GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN / GERMANY

International Max Planck Research School

Molecular Biology

MSc/PhD Program

YEARBOOK 2010 / 2011

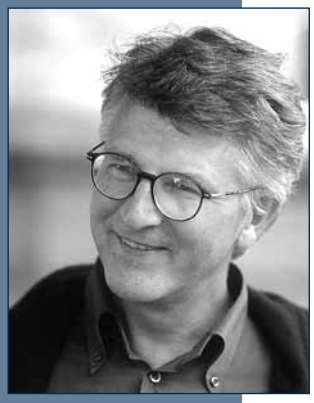
Yearbook 2010/2011

MSc/PhD Molecular Biology Program

at the University of Göttingen

International Max Planck Research School

Index



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 Initiative 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 contact 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, 59 International Max Planck Research Schools have been established involving more than 71 Max Planck Institutes, 37 German universities with 79 participating faculties and more than 38 universities abroad. About 2700 PhD students from 108 countries are presently enrolled. Approximately 2127 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 2006”. 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 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.

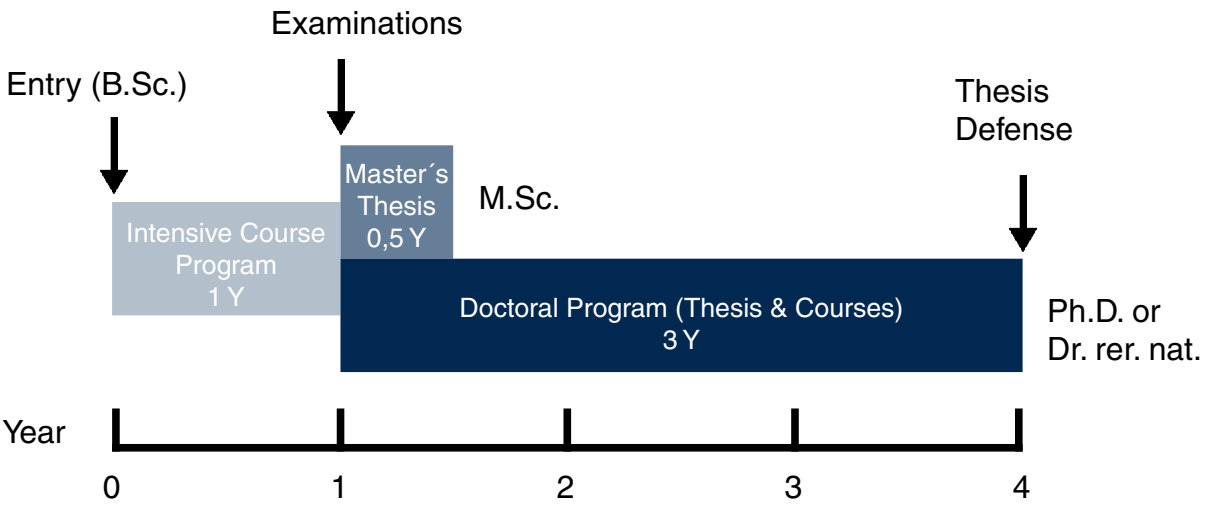
The program is member of the recently founded Göttingen Graduate School for Neurosciences and Molecular Biosciences (GGNB), which is funded by the Excellence Initiative of the German Federal and State Governments. It is offered by the Göttingen Center for Molecular Biosciences (GZMB), a newly established 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 Molecular Biology Program thanks the following institutions and funding initiatives, who contributed to the success of the Molecular Biology Program:

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

International Degree Programs - Auslandsorientierte Studiengänge (AS)

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

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, Essen, Germany, http://www.stifterverband.org

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

Gemeinnützige Hertie-Stiftung, Frankfurt am Main, Germany, http://www.ghst.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 Europa Holding GmbH, Hamburg, Germany

Roche Diagnostics GmbH, Penzberg, Germany

Sartorius stedim 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 at an advanced level throughout the first year (36 weeks, 4 hours per week):

A. Biochemistry and Structural Biology

- Architecture of the Cell
- Energy Metabolism, Lipid Metabolism, Metabolic Networks
- NMR, Crystallography
- Single Particle Electron Microscopy, EPR Spectroscopy
- Protein Structures and Folding
- Enzyme Mechanisms and Regulation

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

- Biosynthesis of Organelles, Nucleocytoplasmic Transport
- Protein Sorting and Processing, Membrane Traffic
- Autophagocytosis
- Cytoskeleton
- Cell Adhesion
- Immunology
- Infectious Diseases, Principles of Pathogenicity
- Cell Cycle, Apoptosis, Cancer
- Nervous Systems, Sensory Systems

D. Model Systems of Molecular Biology/Biotechnology

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

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. Since 2007, a "Career Fair for Scientists" precedes the annual Horizons meetings. The career fair offers a unique and exciting program of career presentations, CV-Check, workshops and interviews and is also organized by the Molecular Biology students.

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 2010

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.

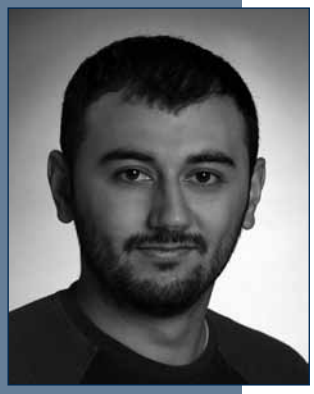
In the year 2010, the Molecular Biology program received 472 applications from 58 countries.

Continent	Applications	Admissions
Europe (total)	**113**	**12**
Germany	32	5
other West Europe	25	1
East Europe	56	6
America (total)	**39**	**2**
North America	12	0
Central/South America	27	2
Africa (total)	**48**	**0**
North Africa	21	0
Central/South Africa	27	0
Asia (total)	**272**	**3**
Near East	38	0
Central Asia/ Far East	234	3
Australia	**0**	**0**

Students 2010 / 2011

Name		Home Country
Metin	Aksu	Turkey
Irena	Andreeva	Bulgaria
Victor Manuel	Bustos Parra	Colombia
Marta	Gião Carneiro	Portugal
Ibrahim Ömer	Cicek	Turkey
Bernard	Freytag	Germany
Christoffer	Hitzing	Germany
Paola	Kuri	Mexico
Maria	Levchenko	Ukraine
Ewa	Maj	Poland
Sona	Pirkuliyeva	Turkmenistan
Tino	Pleiner	Germany
Michael	Ratz	Germany
Ines	Rudolf	Germany
Kundan	Sharma	India
Avani	Shukla	India
Ingrid-Cristiana	Vreja	Romania

Metin Aksu



Turkey

Metin Aksu

EDUCATION

College / University

Middle East Technical University (METU), Ankara, Turkey

Highest Degree

B.Sc.

Major Subjects

Molecular Biology and Genetics

Lab Experience

Various techniques in molecular and cellular biology, biochemistry, microbiology and genetics

Projects / Research

06/2009 – 09/2009 Characterization and identification of S layer protein(s) of *Dehalococcoides* sp. strain CBDB1. Applied Biochemistry Laboratory, Berlin Technical University, Berlin, Germany

10/2009 – 01/2010 Effect of Heat Stress in Lentil (*Lens culinaris* m.). Plant Biotechnology Laboratory, METU, Ankara, Turkey

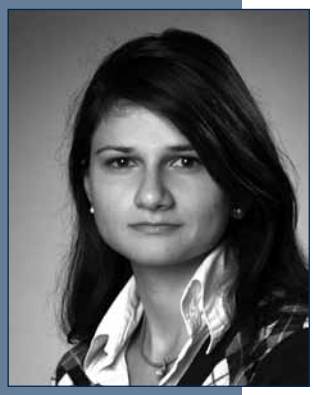
Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

06/2009 – 09/2009 Erasmus Program Summer Practice Scholarship

2005 – 2010 The Scientific and Technological Research Council of Turkey Scholarship

Irena Andreeva



Bulgaria

Irena Andreeva

EDUCATION

College / University

Sofia University “St. Kliment Ohridski”, Sofia, Bulgaria

Highest Degree

B.Sc.

Major Subjects

Biochemistry, Molecular Biology

Lab Experience

09/2008 – 06/2009 Biochemical and anticoagulant study of the neurotoxin vipoxin and its components - basic phospholipase A2 and an acidic inhibitor. Laboratory of Biocoordination and Bioanalytical Chemistry, Faculty of Chemistry, Sofia University “St. Kliment Ohridski”

09/2009 – 03/2010 Isolation of pharmacologically active proteins affecting blood coagulation from Bulgarian viper venom (*Vipera ammodytes meridionalis*). Laboratory of Enzymology, Faculty of Biology, Sofia University “St. Kliment Ohridski”

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2006 – 07/2010 Scholarship for Academic Excellence, Sofia University “St. Kliment Ohridski”, Sofia, Bulgaria

Colombia

Victor Manuel Bustos Parra

EDUCATION

College / University

Universidad Nacional de Colombia, Bogotá, Colombia

Highest Degree

B.Sc.

Major Subjects

Molecular Biology, Biochemistry, Bioinformatics, Microbiology

Lab Experience

Techniques in Biochemistry, Molecular Biology and Bioinformatics

Projects / Research

12/2008 – 07/2010 Approach to the NAD metabolism in a protozoan parasite using biochemical and bioinformatics tools. Universidad Nacional de Colombia, Bogotá, Colombia

06/2009 – 06/2010 Study of the metabolism of *Zimomonas mobilis* and production of gluconic acid. Universidad Nacional de Colombia, Bogotá, Colombia

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

Portugal

Marta Gião Carneiro

EDUCATION

College / University

Faculdade de Ciências e Tecnologia - Universidade Nova de Lisboa, Portugal

Highest Degree

B.Sc.

Major Subjects

Molecular Biology, Genetics and Biochemistry

Lab Experience

Molecular biology techniques (PCR, cloning, electrophoresis). Protein structure determination by NMR spectroscopy

Projects / Research

10/2007 – 07/2008 Automated projection spectroscopy at low fields; assignment and determination of the NMR solution structure of ^{1}H, ^{15}N and ^{13}C rubredoxin.

08/2008 – 11/2008 Application of molecular biology tools for 2nd generation ethanol production.

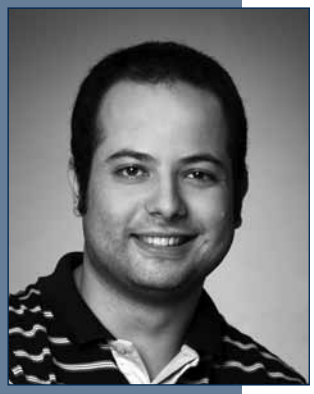
11/2008 – 02/2009 *In vitro* transcription and PAGE analysis of a ribozyme, its substrate and cleavage products.

03/2009 – 07/2009 Generation of antibodies and siRNA knock-down studies on the DOR (diabetes and obesity regulated) gene.

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

03/09 – 07/09 Socrates/Erasmus program scholarship



Turkey

Ibrahim Ömer Cicek

EDUCATION

College / University

Bogazici University, Istanbul, Turkey

Highest Degree

B.Sc. (Honours Degree)

Major Subjects

Molecular Biology and Genetics

Lab Experience

Biochemical, histologic, recombinant DNA, and in vivo techniques with fruit fly and zebrafish

Projects / Research

3/2009 – 6/2010 Generating a transgenic *Danio rerio* line for conditional knock-out studies to reveal mechanisms of olfactory sensory receptor expression and axon projection. Fuss Lab, Molecular Biology and Genetics, Bogazici University, Istanbul, Turkey

7/2009 – 10/2009 Identification of genes involved in axonal projection by olfactory sensory neurons in *Drosophila melanogaster* by using RNAi. AG Hummel, Institute for Neuro- and Behavioral Biology, University of Münster, Germany

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

10/2009 – 7/2010 Scholarship by Bogazici University

10/2005 – 7/2010 Scholarship by the Turkish Scientific and Technological Research Foundation (TUBITAK)

Germany

Bernard Freytag

EDUCATION

College / University

Georg-August-University Göttingen, Germany

Highest Degree

B.Sc.

Major Subjects

Biology, Molecular Biology

Lab Experience

Various techniques in molecular biology and genetics (protein and DNA electrophoresis including DGGE, cloning of bacteria via LFH-PCR, mutation rate analysis)

Projects / Research

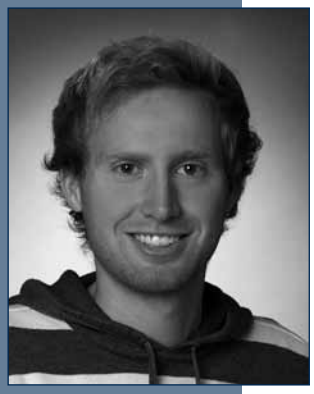
12/2008 – 02/2009 Influence of winter moth caterpillar faeces on the microbial diversity in soil. Department of Crop Sciences, Section Molecular Phytopathology and Mycotoxin Research, University of Göttingen

08/2009 Influence of transcription on the reversion of the *gud*B-allel in *B. subtilis*. Institute for Microbiology and Genetics, Department of General Microbiology, University of Göttingen

07/2010 – 08/2010 Mechanism of the malate-mediated catabolite repression in *B. subtilis* (Bachelor's thesis). Institute for Microbiology and Genetics, Department of General Microbiology, University of Göttingen

Scholarships / Awards

2010 – 2011 International Max Planck Research School support



Germany

Christoffer Hitzing

EDUCATION

College / University

Georg August University Göttingen, Germany

Highest Degree

B.Sc.

Major Subjects

Human Genetics

Lab Experience

Various techniques in cell biology, biochemistry and molecular genetics

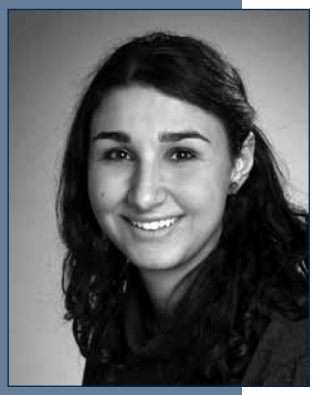
Projects / Research

2/2010 – 8/2010 Research on the function and phosphorylation of Leupaxin and the interaction with the protein Caldesmon during anoikis and migration of prostate cancer cells

Scholarships / Awards

Since 2010 Scholarship of the „Studienstiftung des deutschen Volkes“

2010 – 2011 International Max Planck Research School support



Mexico

Paola Sofía Kuri Rodríguez

EDUCATION

College / University

2006 – 2010 Facultad de Ciencias, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico

Highest Degree

B.Sc.

Major Subjects

Biology

Lab Experience

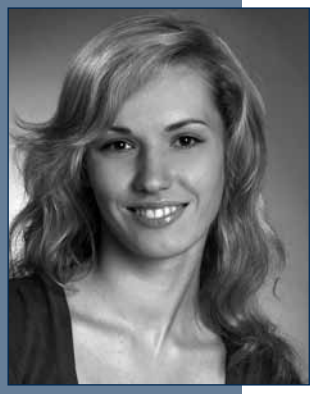
qRT-PCR, western blotting, and other basic techniques in microbiology and molecular biology

Projects / Research

9/2009 – 6/2010 Growth-phase dependent regulation of SPI-1 and SPI-2 genes in *Salmonella enterica* ser. Typhimurium. Thesis project. Instituto de Biotecnología, UNAM, Cuernavaca, Mexico

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society



Ukraine

Maria Levchenko

EDUCATION

College / University

National Taras Shevchenko University of Kyiv, Ukraine

Highest Degree

B.Sc.

Major Subjects

Molecular Biology (Biochemistry)

Lab Experience

Molecular biology techniques (recombinant DNA technology, PCR), biosensors construction

Projects / Research

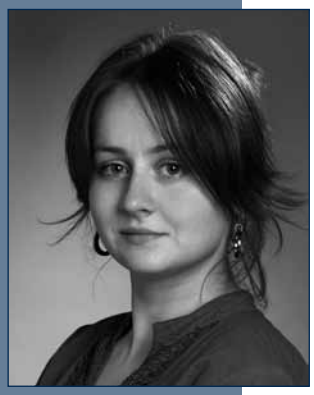
9/2009 – 6/2010 Use of zeolites for glyceroloxidase immobilization in amperometric biosensors. Middle East Technical University, Central Laboratory, Micro- and Nanotechnology department, Ankara, Turkey together with Institute of Molecular Biology, Department of Translation Mechanisms, Laboratory of Biomolecular Electronics, Kyiv, Ukraine

2/2009 – 9/2009 Microsatellite markers for PCR analysis of posttransplantational chimerism. Institute of Molecular Biology, Department of Cell Regulatory Mechanisms, Kyiv, Ukraine

9/2007 – 12/2008 Influence of Bcr/Abl fusion proteins on course of Ph' leukemias. Institute of Molecular Biology, Department of Molecular Genetics, Kyiv, Ukraine

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society



Poland

Ewa Maj

EDUCATION

College / University

2005-2008 Faculty of Biology – University of Gdansk, Poland
2008-2010 Intercollegiate Faculty of Biotechnology – University of Gdansk and Medical University of Gdansk, Poland

Highest Degree

M.Sc.

Major Subjects

Molecular virology, microbiology, molecular biology

Lab Experience

Various techniques in molecular biology, virology and microbiology

Projects / Research

8/2009 – 9/2009 Molecular characterization of nonstructural protein NS38 of Grass Carp Reovirus. Wuhan Institute of Virology, CAS, Wuhan, P.R. China

10/2009 – 06/2010 Generating a recombinant Bovine Herpes Virus-1 (wild type BHV-1, BHV-1 vp26-GFP) with deletion of US3 tegument protein. MSc thesis.

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

10/2009 Congratulatory letter by the Dean of Intercollegiate Faculty of Biotechnology, University of Gdansk and Medical University of Gdansk for outstanding results in the academic year 2008/2009 and active participation in the academic community life.

Sona Pirkuliyeva

Turkmenistan

Sona Pirkuliyeva

EDUCATION

College / University

Middle East Technical University, Ankara, Turkey

Highest Degree

B.Sc.

Major Subjects

Molecular Biology and Genetics

Lab Experience

Techniques in molecular biology, microbiology, and biochemistry

Projects / Research

6/2009 – 8/2009 Composition and localization of centromeric nucleosome in *Saccharomyces cerevisiae*. Friedrich Miescher Laboratory of the Max-Planck Society, Tübingen, Germany

2/2010 – 6/2010 Surveillance of prion protein gene polymorphisms in Pakistani and Turkish native sheep breeds. Department of Biological Sciences, Middle East Technical University, Ankara

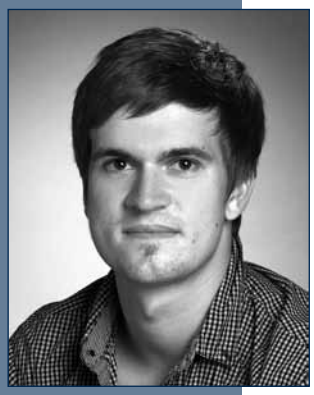
7/2010 – 9/2010 Analysis of DNA binding activity and specificity of Lon protease and CbpA in *E. coli*. ZMBH, Heidelberg

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

9/2007 – 9/2010 Nippon Foundation Scholarship for Central Asian University Students in Turkey

Tino Pleiner



Germany

Tino Pleiner

EDUCATION

College / University

University of Leipzig, Germany

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Various techniques in biochemistry, cell and molecular biology

Projects / Research

3/2010 – 8/2010 Cloning of a putative plant poly(A) polymerase and characterization of *S. cerevisiae* poly(A) polymerase. Bachelor's Thesis. Mörl Group, Institute of Biochemistry, University of Leipzig

Scholarships / Awards

9/2009 – present Studienstiftung des deutschen Volkes

2010 – 2010 International Max Planck Research School support

Michael Ratz

Germany

Michael Ratz

EDUCATION

College / University

University of Leipzig, Germany

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Various techniques in biochemistry, analytical chemistry, immunology, cell and molecular biology

Projects / Research

3/2010 – 8/2010 Creation and characterization of a TPP riboswitch deletion variant. Bachelor's thesis. Institute of Biochemistry, University of Leipzig, Germany

Scholarships / Awards

2010 – 2011 International Max Planck Research School Support

Ines Rudolf

Germany

Ines Rudolf

EDUCATION

College / University

Heinrich-Heine-University Düsseldorf, Germany

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Various techniques in molecular biology

Projects / Research

3/2009 – 7/2009 Analysis of risk-associated sequence variants (SNPs) in breast cancer patients. BSc project. Molecular Genetics Laboratory (Dr. Dieter Niederacher), Universitätsfrauenklinik Düsseldorf, Germany

8/2009 – 5/2010 Optimizing the infection rate of the oncolytic vesicular stomatitis virus by adaptation to glioblastoma cells. Postgraduate research fellow. Department of Neurosurgery (Prof. Anthony van den Pol), Yale University School of Medicine, New Haven, CT, USA

7/2010 – 9/2010 The E2F1-responsive microRNA 449 promotes apoptosis. Student internship. Department of Molecular Oncology (Prof. Matthias Dobbelstein), University of Göttingen, Germany

Scholarships / Awards

2010 – 2011 International Max Planck Research School support

9/2009 – 5/2010 IALS / DAAD ISAP Scholarship

Kundan Sharma

India

Kundan Sharma

EDUCATION

College / University

2008 – 2010 Department of Microbiology, University of Delhi, India
2005 – 2008 Ram Lal Anand College, University of Delhi, India

Highest Degree

M.Sc.

Major Subjects

Microbiology, Immunology, Molecular Biology, Recombinant DNA technology, Microbial Genetics, Biochemistry, and Virology

Lab Experience

Basic microbiology, molecular biology, and immunology techniques

Projects / Research

5/2009 – 3/2010 Partial purification, characterization, cloning and expression of pectate lyase from *Bacillus subtilis* RCK, Dept. of Microbiology, University of Delhi, India

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2008 – 2010 Gold Medal for 1st rank in MSc Microbiology, University of Delhi, India

12/2009 – Qualified the National Eligibility Test for CSIR – Junior Research Fellowship

2008 – 2010 Monsanto Scholarship in M.Sc. for 2 years

2005 – 2008 1st rank in B.Sc. (Hons) Microbiology, Ram Lal Anand College, University of Delhi, India

Avani Shukla

India

Avani Shukla

EDUCATION

College / University

Sri Venkateswara College, University of Delhi, India

Highest Degree

B.Sc. (Honors) Biochemistry

Major Subjects

Biochemistry, Molecular Biology, Genetics, Cell Biology, Immunology, Membrane Biology, and Bioenergetics

Lab Experience

Various biochemical and molecular biology techniques

Projects / Research

2009 & 2010 Identification of the site of acetylation and methylation on Transition Protein 2 (TP2), a testis-specific protein involved in mammalian spermiogenesis. Summer training, Chromatin Biology Lab (Prof. M.R.S. Rao), JNCASR, Bangalore, India

2008 – 2009 'Unsaturation and peroxidation of bacterial membrane lipids' and '*In silico* modeling and docking studies of human Catechol-O-Methyltransferase'. Sri Venkateswara College

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2010 Diploma in biology awarded by Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) for successful completion of Project Oriented Biological Education (POBE) program

2008 3rd rank in the University of Delhi for Biochemistry Honors

Romania

Ingrid-Cristiana Vreja

EDUCATION

College / University

Faculty of Biology, University of Bucharest, Romania

Highest Degree

B.Sc.

Major Subjects

Biochemistry

Lab Experience

Cell cultures, electrophoresis (agarose gel and SDS-PAGE), protein/ DNA purification, cloning, mutagenesis and expression, spectrophotometry

Projects / Research

5/2009 – 08/2010 Enzymatic assays of PTPD1 catalytic domain mutants obtained by site-directed mutagenesis. Enzymology Department, Institute of Biochemistry, Bucharest, Romania

10/2008 – 12/2008 The effect of manganese intoxication on the anion superoxide and lipid peroxidation levels in Hep G2 cells. Faculty of Biology, University of Bucharest, Romania

Scholarships / Awards

2010 – 2011 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

2007 – 2010 “Olympic Merit” Scholarship awarded by the Romanian Government

2007 – 2010 Sindan Pharma Study Scholarship

Faculty

Name		Institute	
Mathias	Bähr	Neurology	U Göttingen
Gerhard H.	Braus	Molecular Microbiology and Genetics	U Göttingen
Bertram	Brenig	Molecular Biology of Livestock	U Göttingen
Nils	Brose	Molecular Neurobiology	MPI em
Matthias	Dobbelstein	Molecular Oncology	U Göttingen
Roland	Dosch	Junior Group Leader at the Dept. of Developmental Biochemistry	U Göttingen
Stefan	Eimer	Molecular Neurogenetics	ENI
Wolfgang	Engel	Human Genetics	U Göttingen
Ivo	Feußner	Plant Biochemistry	U Göttingen
Ralf	Ficner	Molecular Structural Biology	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	Medical Microbiology	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
Steven	Johnsen	Molecular Oncology	U Göttingen
Michael	Kessel	Developmental Biology	MPI bpc
Dieter	Klopfenstein	Kinesin Motor-Cargo Interactions and Membrane Transport	U Göttingen
Wilfried	Kramer	Molecular Genetics	U Göttingen
Heike	Krebber	Professor for Molecular Genetics	U Göttingen
Volker	Lipka	Plant Cell Biology	U Göttingen
Reinhard	Lührmann	Cellular Biochemistry	MPI bpc
Ahmed	Mansouri	Molecular Developmental Genetics	MPI bpc
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
Blanche	Schwappach	Professor, Director of Biochemistry I	U Göttingen
Halyna	Shcherbata	Gene expression and signaling	MPI bpc
George Michael	Sheldrick	Structural Chemistry	U Göttingen
Mikael	Simons	Molecular and Cellular Neurobiology	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
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

Address

Center for
Neurological Medicine
Neurology
University of Göttingen
Robert-Koch-Str. 40

37075 Göttingen
Germany

phone: + 49-551-39 6603
fax: + 49-551-39 8405
e-mail: mbaehr@gwdg.de

Further Information

http://www.baehrlab.med.uni-goettingen.de/

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

Neuronal cell loss is not only a major feature of human neurodegenerative diseases like Parkinson's disease (PD), Alzheimer's disease (AD) or stroke, but can also be observed in neuroinflammatory conditions like Multiple Sclerosis (MS) or after traumatic lesions, e.g. of the optic nerve. We examine the cellular and molecular mechanisms of neuronal dysfunction and neuronal cell death in animal models of the respective disorders with the ultimate goal to detect new targets for a therapeutic neuroprotective intervention.
In PD for example, a multidisciplinary research team with our participation in the area C2 of the CMPB examines the role of α-synuclein aggregation for dopaminergic dysfunction and cell death and characterizes other disease related proteins in order to develop new neuroprotective strategies. To that end we use AAV viral gene transfer to express different disease-associated and design mutants of α-synuclein in the nigrostriatal system of rodents. Using this technology we also developed a novel model of PD based on RNA-interference mediated depletion of anti-oxidant defense mechanisms, demonstrating several features of idiopathic PD such as selective degeneration of DA neurons, progressive aggregate formation and inflammation. A similar approach is also used to develop new gene therapy strategies using viral vectors for delivery of neuroprotective factors to specific neurons or glial cells in various species.
In the recent years it became also clear that axonal and neuronal loss do not only occur in classical neurodegenerative disorders but also in immune-mediated diseases like MS. To study this issue in more detail we have developed a model system of MS in rodents that reproducibly leads to optic neuritis, one of the most common early manifestations of MS. To monitor disease course we have established electrophysiological measurements like visually evoked potentials (VEP), electroretinogramm (ERG) and optical coherence tomography (OCT) that allow us to correlate onset, course and outcome of disease with and without therapy with histomorphological and molecular analyses. The aim is to describe in detail the molecular pathophysiology that leads to axonal and neuronal loss and to develop new therapeutic strategies, some of which have already been translated into proof of concept studies in human patients.

Selected Recent Publications

Knöferle J, Koch JC, Ostendorf T, Michel U, Planchamp V, Tönges L, Stadelmann C, Brück W, Bähr M, Lingor P (2010) Mechanisms of acute axonal degeneration in the optic nerve *in vivo*. Proc Natl Acad Sci USA 107(13): 6064-9

Deeg S, Gralle M, Sroka K, Bähr M, Wouters FS, Kermer P (2010) BAG1 restores formation of functional DJ-1 L166P dimers and DJ-1 chaperone activity. J Cell Biol: 188(4): 505-13

Gadjanski I, Boretius S, Williams SK, Lingor P, Knöferle J, Sättler MB, Fairless R, Hochmeister S, Sühs KW, Michaelis T, Frahm J, Storch MK, Bähr M, Diem R (2009) Role of N-Type voltage-dependent calcium channels in autoimmune optic neuritis. Ann Neurol 66(1): 81-93

Planchamp V, Bermel C, Tönges L, Ostendorf T, Kügler S, Reed JC, Kermer P, Bähr M, Lingor P (2008) BAG1 promotes axonal outgrowth and regeneration *in vivo* via Raf-1 and reduction of ROCK activity. Brain 131(Pt 10): 2606-19

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 131 (Pt 1): 250-63

Address

Department of Molecular Microbiology and Genetics
University of Göttingen
Grisebachstr. 8

37077 Göttingen
Germany

phone: +49-551-39 3771
fax: +49-551-39 3330
e-mail: gbraus@gwdg.de

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

Address

Institute of Veterinary Medicine
Dept. Molecular Biology of Livestock
University of Göttingen
Burckhardtweg 2

37077 Göttingen
Germany

phone: +49-551-39 3383
or 39 3380
fax: +49-551-39 3392
e-mail: bbrenig@gwdg.de

Further Information

http://www.tieraerztliches-institut.uni-goettingen.de

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. since several years we are analyzing 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, we are also interested in other species, e.g. cattle, dog, horse, and sheep.

In recent years we have also focused on the analysis of circulating nucleic acids (CNA) which we have identified in BSE infected cattle. Currently, we are using next generation sequencing technology to determine the repertoire of CNAs in man, cattle, and dog and associate differences in CNA patterns to diseases, e.g. cancer.

Selected Recent Publications

Brenig B, Beck J, Schütz E (2010) Shotgun metagenomics of biological stains using ultra-deep DNA sequencing. Forensic Sci Int Genet 4: 228-31

Kolodziejczak D, Da Costa Dias B, Zuber C, Jovanovic K, Omar A, Beck J, Vana K, Mbazima V, Richt J, Brenig B, Weiss SF (2010) Prion Interaction with the 37-kDa/67-kDa Laminin Receptor on Enterocytes as a Cellular Model for Intestinal Uptake of Prions. J Mol Biol 402: 293-300

Chen C, Guo Y, Yang G, Yang Z, Zhang Z, Yang B, Yan X, Perez-Enciso M, Ma J, Duan Y, Brenig B, Huang L (2009) A genome wide detection of quantitative trait loci on pig maternal infanticide behavior in a large scale White Duroc x Erhualian resource population. Behav Genet 39: 213-9

Ding NS, Mao HR, Guo YM, Ren J, Xiao SJ, Wu GZ, Shen HQ, Wu LH, Ruan GF, Brenig B, Huang LS (2009) A genome-wide scan reveals candidate susceptibility loci for pig hernias in an intercross between White Duroc and Erhualian. J Anim Sci 87: 2469-74

Gordon PM, Schutz E, Beck J, Urnovitz HB, Graham C, Clark R, Dudas S, Czub S, Sensen M, Brenig B, Groschup MH, Church RB, Sensen CW (2009) Disease-specific motifs can be identified in circulating nucleic acids from live elk and cattle infected with transmissible spongiform encephalopathies. Nucleic Acids Res 37: 550-6

Wemheuer WM, Benestad SL, Wrede A, Schulze-Sturm U, Wemheuer WE, Hahmann U, Gawinecka J, Schutz E, Zerr I, Brenig B, Bratberg B, Andreoletti O, Schulz-Schaeffer WJ (2009) Similarities between forms of sheep scrapie and Creutzfeldt-Jakob disease are encoded by distinct prion types. Am J Pathol 175: 2566-73

Address

Dept. of Molecular Neurobiology
Max Planck Institute for Experimental Medicine
Hermann-Rein-Str. 3

37075 Göttingen
Germany

phone: +49-551-3899 725
fax: +49-551-3899 715
e-mail: brose@em.mpg.de

Further Information

http://www.em.mpg.de/

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 100 billion nerve cells are connected by 100 trillion 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, their role in synapse formation, and their dysfunction in neuropsychiatric diseases. 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

Junge H, Rhee J-S, Jahn O, Varoqueaux F, Spiess J, Waxham MN, Rosenmund C, Brose N (2004) Calmodulin and Munc13 form a Ca^{2+}-sensor/effector complex that controls short-term synaptic plasticity. Cell 118: 389-401

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

Address

Department of
Molecular Oncology
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 13840
fax: +49-551-39 13713
e-mail: mdobbel@uni-goettingen.de

Further Information

http://www.moloncol.med.uni-goettingen.de

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

Lizé M, Pilarski S, Dobbelstein M (2010) E2F1-inducible microRNA 449a/b suppresses cell proliferation and promotes apoptosis. Cell Death Differ 17: 452-8

Wolff S, Talos F, Palacios G, Beyer U, Dobbelstein M, Moll UM (2009) The alpha/beta carboxy-terminal domains of p63 are required for skin and limb development. New insights from the Brdm2 mouse which is not a complete p63 knockout but expresses p63 gamma-like proteins. Cell Death Differ 16(8): 1108-17

Braun CJ, Zhang X, Savelyeva I, Wolff S, Moll UM, Schepeler T, Ørntoft TF, Andersen CL, Dobbelstein M (2008) p53-Responsive micrornas 192 and 215 are capable of inducing cell cycle arrest. Cancer Res 68(24): 10094-104

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 66(21): 10274-80

Schümann 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

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

Address

Dr. Roland Dosch
Georg August University Göttingen
Dept. of Developmental Biochemistry
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 14607
fax: +49-551-39 14614
e-mail: roland.dosch@med.uni-goettingen.de

Further Information

http://www.uni-bc.gwdg.de/index.php?id=583

Roland Dosch

Junior Group Leader at the Dept. of Developmental Biochemistry

- 1994-1999 PhD with Prof. C. Niehrs, Deutsches Krebsforschungszentrum (DKFZ), Heidelberg, Germany
- 1999-2003 Postdoc with Prof. M. Mullins, Dept. of Cell and Developmental Biology, University of Pennsylvania, Philadelphia, USA
- 2004-2010 Junior group leader, Dept. of Zoology and Animal Biology, University of Geneva, Switzerland
- since 2010 Group leader at the Dept. of Developmental Biochemistry, Georg August University, Göttingen

Major Research Interests

Molecular Control of Zebrafish Oogenesis

Reproduction is a fundamental principle of all biological systems. To produce a new individual, multicellular organisms use specific cells called gametes. Female gametes form during oogenesis, which prepares the egg for fertilization and provides vital gene products for early embryogenesis. Defects in oogenesis lead to sterility and are frequently the genetic cause of human developmental disorders such as Down syndrome.

Our goal is to understand the molecular regulation of oogenesis. To investigate egg development in vertebrates, we take advantage of the molecular resources available in the zebrafish, Danio rerio. Using zebrafish genetics, genomics and bioinformatics, we focus on the identification of key genes crucial for two molecular processes during oogenesis:

I) The formation of germ plasm
II) Vitellogenesis – the endocytosis of yolk protein

Currently, we are applying cell biological and biochemical approaches in combination with embryological methods to molecularly characterize the identified genes. Through these methods we recently discovered the bucky ball gene, which represents the first gene in vertebrates inducing the assembly of germ plasm. Germ plasm describes a specific cytoplasm in the oocyte, which controls the differentiation of gametes in the developing embryo. The long-term aim is to provide important insights into the molecular mechanisms of oogenesis and how its failure leads to sterility and developmental defects.

Selected Recent Publications

Bontems F, Stein A, Marlow F, Lyautey J, Mullins MC, Dosch R (2009) Bucky ball organizes germ plasm assembly in zebrafish. Curr Biol 19 (5), 414-22

Holloway BA, Gomez de la Torre Canny S, Ye Y, Slusarski DC, Freisinger CM, Dosch R, Chou MM, Wagner DS, Mullins MC (2009) A Novel Role for MAP-KAPK2 in Morphogenesis during Zebrafish Development. PLoS Genet 5(3), e1000413

Hogg RC, Bandelier F, Benoit A, Dosch R, Bertrand D (2008) An automated system for intracellular and intranuclear injection. J Neurosci Methods 169(1), 65-75

Panzer JA, Gibbs SM, Dosch R, Wagner D, Mullins MC, Granato M, Balice-Gordon RJ (2005) Neuromuscular synaptogenesis in wild-type and mutant zebrafish. Dev Biol 285, 340-57

Birely J, Schneider VA, Santana E, Dosch R, Wagner DS, Mullins MC, Granato M (2005) Genetic Screens for Genes Controlling Motor Nerve-Muscle development and Interactions. Dev Biol 280, 162-176

Address

Dept. of Neuroendocrinology
European Neuroscience Institute
Grisebachstr. 5

37077 Göttingen
Germany

phone: +49-551-39 12379
fax: +49-551-39 10129
e-mail: seimer@gwdg.de

Further Information

http://www.eni.gwdg.de/index.php?id=104

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

Sumakovic M, Hegermann J, Luo L, Husson SJ, Schwarze K, Olendrowitz C, Schoofs L, Richmond J, Eimer S (2009) UNC-108/RAB-2 and its effector RIC-19 are involved in dense core vesicle maturation in *Caenorhabditis elegans*. J Cell Biol 186(6): 897-914

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

Address

Institute for Human Genetics
University of Göttingen
Heinrich-Düker-Weg 12

37073 Göttingen
Germany

phone: +49-551-39 7590
fax: +49-551-39 9303
e-mail: wengel@gwdg.de

Further Information

http://www.humangenetik.gwdg.de/HG/1/index.php

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

Dressel R, Guan K, Nolte J, Elsner L, Monecke S, Nayernia K, Hasenfuss G, Engel W (2009) Multipotent adult germ-line stem cells, like other pluripotent stem cells, can be killed by cytotoxic T lymphocytes despite low expression of major histocompatibility complex class I molecules. Biology Direct 4: 31

Glaser T, Opitz T, Kischlat T, Konang R, Sasse P, Fleischmann BK, Engel W, Nayernia K, Brüstle O (2008) Adult germ line stem cells as a source of functional neurons and glia. Stem Cells 26: 2434-2443

Zovoilis A, Nolte J, Drusenheimer N, Zechner U, Hada H, Guan K, Hasenfuß G, Nayernia K, Engel W (2008) Multipotent adult germline stem cells and embryonic stem cells have similar microRNA profiles. Molecular Human Reproduction 14: 521-529

Guan K, Wagner S, Unsöld B, Maier LS, Kaiser D, Hemmerlein B, Nayernia K, Engel W, Hasenfuss G (2007) Generation of functional cardiomyocytes from adult mouse spermatogonial stem cells. Circulation Research 100: 1615-1625

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

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

Address

Albrecht von Haller Institute
for Plant Sciences
Dept. of Plant Biochemistry
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 5743
fax: +49-551-39 5749
e-mail: ifeussn@gwdg.de

Further Information

http://www.plant-biochem.uni-goettingen.de

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)
- Fellow of the Saxonian Academy of Sciences, Leipzig, Germany (2009)

Major Research Interests

Metabolic Pathways: Our laboratory is studying the primary metabolism of plants, fungi and mammals with main focus on the metabolism and function of lipids. For this purpose, different approaches ranging from analytical chemistry to biochemistry and structural biochemistry as well as molecular biology are used. Another major focus is the development of metabolomics and fluxomics technologies.

Lipid Metabolism: We are interested in physiological functions of specific Lipoxygenases, dioxygenases and P450 enzymes and their involvement in signal transduction processes. Another research topic is the analysis of their catalytic mechanism. In addition, lipid metabolism is analysed in general by metabolomic approaches. Moreover, enzymes which introduce new functionalities in lipids (i.e. wax ester) are isolated and characterized in order to obtain new seed oils for biotechnological and medical purposes. 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

Stumpe M, Göbel C, Faltin B, Beike AK, Hause B, Himmelsbach K, Bode J, Kramell R, Wasternack C, Frank W, Reski R, Feussner I (2010) The moss *Physcomitrella patens* contains cyclopentenones but no jasmonates: mutations in allene oxide cyclase lead to reduced fertility and altered sporophyte morphology. New Phytol, doi: 10.1111/j.1469-8137.2010.03406.x

Volkov A, Liavonchanka A, Kamneva O, Fiedler T, Göbel C, Kreikemeyer B, Feussner I (2010) Myosin cross-reactive antigen of *Streptococcus pyogenes* M49 encodes a fatty acid double bond hydratase that plays a role in oleic acid detoxification and bacterial virulence. J Biol Chem 285: 10353-10361

Brodhun F, Göbel C, Hornung E, Feussner I (2009) Identification of psi-factor producing oxygenase A (PpoA) from *A. nidulans* as a fusion protein of a fatty acid heme dioxygenase/peroxidase and a cytochrome P450. J Biol Chem 284: 11792-11805

Liavonchanka A, Rudolph M, Tittmann K, Hamberg M, Feussner I (2009) On the mechanism of a polyunsaturated fatty acid double bond isomerase from Propionibacterium acnes. J Biol Chem 284: 8005-8012

Kim C, Lee KP, Baruah A, Nater M, Göbel C, Feussner I, Apel K (2009) O_2-mediated retrograde signaling during late embryogenesis predetermines plastid differentiation in seedlings by recruiting abscisic acid. Proc Natl Acad Sci USA 106: 9920-9924

Address

Dept. of Molecular
Structural Biology
Institute for Microbiology
and Genetics & GZMB
University of Göttingen
Justus-von-Liebig-
Weg 11

37077 Göttingen
Germany

phone: +49-551-39 14072
fax: +49-551-39 14082
e-mail: rficner@gwdg.de

Further Information

www.uni-goettingen.de/msb

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

Schulz E-C, Dickmanns A, Urlaub H, Schmitt A, Mühlenhoff M, Stummeyer K, Schwarzer D, Gerardy-Schahn R, Ficner R (2010) Crystal structure of a novel intramolecular chaperone mediating triple ß-helix folding. Nature Struct Mol Biol 17: 210-215

Monecke T, Güttler T, Neumann P, Dickmanns A, Görlich D, Ficner R (2009) Crystal structure of the nuclear export receptor CRM1 in complex with Snurportin1 and RanGTP. Science 324(5930): 1087-91

Monecke T, Dickmanns A, Ficner R (2009) Structural basis for m7G-cap hypermethylation of small nuclear, small nucleolar and telomerase RNA by the dimethyltransferase TGS1. Nucleic Acids Res 37(12): 3865-77

Ficner R (2009) Novel structural insights into class I and II histone deacetylases. Curr Top Med Chem 9(3):235-40

Wohlwend D, Strasser A, Dickmanns A, Ficner R (2007) Structural basis for RanGTP independent entry of spliceosomal U snRNPs into the nucleus. J Mol Biol 374(4): 1129-38

Wohlwend D, Strasser A, Dickmanns A, Doenecke D, Ficner R (2007) Thermodynamic analysis of H1 nuclear import: receptor tuning of importinbeta/importin7. J Biol Chem 282(14): 10707-19

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

Address

Laboratory of Chromatin Biochemistry
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1340
fax: +49-551-201 1197
e-mail: wfischl@gwdg.de

Further Information

http://www.mpibpc.mpg.de/research/ags/fischle/

Wolfgang Fischle

Group Leader at the MPI for Biophysical Chemistry

- 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 limited.
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

Franz H, Mosch K, Soeroes S, Urlaub H, Fischle W (2009) Multimerization and H3K9me3 binding is required for CDYL1b heterochromatin association. J Biol Chem, 2009 Oct 5 [Epub ahead of print]

Fischle W (2008) Talk is cheap--cross-talk in establishment, maintenance, and readout of chromatin modifications. Genes Dev 22(24): 3375-82

Zhang K, Mosch K, Fischle W, Grewal SI (2008) Roles of the Clr4 methyltransferase complex in nucleation, spreading and maintenance of heterochromatin. Nat Struct Mol Biol 15(4): 381-8

Li H, Fischle W, Wang W, Duncan EM, Liang L, Murakami-Ishibe S, Allis CD, Patel DJ (2007) Structural basis for lower lysine methylation state-specific readout by MBT repeats of L3MBTL1 and an engineered PHD finger. Mol Cell 28(4): 677-91

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: 1116-1122

Address

Albrecht von Haller Institute
for Plant Sciences, Dept.
General and Developmental
Physiology of the Plant
University of Göttingen
Untere Karspüle 2

37073 Göttingen
Germany

phone: +49-551-39 7843
fax.: +49-551-39 7820
e-mail: cgatz@gwdg.de

Further Information

http://www.ubpb.gwdg.de/

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 the molecular mechanisms establishing plant innate immunity. We focus on the elucidation of signalling transduction mechanisms that lead to transcriptional reprogramming in the course of plant defense responses against bacteria and fungi.

Plants have developed multiple layers of defense responses against pathogens. In general, infection of the model plant *Arabidopsis thaliana* 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.

Members of the TGA family of 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 by co-activators (Fode et al., 2008) or redox modulators (Ndamukong et al., 2007). Moreover, we are interested in the cross-talk between both pathways. We combine genetic (e.g. analysis of mutants and double mutants), molecular (e.g. gene expression analysis by real-timer RT PCR), cell (subcellular localization and protein-protein-interaction studies in living cells) and biochemical (e.g. chromatin immunoprecipitation) strategies to gain novel insights into these complex mechanisms.

Selected Recent Publications

Zander M, La Camera S, Lamotte O, Metraux JP, Gatz C (2009) *Arabidopsis thaliana* class II TGA transcription factors are essential activators of jasmonic acid/ethylene-induced defense responses. Plant J, Oct 12 [Epub ahead of print]

Fode B, Siemsen T, Thurow C, Weigel R, Gatz C (2008) The *Arabidopsis* GRAS protein SCL14 interacts with class II TGA transcription factors and is essential for the activation of stress inducible promoters. Plant Cell 20: 3122-3135

Herde M, Gärtner K, Köllner TG, Fode B, Boland W, Gershenzon J, Gatz C*, Tholl D (2008) Identification and regulation of TPS04/GES an *Arabidopsis* geranyllinalool synthase catalyzing the first step in the formation of the insect-induced volatile C16-homoterpene TMTT. Plant Cell 20: 1152-1168 (*corresponding author)

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

Address

Dept. Cellular Logistics
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 2400
email: dgoerli@gwdg.de

Further Information

http://www.mpibpc.mpg.de/research/dep/goerlich/

Dirk Görlich

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- 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 (2009) FG/FxFG as well as GLFG repeats form a selective permeability barrier with self-healing properties. EMBO J 28(17): 2554-67

Mohr D, Frey S, Fischer T, Güttler T, Görlich D (2009) Characterisation of the passive permeability barrier of nuclear pore complexes. EMBO J 28(17): 2541-53

Monecke T, Güttler T, Neumann P, Dickmanns A, Görlich D, Ficner R (2009) Crystal structure of the nuclear export receptor CRM1 in complex with Snurportin1 and RanGTP. Science 324(5930): 1087-91

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

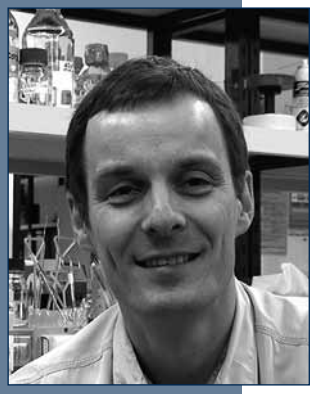
Frey S, Richter RP, Görlich D (2006) FG-rich repeats of nuclear pore proteins form a three-dimensional meshwork with hydrogel-like properties. Science 314: 815-817

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



Address

Dept. of NMB-based Structural Biology
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 2201
+49-551-201 2200
fax: +49-551-201 2202
email: cigr@nmr.mpibpc.mpg.de

Further Information

http://medusa.nmr.mpibpc.mpg.de/

Christian Griesinger

Professor, Director at the Max Planck Institute for Biophysical Chemistry, Göttingen

- 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

In the department, we develop NMR spectroscopic methods and apply them to the investigation of water soluble and membrane proteins, nucleic acids and their complexes as well as drug/target complexes. Structural biology projects are performed in the context of signal transduction, ion channels, G-protein coupled receptors, cytoskeletal proteins, catalytic RNA, enzymes and drug/target complexes using NMR as well as X-ray crystallography to characterize structure and dynamics. A rather big project is the investigation of proteins involved in neurodegenerative diseases that are studied in the context of the CMPB and involve almost all resources of the department. Methods developments are aimed at pushing the limits of sensitivity for NMR spectroscopic detection (e.g. DNP), developing the measurement of structurally and dynamically relevant parameters, establishing methods to describe structural ensembles for unfolded proteins and developing structural proteomics tools. For solid state NMR investigations, pulse sequences that allow structure determination of uniformly labelled membrane proteins as well as oligomers and fibrils formed from proteins involved in neurodegenerative diseases have been successfully developed.

Selected Recent Publications

Karpinar P, Gajula Balija MB, Kuegler S, Opazo F, Rezaei-Ghaleh N, Wender N, Kim HJ, Taschenberger G, Falkenburger BH, Heise H, Kumar A, Riedel D, Fichtner L, Voigt A, Braus GH, Giller K, Becker S, Herzig A, Baldus M, Jaeckle H, Eimer S, Schulz JB, Griesinger C, Zweckstetter M (2009) Pre-fibrillar α-synuclein variants with impaired bold β-structure increase neurotoxicity in Parkinson's disease models. EMBO J DOI 10.1038/emboj.2009.257

Lee D, Walter KFA, Brückner AK, Hilty C, Becker S, Griesinger C (2008) Bilayer in small bicelles revealed by lipid-protein interactions using NMR spectroscopy, J Am Chem Soc 130: 13822-3

Lange O, Lakomek NA,. Farès C, Schroeder GF, Walter K, Becker S, Meiler J, Grubmueller H, Griesinger C, de Groot BL (2008) Recognition dynamics up to microseconds revealed from an RDC-derived ubiquitin ensemble in solution. Science 320: 1471-1475

Bayrhuber M, Meins T, Habeck M, Becker S, Giller K, Villinger S, Vonrhein C, Griesinger C, Zweckstetter M, Zeth K (2008) Structure of the human voltage-dependent anion channel. Proc Natl Acad Sci USA 105: 15370-15375

Bertoncini C W, Jung YS, Fernandez CO, Hoyer W, Griesinger C Jovin TM, Zweckstetter M (2005) Release of long-range tertiary interactions potentiates aggregation of natively unstructured α-synuclein. Proc Natl Acad Sci USA 102: 1430-1435

Sanchez-Pedregal VM, Reese M, Meiler J, Blommers MJJ, Griesinger C, Carlomagno T (2005) The INPHARMA method: Protein-mediated interligand NOEs for pharmacophore mapping. Angewandte Chemie-International Edition 44: 4172-4175

Address

Department of Medical Microbiology
Medical Faculty of the University of Göttingen
Kreuzbergring 57

37075 Göttingen
Germany

phone: +49-551-39 5801/ 5806
fax: +49-551-39 5861
e-mail: ugross@gwdg.de

Further Information

http://www.bakteriologie.uni-goettingen.de/

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

Tareen AM, Dasti JI, Zautner A, Groß U, Lugert R (2010) *Campylobacter jejuni* proteins Cj0952c and Cj0951c affect the chemotactical behavior towards formic acid and are important for the invasion of host cells. Microbiology 156, 3123-3135

Dasti JI, Tareen AM, Lugert R, Zautner AE, Groß U (2010) *Campylobacter jejuni*: A brief overview on pathogenicity-associated factors and disease-mediating mechanisms. Int J Med Microbiol 300: 205-211

Bajohr LL, Ma L, Platte C, Liesenfeld O, Tietze LF, Groß U, Bohne W (2010) *In-vitro* and *in-vivo* activity of 1-hydroxy-2-alkyl-4(1H)quinolone derivatives against *Toxoplasma gondii*. Antimicrob Agents Chemother 54: 517-521

Lin SS, Groß U, Bohne W (2009) Type II NADH dehydrogenase inhibitor 1-hydroxy-2-dodecyl-4 (1H) quinolone leads to collapse of mitochondrial inner-membrane potential and ATP depletion in *Toxoplasma gondii*. Eukaryot Cell 8: 877-887

Rönnebäumer K, Groß U, Bohne W (2008) The nascent parasitophorous vacuole membrane of *E. cuniculi* is formed by host cell derived lipids and contains pores which allow nutrient uptake. Eukaryot Cell 7: 1001-1008

Address

Zentrum Biochemie und
Molekulare Zellbiologie
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 14613
fax: +49-551-39 14614
e-mail: Joerg.grosshans@medizin.uni-goettingen.de

Jörg Großhans

Professor of Developmental Biochemistry

- 1993 Diplom Biochemistry, Tübingen
- 1993 - 1996 Doctoral research with C Nüsslein-Volhard, Max-Planck-Institut für Entwicklungsbiologie, Tübingen
- 1997 - 2001 Post-doc with E Wieschaus, Princeton (USA)
- 2002 - 2008 ZMBH and Emmy-Noether research group, Heidelberg
- since 2009 Professor, Universitätsmedizin Göttingen

Major Research Interests

Biological structure formation and ageing.
Our group is interested in the molecular and cell-biological mechanisms how biological structures are formed. We analyse structure formation in the early *Drosophila* embryo employing genetical, biochemical and embryological experiments as well as live-imaging. Specifically we investigate how nuclear shape is determined and how the farnesylated protein Kugelkern is involved, how the cells are regularly arranged, how apical-basal polarity is established and how the number of synchronous cell divisions is robustly controlled. Based on our studies nuclear shape we have studied the function of the nuclear lamina and lamina proteins, such as lamin and Kugelkern, in ageing and stem cell proliferation and differentiation in the adult fly.

Selected Recent Publications

Polychronidou M, Hellwig A, Großhans J. The farnesylated nuclear proteins Kugelkern and LaminDm0 affect nuclear morphology by directly interacting with the nuclear membrane. Mol Biol Cell, in press

Wenzl C, Yan S, Laupsien P, Großhans J (2010) Localization of RhoGEF2 during *Drosophila* cellularization is developmentally controlled by slam. Mech Dev 127 (2010) 371-384

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

Address

Prof. Dr. Heidi Hahn
UMG
Department of Human Genetics
Section of Developmental Genetics

Heinrich-Düker-Weg 12

37073 Göttingen
Germany

phone: +49-551-39 14010
fax: +49-551 39 6580
e-mail: hhahn@gwdg.de

Further Information

http://www.humangenetik.gwdg.de/HG/1/index.php?i=Fo&s=Sonic

Heidi Hahn

Professor of Molecular Developmental Genetics

- 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

Cancer is a disease that results from inappropriate cell division induced by hyperproliferation. In many cases, the development of cancer is associated with genes or signaling pathways important for patterning during embryogenesis.

We investigate the role of the Hedgehog/Patched (Hh/Ptch) signaling cascade in the development of solid tumors. The focus is on tumors caused by mutations in Ptch, such as medulloblastoma, rhabdomyosarcoma and basal cell carcinoma.

The first aim is the discovery of molecular and cellular events that trigger the initiation of Ptch associated tumors. The second aim is to elucidate the function of Hh/Ptch signaling during tumor progression. The current focus is on the interaction between Hh/Ptch and Wnt signaling during formation, progression and regression of basal cell carcinoma. In addition, we are investigating the role of Hh/Ptch signalling in myeloid or T cells during tumorigenesis. The third goal is the identification of drugs that target solid tumors caused by mutations in Ptch. Currently we are analyzing the anti-tumoral effects of the cytostatic drug doxorubicin and of Vitamin D3 derivatives. To test the anti-tumor activity of the drugs we use tumor-bearing Ptch mutant mice.

Selected Recent Publications

Zibat A, Missiaglia E, Rosenberger A, Pritchard-Jones K, Shipley J, Hahn H, Fulda S Activation of the hedgehog pathway confers a poor prognosis in embryonal and fusion gene-negative alveolar rhabdomyosarcoma. Oncogene, in press

Nitzki F, Zibat A, Konig S, Wijgerde M, Rosenberger A, Brembeck FH, Carstens PO, Frommhold A, Uhmann A, Klingler S, Reifenberger J, Pukrop T, Aberger F, Schulz-Schaeffer W, Hahn H (2010) Tumor stroma-derived Wnt5a induces differentiation of basal cell carcinoma of Ptch-mutant mice via CaMKII. Cancer Res 70: 2739-48

Ecke I, Petry F, Rosenberger A, Tauber S, Monkemeyer S, Hess I, Dullin C, Kimmina S, Pirngruber J, Johnsen SA, Uhmann A, Nitzki F, Wojnowski L, Schulz-Schaeffer W, Witt O, Hahn H (2009) Antitumor effects of a combined 5-aza-2'deoxycytidine and valproic acid treatment on rhabdomyosarcoma and medulloblastoma in Ptch mutant mice. Cancer Res 69: 887-95

Zibat A, Uhmann A, Nitzki F, Wijgerde M, Frommhold A, Heller T, Armstrong V, Wojnowski L, Quintanilla-Martinez L, Reifenberger J, Schulz-Schaeffer W, Hahn H (2009) Time-point and dosage of gene inactivation determine the tumor spectrum in conditional Ptch knockouts. Carcinogenesis 30: 918-26

van Dop WA, Uhmann A, Wijgerde M, Sleddens-Linkels E, Heijmans J, Offerhaus GJ, van den Bergh Weerman MA, Boeckxstaens GE, Hommes DW, Hardwick JC, Hahn H and van den Brink GR (2009) Depletion of the colonic epithelial precursor cell compartment upon conditional activation of the hedgehog pathway. Gastroenterology 136: 2195-2203 e1-7

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: 1814-23

Address

Nucleic Acid Chemistry Group
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1685
fax: +49-551-201 1680
e-mail: claudia.hoebartner@mpibpc.mpg.de

Further Information

http://www.mpibpc.mpg.de/english/research/ags/hoebartner

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

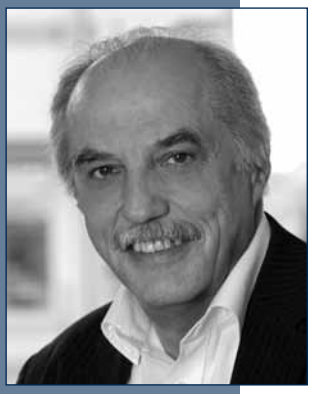
Selected Recent Publications

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



Address

Dept. of Molecular Developmental Biology,
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1482
fax: +49-551-201 1755
e-mail: hjaeckl@gwdg.de

Further Information

http://www.mpibpc.mpg.de/groups/jaeckle

Herbert Jäckle

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 focused 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

Günesdogan U, Jäckle H, Herzig A (2010) A genetic system to assess *in vivo* the functions of histones and histone modifications inhigher eukaryotes. EMBO Reports 11, 772-776

Löhr U, Chung HR, Beller M, Jäckle H (2009). Antagonistic action of Bicoid and the repressor Capicua determines the spatial limits of *Drosophila* head gene expression domains. P Natl Acad Sci USA 106: 21695-21700

Chanana B, Steigemann,P, Jäckle H, Vorbrüggen G (2009) Reception of Slit requires only the chondroitin-sulphate-modified extracellular domain of Syndecan at the target cell surface. P Natl Acad Sci USA 106: 11984-11988

Beller M, Sztalryd C, Southall N, Bell M, Jäckle H, Auld DS, Oliver B (2008) COPI Complex Is a Regulator of Lipid Homeostasis. Plos Biol 6: 2530-2549

Grönke S, Müller G, Hirsch J, Fellert S, Andreou A, Haase T, Jäckle H, Kühnlein RP (2007) Dual lipolytic control of body fat storage and mobilization in *Drosophila*. Plos Biol 5: 1248-1256

Address

Dept. of Neurobiology
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1635
fax: +49-551-201 1639
e-mail: rjahn@gwdg.de

Further Information

http://www.mpibpc.gwdg.de/abteilungen/190/

Reinhard Jahn

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- 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

Pavlos NJ, Grønborg M, Riedel D, Chua JJE, Boyken J, Kloepper TH, Urlaub H, Rizzoli SO, Jahn R (2010) Quantitative analysis of synaptic vesicle Rabs uncovers distinct yet overlapping roles for Rab3a and Rab27b in Ca^{2+} -triggered exocytosis. J Neurosci 30(40): 13441-13453

Chua JJ, Kindler S, Boyken J, Jahn R (2010) The architecture of an excitatory synapse. J Cell Sci 123: 819-823

Schmitt HD, Jahn R (2009) A tethering complex recruits SNAREs and grabs vesicles. Cell 139: 1053-1055

Barysch SV, Aggarwal S, Jahn R, Rizzoli SO (2009) Sorting in early endosomes: connections to docking and fusion-associated factors. Proc Natl Acad Sci USA 106: 9697-9702

Van den Bogaart G, Holt MG, Bunt G, Riedel D, Wouters FS, Jahn R (2009) One SNARE complex is sufficient for membrane fusion. Nat Struct Mol Biol 17: 358-364

Grønborg M, Pavlos NJ, Brunk I, Chua JJE, Münster-Wandowski A, Riedel D, Ahnert-Hilger G, Urlaub H, Jahn R (2009) Quantitative comparison of glutamatergic and GABAergic synaptic vesicles unveils selectivity for few proteins including MAL2, a novel synaptic vesicle protein. J Neurosci 30: 2-12

Stein A, Weber G, Wahl MC, Jahn R (2009) Helical extension of the neuronal SNARE complex into the membrane. Nature 460: 525-528

Holt M, Riedel D, Stein A, Schuette C, Jahn R (2008) Synaptic vesicles are constitutively active fusion machines, which function independently of Ca^{2+}. Curr Biol 18: 715-722

Address

Dept. of Molecular Oncology, GZMB
University Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 10373
fax: +49-551-39 13713
e-mail: steven.johnsen@zentr.uni-goettingen.de

Further Information

http://www.moloncol.med.uni-goettingen.de/content/researchgroups/25.htm

Steven Johnsen

Assistant Professor in Molecular Oncology

- 1999 - 2002 Ph.D. Mayo Clinic College of Medicine, Rochester, Minnesota, USA
- 2003 - 2006 Doctoral Fellow, Center for Molecular Neurobiology (ZMNH), Hamburg, Germany
- 2006 - 2007 Post-Doctoral Fellow, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany
- since 2007 Assistant Professor in Molecular Oncology, University of Göttingen Medical Faculty, Göttingen, Germany

Major Research Interests

The 3 x 10^9 bp of DNA in the human genome is organized in several higher order chromatin structures which allow for the correct packaging and “reading” of the genetic material. Importantly, the proper regulation of gene transcription, DNA replication and probably most DNA-associated nuclear functions is regulated by the post-translational modification of histone proteins. Our group is focused on the role and regulation of chromatin modifications in controlling transcription and transcription-coupled nuclear processes during tumorigenesis. The primary interest of our work is the monoubiquitination of histone H2B (H2Bub1) which appears to serve a tumor suppressor role in breast cancer and is tightly associated to active gene transcription. Although this modification has been studied extensively in yeast, relatively little is known about its function and regulation in higher eukaryotic organisms.
In our future work we will address:

1. How p53 controls replication-dependent histone pre-mRNA processing and the role of this during tumorigenesis.
2. The role of RNF20 and RNF40 in controlling estrogen-regulated transcription and tumorigenic properties in mammary tumorigenesis.
3. The role of the ubiquitin-proteasome system and crosstalk with chromatin modifications and structure during estrogen-regulated transcription.
4. The function of H2B monoubiquitination (on Lys120) in transcriptional regulation and nuclear function in human breast cancer.
5. The regulation of H2Bub1 by CDK9 and the function of these during physiological stress responses.

Selected Recent Publications

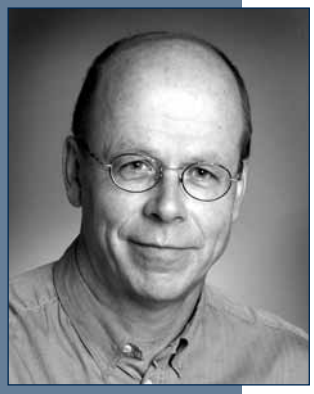
Büttner N, Johnsen SA, Kügler S, Vogel T (2010) Af9/Mllt3 Interferes With Tbr1 Expression Through Epigenetic Modification of Histone H3K79 During Development of Upper Layers in the Cerebral Cortex. Proc Natl Acad Sci USA 107: 7042-7047

Pirngruber J, Johnsen SA (2010) Induced G1 Cell Cycle Arrest Controls Replication-Dependent Histone mRNA 3’ End Processing Through P21, P220/NPAT and CDK9. Oncogene 29: 2853-2863

Pirngruber J, Shchebet A, Schreiber L, Shema E, Minsky N, Chapman RD, Eick D, Aylon Y, Oren M, Johnsen SA (2009) CDK9 Directs Histone H2B Monoubiquitination to Control Replication-Dependent Histone mRNA 3’ End Processing. EMBO Rep 10: 894-900

Johnsen SA, Güngör C, Prenzel T, Riethdorf S, Riethdorf L, Taniguchi-Ishigaki N, Rau T, Furlow JD, Sauter G, Pantel K, Scheffner M, Gannon F, Bach I (2009) Regulation of Estrogen-Dependent Transcription by the LIM Cofactors CLIM and RLIM in Breast Cancer. Cancer Res 69: 128-136

Shema E, Tirosh I, Aylon Y, Huang J, Ye C, Moskovitis N, Raver-Shapira N, Minsky N, Pirngruber J, Tarcic G, Hublarova P, Moyal L, Gana-Weisz M, Shiloh Y, Yarden Y, Johnsen SA, Vojtesek B, Berger SL, and Oren M (2008) The Histone H2B-specific Ubiquitin Ligase RNF20/hBRE1 Acts as a Putative Tumor Suppressor Through Selective Regulation of Gene Expression. Gene Dev 22(19): 2664-2676



Address

Max Planck Institute
for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1560
fax: +49-551-201 1504
e-mail: mkessel1@gwdg.de

Further Information

http://www.mpibpc.mpg.de/research/ags/kessel/profil/index.html

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 is interested in the coordination between cell cycle and developmental control processes in mice. We apply biochemical, genetic and embryological techniques.

We previously 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. Studying a conditional mouse knock-out model we found that Geminin is essential for the first cell divisions in murine embryos, but not later in development. Geminin is also necessary for the establishment, growth and maintenance of murine embryonic stem cells.

We further analyze the Mad2l2, a regulator of the APC/C complex, and a subunit of translesion DNA polymerase zeta. We study the role of Mad2l2 in cell cycle regulation with particular focus on the development of primordial germ cells. We generated a model where a programming of the germ cell fate is inhibited. On the other hand, we attempt to transdifferentiate somatic cells into a germ cells, following the approach used for induced pluripotency.

Selected Recent Publications

Asli NS, Kessel M (2010) Spatiotemporally restricted regulation of generic motor neuron programs by *miR-196*-mediated repression of Hoxb8. Dev Biol 344: 857-868

Pitulescu ME, Teichmann M, Luo L, Kessel M (2009) TIPT2 and geminin interact with basal transcription factors to synergize in transcriptional regulation. BMC Biochem 10: 16

Wittler L, Saborowski M, Kessel M (2008) Expression of the chick Sizzled gene in progenitors of the cardiac outflow tract. Gene Expr Patterns 8(6): 471-6

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

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 forebrainspecific regulation of the vertebrate homeobox gene ANF/Hesx1. Dev Biol 269: 567-79

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

Address

Center for Molecular
Physiology of the Brain
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 13209
fax: +49-551-39 13208
email: dklopfe@gwdg.de

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

Wagner OI, Esposito A, Köhler B, Chen CW, Shen CP, Wu GH, Mandalapu S, Wenzel D, Wouters FS, Klopfenstein DR (2009) Synaptic scaffolding protein SYD-2 clusters and activatesKinesin-3 UNC-104 in C. elegans. Proc Natl Acad Sci USA (PNAS Early Edition Week 44)

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

Address

Dept. of Molecular Genetics and Preparative Molecular Biology
University of Göttingen
Grisebachstr. 8

37077 Göttingen
Germany

phone: +49-551-39 9653
fax: +49-551-39 3805
email: wkramer@gwdg.de

Further Information

http://www.img.bio.uni-goettingen.de/molgen.htm

Wilfried Kramer

Privatdozent Molecular Biology and Genetics

- Diploma (Biology), University of Cologne, Germany, 1982
- 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

Schomacher L, Chong JP, McDermott P, Kramer W, Fritz HJ (2009) DNA uracil repair initiated by the archaeal ExoIII homologue Mth212 via direct strand incision. Nucleic Acids Res 37(7): 2283-93

Prakash R, Satory D, Dray E, Papusha A, Scheller J, Kramer W, Krejci L, Klein H, Haber JE, Sung P, Ira G (2009) Yeast Mph1 helicase dissociates Rad51-made D-loops: implications for crossover control in mitotic recombination. Genes Dev 23(1): 67-79

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)

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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

Address

Prof. Dr. Heike Krebber
Dept. of Molecular Genetics
Institute for Microbiology
and Genetics
Grisebachstr. 8

37077 Göttingen
Germany

Tel.: +49-551-39 3801
Fax: +49-551-39 3805
e-mail: heike.krebber@
biologie.uni-
goettingen.de

Further Information

http://www.img.bio.uni-goettingen.de/molgen.htm

Heike Krebber

Professor for Molecular Genetics

- 1996 Dr. rer. nat., Deutsches Krebsforschungszentrum, DKFZ, Heidelberg (Germany)
- 1996 Visiting Scientist, Weizman Institute of Science, Rehovot (Israel)
- 1996-1999 Scientist, Dana-Farber Cancer Institute, Harvard Medical School, Boston (USA)
- 1999-2010 Junior group leader, Institute for Molecular Biology and Tumor Research, Philipps-Universität Marburg (Germany)
- 2005 Habilitation in Molecular Biology
- 2006 Heisenberg Fellow
- since 2010 Professor for Molecular Genetics, Georg-August Universität Göttingen (Germany)

Major Research Interests

The compartmentalization of eukaryotic cells requires a machinery that is able to transport a great number of molecules into and out of the nucleus in a rapid, accurate and regulated manner. The natural cargos for this machinery are proteins and RNA-protein complexes (RNPs). For the mRNPs it has to be assured that intron containing pre messenger RNAs are retained in the nucleus until processing is completed. Only fully processed and spliced mRNAs are transported into the cytoplasm and translated at the ribosomes. The otherwise resulting gene products can be toxic to cells and harmful to the organism. Several examples exist where not fully processed pre-mRNAs reach the cytoplasm, resulting in diseases like cancer or neurodegenerative diseases. Our project aims to identify and characterize the export-competent mRNPs that are transported into the cytoplasm. We want to learn which proteins are associated with the transported RNP, how transport is regulated and how the cell distinguishes between export incompetent and export competent mRNPs. Saccharomyces cerevisiae has been proven to be a useful model organism for eukaryotic cells and we use a combination of genetics, biochemistry and cell biology to gain insight into mRNA export out of the nucleus.

Selected Recent Publications

Baierlein C, Krebber H (2010) Translation termination: New factors and insights. RNA-Biology 7(5), in press

Khoshnevis S, Gross T, Rotte C, Baierlein C, Ficner R, Krebber H (2010) The iron-sulfur protein Rli1 functions in translation termination. EMBO Rep 11: 214-219

Gross T, Siepmann A, Sturm D, Windgassen M, Scarelli J, Cole CN, Seedorf M, Krebber H (2007) The DEAD-box RNA-helicase Dbp5 functions in translation termination. Science 315(5812): 646-649

Windgassen M, Sturm D, Cajigas IJ, González CI, Seedorf M, Bastians H, Krebber H (2004) Yeast shuttling SR-proteins Npl3p, Gbp2p and Hrb1p are part of the translated mRNAs and Npl3p can function as a translational repressor. Mol Cell Biol 24(23): 10479-10491

Häcker S, Krebber H (2004) Differential export requirements for shuttling SR-type mRNA binding proteins. J Biol Chem 279(7): 5049-5052

Windgassen M, Krebber H (2003) Identification of Gbp2p as a novel poly(A)+RNA binding protein in yeast involved in the cytoplasmic delivery of mRNAs. EMBO Rep 4(3): 278-283

Address

Albrecht von Haller Institute
for Plant Sciences
Department of Plant Cell
Biology
University of Göttingen
Untere Karspüle 2

37073 Göttingen
Germany

phone: +49-551-39 13581
fax: +49-551-39 10406
email: Volker.Lipka@
biologie.uni-
goettingen.de

Further Information

http://www.uni-goettingen.
de/en/33181.html

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

Address

Dept. Cellular Biochemistry
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1407
fax: +49-551-201 1197
e-mail: reinhard.luehrmann
@mpi-bpc.mpg.de

Further Information

http://www.mpibpc.gwdg.de/research/dep/luehrmann/

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)
- since 2007: Honorary Professor at the Philipps University of Marburg (since 2000) and Georg August University of Göttingen

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

Schneider M, Will CL, Anokhina A, Tazi J, Urlaub H, Lührmann R (2010) Exon definition complexes contain the tri-snRNP and can be directly converted into B-like pre-catalytic splicing complexes. Mol Cell 38: 223-235

Wahl MC, Will CL, Lührmann R (2009) The spliceosome: design principles of a dynamic RNP machine. Cell 136: 701-718

Lührmann R, Stark H (2009) Structural mapping of spliceosomes by electron microscopy. Curr Opin Struct Biol 19: 96-102

Warkocki Z, Odenwälder P, Schmitzova J, Platzmann F, Stark H, Urlaub H, Ficner R, Fabrizio P, Lührmann R (2009) Reconstitution of both steps of S. cerevisiae splicing with purified spliceosomal components. Nature Struct Mol Biol 16: 1237-1243

Pena V, Mozaffari SJ, Fabrizio P, Orlowski J, Bujnicki JM, Lührmann R, Wahl MC (2009) Common design principles in the spliceosomal RNA helicase Brr2 and in the Hel308 DNA helicase. Mol Cell 35: 454-466

Bessonov S, Anokhina, M, Will CL, Urlaub H, Lührmann R (2008) Isolation of an active step 1 spliceosome and composition of its RNP core. Nature 452: 846-850

Address

Dept. of Molecular
Cell Biology
Molecular Cell
Differentiation
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1709
fax: +49-551-201 1504
e-mail: amansou@gwdg.de

Further Information

http://www.mpibpc.mpg.de/groups/gruss

Ahmed Mansouri

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

Studying the molecular mechanisms controlling cell fate destiny and diversity is of fundamental interest for understanding pathological processes and diseases. We are using mouse genetics to study the role of transcription factors during cell differentiation in the endocrine pancreas and in the ventral midbrain.

In the pancreas, we are interested in molecules that control the endocrine cell subtype specification. In addition, we are studying animal models to uncover molecular pathways promoting beta-cell regeneration in the adult pancreas.

In the midbrain the specification of dopaminergic neurons is under the control of several transcription and secreted factors. Specifically, we want to identify factors that interact with Lmx1 a/b in order to promote the generation of functionally distinct dopaminergic neuron populations.

Selected Recent Publications

Collombat P, Xu X, Ravassard P, Sosa-Pineda B, Dussaud S, Billestrup N, Ole Madsen OD, Serup P, Heimberg H, Mansouri A (2009) The ectopic expression of Pax4 in the mouse pancreas converts progenitor cells into α- and subsequently β-cells. Cell 138: 449-462

Dressel R, Schindehütte J, Kuhlmann T, Elsner L, Novota P, Baier PC, Schillert A, Bickeböller H, Herrmann T, Trenkwalder C, Paulus W, Mansouri A (2008) The tumorigenicity of mouse embryonic stem cells and *in vitro* differentiated neuronal cells is controlled by the recipients’ immune response. PLoS ONE 3(7): e2622

Zembrzycki A, Griesel G, Stoykova A, Mansouri A (2007) Genetic interplay between the transcription factors Sp8 and Emx2 in the patterning of the forebrain. Neural Dev 2: 8

Collombat P, Hecksher-Sørensen J, Krull J, Berger J, Riedel D, Herrera PL, Serup P, Mansouri A (2007) Embryonic endocrine pancreas and mature beta cells acquire alpha and PP cell phenotypes upon Arx misexpression. J Clin Invest 117(4): 961-70

Griesel G, Treichel D, Collombat P, Krull J, Zembrzycki A, van den Akker WM, Gruss P, Simeone A, Mansouri A (2006) Sp8 controls the anteroposterior patterning at the midbrain-hindbrain border. Development 133: 1779-1787

Address

Dept. of Bioinformatics
University of Göttingen
Goldschmidtstrasse 1

37077 Göttingen
Germany

phone: +49-551-39 14628
fax: +49-551-39 14966
e-mail: bmorgen@gwdg.de

Further Information

http://www.gobics.de/burkhard/

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 have been developed and are maintained by our department. Current projects in these fields include novel graph-theoretical approaches to multiple alignment and application of conditional random fields for probabilistic sequence modeling.

Other areas of research in our department include: metabolomics and mass spectroscopy data analysis, phylogeny reconstruction, RNA structure analysis, metagenomics, motif discovery and remote homology detection using machine-learning methods, genome annotation for prokaryotes, recombinations in viral genomes and HIV classification using coalescent theory

Selected Recent Publications

Philippe et al (2009) Phylogenomics restores traditional views on deep animal relationships. Curr Biol 19: 706-712

Meinicke P, Lingner T, Kaever A, Feussner K, Gobel C, Feussner I, Karlovsky P, Morgenstern B (2008) Metabolite-based clustering and visualization of mass spectrometry data using one-dimensional self-organizing maps. Algorithms Mol Biol 3: 9

Subramanian AR, Kaufmann M, Morgenstern B (2008) DIALIGN-TX: greedy and progressive approaches for segment-based multiple sequence alignment. Algorithms Mol Biol 3: 6

The Tribolium Genome Sequencing Consortium (2008) The genome of the beetle developmental model and pest *Tribolium castaneum*. Nature 452: 949-955

Chen et al (2007) Comparative analysis of the complete genome sequence of the plant growth promoting *Bacillus amyloliquefaciens* FZB42. Nat Biotechnol 25: 1007-1014

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 Biol 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

Address

Dept. of Neurogenetics
Max Planck Institute for
Experimental Medicine
Hermann-Rein-Strasse 3

37075 Göttingen
Germany

phone: +49-551-38 99757
fax: +49-551-38 99758
email: nave@em.mpg.de

Further Information

http://www.em.mpg.de/index.php?id=34&no_cache=1

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.

Selected Recent Publications

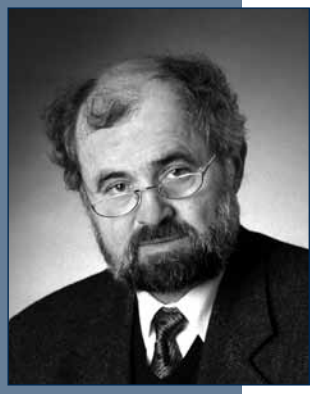
Nave KA (2010) Myelination and glial support of axonal integrity. Nature 468: 244-252

Brinkmann BG, Agarwal A, Sereda MW, Garratt AN, Müller T, Wende H, Stassart RM, Nawaz S, Humml C, Velanac V, Radyuschkin K, Goebbels S, Fischer TM, Franklin RJ, Lai C, Ehrenreich H, Birchmeier C, Schwab MH, Nave, KA (2008) Neuregulin-1/ErbB signaling serves distinct functions in myelination of the peripheral and central nervous system. Neuron 59: 581-595

Kassmann CM, Lappe-Siefke C, Baes M, Brügger B, Mildner A, Werner HB, Natt O, Michaelis Th, Prinz M, Frahm J, Nave KA (2007) Axonal loss and neuroinflammation caused by peroxisome-deficient oligodendrocytes. Nat Genet 39: 969-976

Saher G, Brugger B, Lappe-Siefke C, Mobius W, Tozawa R, Wehr MC, Wieland F, Ishibashi S, Nave KA (2005) High cholesterol level is essential for myelin membrane growth. Nat Neurosci 8: 468-475

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



Address

Dept. Membrane Biophysics
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1675
fax: +49-551-201 1688
e-mail: eneher@gwdg.de

Further Information

http://www.mpibpc.gwdg.de/abteilungen/140/

Erwin Neher

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 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. We recently developed techniques to express mutated synaptic proteins in the Calyx terminal, such that the functional role of specific molecules can be studied on the single-cell level.

A second line of research concerns the analysis of fluorescence images, particularly the separation of multiple labels.

Selected Recent Publications

Neher RA, Mitkovski M, Kirchhoff F, Neher E, Theis FJ, Zeug A (2009) Blind source separation techniques for the decomposition of multiply labeled fluorescence images. Biophys J 96: 3791-3800

Young S. Jr, Neher E (2009) Synaptotagmin has an essential function in synaptic vesicle positioning for synchronous release in addition to its role as a calcium sensor. Neuron 63: 482-496

Neher E, Sakaba T (2008). Multiple roles of calcium ions in the regulation of neurotransmitter release. Neuron 59: 861-872

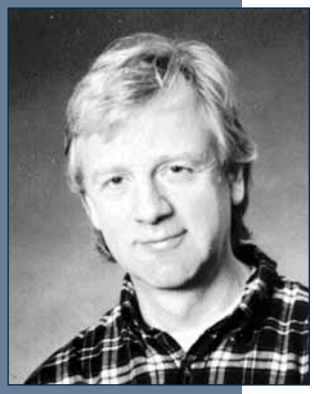
Sakaba T, Stein A, Jahn R, Neher E (2005) Distinct kinetic changes in neurotransmitter release after SNARE protein cleavage. Science 309: 491-494

Sakaba T, Neher E (2003) Direct modulation of synaptic vesicle priming by GABAB 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-23. Cell 114: 75-86

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

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



Address

Dept. Developmental Biochemistry
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 5683
+49-551-39 14613
fax: +49-551-39 14614
e-mail: tpieler@gwdg.de

Further Information

http://www.uni-bc.gwdg.de/entwickl/index.html

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
- Germ cell specification and migration

Selected Recent Publications

Arthur PK, Claussen M, Koch S, Tarbashevich K, Jahn O, Pieler T (2009) Participation of *Xenopus* Elr-type proteins in vegetal mRNA localization during oogenesis. J Biol Chem 284(30): 19982-92

Damianitsch K, Melchert J, Pieler T (2009) XsFRP5 modulates endodermal organogenesis in *Xenopus laevis*. Dev Biol. 329(2): 327-37

Souopgui J, Rust B, Vanhomwegen J, Heasman J, Henningfeld KA, Bellefroid E, Pieler T (2008) The RNA-binding protein XSeb4R: a positive regulator of VegT mRNA stability and translation that is required for germ layer formation in *Xenopus*. Genes Dev 22(17): 2347-52

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 133: 4097-4108

Address

Dept. Genetics of
Eukaryotic Microorganisms
Institute of Microbiology and
Genetics
University of Göttingen
Grisebachstr.8

37077 Göttingen
Germany

phone: +49-551-39 13930
fax: +49-551-39 10123
e-mail: spoegge@gwdg.de

Stefanie Pöggeler

Professor of Genetics of Eukaryotic Microorganisms

- 1993 Dr. rer. nat., Ruhr-Universität Bochum
- 1993 - 1995 Research associate
- 1995 - 2001 Postdoctoral research fellow and group leader
- 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. 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. In addition to mutants generated by chemical mutagenesis, several mutants affecting fruiting-body development were produced by knock-out of mating-type genes, pheromone and receptor genes, as well as genes involved in autophagy and bicarbonate metabolism.

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. 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 such as protein purification, addition of fluorescent biosensors and expression of cytotoxic proteins.

Selected Recent Publications

Nowrousian M, Staich J, Engh I, Kamerewerd J, Kempken F, Kunstamnn B, Kuo HC, Osiewacz HD, Pöggeler S, Read N, Seiler S, Smith S, Zickler D, Kück U, Freitag M (2010) Next-Generation Sequencing of the 40 Mb Genome of the Filamentous Fungus *Sordaria macrospora*. PloS Genetics 6:e1000891

Elleuche S, Pöggeler S (2009) -Carbonic anhydrases play a role in fruiting body development and ascospore germination in the filamentous fungus *Sordaria macrospora* PloS One: 4:e5177

Storlazzi A, Tesse S, Ruprich-Robert G, Gargano S, Pöggeler S, Kleckner N, Zickler D (2008) Coupling meiotic chromosome axis integrity to recombination. Genes Dev 15: 796-809

Elleuche S, Döring K, Pöggeler S (2008) Minimization of a eukaryotic mini-intein. Biochem Biophys Res Com 366: 239-243

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

Address

University Medicine
Dept. Biochemistry II
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 5947
fax: +49-551-39 5979
e-mail: peter.rehling@medizin.uni-goettingen.de

Further Information

http://www.uni-bc.gwdg.de/index.php

Peter Rehling

Professor, Director of the Dept. of Biochemistry II

- 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), 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
- Since 2009 Speaker of the Study Section “Molecular Cell Biology” of the German Society for Biochemistry and Molecular Biology (GBM)
- Since 2010 Group associated with the Max Planck Institute for Biophysical Chemistry

Major Research Interests

We are interested in understanding the molecular mechanisms by which proteins are transported across the mitochondrial membranes and to find out how multi-protein complexes in the inner membrane (TIM complexes; translocation machineries of the inner membrane) mediate this task. In another aspect of our work we addresses the question how newly imported proteins assemble into multi-protein complexes in the inner membrane. In case of the respiratory chain complexes the assembly process is especially demanding since central subunits of the complexes are made within mitochondria. Dedicated chaperone- like factors are required to assist and regulate assembly and translation in mitochondria. The analysis of the principles of the biogenesis process and the activities of the assembly factors is of central importance for our understanding of the molecular basis of human mitochondrial disorders.

Selected Recent Publications

Mick DU, Vukotic M, Piechura H, Meyer HE, Warscheid B, Deckers M, Rehling P (2010) Coa3 and Cox14 are essential for negative feedback regulation of *COX1* translation in mitochondria. J Cell Biol 191(1): 141-154

Chacinska A, van der Laan M, Mehnert CS, Guiard B, Mick DU, Hutu DP, Truscott KN, Wiedemann N, Meisinger C, Pfanner N, Rehling P (2010) Distinct forms of mitochondrial TOM-TIM supercomplexes define signal-dependent states of preprotein sorting. Mol Cell Biol 30(1) 307-318

Odorizzi G, Rehling P (2009) Membranes and organelles. Curr Opin Cell Biol21: 481-3

Mick DU, Wagner K, Van der Laan M, Frazier AE, Perschil I, Pawlas M, Meyer HE, 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 DP, 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 DU, Hutu DP, Voos W, Truscott KN, Chacinska A, Pfanner N, Rehling P (2006) Tim50 maintains thepermeability barrier of the mitochondrial inner membrane. Science 312: 1523-1526

Frazier AE, Taylor R, Mick DU, Warscheid B, Stoepel N, Meyer HE, Ryan MT, 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

Address

European Neuroscience
Institute Göttingen
Grisebachstr. 5

37077 Göttingen
Germany

phone: +49-551-39 3630
fax: +49-551-39 12346
e-mail: srizzol@gwdg.de

Further Information

http://www.eni.gwdg.de/index.php?id=199

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, Werner A, Kadian C, Geumann U, Jahn R, Rizzoli SO (2009). Endosomal fusion upon SNARE knockdown is maintained by residual SNARE activity and enhanced docking. Traffic 10: 1543-1559

Barysch SV, Aggarwal S, Jahn R, Rizzoli SO (2009). Sorting in early endosomes reveals connections to docking- and fusion-associated factors. Proc Natl Acad Sci USA 106: 9697-9702

Denker A, Kröhnert K, Rizzoli SO (2009) Revisiting synaptic vesicle pool localization in the *Drosophila* neuromuscular junction. J Physiol 587: 2919-2926

Geumann U, Barysch SV, Hoopmann P, Jahn R, Rizzoli SO (2008) SNAREs are not involved in endosome docking. Mol Biol Cell 19: 5327-5337

Westphal* V, Rizzoli* SO, Lauterbach M, Kamin D, Jahn R, Hell SW (2008) Video-rate far-field optical nanoscopy dissects synaptic vesicle movement. Science 320: 246-249

Bethani I, Lang T, Geumann U, Sieber JJ, Jahn R, Rizzoli SO (2007) The specificity of SNARE pairing in biological membranes is mediated by both proof-reading and spatial segregation. EMBO J 26: 3981-3992

Willig* KI, Rizzoli* SO, Westphal V, Jahn R, Hell SW. (2006). STED microscopy reveals that synaptotagmin remains clustered after synaptic vesicle exocytosis. Nature 44: 935-939

Brandhorst* D, Zwilling* D, Rizzoli* SO, Lippert U, Lang T, Jahn R (2006). Homotypic fusion of early endosomes: SNAREs do not determine fusion specificity. Proc Natl Acad Sci USA 103: 2701-2706

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: 1163-1176

Rizzoli SO, Betz WJ (2004) The structural organization of the readily releasable pool of synaptic vesicles. Science 303: 2037-2039

*equal contribution

Address

Dept. Physical Biochemistry
Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 2901
fax: +49-551-201 2905
e-mail: rodnina@mpibpc.mpg.de

Further Information

http://www.mpibpc.mpg.de/research/dep/rodnina/

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

Address

Max Planck Institute for
Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1758
fax: +49-551-201 1755
e-mail: rschuh@gwdg.de

Further Information

http://www.mpibpc.gwdg.de/abteilungen/170/schuh/

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
- since 2008: Teaching as an adjunct professor on the Faculty of Biology at the University of Göttingen

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

Harder B, Schomburg A, Pflanz R, Küstner K M, Gerlach N, Schuh R (2008) TEV protease-mediated cleavage in *Drosophila* as a tool to analyze protein functions in living organisms. BioTechniques 44: 765-772

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

Address

Prof. Dr. Blanche Schwappach
University of Göttingen
Medical School
Dept. of Biochemistry I
Humboldtallee 23

37073 Göttingen
Germany

Tel.: +49-551-39 5962
Fax: +49-551-39 5960
e-mail: blanche.schwappach@med.uni-goettingen.de

Further Information

http://www.uni-bc.gwdg.de/index.php

Blanche Schwappach

Professor, Director of Biochemistry I

- 1996 Dr rer nat (Biology), Centre for Molecular Neurobiology (ZMNH), University of Hamburg
- 1997-2000 Postdoctoral fellow (Laboratory of Lily Jan, University of California, San Francisco, USA)
- 2000-2007 Research group leader at the Centre for Molecular Biology (ZMBH), University of Heidelberg
- 2004 Habilitation (Molecular Biology and Cell Biology) at the ZMBH
- 2007-2010 Wellcome Trust Senior Research Fellow, Faculty of Life Sciences, University of Manchester, UK
- since 2010 Professor of Biochemistry and Director of Biochemistry I
- since 2010 the group is associated with the Max Planck Institute of Biophysical Chemistry

Major Research Interests

The group works on different aspects of membrane protein biogenesis and its integration into the physiology of organs such as the brain or the heart. We study the early life of tail-anchored proteins that are post-translationally targeted to the endoplasmic reticulum for membrane integration. Other projects address the role of sorting motifs during the passage of ion channels and neurotransmitter receptors through the secretory pathway. One channel under investigation (the KATP channel) couples cellular metabolism to insulin secretion in pancreatic beta cells. In the brain and the heart KATP channels play less defined roles that we currently address employing biochemical methods. We study biogenesis and trafficking under (patho)physiological conditions in genetically tractable model organisms such as yeast or mouse. Besides membrane protein biochemistry we use GFP-based physiological sensors for small molecules and ions in cellular compartments. This allows us to tackle how ion channels and transporters contribute to different physicochemical milieus inside cells.

Selected Recent Publications

Braun NA, Morgan B, Dick TP, Schwappach B (2010) The yeast CLC protein counteracts vesicular acidification during iron starvation J Cell Sci 123: 2342-2350

Leznicki P, Clancy A, Schwappach B, High S (2010) Bat3 promotes the membrane integration of tail-anchored proteins. J Cell Sci 123: 2170-2178

Rabu C, Schmid V, Schwappach B, High S (2009) Biogenesis of tail-anchored proteins: the beginning for the end? J Cell Sci 122: 3605-3

Schuldiner M, Metz J, Schmid V, Denic V, Rakwalska M, Schmitt HD, Schwappach B, Weissman JS (2008) The GET Complex Mediates Insertion of Tail-Anchored Proteins into the ER. Cell 134: 635-645

Michelsen K, Schmid V, Metz J, Heusser K, Liebel U, Schwede T, Spang A, Schwappach B (2007) Novel cargo-binding site in the beta and delta subunits of coatomer. J Cell Biol 179: 209-217

Heusser K, Yuan H, Neagoe I, Tarasov A, Ashcroft F, Schwappach B (2006) Scavenging of 14-3-3 proteins reveals their involvement in the cell-surface expression of ATP-sensitive potassium channels. J Cell Sci 119: 4353-4363

Michelsen K, Mrowiec T, Duderstadt KE, Frey S, Minor DL, Mayer MP, Schwappach B (2006) A multimeric membrane protein reveals 14-3-3 isoform specificity in forward transport in yeast. Traffic 7: 903-916

Address

Gene expression and signaling
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1656
fax: +49-551-201 1755
e-mail: halyna.shcherbata@mpibpc.mpg.de

Further Information

http://www.mpibpc.mpg.de/research/ags/shcherbata/

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

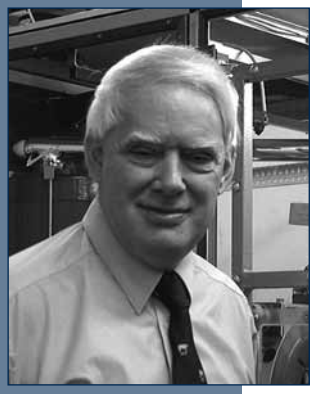
Kucherenko MM, Pantoja M, Yatsenko AS, Shcherbata HR, Fischer KA, Maksymiv DV, Chernyk YI, Ruohola-Baker H (2008) Genetic modifier screens reveal new components that interact with the *Drosophila* Dystroglycan-Dystrophin complex. PLoS ONE 2008;3.e2418.

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.



Address

Institute of Inorganic Chemistry
University of Göttingen
Tammannstr. 4

37077 Göttingen
Germany

phone: +49-551-39 3021
fax: +49-551-39 2582
e-mail: gsheldr@shelx.uni-ac.gwdg.de

Further Information

http://shelx.uni-ac.gwdg.de/

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 about 800 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

Sheldrick, GM (2008) A short history of SHELX. Acta Crystallogr A64: 112-122 (open access) This paper is currently the most highly cited scientific paper of the last five years in all subjects; see http://www.info.scopus.com/topcited/

Beck T, Krasauskas A, Grüne T, Sheldrick GM (2008) A magic triangle for experimental phasing of macromolecules. Acta Crystallogr D64 1179-1182

Pfoh R, Laatsch H, Sheldrick GM (2008) Crystal structure of trioxacarcin A covalently bound to DNA. Nucleic Acids Research 36: 3508-3514 (open access)

Pal A, Debreczeni JE, Sevvana M, Grüne T, Kahle B, Zeeck A, Sheldrick GM (2008) Structures of viscotoxins A1 und B2 from European mistletoe solved using native data alone. Acta Crystallogr D64: 985-992

Bunkóczi G, Vértesy L, Sheldrick GM (2005) The antiviral antibiotic feglymycin: First direct-methods solution of a 1000+ equal-atom structure. Angew Chem 117: 1364-1366; Int Edn 44: 1340-1342

Address

Max Planck Institute for
Experimental Medicine
Hermann-Rein-Str. 3

37075 Göttingen
Germany

phone: +49-551-3899 533
e-mail: msimons@gwdg.de

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
- Feb 2009 W3-Heisenberg Professorship

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

Nawaz S, Kippert A, Saab A, Werner HB, Lang T, Nave K.-A., Simons M (2009) Phosphatidylinositol (4,5) bisphosphate dependent interaction of MBP with the plasma membrane in oligodendroglial cells and its rapid perturbation by elevated calcium. J Neurosci 29(15): 4794-4807

Simons A, Raposo G (2009) Exosomes-vesicular carriers for intercellular communication. Curr Opin Cell Biol 21(4): 575-81

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 Aß40 and Aß42 *in vitro* and *in vivo*. Proc Natl Acad Sci USA 98: 5856-5861; *equal contribution to first authorship

Simons M, Krämer EM, 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

Address

Max Planck Institute for
Biophysical Chemistry
3D-Cryo Electron
Microscopy
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1305
fax: +49-551-201 1197
e-mail: holger.stark@
mpibpc.mpg.de

Further Information

http://www.mpibpc.mpg.de/
groups/stark/

Holger Stark

Group Leader 3D-Cryo Electron Microscopy

- 1996 Dr. rer. nat. (Biochemistry) Free University of Berlin
- 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

Schmeisser M, Heisen BC, Luettich M, Busche B, Hauer F, Koske T, Knauber KH, Stark H (2009) Parallel, distributed and GPU computing technologies in single-particle electron microscopy. Acta Crystallogr D Biol Crystallogr 65(Pt 7): 659-71

Wolf E, Kastner B, Deckert J, Merz C, Stark H, Lührmann R (2009) Exon, intron and splice site locations in the spliceosomal B complex. EMBO J 28(15): 2283-2292

Lührmann R, Stark H (2009) Structural mapping of spliceosomes by electron microscopy. Curr Opin Struct Biol 19(1): 96-102

Chari A, Golas MM, Klingenhäger M, Neuenkirchen N, Sander B, Englbrecht C, Sickmann A, Stark H, Fischer U (2008) An assembly chaperone collaborates with the SMN complex to generate spliceosomal SnRNPs. Cell 135(3): 497-509

Kastner B, Fischer N, Golas MM, Sander B, Dube P, Boehringer D, Hartmuth K, Deckert J, Hauer F, Wolf E, Uchtenhagen H, Urlaub H, Herzog F, Peters JM, Poerschke D, Lührmann R, Stark H (2008) GraFix: sample preparation for single-particle electron cryomicroscopy. Nat Methods 5(1): 53-5

Sander B, Golas MM, Makarov EM, Brahms H, Kastner B, Lührmann 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

Address

Department of General Microbiology
University of Göttingen
Grisebachstr. 8

37077 Göttingen
Germany

phone: +49-551-39 3781
fax: +49-551-39 3808
e-mail: jstuelk@gwdg.de

Further Information

http://www.genmibio.uni-goettingen.de/

Jörg Stülke

Professor of Microbiology

- 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! Specifically, we are analysing protein phosphorylation and mechanisms of transcription regulation in *M. pneumoniae*. We have shown, that protein phosphorylation of is of key importance for pathogenicity of M.pneumoniae. Metabolism in Bacillus subtilis is studied by transcriptomics, 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. 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. Our studies revealed that glycolytic enzymes themselves are part of a protein complex that is required for mRNA processing and degradation. Finally, we are interested in systems biology approaches to the analysis of *B. subtilis* and develop web interfaces for the functional annotation.

Selected Recent Publications

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 7: 4032-4035

Görke B, Stülke J (2008) Carbon catabolite repression in bacteria: many ways to make most out of nutrients. Nature Rev Microbiol 6: 613-624

Commichau FM, Roth FM, Herzberg C, Wagner E, Hellwig D, Lehnik-Habrink M, Hammer E, Völker U, Stülke J (2009) Novel activities of glycolytic enzymes in *Bacillus subtilis*: Interactions with essential proteins involved in mRNA processing. Mol Cell Proteomics 8: 1350-1360

Flórez L A, Roppel S F, Schmeisky A , Lammers CR, Stülke J (2009) A community-curated consensual annotation that is continuously updated: the *Bacillus subtilis* centred wiki *Subti*Wiki. Database, doi: 10.1093/database/bap012

Schmidl SR, Gronau K, Hames C, Busse J, Becher D, Hecker M, Stülke J (2010) The stability of cytadherence proteins in *Mycoplasma pneumoniae* requires activity of the protein kinase PrkC. Infect Immun 78: 184-192

Schmidl S R, Gronau K, Pietack N, Hecker M, Becher D, Stülke J (2010) The phosphoproteome of the minimal bacterium *Mycoplasma pneumoniae*: Analysis of the complete known Ser/Thr kinome suggests the existence of novel kinases. Mol Cell Proteomics 9: 1228-1242

Lehnik-Habrink M, Pförtner H, Rempeters L, Pietack N, Herzberg C, Stülke J (2010) The RNA degradosome in *Bacillus subtilis*: Identification of CshA as the major RNA helicase in the multi-protein complex. Mol Microbiol 77: 958-971

Address

Center of Biochemistry and
Molecular Cell Biology
Dept. Biochemistry II
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 5958
fax: +49-551-39 5979
e-mail: mthumm@uni-goettingen.de

Michael Thumm

Professor of Biochemistry and 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 pathway, which delivers cytosolic material for degradation to the lysosome (vacuole). It is highly conserved in all eukaryotes 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. Due to the use of two limiting membranes the biogenesis of autophagosomes is a very unique process. Molecular dissection of this process is one of our main areas of research.

Selected Recent Publications

Krick R, Bremer S, Welter E, Schlotterhose P, Muehe Y, Eskelinen EL, Thumm M (2010) Cdc48/p97 and Shp1/p47 regulate autophagosome biogenesis in concert with ubiquitin-like Atg8. J Cell Biol 190(6): 965-973

Farré JC, Krick R, Subramani S, Thumm M (2009) Turnover of organelles by autophagy in yeast. Curr Opinion Cell Biol 21: 522-530

Krick R, Muehe Y, Prick T, Bremer S, Schlotterhose P, Eskelinen EL, Millen J, Goldfarb DS, Thumm M (2008) Piecemeal microautophagy of the nucleus requires the core macroautophagy genes. Mol Biol Cell 19: 4492-4505

Krick R, Henke S, Tolstrup J, Thumm M (2008) Dissecting the localization and function of Atg18, Atg21 and Ygr223c. Autophagy 4(7): 896-905

Santt O, Pfirrmann T, Braun B, Juretschke J, Kimmig P, Scheel H, Hofmann K, Thumm M, Wolf DH (2008) The yeast GID complex, a novel ubiquitin ligase (E3) involved in the regulation of carbohydrate metabolism. Mol Biol Cell 19(8): 3323-33

Address

Dept. of Bioanalytics
Albrecht von Haller Institute
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 14430
fax: +49-551-39 5749
e-mail: ktittma@gwdg.de

Further Information

http://www.bioanalytik.uni-goettingen.de/

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

Address

Bioanalytical Mass Spectrometry Group
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1060
fax: +49-551-201 1197
e-mail: henning.urlaub@mpi-bpc.mpg.de

Further Information

http://www.mpibpc.gwdg.de/english/ags/urlaub/index.html

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, Freie 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

Address

Department of
Primate Genetics
German Primate Center
Kellnerweg 4

37077 Göttingen
Germany

phone: +49-551-3851 161
fax: +49-551-3851 228
e-mail: lwalter@gwdg.de

Further Information

http://dpz.eu/index.php?id=86

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

Natural killer (NK) cells belong to the lymphocyte lineage and represent an essential part of the innate immune system. Upon interaction with target cells and stimulation via various receptors, NK cells can either kill other cells or secrete substantial amounts of cytokines. Signals from activating and inhibitory NK cell receptors are integrated and regulate the activity of NK cells. Typical targets for NK cell killing are virus-infected or malignant cells, which both frequently reveal changed patterns of ligand expression on their cell surface. Such changes are recognised by NK cells, leading to killing of virally infected or transformed cells. NK cells can also be activated by different stimuli during interaction with dendritic cells, leading to release of pro-inflammatory cytokines and anti-viral substances. Due to these properties, NK cells play also important roles in autoimmune diseases, transplantation, and reproduction.

Our interests lie in biology and genetics of natural killer (NK) cells. In particular, we are interested in NK cell receptors and their interaction with MHC class I ligands and the regulation of NK cell activation. Furthermore, we analyse the role of micro-RNA molecules in the regulation of NK cell activity (see also below).

A further research area includes small non-coding RNA genes and molecules (micro-RNA, siRNA, snoRNA) and their role and contribution in various virus infection models including human immunodeficiency virus (HIV) and Epstein-Barr virus (EBV).

Selected Recent Publications

Averdam A, Petersen B, Rosner C, Neff J, Roos C, Eberle M, Aujard F, Münch C, Schempp W, Carrington M, Shiina T, Inoko H, Knaust F, Coggill P, Sehra H, Beck S, Abi-Rached L, Reinhardt R, Walter L (2009) A novel system of polymorphic and diverse NK cell receptors in primates. PLoS Genetics Oct;5(10): e1000688 (open access)

Elsner E, Flügge PF, Lozano J, Muppala V, Eiz-Vesper B, Demiroglu SY, Malzahn D, Herrmann T, Brunner E, Bickeböller H, Multhoff G, Walter L, Dressel R (2009) The endogenous danger signals HSP70 and MICA cooperate in the activation of cytotoxic effector functions of NK cells. J Cell Mol Med, in press

Herr A, Dressel R, Walter L (2009) Different subcellular localisation of TRIM22 suggests species-specific function. Immunogenetics 61: 271-280

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

Address

Department of
Cellular and Molecular
Immunology
University of Göttingen
Humboldtallee 34

37073 Göttingen
Germany

phone: +49-551-39 5812
fax: +49-551-39 5843
e-mail: jwienan@uni-goettingen.de

Further Information

http://www.immunologie.uni-goettingen.de

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

Engels N, König L, Heemann C, Lutz J, Tsubata T, Griep S, Schrader V, Wienands J (2009) Recruitment of the cytoplasmic adapter Grb2 to surface IgG and IgE provides antigen receptor-intrinsic costimulation to class-switched B cells. Nature Immunol 10: 1018-1025

Oellerich T, Grønborg M, Neumann K, Hsiao HH, Urlaub H, Wienands J (2009) SLP-65 phosphorylation dynamics reveals a functional basis for signal integration by receptor-proximal adaptor proteins. Mol Cell Proteom 8: 1738-1750

Stork B, Neumann K, Goldbeck I, Alers S, Kähne T, Naumann M, Engelke M, Wienands J (2007) Subcellular localization of Grb2 by the adaptor protein Dok-3 restricts the intensity of Ca^{2+} signaling in B cells. EMBO J 26: 1140-1149

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, Kirkunova M, Glyvuk N, Tsytsyura Y, Hilfiker-Kleiner D, Bartsch JW, Klingauf J, Wienands J (2006) SH3P7/mAbp1 deficiency leads to tissue and behavioural abnormalities and impaired vesicle transport. EMBO J 25: 1611-1622

for review see:

Engelke M, Engels N, Dittmann K, Stork B, Wienands J (2007) Ca^{2+} signaling in antigen receptor-activated B lymphocytes. Immunol Rev 218: 235-246

Address

Dept. of Developmental Biology
Institute of Zoology, Anthropology and Developmental Biology
GZMB, Ernst-Caspari-Haus
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 22889
fax: +49-551-39 5416
e-mail: ewimmer@gwdg.de

Further Information

http://www.uni-goettingen.de/en/sh/49202.html

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. For insects, only in Drosophila the early developmental events are known in molecular detail. However, arthropods 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. By genomics approaches, transgenesis, and reverse genetics based on RNA interference, we analyze genetic interactions within the regulatory network of early embryogenesis in diverse arthropod 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 on developmental processes to insect pest management. 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

Schaeper ND, Prpic NM, Wimmer EA (2010) Evolutionary plasticity of *collier* function in head development of diverse arthropods Dev Biol 344: 363-76

Schetelig MF, Caceres C, Zacharopoulou A, Franz G, Wimmer EA (2009) Conditional embryonic lethality to improve the sterile insect technique in *Ceratitis capitata* (Wiedemann; Diptera: Tephritidae). BMC Biology 7: 4

Schetelig MF, Scolari F, Kittelmann S, Malacrida AR, Gasperi G, Wimmer, EA (2009) Site-specific integration to modify successfully tested transgenic *Ceratitis capitata* (Diptera: Tephritidae) lines. Proc Natl Acad Sci USA 106: 18171-6

Trauner J, Schinko J, Lorenzen MD, Shippy TD, Wimmer EA*, Beeman RW, Klingler M, Bucher G, Brown SJ (2009) Large-scale insertional mutagenesis of the coleopteran stored grain pest, the red flour beetle *Tribolium castaneum*, identifies embryonic lethal mutations and enhancer traps. BMC Biology 7: 73 (* corresponding author)

The *Tribolium* Genome Consortium (2008). The genome of the model beetle and pest *Tribolium castaneum*. Nature 452: 949-955

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

Krahn MP, Bückers J, Kastrup L, Wodarz A (2010) Formation of a Bazooka-Stardust complex is essential for plasma membrane polarity in epithelia. J Cell Biol 190: 751-760

Krahn MP, Klopfenstein D, Fischer N, Wodarz A (2010) Membrane targeting of Bazooka/PAR-3 is mediated by direct binding to phosphoinositide lipids. Curr Biol 20: 636-642

Koch CM, Honemann-Capito M, Egger-Adam D, Wodarz A (2009) Windei, the *Drosophila* homolog of mAM/MCAF1, is an essential cofactor of the H3K9 methyl transferase dSETDB1/Eggless in germ line development. PLoS Genetics 5: e1000644

Kim S, Gailite I, Moussian B, Luschnig S, Goette M, Fricke K, Honemann-Capito M, Grubmüller H, Wodarz A (2009) Kinase activity independent functions of atypical protein kinase C in *Drosophila*. J Cell Sci 122: 3759-3771

Krahn MP, Egger-Adam D, Wodarz A (2009) PP2A antagonizes phosphorylation of Bazooka by PAR-1 to control apical-basal polarity in dividing embryonic neuroblasts. Dev Cell 16: 901-908

Zhang G, Breuer M, Förster A, Egger-Adam D, Wodarz A (2009) Mars, a *Drosophila* protein related to vertebrate HURP, is required for the attachment of centrosomes to the mitotic spindle during syncytial nuclear divisions. J Cell Sci 122: 535-545

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Address

Department of
Stem Cell Biology
University of Göttingen
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone: +49-551-39 13711
fax: +49-551-39 13713
e-mail: awodarz@gwdg.de

Further Information

http://www.stammzellen.med.uni-goettingen.de/index.html

Graduate Program Committee

Faculty

Prof. Dr. Ivo Feußner (Chair)
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Program Coordination

Molecular Biology Program

Dr. Steffen Burkhardt
(Program Coordinator)

Kerstin Grüniger
(Program Assistant)

Georg-August-Universität
Göttingen
Coordination Office
Molecular Biology
Justus-von-Liebig-Weg 11

37077 Göttingen
Germany

phone:
+49 – 551 – 39 12110 / 12111
fax:
+49 – 551 – 39 3811
e-mail:
gpmolbio@gwdg.de

Further Information

http://www.gpmolbio.uni-goettingen.de

Neuroscience Program

Prof. Dr. Michael Hörner
(Program Coordinator)

Sandra Drube
(Program Assistant)

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