiae* MPH1 gene, required for homologous recombination-mediated mutation avoidance, encodes a 3' to 5' DNA helicase. J Biol Chem 280: 7854-7860

Schürer KA, Rudolph C, Ulrich HD, Kramer W (2004) Yeast MPH1 gene functions in an error-free DNA damage bypass pathway that requires genes from homologous recombination, but not from postreplicative repair. Genetics 166: 1673-1686

Laging M, Lindner E, Fritz H-J, Kramer W (2003) Repair of hydrolytic DNA deamination damage in thermophilic bacteria: Cloning and characterization of a Vsr endonuclease homolog from *Bacillus stearothermophilus*. Nucl Acids Res 31: 1913-1920

Meyer C, Scheller J, Kramer W (2001) Transcription of mutS- and mutL-homologous genes during meiosis in *Saccharomyces cerevisiae* and identification of a regulatory cis-element for meiotic induction of MSH2. Mol Gen Genomics 265: 826-836

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Volker Lipka

Professor of Plant Cell Biology

- Dr. rer.nat. at the Department for Plant Molecular Biology, Technical University Aachen, 1999
- Postdoctoral fellow at the SainsburyLaboratory, John Innes Centre, Norwich, UK, 1999 - 2000
- Postdoctoral fellow at the Max-Planck Institute for Plant Breeding Research, Cologne, 2000-2004
- Leader of an independent research group at the Department for Plant Biochemistry, Centre for Plant Molecular Biology, University of Tübingen, 2004 - 2007
- Leader of an independent research group at the SainsburyLaboratory, John Innes Centre, Norwich, UK, 2007 - 2009
- Professor at the University of Göttingen since 2009

Major Research Interests

Our laboratory is interested in the molecular analysis of plant innate immunity. Our research is focused on 1) the molecular dissection of mechanisms that control activation of basal defence in the plant model *Arabidopsis thaliana* 2) the analysis of defence mechanisms that contribute to resistance against fungal pathogens 3) the identification of fungal effector molecules that interfere with the plant defence machinery and allow host plant colonization
In nature, plants are constantly exposed to above- and below-ground attack by a vast array of potential pathogens. However, most plants are immune to the majority of would-be pathogens and susceptible to only a relatively small number of adapted microbes. Using a novel plant-fungus interaction model system we recently identified several molecular components that are required for the activation (Gimenez-Ibanez et al., 2009) and execution of basal plant defence (Collins et al., 2003; Lipka et al., 2005; Stein et al., 2006; Kwon et al., 2008; Lipka et al., 2008). As a consequence, receptor-mediated recognition, pathogen-induced intracellular transport processes, dynamic organelle translocation and cytoskeletal rearrangements represent major research topics in our department. Suppression of these defence mechanisms is a key requirement for adapted pathogens and we recently began studies to identify secreted fungal effector molecules that are likely to be involved. We combine genetic, cell, molecular and biochemical experimental strategies to gain novel insights into these complex mechanisms.

Selected Recent Publications

Gimenez-Ibanez S, Hann DR, Ntoukakis V, Petutschnig E, Lipka V *, Rathjen JP * (2009) AvrPtoB targets the LysM receptor kinase CERK1 to promote bacterial virulence on plants. Current Biology, in press *co-corresponding authors

Lipka U, Fuchs R, Lipka V (2008) *Arabidopsis* non-host resistance to powdery mildews. Current Opinion in Plant Biology 11: 404-411

Kwon C, Neu C, Pajonk S, Yun HS, Lipka U, Humphry ME, Bau S, Straus M, Rampelt H, El Kasmi F, Jürgens G, Parker J, Panstruga R *, Lipka V*, Schulze-Lefert P* (2008) Co-option of a default secretory pathway for plant immune responses. Nature 451: 835-840 *co-corresponding authors

Stein M, Dittgen J, Sanchez-Rodriguez C, Hou B-H, Molina A, Schulze-Lefert P, Lipka V, Somerville S (2006) *Arabidopsis* PEN3/PDR8, an ATP binding cassette transporter, contributes to nonhost resistance to inappropriate pathogens that enter by direct penetration. Plant Cell 18: 731-746

Lipka V, Dittgen J, Bednarek P, Bhat RA, Stein M, Landtag J, Brandt W, Scheel D, Llorente F, Molina A, Wiermer M, Parker J, Somerville SC, Schulze-Lefert P (2005) Pre- and post-invasion defenses both contribute to non-host resistance in *Arabidopsis*. Science 310: 1180-1183

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Reinhard Lührmann

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- Dr. rer. nat (Ph. D.), University of Münster (1975)
- Research group leader, Max Planck Institute for Molecular Genetics, Berlin (1981 - 1988)
- Professor of Biochemistry and Molecular Biology at the University of Marburg (1988 - 1999)
- Director, Dept. of Cellular Biochemistry, Max Planck Institute for Biophysical Chemistry, Göttingen (since 1999)

Major Research Interests

Most metazoan pre-mRNAs contain multiple introns and exons. In order to generate mature mRNA, the introns must be excised from the pre-mRNA, a process termed pre-mRNA splicing. In many cases, alternative splicing generates different mRNAs from a single pre-mRNA by the regulated removal of different sections of the RNA, a process which greatly expands the complexity of the repertoire of proteins that can be expressed from relatively small genomes. Splicing is catalysed by a large macromolecular machine, termed the spliceosome which consists of the small nuclear RNAs (U1, U2, U4, U5 and U6) and more than 150 proteins, 50 of which are associated with the snRNAs to form snRNPs.
In our laboratory, intense efforts are focussed on understanding how the spliceosome recognizes and binds the intron ends and discriminates them from exons. This is an especially confounding problem in metazoans because, in contrast to lower eucaryotes such as yeast, pre-mRNA introns are often extremely long (104-105 nucleotides), while exons are generally small (less than 300 nucleotides). Another major goal of our research is the elucidation of the mechanisms by which the spliceosome assembles into a catalytically active machine and catalyses intron excision. None of the building blocks of the spliceosome contains an active site. Instead, the catalytically active domain must be assembled anew on to each intron, a highly dynamic process which entails dramatic structural rearrangements of the RNP structure of the spliceosome, and which is orchestrated by the successive action of more than 10 enzymes such as RNA helicases and GTPases, as well as by posttranslational phosphorylation of a multitude of spliceosomal proteins. Our studies involve a large number of experimental approaches, including biochemical purification of entire spliceosomes or large protein ensembles, and characterization of their proteins by mass spectrometry; RNA biology methods such as enzymatic engineering of RNA molecules, RNA structure probing and RNA interference methods; production of recombinant proteins and antibodies; procedures for the investigation of protein-protein and protein-RNA interactions in vitro and *in vivo*; and biophysical methods such as fluorescence spectroscopy.
Finally, we are investigating the 3D structure of purified spliceosomes or major building blocks thereof using electron microscopic approaches and X ray crystallography. Our studies on the regulatory mechanisms of constitutive and alternative pre-mRNA splicing involve mainly mammalian systems. As the basic mechanisms of splicing catalysis appear to be evolutionarily highly conserved, we are also taking advantage of molecular genetic approaches in baker yeast to elucidate the structure and function of the catalytic core domain of the spliceosome.

Selected Recent Publications

Dönmez G, Hartmuth K, Kastner B, Will C L, Lührmann R (2007) The 5'End of U2 snRNAs is in close proximity to U1 and functional sites of the pre-mRNA in early spliceosomal complexes. Mol Cell 25: 399-411

Liu S, Li P, Dybkov O, Nottrott S, Hartmuth K, Lührmann R, Carlomagno T, Wahl MC (2007) Binding of the Human Prp31 Nop Domain to a Composite RNA-Protein Platform in U4 snRNP. Science 316: 115-120

Deckert J, Hartmuth K, Böhringer D, Behzadnia N, Will CL, Kastner B, Stark H, Urlaub H, Lührmann R (2006) Protein composition and electron microscopy structure of affinity-purified human spliceosomal B complexes isolated under physiological conditions. Mol Cell Biol 26: 5528-5543

Will CL, Lührmann R (2005) Spliceosome structure and function. RNA World III (CSH Laboratory Press) (R F Gesteland, T R Cech, J F Atkins eds.): 369-400

Böhringer D, Makarov EM, Sander B, Makarova OV, Kastner B, Lührmann R, Stark H (2004) Three-dimensional structure of a pre-catalytic human spliceosomal complex B. Nature Struct. Mol Biol 11: 463-468

Makarov EM, Makarova OV, Urlaub H, Gentzel M, Will CL, Wilm M, Lührmann R (2002) Small nuclear ribonucleoprotein remodeling during catalytic activation of the spliceosome. Science 298: 2205-2208

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Molecular Developmental Genetics

- Diploma (Chemistry), Technical University, Braunschweig (Germany) 1975
- Dr. rer. nat. Chemical Technology Institute, Technical University, Braunschweig (Germany), 1978
- Postdoc at the Institute of Human Genetics in Göttingen (1982 - 1986)
- Postdoc at the Miescher Institute in Tübingen (MPI) and at the Max Planck
- Institute of Immunbiology in Freiburg (Germany) (1986 - 1989)
- Since 1989 Dept of Molecular Cell Biology at the MPI for Biophysical Chemistry in Göttingen
- Habilitation (Molecular Developmental Genetics), University of Göttingen, Germany, 1999
- Since 2005: Dr. Helmut Storz Stiftungsprofessur for “dopaminerge Stammzelltherapie”, Dept. of Clinical Neurophysiology at the University of Göttingen

Major Research Interests

Molecular mechanisms of mammalian development and stemcell biology
In order to understand the molecular mechanisms governing mammalian development, we are using the mouse as a model system. We are focusing on the role of transcription factors in development. Using embryonic stem cells mouse loss-of-function mutants were generated. Specifically, we have shown that Pax and homeobox-containing genes are required for early decisions in organogenesis and cell differentiation. In addition, we are currently taking advantage of the *in vitro* differentiation potential of embryonic stem cells to search for molecules that are involved in dopaminergic neuron induction, differentiation, and/or survival.

Selected Recent Publications

Schindehütte J, Fukumitsu H, Collombat P, Griesel G, Brink C, Baier PC, Capecchi MR, Mansouri A (2005) *In vivo* and *in vitro* tissue-specific expression of GFP using the Cre-lox system in mouse embryonic stem cells. Stem Cells 23: 10-15

Collombat P, Hecksher-Soerensen J, Broccoli V, Krull J, Ponte I, Mundiger T, Smith J, Gruss P, Serup P, Mansouri A (2005) The simultaneous loss of Arx and Pax4 genes promotes a somatostatin-producing cell fate specification at the expense of the alpha- and beta-cell lineages in the mouse endocrine pancreas. Development 132 (13): 2969-80

Thinyane K, Baier PC, Schindehütte J, Mansouri A, Paulus W, Trenkwalder C, Flügge G, Fuchs E (2005) Fate of pre-differentiated mouse embryonic stem cells transplanted in unilaterally 6-hydroxydopamine lesioned rats: histological characterization of the grafted cells. Brain Res 1045 (1-2): 80-87

Relaix F, Rocancourt D, Mansouri A, Buckingham M (2005) A Pax3/Pax7-dependent population of skeletal muscle progenitor cells. Nature 435: 948-953

Baier PC, Schindehütte J, Thinyane K, Flugge G, Fuchs E, Mansouri A, Paulus W, Gruss P, Trenkwalder C (2004) Behavioral changes in unilaterally 6-hydroxydopamine lesioned rats after transplantation of differentiated mouse embryonic stem cells without morphological integration. Stem Cells 22(3): 396-404

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Frauke Melchior

Professor of Biochemistry

- 1990 Dr. rer. nat., University of Marburg, Germany
- 1990 - 1992 Postdoctoral fellow at the Max Planck Institute for Biophysical Chemistry, Göttingen
- 1992 - 1998 Postdoctoral fellow at the Scripps Research Institute, La Jolla, CA, USA
- 1998 - 2004 Independent group leader at the Max Planck Institute of Biochemistry, Martinsried
- 1998 BioFUTURE young investigator award Since 2004 Professor of Biochemistry, Georg-August University Göttingen
- Since 2004 Professor of Biochemistry, Georg-August University Göttingen

Major Research Interests

Research in our group centers around posttranslational modification with small ubiquitin-related proteins of the SUMO family. SUMO proteins are ubiquitously expressed in eukaryotic cells, and are essential for life. They are reversibly coupled to a large number of cellular targets, and thereby modulate protein / protein or protein / DNA interactions, alter intracellular localization, or protect from ubiquitin mediated degradation. Higher organisms often express several distinct SUMO proteins (e.g., three in humans). Those are conjugated to different targets under normal growth conditions, or conjugated preferentially upon stress. Most of the known targets for sumoylation can be associated with a few specific pathways: signal transduction, transcription, chromatin remodelling, DNA repair, mitosis, viral infection, and nucleocytoplasmic trafficking. Projects in the lab aim to understand basic mechanisms, regulation, and function of SUMOylation in mammalian cells. This involves, e.g., characterization of SUMO enzymes, analysis of SUMO conjugation under stress conditions, and the identification and characterization of novel SUMO targets. Special emphasis is also given to the interplay between SUMOylation and nucleocytoplasmic trafficking.

Selected Recent Publications

Bossis G, Melchior F (2006) Regulation of SUMOylation by reversible oxidation of SUMO conjugating enzymes. Mol Cell 21: 349-357

Pichler A, Knipscher P, Saitoh H, Sixma T, Melchior F (2004) SUMO E3 ligase is neither Hect nor Ring type. Nat Struct Mol Biol 11: 984-991

Swaminathan S, Kiendl F, Körner R, Lupetti R, Hengst L, Melchior F (2004) RanGAP1*SUMO-1 is phosphorylated at the onset of mitosis and remains associated with RanBP2 upon NPC disassembly. J Cell Biol 164:965-971

Melchior F, Schergaut M, Pichler A (2003) SUMO: ligases, isopeptidases and nuclear pores. Trends Biochem Sci 28: 612-618

Pichler A, Gast A, Seeler JS, Dejean A, Melchior F (2002) The nucleoporin RanBP2 is a SUMO1 E3 Ligase. Cell 108:109-120

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Burkhard Morgenstern

Professor of Bioinformatics

- 1993 Diploma (Mathematics), LMU München
- 1996 PhD (Dr. Math.), Universität Bielefeld
- 1997 - 1998 Visiting Scientist, North Carolina State University, Raleigh, NC, USA
- 1998 - 2000 RPR/Aventis, Dagenham, Essex, UK
- 2000 - 2001 MIPS, MPI fuer Biochemie, Martinsried and GSF, Neuherberg
- 2001 - 2002 Group leader and faculty member at International Graduate
- School in Bioinformatics and Genome Research, Univertität Bielefeld
- Since 2002 Professor of Bioinformatics, Universität Göttingen

Major Research Interests

The focus of our work is on algorithm development for nucleic acid and protein sequence analysis. We are particularly interested in multiple sequence alignment and gene prediction; the software programs DIALIGN and AUGUSTUS are developed and maintained by our department.

In recent years, alignment of large genomic sequences became a powerful tool for genome analysis and annotation. Cross-species alignment of genomic sequences has been used for gene prediction, to detect regulatory sites or to identify signature sequences for pathogen microorganisms. These novel alignment approaches are also used to improve our gene-finding software tools.

Other areas of research include: metabolomics and mass spectroscopy data analysis, phylogeny reconstruction, RNA structure analysis, motif discovery and remote homology detection using machine-learning methods, genome annotation for prokaryotes, recombinations in viral genomes and grid computing.

Selected Recent Publications

Chen et al (2007) Nature Biotechnology 25: 1007-1014 http://www.nature.com/nbt/journal/v25/n9/abs/nbt1325.html

Stanke M, Tzvetkova A, Morgenstern B (2006) AUGUSTUS+ at EGASP: using EST, protein and genomic alignments for improved gene prediction in the human genome. Genome Biology 7: S11

Schultz A-K, Zhang M, Leitner T, Kuiken C, Korber B, Morgenstern B, Stanke M (2006) A jumping profile Hidden Markov Model and applications to recombination sites in HIV and HCV genomes. BMC Bioinformatics 7: 265

Stanke M, Keller O, Gunduz I, Hayes A, Waack S, Morgenstern B (2006) AUGUSTUS: ab initio prediction of alternative transcripts. Nucleic Acids Res 34: W435 - W439

Subramanian AR, Weyer-Menkhoff J, Kaufmann M, Morgenstern B (2005) DIALIGN-T: An improved algorithm for segment-based multiple sequence alignment. BMC Bioinformatics 6: 66

Brudno M, Chapman M, Göttgens B, Batzoglou S, Morgenstern B (2003) Fast and sensitive multiple alignment of large genomic sequences. BMC Bioinformatics 4: 66

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Klaus-Armin Nave

Professor of Molecular Biology, Director at the Max Planck Institute of Experimental Medicine

- 1987 PhD, University of California, San Diego
- 1987 - 1991 Postdoc, The Salk Institute, la Jolla, California
- 1991 Junior Group Leader, ZMBH, University of Heidelberg
- 1998 Professor of Molecular Biology (C4), ZMBH, University of Heidelberg
- 2000 Director, Department of Neurogenetics, Max Planck Institute for Experimental Medicine Göttingen and Professor of Biology, University of Heidelberg

Major Research Interests

We are interested in the mechanisms of neuron-glia interactions in the higher nervous system, and in the genes that are required for normal glial cell function. Here, transgenic and mutant mice have become important to study developmental processes as well as genetic diseases. For example, oligodendrocytes are glial cells highly specialized for enwrapping CNS axons with multiple layers of membranes, known to provide electrical insulation for rapid impulse propagation. We found that oligodendrocytes are also essential for maintaining the long-term integrity of myelinated axons, independent of the myelin function itself. The mechanisms by which oligodendrocytes support long-term axonal survival are still under investigation. The importance of glial cells as the “first line of neuroprotection”, however, is illustrated by several myelin-associated diseases in which axonal neurodegeneration contribute to progressive disability. These range in humans from peripheral neuropathies (CMT1) to spastic paraplegia (SPG2), and presumably multiple sclerosis (MS) and certain forms of psychiatric disorders. We are developing transgenic animal models for some of these diseases, in order to dissect the underlying disease mechanisms and, in the case of CMT1A, have used these models to design novel therapeutic strategies.
The glial “decision” to myelinate an axonal segment is partly controlled by the axon itself, but the signaling mechanism is not understood. We have found that axonal neuregulin-1 (NRG1) is the major determinant of myelination in the peripheral nervous system. We are now investigating NRG1 dysregulation also in CNS myelination, using quantifiable behavioural functions in mice. By combining genetics with enviromental risk factors for schizophrenia (in collaboration with H. Ehrenreich) we will explore the hypothesis that NRG1, a known human schizophrenia susceptibility gene, points to an important role of myelinating glia in some psychiatric disorders.

Future Projects and Goals

Mechanisms of neuron-glia signalling; function of myelin proteins and lipids; transcriptional profiling of single cells *in vivo*; novel mouse models of neuropsychiatric disorders.

Selected Recent Publications

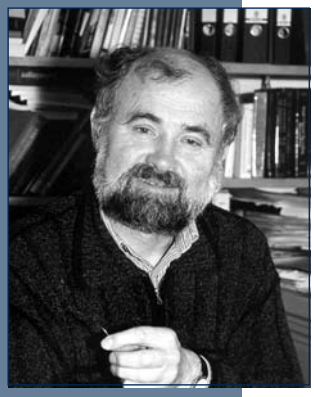
Dhaunchak A, Nave K-A (2007) A common mechanism of proteolipid protein misfolding leading to cysteine-mediated ER retention in oligodendrocytes and Pelizaeus-Merzbacher disease. Proc Natl Acad Sci USA (in press)

Kassmann CM, Lappe-Siefke C, Baes M, Brügger B, Mildner A, Werner HB, Natt O, Michaelis Th, Prinz M, Frahm J, Nave K-A (2007) Axonal loss and neuroinflammation caused by peroxisome-deficient oligodendrocytes. Nature Genetics 8: 969-976

Kramer-Albers EM, Gehrig-Burger K, Thiele C, Trotter J, Nave K-A (2006) Perturbed interactions of mutant proteolipid protein/DM20 with cholesterol and lipid rafts in oligodendroglia: implications for dysmyelination in spastic paraplegia. J Neurosci 26: 11743-11752

Saher G, Brügger B, Lappe-Siefke C, Möbius W, Tozawa R, Wehr M, Wieland F, Ishibashi S, Nave K-A (2005) Cholesterol is essential and rate-limiting for myelin membrane growth. Nature Neurosci 8: 468-475

Michailov GV, Sereda MW , Brinkmann BG, Fischer TM, Haug B, Birchmeier C, Role L, Lai C, Schwab MH, Nave K-A (2004) Axonal neuregulin-1 regulates myelin sheath thickness. Science 304: 700-703



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Professor, Director at the Max Planck Institute for Biophysical Chemistry

- M.Sc. (Physics), University of Wisconsin, (1967)
- Ph.D. (Physics), Institute of Technology, Munich (1970)
- Research associate at the Max Planck Institute for Biophysical Chemistry in Göttingen, Germany (1972 - 1975 and 1976 - 1982) and as a guest in the
- laboratory of Dr. Ch.F. Stevens at Yale University, Dept. of Physiology, New Haven, Conn. (1975 - 1976)
- Fairchild Scholar, California Institute of Technology; Pasadena, USA (1989)
- Director of the Membrane Biophysics Department at the Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, since 1983

Major Research Interests

Molecular Mechanisms of Exocytosis, Neurotransmitter Release, and Short Term Synaptic Plasticity
In order to understand how the brain handles its information flow and adjusts synaptic connections on the second and subsecond timescale, one has to understand all aspects of synaptic transmission ranging from availability of vesicles for exocytosis, presynaptic electrophysiology, Ca^{++} signalling, the process of exocytosis, and postsynaptic neurotransmitter action. Our work concentrates on presynaptic aspects. We study the basic mechanisms of exocytosis, using adrenal chromaffin cells as a model system and the patch-clamp method. This work, in which intracellular Ca^{++} is manipulated (caged Ca^{++}) and measured on the single cell level aims at understanding the role of specific synaptic proteins in the maturation and exocytosis of secretory vesicles. We use neuronal cell cultures and brain slices for studying mechanisms of short term plasticity, such as depression and paired pulse facilitation. The Calyx of Held, a specialized synapse in the auditory pathway, offers unique possibilities for simultaneous pre- and postsynaptic voltage clamping. This allows a quantitative analysis of the relationship between [Ca^{++}] and transmitter release.

Selected Recent Publications

Klingauf J, Neher E (1997) Modeling buffered Ca^{2+} diffusion near the membrane: Implications for secretion in neuroendocrine cells. Biophys J 72: 674-690

Neher E (1998) Vesicle pools and Ca^{2+} microdomains: new tools for understanding their roles in neurotransmitter release. Neuron 20: 389-399

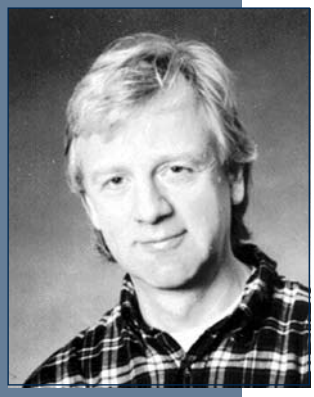
Schneggenburger R, Neher E (2000) Intracellular calcium dependence of transmitter release rates at a fast central synapse. Nature 406: 889-893

Rettig J, Neher E (2002) Emerging roles of presynaptic proteins in Ca^{++}-triggered exocytosis. Science 298: 781-785

Sakaba T, Neher E (2003) Direct modulation of synaptic vesicle priming by $GABA_B$ receptor activation at a glutamatergic synapse. Nature 424: 775-778

Soerensen J, Nagy G, Varoqueaux F, Nehring RB, Brose N, Wilson MC, Neher E (2003). Differential control of the releasable vesicle pools by SNAP-25 splice variants and SNAP-23. Cell 114: 75-86

Sakaba T, Stein A, Jahn R, Neher E (2005) Distinct kinetic changes in neurotransmitter release after SNARE protein cleavage. Science 309: 491-494



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Tomas Pieler

Professor of Biochemistry

- Dr. rer. nat. Biochemistry, Freie Universität Berlin, 1984
- Guest Investigator, Rockefeller University, New York (1985/86)
- Heisenberg fellow, Freie Universität Berlin and Rockefeller University, New York (1986/87)
- Junior group leader, Max-Planck-Institut für Molekulare Genetik, Berlin (1988 - 1992)
- Professor of Biochemistry, Georg-August-Universität Göttingen (since 1992)
- Head of the Department of Developmental Biochemistry, Georg-August-Universität Göttingen

Major Research Interests

The differentiation of complex organisms has its origin in the asymmetric distribution of regulatory proteins or of the corresponding mRNAs in the egg, as well as in a complex system of cell/cell communication events via extracellular signalling molecules during early stages of embryogenesis. The genes that encode for these different activities form functional networks which provide the basis for the genetic programming of embryonic development. Our primary research interest is in the identification of such regulatory genes and networks in vertebrates, as well as in the definition of their regulation and function on the molecular level. For this purpose, we use *Xenopus laevis*, a frog from South Africa, as a model system. As a traditional object in experimental embryology and in comparison with other experimental systems such as the mouse, use of *Xenopus* offers a number of practical advantages. Oocytes and embryos are easy to collect in large numbers, they are easy to manipulate by relatively simple techniques, also because embryonic development proceeds in the petridish, and, more recently, it has even become possible to generate hundreds of transgenic frogs within a single experimental day. The research topics that we are focussing on are:

- Transport and function of vegetally localized maternal mRNAs
- Organogenesis: formation of pancreas and liver in vertebrate embryos
- Early neural development: primary neurogenesis

Selected Recent Publications

Afelik S, Chen Y, Pieler T (2006) Combined ectopic expression of Pdx1 and Ptfa/p48 results in the stable conversion of posterior endoderm into endo- and exocrine pancreatic tissue. Genes and Dev 20:1441-1446

Sölter M, Locker M, Boy S, Taelman V, Bellefroid E, Perron M, Pieler T (2006) Characterization and function of the bHLH-O protein XHes2: Insight into the mechanisms controlling retinal cell fate decision. Development (in press)

Loop S, Katzer M, Pieler T (2005) mPer1 mediated nuclear export of Cry ½ is an important element in establishing the circadian rhythm. EMBO Reports 4:341-347

Chen Y*, Pan FC*, Brandes N, Afelik S, Sölter M, Pieler T (2004) Retinoic Acid signaling is essential for pancreas development and promotes endocrine at the expense of exocrine cell differentiation in *Xenopus*. Dev Biol 271: 144-160 *equal contribution

Claußen M, Horvay K, Pieler T (2004) Evidence for overlapping but not identical protein mechineries to operate in vegetal localisation along early and late pathways in *Xenopus oocytes*. Development 131: 4263-4273

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Stefanie Pöggeler

Professor of Genetics of Eukaryotic Microorganisms

- 1993 Dr. rer. nat., Ruhr-Universität Bochum
- 1993 - 1995 Research associate, Laboratory of Prof. U. Kück, Ruhr-Universität Bochum
- 1995 - 2001 Postdoctoral research fellow and group leader, Ruhr-Universität Bochum
- 1997 Visiting Scientist, Institut de Génétique et Microbiologie, Laboratory of Dr. D. Zickler, Université Paris-Sud, Orsay, France
- 2000 Habilitation (Botany), Ruhr-Universität Bochum
- 2001 - 2003 Associate Professor of Botany (stand-in), University of Münster
- 2003 - 2006 University lecturer (Hochschuldozentin) and group leader, Ruhr-Universität Bochum
- since 2006 Associate Professor of Genetics of Eukaryotic Microorganisms, Georg-August-Universität Göttingen

Major Research Interests

Fruiting-body development in filamentous ascomycetes
Fruiting-body development in filamentous ascomycetes is a complex cellular differentiation process that requires special environmental conditions and is controlled by many developmentally regulated genes. We are interested in the genes regulating this development process. We use the homothallic (self-fertile) ascomycete *Sordaria macrospora* as a model organism. Since *S. macrospora* is able to complete the sexual cycle without a mating partner, recessive mutations affecting fruiting body development are directly visible. Numerous mutants which are blocked at various stages of fruiting-body development have been generated and molecular genetic procedures have been applied to isolate genes involved in fruiting-body development.

Fungal inteins
An intein is a self-catalytic protein-intervening sequence that catalyses its precise excision from a host protein and the ligation of its flanking sequences, termed N- and C-exteins, to produce the mature spliced product. Protein splicing is a posttranslational event that releases an internal intein sequence from a protein precursor. Projects in the lab aim to analyse the splicing activity of inteins detected in the *prp8* gene of fungi. The PRP8 protein is one of the largest and most highly conserved nuclear proteins occupying a central position in the catalytic core of the spliceosome. Because of their compactness and high splicing activity inside foreign proteins, fungal PRP8 inteins may be used for the development of new intein-mediated protein-engineering applications.

Selected Recent Publications

Nolting N, Pöggeler S (2006) A STE12 homologue of the homothallic ascomycete *Sordaria macrospora* interacts with the MADS box protein MCM1 and is required for ascosporogenesis. Mol Microbiol 62: 853-868

Mayrhofer S, Weber JM, Pöggeler S (2006) Pheromones and pheromone receptors are required for proper sexual development in the homothallic ascomycete *Sordaria macrospora*. Genetics 172: 1521-1533

Elleuche, S, Nolting N, Pöggeler S (2006) Protein splicing of PRP8 mini-inteins from species of the genus *Penicillium*. Appl Microbiol Biotechnol 72: 959-967

Pöggeler S, Kück U (2004) A WD40 repeat protein regulates fungal cell differentiation and can functionally be replaced by the mammalian homologue striatin. Eukaryotic Cell 3: 232-240

Van Heemst D, James F, Pöggeler S, Bertaux-Lecellier V, Zickler D (1999) Spo76p is a conserved chromosome morphogenesis protein that links the mitotic and meiotic programs. Cell 98: 261-271

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Peter Rehling

Professor, Director of the Dept. of Biochemistry II

- 1993 - 1996 Graduate studies (Laboratory of W.-H. Kunau, Bochum)
- 1996 Dr. rer. nat. (Biology), University of Bochum
- 1996 - 1998 Postdoctoral fellow (Laboratory of W.-H. Kunau, Bochum
- 1998 - 2000 Postdoctoral fellow (S.D. Emr, HHMI, University of California San Diego, USA)
- 2000 - 2004 Research group leader at the Institute for Biochemistry and Molecular Biology, Freiburg
- 2003 Habilitation (Biochemistry and Molecular Biology) at the Medical Faculty, University of Freiburg
- 2004 - 2007 Assistant Professor Institute for Biochemistry and Molecular Biology, Freiburg
- Since 2007 Professor of Biochemistry and Director of the Dept. of Biochemistry II University of Göttingen

Major Research Interests

Selected Recent Publications

Mick D U, Wagner K, Van der Laan M, Frazier A E, Perschil I, Pawlas M, Meyer H E, Warscheid B, Rehling P (2007) Shy1 couples Cox1 translational regulation to cytochrome c oxidase assembly. EMBO J 26: 4347-4358

Van der Laan M, Meinecke M, Dudek J, Hutu D P, Lind M, Perschil I, Guiard B, Wagner R, Pfanner N, Rehling P (2007) Motor-free mitochondrial presequence translocase drives membrane integration of preproteins. Nat Cell Biol 9: 1152-1159.

Meinecke M, Wagner R, Kovermann P, Guiard B, Mick D U, Hutu D P, Voos W, Truscott K N, Chacinska A, Pfanner N, Rehling P (2006) Tim50 maintains the permeability barrier of the mitochondrial inner membrane. Science 312: 1523-1526

Frazier A E, Taylor R, Mick D U, Warscheid B, Stoepel N, Meyer H E, Ryan M T, Guiard B, Rehling P (2006) Mdm38 interacts with ribosomes and is a component of the mitochondrial protein export machinery. J Cell Biol 172: 553-564

Chacinska A, Lind M, Frazier A E, Dudek J, Meisinger C, Geissler A, Sickmann A, Meyer H E, Truscott K N, Guiard B, Pfanner N, Rehling P (2005) Mitochondrial presequence translocase: switching between TOM tethering and motor recruitment involves Tim21 and Tim17. Cell 120: 817-829

Rehling P, Model K, Brandner K, Kovermann P, Sickmann A, Meyer H E, Kühlbrandt W, Wagner R, Truscott K N, Pfanner N (2003) Protein insertion into the mitochondrial inner membrane by a twin-pore translocase. Science 299: 1747-1751

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Silvio Rizzoli

Group Leader STED Microscopy of Synaptic Function

- 2000 - 2004 Research assistant with William Betz at the Dep. of Physiology and Biophysics, University of Colorado Health Sciences Center (USA)
- 08/2004 PhD degree (Physiology) awarded by the University of Colorado
- 2004 - 2007 Post doctoral fellow with Reinhard Jahn at the Neurobiology
- Department of the Max Planck Institute for Biophysical Chemistry in Göttingen (Germany)
- since 2007 Group Leader (STED Microscopy) at the European Neuroscience Institute Göttingen (ENI-G)

Major Research Interests

Conventional fluorescence microscopy is limited by the diffraction of light: fluorescent objects that are close together cannot be discerned. Stimulated emission depletion (STED) is a recent advancement in optical physics that breaks the diffraction barrier, allowing microscopes to obtain much clearer images.

The diffraction barrier has been particularly problematic for imaging synaptic vesicles, which are among the smallest known organelles (30-50 nm in diameter). They are located in small areas in the synapses (about 1 micron in diameter). The group takes advantage of the increased imaging resolution provided by STED to investigate synaptic vesicle function, with an emphasis on synaptic vesicle recycling. Since STED microscopy also allows imaging of protein domains, the group aims at studying the patterning of protein domains in the synapse, in order to understand its molecular architecture.

Selected Recent Publications

Bethani I, Lang T, Geuman U, Sieber JJ, Jahn R, Rizzoli SO (2008) The specificity of SNARE pairing in biological membranes is mediated by both proof-reading and spatial segregation. Neurobiol Dis 30: 353-364

Rizzoli SO, Bethani I, Zwilling D, Wenzel D, Siddiqui TJ, Brandhorst D, Jahn R (2006) Evidence for early endosome-like fusion of recently endocytosed synaptic vesicles. Traffic 7(9): 1163-76

Gaffield MA, Rizzoli SO, Betz WJ (2006) Mobility of synaptic vesicles in different pools in resting and stimulated frog motor nerve terminals. Neuron 51(3): 317-25

Willig KI, Rizzoli SO, Westphal V, Jahn R, Hell SW (2006) STED microscopy reveals that synaptotagmin remains clustered after synaptic vesicle exocytosis. Nature 440(7086): 935-9

Rizzoli SO, Betz WJ (2005) Synaptic vesicle pools. Nat Rev Neurosci 6(1): 57-69. Review

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Marina Rodnina

Professor of Biochemistry

- PhD, Institute of Molecular Biology and Genetics, Academy of Science Ukraine, Kiew, Ukraine, 1989
- Research Fellow of the Alexander von Humboldt Foundation, University of Witten, Germany, 1990-1992
- Research Fellow at the Institute of Molecular Biology, University of Witten/ Herdecke, 1992 - 1998
- Associate Professor for Physical Biochemistry at the Institute of Molecular Biology, University of Witten/Herdecke, 1998 - 2000
- Full Professor, Head of the Institute of Physical Biochemistry, University of Witten/Herdecke, 2000 - 2008
- Director of Department of Physical Biochemistry, Max Planck Institute for Biophysical Chemistry, Göttingen, since 2008

Major Research Interests

1. Ribosome function and dynamics
2. Regulation and fidelity of translation
3. Ribosome-catalyzed reactions

Protein synthesis from amino acids in the cell is performed on ribosomes, large ribonucleoprotein particles that consist of several RNA molecules and over 50 proteins. The ribosome is a molecular machine that selects its substrates, aminoacyl-tRNAs, very rapidly and accurately and catalyses the synthesis of peptides from amino acids. Among the most important unresolved questions is the role of structural dynamics in ribosome function. The communication between the functional centers of the ribosome is known to be crucial, but there are only vague ideas as to how this may take place. The activation of the GTPase of elongation factor (EF)-Tu is a key step in selection of aminoacyl tRNAs by the ribosome. It is triggered by events on the small subunit, but the GTP-binding site of EF-Tu associates with the large subunit, and the way the signal is transmitted within the ribosome remains unknown. The mechanism of the translocation step, i.e. the movement of tRNAs and mRNA through the ribosome, remains a major challenge. EF-G accelerates translocation by using the energy of GTP hydrolysis to drive translocation which resembles the way motor proteins work; however, the structural basis for the movement and its biophysical characteristics are not known. Finally, incorporation of unusual amino acids, such as selenocysteine, requires highly specialized machinery for delivery; very little is known about the molecular mechanism of this process. None of these problems can be solved without using a combination of techniques from Biochemistry, Structural Biology and Physical Biochemistry and developing new approaches to structure, function, and dynamics of the translational apparatus. In a broader context, the ribosome can serve as a well-characterized model of large macromolecular assemblies. Using the biophysical approaches devised for the ribosome, it should be possible to obtain information for even larger and more complex macromolecular assemblies. Developing of highly efficient and controlled ribosome translation systems on a highly sophisticated technological level is important for production of proteins with desired properties for purposes of proteomics and high-throughput structural studies emerging in the post-genomic era. The translational apparatus is a major target for antibiotics. Better understanding of the mechanisms of antibiotic action, resistance mechanisms and the interplay between resistance and bacterial fitness using systems biology will be increasingly important for developing new antimicrobials and combating the major infectious diseases.

Selected Recent Publications

Konevega AL, Fischer N, Semenkov YP, Stark H, Wintermeyer W, Rodnina MV (2007) Spontaneous reverse movement of tRNA-mRNA through the ribosome. Nat Struct Mol Biol 14: 318-324

Gromadski KB, Daviter T, Rodnina MV (2006) A uniform response to mismatches in codon-anticodon complexes ensures ribosomal fidelity. Mol Cell 21: 369-377

Diaconu M, Kothe U, Schlünzen F, Fischer N, Harms J, Tonevitski AG, Stark H, Rodnina MV, Wahl MC (2005) Structural basis for the function of the ribosomal L7/L12 stalk in factor binding and activation of GTP hydrolysis. Cell 121: 991-1004

Sievers A, Beringer M, Rodnina MV, Wolfenden R (2004) The ribosome as an entropy trap. Proc Natl Acad Sci USA 101: 7897-7901

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Reinhard Schuh

Research Group Leader at the MPI for Biophysical Chemistry

- Dr. rer. nat., University of Tübingen, Germany, 1986
- Postdoctoral Fellow at the Max Planck Institute for Developmental Biology, Tübingen, Germany, 1986 - 1988
- Postdoctoral Fellow at the University of Munich, Germany, 1989 - 1991
- Group leader in the Department of Molecular Developmental Biology at the Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, 1992 - 2004
- Habilitation in Cellular and Molecular Biology, Technical University of Braunschweig, Germany, 2001
- Leader of the Research Group Molecular Organogenesis at the Max Planck Institute for Biophysical Chemistry, since 2005

Major Research Interests

Branched tubular networks are a fundamental structural design of many organs including lung, vascular system and kidney. Critical for organ function, i.e. the transport of fluids or gases, is the proper size and diameter of the tubular branches as well as an elaborated network formation. How do these networks develop? How do the branches grow out, detect their fusion partners and interconnect? How are tube size and dia-meter controlled? How can the system respond to different physiological needs? How do epidermal sheets control the paracellular passage of solutes?

We investigate the development of the *Drosophila* tracheal (respiratory) system since it provides an ideal model to address such questions, because of its simple stereotypic architecture, accessible genetics and molecular tools.

Selected Recent Publications

Krause C, Wolf C, Hemphälä J, Samakovlis C, Schuh R (2006) Distinct functions of the leucine-rich repeat transmembrane proteins Capricious and Tartan in the *Drosophila* tracheal morphogenesis. Dev Biol 296: 253-264

Adryan B, Schuh R (2004) Gene Ontology-based clustering of gene expression data. Bioinformatics 20: 2851-2852

Behr M, Riedel D, Schuh R (2003) The claudin-like Megatrachea is essential in septate junctions for the epithelial barrier function in *Drosophila*. Dev Cell 5: 611-620

Wolf C, Gerlach N, Schuh R (2002) *Drosophila* tracheal system formation involves FGF-dependent cell extensions contacting bridge-cells. EMBO Reports 3: 563-568

Wolf C, Schuh R (2000) Single mesodermal cells guide outgrowth of ectodermal tubular structures in *Drosophila*. Genes Dev 14: 2140-2145

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Halyna Shcherbata

Independent Max Planck Research Group Leader

- MS, Biology and Chemistry, Lemberg (Lviv) National University, Ukraine, 1992
- Ph.D., Genetics, Kyiv Institute for Plant Physiology and Genetics, Ukraine, 1996
- Scientific Researcher, Lemberg (Lviv) National University, Ukraine, 1996 - 2000
- Assistant Professor, Genetics and Biotechnology Department, Lemberg (Lviv) National University, Ukraine, 2000 - 2003
- Postdoc, Biochemistry Department, Institute for Stem cell and Regenerative Medicine, University of Washington, Seattle, WA, USA, 2003 - 2007
- Max Planck Research Group Leader, MPI for biophysical Chemistry, Goettingen, Germany, 2008 - present

Major Research Interests

Drosophila melanogaster is an excellent model organism due to a combination of its easy-to-manipulate genetic system, relatively short life cycle, low cost, and biological complexity. As the complete genome of *Drosophila* has been sequenced, it provides critical information about human genes that have homologues in the fruit fly. Around 75% orthologs to human genes have been found within the fly genome.
Our group is currently working on studying the role of the miRNA pathway in stem cells. Previously we have demonstrated the necessity of the microRNA pathway for proper control of stem cell division and maintenance. Given implication of the microRNA pathway in a great variety of developmental processes, any advance in understanding its function in stem cell maintenance or cell cycle control might provide new insight into stem cell and cancer biology and aid development of new therapies. Now, by performing genetic screens, we are trying to find different components and pathways, which are required for stem cell division and maintenance.
The other project we are interested is understanding the origin of muscular dystrophy. Previously we have developed a *Drosophila* model for studying muscular dystrophies, now we decided to use the genetic tractability of *Drosophila* to search for novel components of the Dystroglycan glycoprotein complex, as well as components that may be involved in its signaling and regulation. This could provide new insights into the origin of muscular dystrophy and facilitate development of novel therapeutic strategies for treatment of these fatal neuromuscular diseases.

Selected Recent Publications

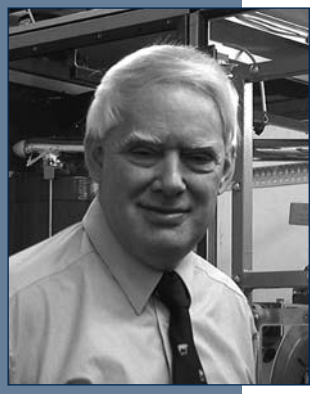
Kucherenko MM, Pantoja M, Yatsenko AS, Shcherbata HR, Fischer KA, Maksymiv DV, Chernyk YI, Ruohola-Baker H (2008) Genetic modifier screens reveal new components that interact with the *Drosophila* Dystroglycan-Dystrophin complex. PLoS ONE 2008;3.e2418.

Yatsenko AS, Gray EE, Shcherbata HR, Patterson LB, Sood VD, Kucherenko MM, Baker D, Ruohola-Baker H (2007) A putative src homology 3 domain binding motif but not the c-terminal Dystrophin WW domain binding motif is required for Dystroglycan function in cellular polarity in *Drosophila*. J Biol Chem 282:15159-15169

Shcherbata HR, Yatsenko AS, Patterson L, Sood VD, Nudel U, Yaffe D, Baker D, Ruohola-Baker H (2007) Dissecting muscle and neuronal disorders in a *Drosophila* model of muscular dystrophy. EMBO J 26: 481-493

Shcherbata HR, Ward EJ, Fischer KA, Yu JY, Reynolds SH, Chen CH, Xu P, Hay BA, Ruohola-Baker H (2007) Stage-specific differences in the requirements for germline stem cell maintenance in the *Drosophila* ovary. Cell Stem Cell 1: 698-709

Ward EJ, Shcherbata HR, Reynolds SH, Fischer KA, Hatfield SD, Ruohola-Baker H (2006) Stem cells signal to the niche through the notch pathway in the *Drosophila* ovary. Curr Biol 16: 2352-2358.



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George M. Sheldrick

Professor of Structural Chemistry and part-time programming technician at the University of Göttingen

- PhD (1966) University of Cambridge with E.A.V. Ebsworth; thesis entitled "NMR Studies of Inorganic Hydrides"
- 1966 - 1978: University Lecturer and Fellow of Jesus College, Cambridge
- Since 1978 Professor at the University of Göttingen
- Author of more than 750 scientific papers and of a computer program called SHELX (http://shelx.uni-ac.gwdg.de/SHELX/)

Major Research Interests

Interested in methods of solving and refining crystal structures (both small molecules and proteins) and in structural chemistry.
Holy Grail: the Crystallographic Phase Problem. If only there was an easy way of measuring the phases of X-ray reflections as well as their intensities, crystal structures could be determined directly. At resolutions of better than about 2.5A, there are more measured intensities than atomic coordinates, so the problem is overdetermined and there should be a solution. Recently we were able to increse the size of structures that can be solved from the intensity data alone by 'ab initio direct methods' from about 200 to 1000 unique atoms, given data to 'atomic resolution', but most interesting macromolecular structures are still out of the reach of such methods. Indirctly however the same techniques are proving very useful for the solution of large macromolecular structures when a little starting phase information is available, e.g. by incorporating heavy atoms into the crystal.

Selected Recent Publications

Bunkóczi G, Vértesy L, Sheldrick GM (2005) The antiviral antibiotic feglymycin: First direct-methods solution of a 1000+ equal-atom structure. Angew Chem Int Ed 44: 1340-1342

Lehmann C, Bunkóczi G, Vértesy L, Sheldrick GM (2002) Structures of glycopeptide antibiotics with peptides that model Bacterial Cell-Wall Precursors. J Mol Biol 318: 723-732

Sheldrick GM (2002) Macromolecular phasing with SHELXE. Z Kristallogr 217: 644-650

Debreczeni JÈ, Bunkóczi G, Ma Q, Blaser H, Sheldrick GM (2003) In-house measurement of the sulfur anomalous signal and its use for phasing. Acta Crystallogr D59: 688-696

Debreczeni JÈ, Girmann B, Zeeck A, Krätzner R, Sheldrick GM (2003) Structure of viscotoxin A3: dislulphide location from weak SAD data. Acta Crystallogr D59: 2125-2132

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Mikael Simons

Group Leader of Centre for Biochemistry and Molecular Cell Biology

- 1991 - 1997 Medical School, University of Heidelberg
- 1993 - 1996 MD thesis (Laboratory of K. Beyreuther, ZMBH, University of Heidelberg)
- 1997 - 1999 Residency in Neurology, Department of Neurology, University of Tübingen
- 1999 - 2000 Post-Doc (Laboratory of J. Trotter, Department of Neurobiology, University of Heidelberg)
- 2000 - 2004 Residency in Neurology, Department of Neurology, University of Tübingen
- 2004 Facharzt/Specialty qualification in Neurology
- 2005 Habilitation in Neurology, University of Tübingen
- 2004 Junior group leader, Centre for Biochemistry and Molecular Cell Biology, University of Göttingen

Major Research Interests

Mechanisms of myelin biogenesis; neuron and glia interactions; membrane trafficking in oligodendrocytes; mechanisms of remyelination in multiple sclerosis; amyloid precursor protein processing in Alzheimer's disease

Selected Recent Publications

Trajkovic K, Hsu C, Chiantia S, Rajendran L, Wenzel D, Wieland F, Schwille P, Brügger B, Simons M (2008) Ceramide triggers budding of exosome vesicles into multivesicular endosomes. Science 319(5867): 1244-7. PMID: 18309083 [PubMed - in process]

Trajkovic K, Dhaunchak A S, Goncalves J, Wenzel D, Bunt G, Nave K A, Simons M (2006) Neuron to glia signalling triggers myelin membrane exocytosis from endosomal storage sites. J Cell Biol 172: 937-48

Fitzner D, Schneider A, Kippert A, Möbius W, Willig K I, Hell S W , Bunt G, Gaus K, Simons M (2006) Myelin basic protein-dependent plasma membrane reorganization in the formation of myelin. EMBO J 25(21): 5037-48

Simons M, Schwärzler F, Lütjohann D, von Bergmann K, Beyreuther K, Dichgans J, Wormstall H, Hartmann T, Schulz J B (2002) Treatment with simvastatin in normocholeserolemic patients with Alzheimer's disease: a 26-week randomised, placebo-controlled, double-blind trial. Annals of Neurology 52: 346-350

Fassbender K, Simons* M, Bergmann C, Stroick M, Lütjohann D, Keller P, Runz H, Kühl S, Bertsch T, von Bergmann K, Hennerici M, Beyreuther K, Hartmann T (2001) Simvastatin strongly reduces levels of Alzheimer's disease amyloid peptides Aβ40 and Aβ42 *in vitro* and *in vivo*. Proc Natl Acad Sci USA 98: 5856-5861; *equal contribution to first authorship

Simons M, Krämer E M, Thiele C, Stoffel W, Trotter J (2000) Assembly of myelin by association of the proteolipid protein to galactosylceramide and cholesterol rich membrane domains. J Cell Biol 151: 143-153

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Holger Stark

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- 1997 - 1998 Postdoc (Laboratory of Marin van Heel, Imperial College, London)
- 1998 - 1999 Junior group leader, University of Marburg
- 2000 - 2004 Junior group leader, Max-Planck-Institute for Biophysical Chemistry
- 2005 - BioFuture group leader, Max-Planck-Institute for Biophysical Chemistry

Major Research Interests

The work in our group is focused on 3D structure determination of large macromolecular complexes by single particle electron cryomicroscopy (cryo-EM). In cryo-EM, thousands of electron microscopical images of a macromolecular complex are taken at low temperature in the electron microscope and are used to calculate a 3D reconstruction of the object by computational image processing. Electron microscopical images can be considered as almost ideal two-dimensional projection images, similar to images obtained by computer tomography in medical applications. However, in cryo-EM the relative orientation of the molecules is a priori unknown and must be determined by computational means prior to calculating the 3D structure.

Cryo-EM is the method of choice for 3D structure determination of macromolecular complexes that are difficult to purify in the amounts and quality that is required for crystallization (X-ray crystallography). Due to the low copy number of many functionally important macromolecular complexes in the cell, cryo-EM is very often the only available method to study the 3D structure of these large macromolecules. Work in our concentrates on macromolecular complexes related to pre-mRNA splicing, translation and cell cycle regulation and on the development of new methods to improve sample preparation, imaging and computational image processing techniques

Selected Recent Publications

Sander B, Golas MM, Makarov EM, Brahms H, Kastner B, Luhrmann R, Stark H (2006) Organization of core spliceosomal components U5 snRNA loop I and U4/U6 Di-snRNP within U4/U6.U5 Tri-snRNP as revealed by electron cryomicroscopy. Mol Cell 24: 267

Dube P, Herzog F, Gieffers C, Sander B, Riedel D, Muller SA, Engel A, Peters JM Stark H (2005) Localization of the Coactivator Cdh1 and the Cullin Subunit Apc2 in a Cryo-Electron Microscopy Model of Vertebrate APC/C. Mol Cell 20: 867-879

Golas MM, Sander B, Will CL, Luhrmann R, Stark H, (2003) Molecular architecture of the multiprotein splicing factor SF3b. Science 300(5621): 980-4

Stark H, Dube P, Lührmann R, Kastner B (2001) The 3-D arrangement of RNA and proteins in the spliceosomal U1 snRNP. Nature 409: 539-542

Stark H, Rodnina MV, Wieden HJ, van Heel M, Wintermeyer W (2000) Large-scale movement of elongation factor G and extensive conformational change of the ribosome during translocation. Cell 3: 301-9

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- 1990 Diploma (Biology), Ernst-Moritz-Arndt-Universität Greifswald
- 1994 Dissertation (Dr. rer. nat.), Ernst-Moritz-Arndt-Universität Greifswald
- 1994 - 1996 Postdoctoral Fellow at the Institut Pasteur, Paris
- 1996 - 2003 Group leader at the Chair of Microbiology, University Erlangen-Nürnberg
- 2000 Habilitation (Microbiology), University Erlangen-Nürnberg
- Since 2003 Professor of General Microbiology, Head of the Department of General Microbiology at the Institute of Microbiology and Genetics, University of Göttingen

Major Research Interests

Our group studies the regulation of metabolism in the pathogenic bacterium *Mycoplasma pneumoniae* and the model organism *Bacillus subtilis*. We are following global ("post-genomic") and gene-specific approaches. In *Mycoplasma pneumoniae*, we study the regulation of gene expression in this pathogenic bacterium and its relation to pathogenicity. This is highly interesting because this bacterium is an important cause of pneumonia. Moreover, *M. pneumoniae* is one of the organisms with the smallest genetic equipment that is capable of independent life. Understanding *M. pneumoniae* means understanding life! So far, we have studied one of the few regulatory proteins of *M. pneumoniae* and determined its crystal structure. Interestingly, the mode of action of this protein is opposed to that of homologous proteins from other bacteria: a hint to the parasitic lifestyle of *M. pneumoniae*! We are now starting to study the metabolic responses of *M. pneumoniae* to the infection process. If we understand what happens upon infection, we may subsequently try to interrupt this chain of events. Metabolism in *Bacillus subtilis* is studied by transcriptomics, protein arrays, and metabolome and fluxome analyses. Our specific interests are focussed on two key pathways: glycolysis and glutamate biosynthesis, the decisive link between carbon and nitrogen metabolism. We discovered recently that genes for glutamate biosynthesis in *B. subtilis* are only expressed if rich carbon sources are available and we identified a regulatory protein-protein interaction that governs this sugar induction. The regulation of glycolysis is studied at the level of a controlled protein-RNA interaction. Regulation through RNA has become widely recognized in the past few years. In the framework of a national priority program, we will analyze the adaptation of RNA-based regulatory processes in organisms that live at very low or very high temperatures.

Selected Recent Publications

Halbedel S, Busse J, Schmidl S, Stülke J (2006) Regulatory protein phosphorylation in *Mycoplasma pneumoniae*: A PP2C-type phosphatase serves to dephosphorylate HPr(Ser-P). J Biol Chem 281: 26253-26259

Schilling O, Herzberg C, Hertrich T, Vörsmann H, Jessen D, Hübner S, Titgemeyer F, Stülke J (2006) Keeping signals straight in transcription regulation: specificity determinants for the interaction of a family of conserved bacterial RNA-protein couples. Nucl Acids Res 34: 6102-6115

Stülke J (2007) Regulation of virulence in *Bacillus anthracis*: the phosphotransferase system transmits the signals. Mol Microbiol 63: 626-628

Halbedel S, Eilers H, Jonas B, Busse J, Hecker M, Engelmann S, Stülke J (2007) Transcription in *Mycoplasma pneumoniae*: Analysis of the promoters of the ackA and ldh genes. J Mol Biol 371: 596-607

Commichau FM, Herzberg C, Tripal P, Valerius O, Stülke J (2007) A regulatory protein-protein interaction governs glutamate biosynthesis in *Bacillus subtilis*: The glutamate dehydrogenase RocG moonlights in controlling the transcription factor GltC. Mol Microbiol 65: 642-654

Herzberg C, Flórez Weidinger LA, Dörrbecker B, Hübner S, Stülke J, Commichau FM (2007) SPINE: A method for the rapid detection and analysis of protein-protein interactions *in vivo*. Proteomics, in press

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Michael Thumm

Professor of Molecular Cell Biology

- Center of Biochemistry and Molecular Cell Biology, University of Göttingen
- 1987 Dr. rer. nat., University of Stuttgart
- 1997 Habilitation (Biochemistry), University of Stuttgart

Major Research Interests

We are studying the molecular mechanism of autophagy in the yeast *Saccharomyces cerevisiae*. Autophagy is a starvation induced transport pahway, which delivers cytosolic material for degradation to the lysosome (vacuole). It is highly conserved in all eukaryots from yeast to human and helps the cells to survive periods of nutrient limitation. Autophagy further plays an important role in ageing, the development of breast cancer and cardiomyopathy and it was linked to neurodegenerative diseases like Alzheimer´s, Huntington´s and Parkinson´s disease. Autophagy is mechanistically unique, since its transport intermediates, the autophagosomes, are surrounded by two individual membranes. It starts at the newly-discovered preautophagosomal structure, where autophagosomes are formed. Autophagosomes unspecifically enclose parts of the cytoplasm including organelles like mitochondria, peroxisomes and parts of the ER. When the autophagosomes reach the vacuole, their outer membrane-layer fuses with the vacuolar membrane and a still membrane-enclosed autophagic body is released into the vacuolar lumen. In the vacuole autophagic bodies are lysed and broken down together with their cytosolic content. The intravacuolar breakdown of autophagic bodies requires the selective lysis of their limiting membrane. The intracellular lysis of a membrane is a very interesting feature of eukaryotic cells and implies a high risk for cellular integrity. In a genetic screen, we identified Aut5 as an essential component of this lysis process. We found that Aut5 is an integral membrane protein and that its lipase active site motive is essential for lysis of autophagic bodies.

Selected Recent Publications

Meiling-Wesse K, Barth H, Voss C, Eskelinen EL, Epple UD, Thumm M (2004) Atg21 is required for effective recruitment of Atg8 to the preautophagosomal structure during the Cvt pathway. J Biol Chem 279: 37741-37750

Epple UD, Eskelinen E-L, Thumm M (2003) Intravacuolar membrane lysis in *Saccharomyces cerevisae*: Does vacuolar targeting of Cvt17/Aut5p affect its function? J Biol Chem 278: 7810-7821

Regelmann J, Schüle T, Josupeit FS, Horak J, Rose M, Entian K-D, Thumm M, Wolf DH (2003) Catabolite degradation of fructose-1,6-bisphosphatase in the yeast *Saccharomyces cerevisiae*: A genome-wide screen identifies eight novel GID genes and indicates the existence of two degradation pathways. Mol Biol Cell 14: 1652-63

Thumm M (2002) Hitchhikers guide to the vacuole-mechanisms of cargo sequestration in the Cvt and autophagic pathways. Mol Cell 10: 1257-1258

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Kai Tittmann

Professor of Bioanalytics

- Diploma (Biochemistry), Martin-Luther-University, Halle/Saale (Germany), 1996
- Dr. rer. nat., Martin-Luther-University, Halle/Saale (Germany), 2000
- Postdoc, Institute for Biochemistry, MLU Halle-Wittenberg, Halle/Saale (Germany), 2001 - 2002
- Jun.-Prof. of Molecular Enzymology, Institute for Biochemistry, MLU Halle-Wittenberg, Halle/Saale, (Germany), 2003 - 2008
- Invited Research Scientist at Rutgers University, Newark, NJ, USA, 2003
- Associate Guest Professor, Ben-Gurion-University of the Negev, Beer-Sheva, IL, 2006
- Since 2008 Professor of Bioanalytics, Georg-August-University, Göttingen (Germany)
- Awards: Dorothea-Erxleben-Prize (best doctoral thesis), 2001
- Prize for excellent basic research at Saxony-Anhalt, 2005

Major Research Interests

The research of the division of bioanalytics is concerned with the mechanistic and structural analysis of various enzymes of carbon metabolism. A particular emphasis is laid on the time-resolved detection and structural characterization of enzymic on-pathway intermediates by means of rapid reaction kinetics, NMR spectroscopy, X-ray crystallography and theoretical studies. In a current project we aim to elucidate the mechanism of regulation by phosphorylation of the human pyruvate dehydrogenase multienzyme complex taking into account both kinetic and structural studies. We are also investigating the catalytic mechanism of bacterial and plant acetohydroxyacid synthases, which catalyze the first committed step of branched-chain amino acid biosynthesis. In another project, underlying principles of intramolecular electron transfer reactions and reversible membrane binding of pyruvate oxidases are being studied. A second research line is devoted to the analysis of the selective bond fission in the enzymes transketolase and transaldolase which act on sugar substrates. Here, we study the reaction trajectory of both enzyme superfamilies by means of detailed transient kinetics, X-ray crystallography and DFT studies. Another related aspect of this work is the mechanistic analysis of ring-opening reactions of cyclic sugar substrates at the active site of these enzymes.

Selected Recent Publications

Kluger R, Tittmann K (2008) Thiamin Diphosphate Catalysis: Enzymic and non-enzymic covalent intermediates. Chem Rev 108: 1797-1833

Kaplun A, Binstein E, Vyazmensky M, Steinmetz A, Barak Z., Chipman DM, Tittmann K, Shaanan B (2008) Glyoxylate carboligase challenges the paradigm for activation of thiamin-dependent enzymes. Nature Chem Biol 4: 113-118

Seifert F, Ciszak E, Korotchkina LG, Golbik R, Spinka M, Dominiak P, Sidhu S, Brauer J, Patel MS, Tittmann K (2007) Phosphorylation of serine 264 impedes active site accessibility in E1 component of human pyruvate dehydrogenase multienzyme complex. Biochemistry 46: 6277-6287

Asztalos P, Parthier C, Golbik R, Kleinschmidt M, Hübner G, Weiss MS, Wille G, Tittmann K (2007) Strain and near attack conformers in enzymic thiamin catalysis: X-ray crystallographic snapshots of bacterial transketolase in covalent complex with donor ketoses xylulose 5-phosphate and fructose 6-phosphate, and in noncovalent complex with acceptor aldose ribose 5-phosphate. Biochemistry 46: 12037-12052

Wille G, Meyer D, Steinmetz A, Hinze E, Golbik R, Tittmann K (2006) The catalytic cycle of a thiamin diphosphate enzyme examined by cryocrystallography. Nature Chem Biol 2: 324-328

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Henning Urlaub

Group Leader - Bioanalytical Mass Spectrometry Group

- since 2005: Independent research group “Bioanalytical Mass Spectrometry
- Group” at the Max Planck Institute for Biophysical Chemistry, Göttingen
- 2004, 2005, 2006: Organizer of the 1st, 2nd, and 3rd BMBF Summer School “Proteomic Basics”
- since 2001: Establishment and management of the mass spectrometry in the Department of Cellular Biochemistry at the Max Planck Institute for Biophysical Chemistry, Göttingen
- 2000-2001: Guest researcher at the EMBL, Heidelberg, Protein Analytical Group of Dr. Matthias Wilm
- 2000: Senior scientist in the Department of Cellular Biochemistry at the Max Planck Institute for Biophysical Chemistry, Göttingen
- 1997 - 2000: Post-Doc in the group of Prof. Dr. Reinhard Lührmann at the Institut für Molekularbiologie und Tumorforschung (IMT) of the Philipps-Universität Marburg
- 1996: Dr. rer. nat. at Faculty of Chemistry, Frei Universität Berlin
- 1993 - 1996: Doctoral thesis project in the group of Prof. Dr. Brigitte Wittmann-Liebold at the Max-Delbrück-Centre of Molecular Medicine, Berlin

Major Research Interests

Modern mass-spectrometric methods are key technologies in the life sciences to elucidate changes at the protein level. Nonetheless, the detection of post-translational modification, reliable MS-quantification procedures, MS-based detection of protein–protein and protein–nucleic acid interactions and, importantly, the identification of proteins that escape detection under standard conditions (e.g., protein isoforms and membrane proteins) are still far from being routine matters.
Our own projects are centered around the establishing of methods for the mass-spectrometric analysis of post-translational modifications and protein-nucleic acid contact sites in ribonucleoprotein (RNPs) particles, such as the spliceosome (collaboration with Reinhard Lührmann at the Max Planck Institute for Biophysical Chemistry (http://www.mpibpc.gwdg.de/english/research/dep/luehrmann/index.html). For that purpose we are developing novel analytical techniques including mass-spectrometric methods (MALDI- and ESI-MS) and chromatographic enrichment strategies.
In collaboration with the Neurobiology Department of Reinhard Jahn at the Max Planck Institute for Biophysical Chemistry (http://www.mpibpc.mpg.de/groups/jahn/), we are developing methods suitable for the reliable MS-based identification of membrane proteins. We use different gel-based purification strategies and liquid-chromatographic approaches to identify novel membrane proteins, for exmple from synaptic vesicles.

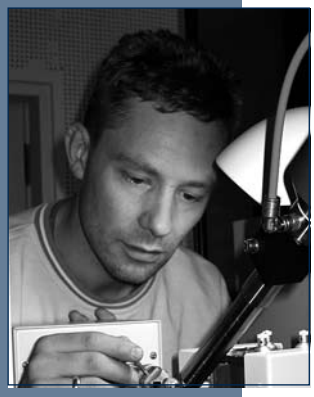
Selected Recent Publications

Merz C, Urlaub H, Will CL., Lührmann R (2007) Protein composition of human mRNPs spliced *in vitro* and differential requirements for mRNP protein recruitment. RNA 13: 116-128

Deckert J, Hartmuth K, Boehringer D, Behzadnia N, Will CL, Kastner B, Stark H, Urlaub H, Lührmann R (2006) Protein composition and electron microscopy structure of affinity-purified human spliceosomal B complexes isolated under physiological conditions. Mol Cell Biol 26: 5528-5543

Holt M, Varoqueaux F, Wiederhold K, Takamori S, Urlaub H, Fasshauer D, Jahn R (2006) Identification of SNAP-47, a novel Qbc-SNARE with ubiquitous expression. J Biol Chem 281: 17076-17083

Kuhn-Holsken E, Lenz C, Sander B, Lührmann R, Urlaub H (2005) Complete MALDI-ToF MS analysis of cross-linked peptide-RNA oligonucleotides derived from nonlabeled UV-irradiated ribonucleoprotein particles. RNA 11: 1915-1930



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Markus Wahl

PhD, Group Leader at the Max Planck Institute for Biophysical Chemistry

- 1996 PhD, The Ohio State University, Columbus, OH, USA
- 1997 - 2002 Post-Doc, Max-Planck-Institute for Biochemistry, Martinsried, Germany
- 2002 Habilitation and Privatdozentur, Technical University München, Faculty of Chemistry, München, Germany
- Since 2002 group leader, Max Planck Institute for Biophysical Chemistry

Major Research Interests

Gene expression pathways encompass a number of RNA metabolic steps such as transcription, splicing, editing, post-transcriptional nucleotide modification, nuclear export, RNA surveillance, cytoplasmic localization, translation and RNA degradation, each of which is orchestrated by a multi-component cellular machine. In a traditional view, RNAs are shuttled along simple linear arrays of such steps that all represent discrete events. However, in recent years it became evident that the various machineries are extensively interconnected and that the route of a given RNA through this network of processes is determined by its particular set of decorating proteins, RNAs or RNA-protein complexes. The general interest of our group lies in exploring the molecular mechanisms underlying the modes of action and functional coupling of RNA-protein machineries involved in these gene expression networks. In particular, we are interested in the regulation of termination and antitermination of transcription by RNA polymerase, in the inner workings of the spliceosome and its constituents and in selected aspects of translation. We employ X-ray crystallography to elucidate the structures of proteins, RNAs and macromolecular complexes, which are part of these molecular machines. Structure-guided hypotheses are then tested by biochemical, molecular biological and genetics approaches.

Selected Recent Publications

Mukherjee K, Sharma M, Urlaub H, Bourenkov GP, Jahn R, Südhof TC, Wahl MC (2008) CASK Functions as a Mg^{2+}-Independent Neurexin Kinase. Cell 133: 328-339

Ganichkin OM, Xu X-M, Carlson BA, Mix H, Hatfiled DL, Gladyshev VN, Wahl MC (2008) Structure and catalytic mechanism of eukaryotic selenocysteine synthase. J Biol Chem 283: 5849-5865

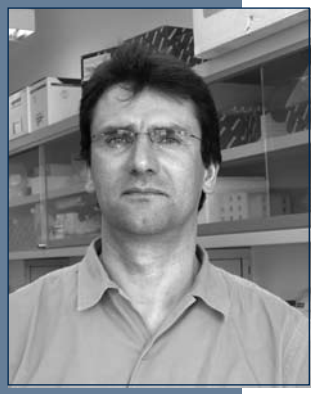
Liu S, Li P, Dybkov O, Nottrott S, Hartmuth K, Lührmann R, Carlomagno T, Wahl MC (2007) Binding of the human Prp31 Nop domain to a composite RNA-protein platform in U4 snRNP. Science 316: 115-20

Pena V, Liu S, Bujnicki JM, Lührmann R, Wahl MC (2007) Structure of a multipartite protein-protein interaction domain in splicing factor Prp8 and its link to Retinitis pigmentosa. Mol Cell 25: 615-24

Spadaccini R, Reidt U, Dybkov O, Will C, Frank R, Stier G, Corsini L, Wahl MC, Lührmann R, Sattler M (2006) Biochemical and NMR analyses of an SF3b155-p14-U2AF-RNA interaction network involved in branch point definition during pre-mRNA splicing. RNA 12: 410-25

Diaconu, M, Kothe, U, Schlünzen, F, Fischer, N, Harms, JM, Tonevitsky, A, Stark, H, Rodnina, MV, Wahl, MC (2005) Structural basis for the function of the ribosomal L7/12 stalk in factor binding and GTPase activation. Cell 121: 991-1004

Bonin I, Mühlberger R, Bourenkov GP, Huber R, Bacher A, Richter G, Wahl MC (2004) Structural basis for the interaction of *Escherichia coli* NusA with protein N of phage Lambda. Proc Natl Acad Sci USA 101: 13762-1376



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Lutz Walter

Head of Department of Primate Genetics at the German Primate Center

- Dr. rer. nat. (PhD), University of Göttingen, 1994
- Postdoctoral fellow and group leader at the Division of Immunogenetics, University of Göttingen, 1994 - 2004
- Head of Department of Primate Genetics, German Primate Center, Göttingen, since 2004
- Habilitation (Immunology and Immunogenetics), Medical Faculty of the University of Göttingen, 2005

Major Research Interests

The main interests of the laboratory are immunology, the genetic control of immune responses, functional genomics, molecular evolution, and population genetics. The research is focussed on the functional, evolutionary, and genomic analysis of genes of the major histocompatibility complex (MHC) as well as the natural killer cell receptor and leukocyte receptor complexes (NKC, LRC). The analyses are carried out in various organisms that are used as models of human diseases such as certain nonhuman primates (rhesus macaque, common marmoset) and rodents (mouse, rat). Functional studies aim at elucidating the role of certain genes of the MHC, NKC, and LRC in innate and adaptive immunity.

In a further research focus, the molecular evolution and population genetics of various nonhuman primate taxa are analyzed on the basis of molecular data. These studies aim at clarifying the phylogenetic relationship of various primates (molecular phylogeny) and to determine their geographic distribution (phylogeography), particularly of highly endangered primate species (conservation biology).

Selected Recent Publications

Averdam A, Kuhl H, Sontag M, Becker T, Hughes AL, Reinhardt R, Walter L (2007): Genomics and diversity of the common marmoset monkey natural killer complex (NKC). J Immunol 178: 7151-7161

Walter L (2007): Pas de deux: natural killer receptors and MHC class I ligands in primates. Curr Genomics 8: 51-57

Rölleke U, Flügge G, Plehm S, Schlumbohm C, Armstrong VW, Dressel R, Uchanska-Ziegler B, Ziegler A, Fuchs E, Czeh B, Walter L (2006) Differential expression of major histocompatibility complex class I molecules in the brain of a New World monkey, the common marmoset (*Callithrix jacchus*). J Neuroimmunol 176: 39-50

Kelley J, Walter L, Trowsdale J (2005) Comparative genomics of natural killer cell receptor gene clusters. PLoS Genetics 1: e27

Roos C, Dressel R, Schmidt B, Günther W, Walter L (2005) The rat expresses two complement factor C4 proteins, but only one isotype is expressed in the liver. J Immunol 174: 970-975

Hurt P, Walter L, Sudbrak R, Klages S, Müller I, Shiina T, Inoko H, Lehrach H, Günther E, Reinhardt R, Himmelbauer H (2004) The genomic sequence and comparative analysis of the rat major histocompatibility complex. Genome Res 14: 631-639

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Jürgen Wienands

Professor of Cellular and Molecular Immunology

- 1982 - 89 Study of Biology at the University of Cologne; graduated at the Institute of Genetics, Dept. of Immunology
- 1989 - 92 Ph.D. poject at the Max Planck Institute for Immunobiology, Freiburg, Germany
- 1992 - 94 Postdoctoral fellow at the Dept. of Preclinical Research at Sandoz Pharma Ltd., Basel, Switzerland
- 1994 - 96 Postdoctoral fellow at the Max Planck Institute for Immunobiology, Freiburg, Germany
- 1996 - 2001 Group leader at the University of Freiburg, Institute of Biology III
- 2001 “Habilitation” and Venia Legendi in “Molecular Immunology and Biochemistry”
- 2001 - 2004 Full Professor for “Biochemistry and Molecular Immunology” at the University of Bielefeld
- since August 2004 Full Professor for “Molecular and Cellular Immunology” at the University of Göttingen

Major Research Interests

The signature structure of B lymphocytes is their clonotypic antigen receptor (BCR). Our major research focuses on the elucidation of intracellular BCR signaling pathways that regulate the development and activation of B cells in health and disease. We have identified enzymatically inert adaptor proteins such as SLP-65 (for: SH2 domain-containing leukocyte adaptor of 65 kDa), which nucleate the formation of multi-molecular protein complexes to integrate and amplify BCR signals. A key function of these signaling modules is to orchestrate the mobilization of the second messenger Ca^{2+}. Interference with expression and/or function of one the signaling components can cause severe immunodeficiencies in mouse and man. Moreover, viruses such as the Epstein-Barr virus (EBV) abuse BCR effector proteins to reorganize signaling cascades for their own benefit. Biochemical and genetic methods, which are applied to study these events *in vitro* and *in vivo*, include protein purification by affinity chromatography and immunoprecipitation, analysis of protein interactions, flow cytometry, targeted gene disruption in cell culture and embryonic stem cells followed by reconstitution experiments using electroporation techniques or retroviral gene transfer.

Selected Recent Publications

Grabbe A, Wienands J (2006) Human SLP-65 isoforms contribute differently to activation and apoptosis of B lymphocytes. Blood 108: 3761-3768

Connert S, Wienand S, Thiel C, Krikunova M, Glyvuk N, Tsytsyura Y, Hilfiker-Kleiner D, Bartsch JW, Klingauf J, Wienands J (2006) SH3P7/mAbp1 deficiency leads to tissue and behavioral abnormalities and impaired vesicle transport. EMBO J 25(8): 1611-22

Stork B, Engelke M, Frey J, Horesjsí V, Hamm-Baarke A, Schraven B, Kurosaki T, Wienands J (2004) Grb2 and the non-T cell activation linker NTAL constitute a Ca2+-regulating signal circuit in B lymphocytes. Immunity 21: 681-691

Wakabayashi C, Adachi T, Wienands J, Tsubata T (2002) A distinct signaling pathway used by the IgG-containing B-cell antigen receptor. Science 298: 2392-2395

Engels N, Merchant M, Pappu R, Chan AC, Longnecker R, Wienands J (2001) Epstein-Barr virus LMP2A employs the SLP-65 signaling module. J Exp Med 194: 255-264

Wienands J (2000) The B cell antigen receptor: Formation of signaling complexes and the function of adaptor proteins. Current Topics Microbiol Immunol 245: 53-76

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Ernst Wimmer

Professor of Developmental Biology

- 1991 Diplom (Biology), Ludwig Maximilians University, Munich (Germany)
- 1995 Dr. rer. nat., Max-Planck-Institute for Biophysical Chemistry, Göttingen (Germany) and Howard Hughes Medical Institute, Baylor College of Medicine, Houston (USA)
- 1995 - 1998 Postdoctoral Fellow and Associate, Howard Hughes Medical Institute, The Rockefeller University, New York (USA)
- 1998 - 2003 Assistant Professor and Robert Bosch Foundation 'Junior Professor' Department of Genetics, University of Bayreuth, Bayreuth (Germany)
- Since 2003 Professor of Developmental Biology at the Johann Friedrich Blumenbach Institute of Zoology and Anthropology, Georg August University, Göttingen (Germany)

Major Research Interests

A key question in developmental biology is how diverse animal body plans are specified. Early developmental decisions determine the coordinates of the embryo and activate the genetic circuitry that sequentially subdivides and regionalizes the animal body. For insects, only in *Drosophila* the early developmental events are known in molecular detail. However, insects with varied life histories must compensate different reproductive strategies by adjusting the regulatory networks within the developmental program. Therefore, phylogenetic differences between diverse species must be manifested in the genetic circuitries regulating embryogenesis.
To identify the plasticity in early developmental processes, we study their conservation and divergence in different arthropod species. Developmental regulatory genes code for signal transduction molecules and transcription factors. But of equal importance to the coding part of these genes are their cis-regulatory sequences, which serve as integration points for originally distinct signals. By insect transgenesis and functional genomics approaches, we analyze genetic interactions within the regulatory network of early embryogenesis in diverse insect species. This will help us to understand how animal evolution is based on changes in gene regulation governing early pattern
formation.
Furthermore we apply our knowledge about developmental processes to insect pest management. Current control efforts rely mostly on insecticides, but the costs for developing new chemical products to overcome the problem of insecticide resistance are escalating. Genetic control based on the sterile-insect technique (SIT) uses the release of sterile males to cause infertile matings which reduce pest population levels. Due to the species specificity, SIT is considered an ecologically safe procedure. However, conventional sterilization by ionizing radiation also decreases the competitiveness of sterilized males. To overcome this problem, we design transgenic approaches to selectively produce vigorous and potent sterile males by generating conditional male sterility in combination with conditional female lethality.

Selected Recent Publications

Wimmer EA (2003) Applications of Iinsect transgenesis. Nature Reviews Genetics 4: 225-232

Häcker U, Nystedt S, Padash-Barmchi M, Horn C, Wimmer EA (2003) piggyBac-based insertional mutagenesis in the presence of stably integrated P elements in *Drosophila*. PNAS 100: 7720-7725

Horn C, Wimmer EA (2003) A transgene-based embryo-specific lethality system for insect pest management. Nature Biotechnology 21: 64-70

Ito J, Ghosh A., Moreira LA, Wimmer EA, Jacobs-Lorena M (2002) Transgenic anopheline mosquitoes impaired in transmission of a malaria parasite. Nature 417: 452-455

Wimmer EA, Carleton A, Harjes P, Turner T, Desplan C (2000) Bicoid-independent formation of thoracic segments in *Drosophila*. Science 287: 2476-2479

Andreas Wodarz

Professor of Stem Cell Biology

- Diploma Biology, University of Cologne, 1990
- Dr. rer. nat. Developmental Biology, University of Cologne, 1993
- Postdoc, Howard Hughes Medical Institute, Stanford University, 1994 - 1997
- Junior Group Leader, Heinrich Heine University Düsseldorf, 1997 - 2004
- Habilitation in Genetics, Heinrich Heine University Düsseldorf, 2001
- Appointed as Head of the Department of Stem Cell Biology at the University of Göttingen, 2004

Major Research Interests

At the center of my research interests is the question of how neural stem cells divide asymmetrically to produce another stem cell and a progenitor cell that will differentiate and give rise to neurons and glia cells. One important aspect of asymmetric cell division is the establishment of an intrinsic polarity which is the prerequisite for the asymmetric localization of proteins and mRNAs that serve as cell fate determinants. Our model system for the asymmetric division of stem cells is the embryonic neuroblast of Drosophila. Here we study the function of genes that control cell polarity, asymmetric localization of cell fate determinants and orientation of the mitotic spindle. The knowledge obtained in the Drosophila system has stimulated intense research on the participation of the orthologous genes and proteins in the asymmetric division of vertebrate stem cells.

Selected Recent Publications

Wodarz A, Stewart DB, Nelson WJ, Nusse R (2006) Wingless signaling modulates cadherin-mediated cell adhesion in *Drosophila* imaginal disc cells. J Cell Sci 119: 2425-2434

Wodarz A (2005) Molecular control of cell polarity and asymmetric cell division in *Drosophila* neuroblasts. Curr Opin Cell Biol 17: 475-481

von Stein W, Ramrath A, Grimm A, Müller-Borg M, Wodarz A (2005) Direct association of Bazooka/PAR-3 with the lipid phosphatase PTEN reveals a link between the PAR/aPKC complex and phosphoinositide signaling. Development 132: 1675-1686

Wodarz A, Ramrath A, Grimm A, Knust E (2000) *Drosophila* atypical protein kinase C associates with Bazooka and controls polarity of epithelia and neuroblasts. J Cell Biol 150: 1361-1374

Wodarz A, Ramrath A, Kuchinke U, Knust E (1999) Bazooka provides an apical cue for Inscuteable localization in *Drosophila* neuroblasts. Nature 402: 544-547

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