Yearbook 2003/04

MSc/PhD Molecular Biology Program
at the University of Göttingen

International Max Planck Research School

Imprint

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In 2000, the Georg August University of Göttingen, together with the Max Planck Society for the Advancement of Science established two international MSc/ PhD programs, namely *Molecular Biology* and *Neurosciences*.

Both programs met with immediate success: Some 500 students from more than 70 countries applied for the 40 study places available.

These intensive research-oriented programs are taught by internationally renowned scientists from five Göttingen University faculties, from the Max Planck Institutes for Biophysical Chemistry and for Experimental Medicine as well as from the German Primate Centre. International guest lecturers also participate in the programs. The Max Planck Society contributes through its newly established International Max Planck Research Schools.

Both programs keep close contacts with the relevant industries in order to also meet market requirements, thus enhancing the chances for successful graduates to find attractive professional careers.

I would very much like to thank all scientific bodies and institutions for their keen support in establishing our new international programs and, last but not least, the German Academic Exchange Service (DAAD) as well as the Lower Saxony Ministry of Science and Culture.

The Georg August University of Göttingen is proud of its long international experience and very much looks forward to offering two attractive and innovative programs within the setting of a lively urban cultural and social background, a prerequisite for creative teaching and research.

Prof. Dr. Horst Kern
(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 1998 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 intense 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 i n t e r nationally 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 German language.

By now, 29 International Max Planck Research Schools have been established involving 34 Max Planck Institutes and 26 German universities. More than 950 (mostly PhD-) students from 70 countries are presently enrolled.

The success of the Göttingen International Max Planck Research Schools in Molecular Biology and Neurosciences is evident from the high quality of the students and from the hundreds of applications the programs receive each year. The Schools also re-shaped the local scientific community, strengthened the ties between the participating institutions, and initiated new scientific collaborations that augment the international reputation of Göttingen as a center for scientific excellence. 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 of their lives.

Peter Gruss
President
Max Planck Society
for the Advancement
of Science

Reinhard Jahn
Coordinator, IMPRS
Göttingen
Director, MPI for Biophysical
Chemistry

Overview

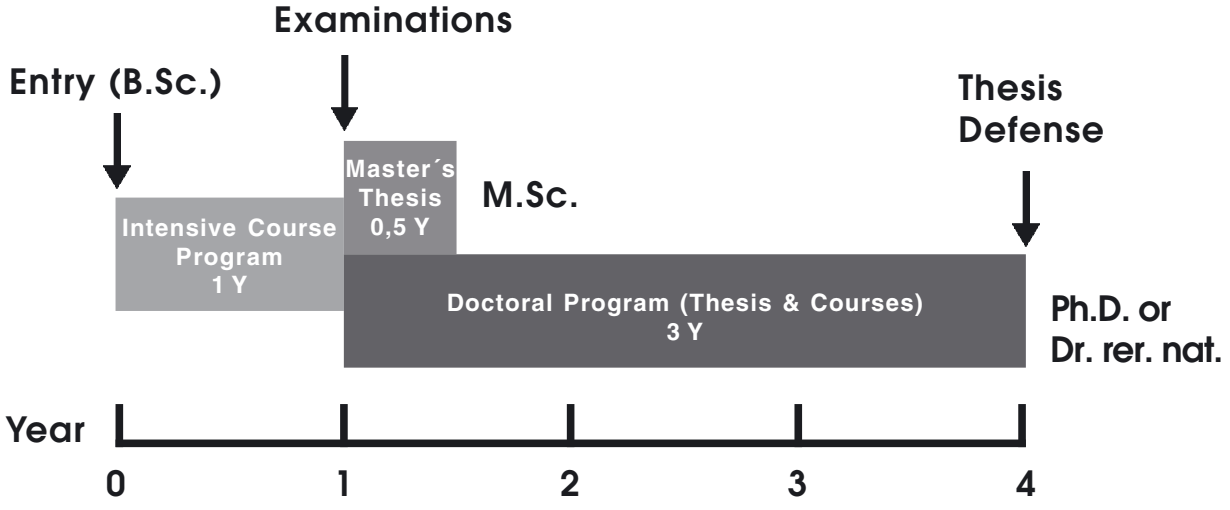
This yearbook is intended to inform about the International MSc/PhD Molecular Biology Program in Göttingen, Germany, that was established in the year 2000. Beyond general information, the yearbook introduces students, faculty, the program committee and the coordination team.

The program is conducted jointly 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 and the Max Planck Institute for Experimental Medicine. Beyond their active participation in the Molecular Biology Program and the research activities of the GZMB, the above-mentioned partners closely cooperate in four collaborative research centers (Sonderforschungsbereiche, SFB), six interdisciplinary doctoral programs (Graduiertenkollegs, GK) and in the recently established DFG Research Center for Molecular Physiology of the Brain (CMPB).

The intensive, research-oriented education 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, holding a Bachelor's degree (or equivalent) in the biosciences, chemistry, medicine, or related fields. All courses are held in English. Tuition fees are waived, scholarships are available. The academic year starts in mid-October, preceded by four weeks of orientation. Applications are welcome until January 31 of the year of enrollment. To assure individual training on a high standard, the number of participants is limited to 20 students per year.

All students first 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 abandoned. The condensed schedule allows students to accumulate 90 credits (ECTS) within one year, which would normally require 3 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. 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 following institutions and funding initiatives contributed to the success of the Molecular Biology Program:

DAAD

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

International Degree Programs - Auslandsorientierte Studiengänge (AS)

IPP made in Germany

International Postgraduate Programs – Internationale Promotionsprogramme (IPP)

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

International Max Planck Research Schools

Niedersächsisches Ministerium für Wissenschaft und Kultur

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

Innovationsoffensive

Doctoral Programs - Promotionsprogramme

Stifterverband für die Deutsche Wissenschaft

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

Sponsors

The following companies contributed stipends:

Bayer AG, Leverkusen, Germany
http://www.bayer.com/en/index.php

Carl Zeiss Lichtmikroskopie, Göttingen, Germany
http://www.zeiss.de

Degussa AG, Düsseldorf, Germany
http://www.degussa.com

DeveloGen AG, Göttingen, Germany
http://www.develogen.com

Hellma GmbH & Co. KG, Müllheim / Baden, Germany
http://www.hellma-worldwide.com

KWS Saat AG, Einbeck, Germany
http://www.kws.com

Leica Microsystems GmbH, Bensheim, Germany
http://www.leica-microsystems.com

Luigs & Neumann, Ratingen, Germany
http://www.luigs-neumann.com

Roche Diagnostics GmbH, Penzberg, Germany
http://www.roche.de

Sartorius AG, Göttingen, Germany
http://www.sartorius.com

Solvay Pharmaceuticals, Hannover, Germany
http://www.solvay.com

Springer Verlag, Heidelberg, Germany
http://www.springer.de

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 organized into a sequence of 8-12 week units. The following topics are taught on an advanced level throughout the first year (36 weeks, 4 hours per week):

A. Biochemistry and Structural Biology

- The Prokaryotic and Eukaryotic Cell
- Thermodynamics, Kinetics
- Enzyme Catalysis, Regulation
- Protein Structure, Crystallography, NMR, Structure Validation
- Energy Metabolism
- Photosynthesis and Lipid Metabolism

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

- Membranes: Biophysics, Structure and Transport
- Protein Sorting, Vesicular Transport, Organelle Biogenesis
- Cytoskeleton
- Cell Adhesion
- Cell Cycle, Cancer, Apoptosis
- Infectious Diseases, Principles of Pathogenicity

D. Model Systems of Molecular Biology/Biotechnology

- Bacteria and *Archaea*
- Biotechnology
- Fungi
- *Arabidopsis*
- *Drosophila*
- *Xenopus*, Zebrafish
- Chicken, Mouse
- Human Genetics
- Immunology
- Nervous System

Each lecture is accompanied by a tutorial session, where students meet with a tutor 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 / whole mount *in situ* hybridisation / detection of reporter activity

Laboratory Rotations

Starting in January, every student conducts three independent research projects (laboratory rotations) in the participating departments. Each project is individually supervised. It involves 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
- cell biology
- developmental biology
- developmental physiology
- genetics
- microbiology
- molecular pharmacology
- neurobiology
- structural 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 of the students. Doctoral students select three faculty members as their doctoral committee which closely monitors progress and advises students in their research project. Laboratory work is accompanied by seminars, training of scientific writing and oral presentation skills, elective courses, and participation in international conferences or workshops.

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.

Orientation, Language Courses, Social Activities

A four-week orientation prior to the program provides assistance and advice for managing day-to-day life, including arrangements for bank account, health insurance, residence permit, housing, and enrollment. 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.

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

Application, Selection and Admission 2003

Applicants must hold a Bachelor's degree or equivalent in biology, biochemistry, chemistry, medicine, agriculture, or related fields. They are required to document their proficiency in English and should not be older than 27 years.

In the year 2003, the coordination office received 496 applications from 66 countries.

Continent	Applications	Admissions
Europe (total)	**87**	**16**
Germany	16	3
other West Europe	10	1
East Europe	61	12
America (total)	**27**	**0**
North America	4	0
Central/South America	23	0
Africa(total)	**72**	**0**
North Africa	13	0
Central/South Africa	59	0
Asia (total)	**309**	**4**
Near East	14	1
Central Asia/ Far East	295	3

Students 2003/2004

Name		Home Country
Anna	Botvinnik	Ukraine
Andrea	Burgalossi	Italy
Bhavna	Chanana	India
Mikalai	Dziubianau	Belarus
Nambirajan	Govindarajan	India
Dawid	Grzela	Poland
Regina	Hecker	Germany
Nadine	Herold	Germany
Caghan	Kizil	Turkey
Lukasz	Kozaczkiewicz	Poland
Alena	Liavonchanka	Belarus
Sandra	Muschiol	Germany
Foteini	Orfaniotou	Greece
H. Günes	Özhan	Turkey
Nirmala	Padmanabhan	India
Naisana	Seyed Asli	Iran
Ekaterina	Torbashevich	Belarus
Toma	Yakulov	Bulgaria
Zafeiris	Zafeirous	Greece
Beata	Zygmunt	Poland

Anna Botvinnik

First Name:
Anna

Last Name:
Botvinnik

Date of birth:
26 October 1979

Country:
Ukraine

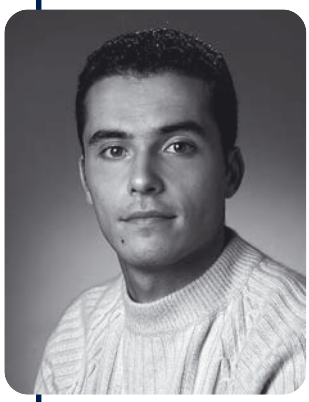
EDUCATION

College / University:
1998 - 2003 M.V. Lomonosov Moscow State University
Highest Degree:
M.Sc., June 2003
Major Subjects:
Molecular biology, bioorganic chemistry
Lab Experience:
Comparative bacterial genomics. Subtractive hybridisation, DNA isolation, PCR, gel electrophoresis, Southern blotting
Projects / Research:
2001 - 2003 Genome wide comparison of different clinical isolates of *Mycobacterium tuberculosis* in purpose of studying its genetic flexibility and possible virulence mechanisms searching for new diagnostic sequences. The Laboratory of structure and function of Human Genes, Institute of Bioorganic Chemistry, Russian Academy of Science, Moscow. Supervisor: Dr. Tatyana Azhikina
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I hope to extend my knowledge in the most relevant topics of molecular biology and to find here a new intriguing area of work for my PhD project.

Andrea Burgalossi



First Name:
Andrea

Last Name:
Burgalossi

Date of birth:
17 May 1978

Country:
Italy

EDUCATION

College / University:
1997 - 2003 University of Perugia, Italy
Highest Degree:
Laurea (Biomolecular sciences)
Major Subjects:
Biochemistry, genetics and molecular biology
Lab Experience:
Major techniques in biochemistry and molecular biology
Projects / Research:
Thesis Project: "Expression and purification of murine lysosomal alpha-D-mannosidase"
Scholarships:
1998 - 2000 ADISU scholarship
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

My main interests are related to the fields of biochemistry, genetics and molecular biology. I am fascinated by processes that take place at the molecular level. Through this MSc/PhD program I wish to get the best education possible, in order to transfer the acquired knowledge into action and to develop a multidisciplinary approach to research.

Bhavna Chanana

First Name:
Bhavna

Last Name:
Chanana

Date of birth:
14 August 1980

Country:
India

EDUCATION

College / University:
1998 - 2001 Ram Lal Anand College, University of Delhi
2001 - 2003 Dr. B. R. Ambedkar Centre for Biomedical Research, University of Delhi
Highest Degree:
M.Sc.
Major Subjects:
Microbiology, Biomedical Sciences
Lab Experience:
Basic techniques in microbiology, molecular biology, biochemistry, protein expression and purification.
Projects / Research:
05/2002 - 07/2002 Expression and purification of MptpA (H_{37}Rv2234) of *Mycobacterium tuberculosis* at the Department for Allergy and Infectious Diseases, Institute of Genomics and Integrative Biology, New Delhi
01/2003 - 07/2003: Study on the kinases and a phosphatase of *Mycobacterium tuberculosis* H_{37}Rv
Scholarships:
2001 - 2003 Fellowship awarded by the Council of Scientific and Industrial Research, Govt. of India
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I want to better understand the process of differential gene expression-how two clonogenic cells adopt different cell fates under identical conditions? I believe, yeast being a unicellular eukaryote is an ideal model system for undertaking this study to establish the fundamental molecular events involved. These can then be extrapolated to higher organisms for understanding the more intricate developmental process.

Mikalai Dziubianau

First Name:
Mikalai

Last Name:
Dziubianau

Date of birth:
05 August 1978

Country:
Belarus

EDUCATION

College / University:
1996 - 2002 Belarusian State Medical University
2002 - 2003 Ghent University, Belgium
Highest Degree:
Medical Doctor (honors)
Major Subjects:
Basic sciences and clinical disciplines
Lab Experience:
Basic techniques for RNA extraction and RT-PCR
Projects / Research:
1999 "The influence of polylayered phospholipids vesicles on rat thymocytes aggregation influenced by concanavalin-A". Awarded on The Scientific Conference of Medical Students, Minsk, Belarus
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I am keenly interested in further research on the immune control mechanisms. Understanding these will allow medicine to find a cure for many diseases. Of great interest for me are also tissue engineering and gene therapy, the disciplines which seem to be the future of modern medicine. In the following year I plan to deepen my knowledge in biomedical sciences and find the topic for my PhD project.

Nambirajan Govindarajan

EDUCATION

College / University:
All India Institute of Medical Sciences
Highest Degree:
B.Sc. (first class with honours)
Major Subjects:
Biochemistry
Lab Experience:
Knowledge and hands-on experience in DNA extraction, PCR, ELISA, serological typing and study of enzyme kinetics
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I'm irresistibly intrigued by the phrase "nature versus nurture" and I would like to specialize in studying gene expression and manipulation. Specifically, I would like to investigate at the genetic and molecular level the mechanisms underlying the observed changes in the cell cycle which convert a normal cell into a cancerous one. If by switching "on" or "off" certain genes we could significantly alter the characteristic properties of cancer cells like malignancy and metastasis. I feel our crusade against this ruthless killer will be strengthened formidably.

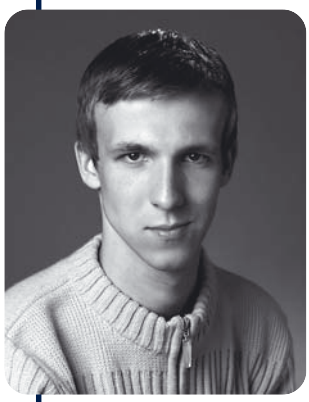
First Name:
Nambirajan

Last Name:
Govindarajan

Date of birth:
24 May 1982

Country:
India

Dawid Grzela



EDUCATION

College / University:
1998 - 2003: Jagiellonian University, Krakow, Poland
Highest Degree:
M.Sc. (Biotechnology)
Major Subjects:
Biochemistry, molecular biology
Lab Experience:
Various biochemical and molecular biology techniques, cell culture, nucleic acids and protein methods, protein expression and purification, monoclonal antibody obtaining, luminescence measurements.
Projects / Research:
2002-2003 Master's degree project: "Influence of tumor cells on functional activity of human peritoneal phagocytes"
Scholarships:
2003 - 2004 Stipend International Max Planck Research School
Publications:
"Influence of tumor cells on functional activity of human peritoneal phagocytes." 12th International Symposium of the Polish Network of Molecular and Cellular Biology, UNESCO / Polish Academy of Sciences, 150-154, Krakow, June 2003

SCIENTIFIC INTERESTS AND GOALS:

My area of scientific interests lies in molecular branches of biology and medicine. I would like to get the best education possible to be prepared to work in the research fields.

First Name:
Dawid Pawel

Last Name:
Grzela

Date of birth:
28 August 1979

Country:
Poland

Regina Hecker

First Name:
Regina

Last Name:
Hecker

Date of birth:
12 February 1980

Country:
Germany

EDUCATION

College / University:
1999 - 2003 University of Applied Sciences Emden (FH), Germany

Highest Degree:
Dipl. Ing. Biotechnology (FH)

Major Subjects:
Biotechnology, molecular genetics, biochemistry

Projects / Research:
5/2003 - 10/2003 "Investigation of a new scaffold protein in the c-Jun N-terminal kinase signaling pathway", Cold Spring Harbor Laboratory (Ph.D. N. Tonks), Cold Spring Harbor/NY, USA
7/2002 "Characterisation of the stable maintenance of chromosomes proteins SMC1 and SMC3", Dept. of Molecular Genetics, Max Planck Institute for Biophysical Chemistry (Dr. M. Konrad), Göttingen, Germany
9/2001 - 2/2002 "Overexpression, purification and characterisation of active site mutants of aminoacylase 1" Health Sector, National Research Council of Canada (Dr. R. Ménard), Montreal, Canada
2/2001 "Product formation with multi-componant reactions (MCRs) using acid anhydrides as the starting material" Morphochem AG (Dr. A. Dömling), München, Germany

Scholarships:
9/2001 - 2/2002 DAAD scholarship for internship in Canada
2003 - 2004 Stipend International Max Planck Research School

Publications:
Lindner HA, Lunin VV, Alary A, Hecker R, Cygler M, Ménard R (2003) Essential roles of zinc ligation and enzyme dimerization for catalysis in the aminoacylase-1/M20 family. J Biol Chem 10: 1074

SCIENTIFIC INTERESTS AND GOALS:

One of my interests focuses on mechanisms involving signal transduction. My goal is to obtain a deeper understanding in the molecular basis of these processes which might help to develop new therapeutic approaches for diseases associated with dysfunctional signaling as in cancer development of cardiovascular inflammation and neurodegenerative diseases.

Nadine Herold

First Name:
Nadine

Last Name:
Herold

Date of birth:
14 April 1981

Country:
Germany

EDUCATION

College / University:
2000 - 2003 University of Abertay-Dundee

Highest Degree:
B.Sc.

Major Subjects:
Medical Biotechnology

Lab Experience:
Various techniques in molecular biology, biochemistry, immunology and microbiology

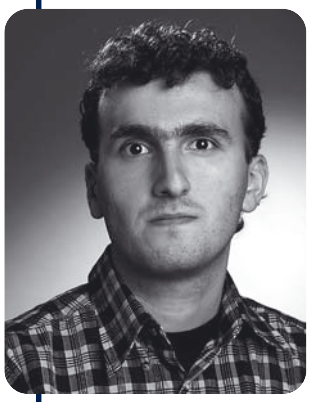
Projects / Research:
06/2002 - 09/2002 Studentship Aventis Pharma Dtl.

Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

Science has fascinated me for a long time. I am interested in medical research since immunology and developmental biology are particularly challenging fields of research. I think this program will enable me to improve my knowledge and practical skills while at the same time giving me the chance to meet and work with people of different cultural and scientific background.

Caghan Kizil



First Name:
Caghan

Last Name:
Kizil

Date of birth:
14 October 1981

Country:
Turkey

EDUCATION

College / University:
1999 - 2003 Middle East Technical University, Turkey

Highest Degree:
B.Sc. (Molecular biology and genetics)

Major Subjects:
Molecular biology and genetics

Lab Experience:
Major techniques in molecular biology, genetic engineering and biochemistry; FT-IR Spectroscopy

Projects / Research:
2002 Screening for Factor V-Leiden, Prothrombin and MTHFR mutations in patients bearing post-delivery complications
2002 Detection of the levels of a specific polymorphism in IgG genes and k-ras in the Turkish population
2003 Determination of the effects of Melatonin on rat liver tissues as a direct free-radical scavenger and an indirect antioxidant. FTIR Spectroscopic analyses of microsomal fractions, and investigation of induction in three antioxidant system enyzmes

Scholarships:
2003 - 2004 Stipend International Max Planck Research School

Publications:
Kizil C, Özhan HG, Görgülü G, Sadi G, Severcan F, Güray T (submittend) Effects of melatonin on rat liver tissues: Determination of antioxidant system induction and FT-IR Spectroscopic analyses of rat liver bulky microsomal fractions.

SCIENTIFIC INTERESTS AND GOALS:

I am interested in cancer genetics; particularly in protein-protein interactions; molecular cell biology approaches to tumorigenesis, and epigenetics of tumor-specific genes that cause malignant transformation, as well as functional genomics in cancer research. I wish to proceed further in scientific academy and foster my intellectual challenges.

Lukasz Kozaczkiewicz

First Name:
Lukasz

Last Name:
Kozaczkiewicz

Date of birth:
20 August 1981

Country:
Poland

EDUCATION

College / University:
2000 - 2003 Jagiellonian University, Cracow, Poland

Major Subjects:
Molecular biology, biotechnology

Lab Experience:
Basic techniques in molecular biology : PCR, Northern Blot, Western Blot, FACS, protein purification, monoclonal antibody production, cell cultures

Projects / Research:
2003 - Determination of intracellular localization of TACE (TNF-α Converting Enzyme) and its maturation

Scholarships:
1998 - 2000 Scholarship of Polish prime minister
2002 - 2003 Scholarship of Jagiellonian University
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I am basically interested in molecular biology. I consider it a way to explore secrets of life. So far I have focused mainly on immunology, particularly host-pathogen interactions. I am also keen on protein structure determination methods and bioinformatics.

Alena Liavonchanka

First Name:
Alena

Last Name:
Liavonchanka

Date of birth:
18 March 1979

Country:
Belarus

EDUCATION

College / University:
1996 - 2001 Belarusian State University, Belarus
2002 - 2003 University of Liege, Belgium
Highest Degree:
M.Sc. (first class honours)
Major subjects:
Biochemistry, pharmaceutical chemistry and analysis
Lab experience:
Basic techniques in biochemistry (protein purification, enzyme kinetics, electrophoresis, spectrophotometry, chromatography), drug development and quality control, clinical toxicology
Projects / Research:
2000 - 2001 M.Sc. degree project "Analysis of hydrophobic fused proteins of P450 family"
2002 - 2003 Study and research work in the area of drug analysis at Pharmacy department, University of Liege
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I'm interested in molecular details of major biomolecules structure and action, as well as in applied methods of biochemical analysis. I think this knowledge is very important for new drugs development which is also interesting for me. I believe that molecular biology will be transformed into precise science like chemistry or physics due to IT-progress and hope to take part in this process.

Sandra Muschiol

First Name:
Sandra

Last Name:
Muschiol

Date of birth:
23 October 1979

Country:
Germany

EDUCATION

College / University:
1999 - 2003 University of Applied Sciences, Berlin, Germany
Highest Degree:
B.Sc. (hons)
Major Subjects:
Biotechnology
Lab Experience:
Gene Analysis Service GmbH, Berlin, Germany
Max Planck Institute for Molecular Genetics, Berlin, Germany
Jerini Bio Tools AG, Berlin, Germany
Projects / Research:
10/2001 - 3/2002 "Exploring enzyme catalyzed racemization of non natural substrates" Department of Biotechnology, Royal Institute of Technology, Stockholm, Sweden
2/2003 - 8/2003 "Pyrosequencing-based typing of HLA-A", Gene Mapping Center, Max-Delbrück Center for Molecular Medicine, Berlin, Germany
Scholarships:
10/2001 - 3/2002 Leonardo da Vinci Stipend
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

Molecular biology is probably one of the most promising core subjects in modern biology. Intensive research in this area will finally lead to major breakthroughs in the treatment of numerous human diseases, which will make a real difference to patients, practitioners and the society in general. I am convinced that this programme will offer me a whole range of diverse opportunities for individual and professional development, which will be of highest importance for a future scientific career.

Foteini Orfaniotou

First Name:
Foteini

Last Name:
Orfaniotou

Date of birth:
29 July 1978

Country:
Greece

EDUCATION

College / University:
National and Kapodistrian University of Athens

Highest Degree:
Diploma

Major Subjects:
Biology

Lab Experience:
Molecular biology techniques, protein purification methods, Cyclic dichroism spectra analysis, immunoassays

Projects / Research:
2001 - 2003 "Cloning, over-expression, purification and biophysical analysis of the DNA binding protein HU from the Archaebacterium *Thermoplasma volcanium*", Prof. Dr. Constantin Vorgias, Dept. of Molecular Biology and Biochemistry, Faculty of Biology, University of Athens, Athens, Greece.
2002 Cloning and overexpression of a bacterial nitrilase gene. Prof. Dr. Andranikian, Dept of Microbiology and Biotechnology, Technical University Hamburg Harburg, Hamburg, Germany.
2003 "Translational intensity of five genes commonly implicated in end-stage renal failure, diabetes and Alzheimer's disease in patient lymphocytes", Dr. Cornelia Poulopoulou, Neurology Dept., University of Athens Medical School, Athens, Greece

Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I'm interested in understanding the nature of sub-cellular mechanisms, their interactions and extent of their interdependence.

H. Günes Özhan

First Name:
H. Günes

Last Name:
Özhan

Date of birth:
03 December 1980

Country:
Turkey

EDUCATION

College / University:
1999 - 2003 Middle East Technical University, Turkey

Highest Degree:
B.Sc. in Molecular biology and genetics

Major Subjects:
Molecular biology and genetics

Lab Experience:
Basic techniques in cell and molecular biology, molecular genetics, biochemistry and genetic engineering

Projects / Research:
2002 Screening for MTHFR, Factor V-Leiden and Prothrombin mutations in women with post-pregnancy complications and new-born babies
2002 Investigation of K-ras mutations in patients of colorectal cancer
2003 Biochemical and biophysical determination of direct and indirect effects of melatonin on rat liver tissues. Detection of potential free-radical scavenging and antioxidant effects of melatonin by Fourier-Transform Infrared Spectroscopy and enzyme assays of microsomes and cytosol

Scholarships:
2003 - 2004 Stipend International Max Planck Research School

Publications:
Kizil C, Özhan HG, Görgülü G, Sadi G, Severcan F, Güray T (submittend) Effects of melatonin on rat liver tissues: Determination of antioxidant system induction and FT-IR Spectroscopic analyses of rat liver bulky microsomal fractions.

SCIENTIFIC INTERESTS AND GOALS:

I am particularly interested in the molecular genetics of carcinogenesis, epigenetic interactions within and between tumor-supressor genes and oncogenes and certain signal transduction pathways whose deterioration lead to malignancy. I am also eager to study on drug response, drug-cell and drug-drug interactions.

Nirmala Padmanabhan

First Name:
Nirmala

Last Name:
Padmanabhan

Date of birth:
26 February 1980

Country:
India

EDUCATION

College / University:
University of Hyderabad, Hyderabad
Highest Degree:
M.Sc.
Major Subjects:
Biotechnology
Lab Experience:
Techniques in molecular biology, biochemistry, immunology, plant tissue culture and animal cell culture
Projects / Research:
"Purification and immunological characterisation of the enzyme α-Fucosidase from the invertebrate Unio". (Master's thesis 2002 - 2003)
Scholarships:
2001 - 2003 Scholarship from the Department of Biotechnology, Govt. of India during my two year M.Sc. programme
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I have always been interested in the molecular biology of intracellular protein sorting and transport. My other interest includes research on tumour angiogenesis. I would like to pursue research of academic as well as medical value leading to a better understanding of cellular processes.

Naisana Seyed Asli

First Name:
Naisana

Last Name:
Seyed Asli

Date of birth:
03 February 1979

Country:
Iran

EDUCATION

College / University:
1996 - 2000 (BSc) Faculty of Sciences, Tehran University, Iran
2000 - 2003 (MSc) Faculty of Sciences, Razi University of Kermanshah, Iran
Highest Degree:
M.Sc.
Major Subjects:
Biology - botany (B.Sc.), cell & molecular biology (M.Sc.)
Lab Experience:
Agrobacterium-mediated transformation; Agricultural Biotechnology Research Institute of Iran (ABRII)
Cytochemical techniques; Faculty of Sciences, Tehran University
Enzymology, biochemistry, genomics & proteomics; Faculty of Sciences, Razi University of Kermanshah
Projects / Research:
1999 - 2000 Study of the allelopathic effects in *Salvia sp.*
2000 - 2003 Study of chitinolytic activity and partial amplification of chitinase genes in *Trichoderma* isolates
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I am mainly interested in the molecular mechanisms governing the signalling pathways. I prefer to work on plants and have a special interest in alga.

Ekaterina Torbashevich

First Name:
Ekaterina

Last Name:
Torbashevich

Date of birth:
21 January 1981

Country:
Belarus

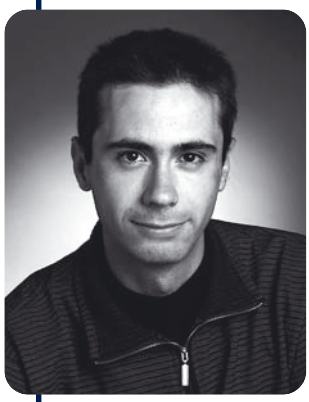
EDUCATION

College / University:
1998 - 2003 International Sakharov Environmental University, Belarus
Highest Degree:
M.Sc.
Major Subjects:
Molecular biology, genetics
Lab Experience:
DNA/protein chemistry, ARMAS-PCR, SSCP, affine chromatography, RIA, IEA
Projects / Research:
2000 - 2001 Belarus State Grant project "Changes of IgG glycosylation level in blood samples of patients with ischemic heart disease"
2001 - 2002 Course work (Bachelor thesis) "Gene p53 structural and functional pecularities and its role in cancerogenesis"
2002 - 2003 Diploma work (M.Sc.) "Use of ARMAS-PCR for revealing gene p53 mutations in samples of patients with breast or bladder cancer"
Scholarships:
2000 - 2001 State Grant for young scientists´ project
2001 - 2002 Republic of Belarus President's Stipend
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

I'll do my best continuing studies in fields of molecular biology and genetics to enrich our knowledge about cancerogenesis, its early diagnostics and treatment.

Toma Yakulov



First Name:
Toma

Last Name:
Yakulov

Date of birth:
10 November 1978

Country:
Bulgaria

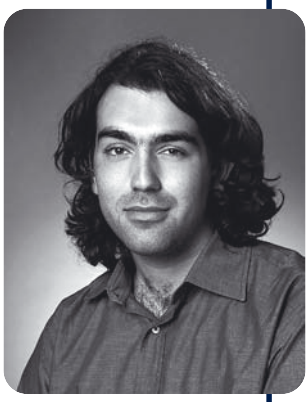
EDUCATION

College / University:
Faculty of Biology, Sofia University "St. Kl. Ohridski", Sofia, Bulgaria
Highest Degree:
M.Sc. (molecular biology), July 2003
Major Subjects:
Biochemistry, molecular biology
Lab Experience:
DNA extraction and purificartion; PCR based methods; SSCP; RFLP; direct sequencing
Projects / Research:
2002 "Met129Val Prion Protein Polymorphism Genotyping in Bulgarian and Roma Population"
2003 "Associative study of polymorphic markers in estrogen receptor (ER) and vitamin D receptor (VDR) genes in patients with colorectal cancer"
Scholarships:
1998 - 2003 Scholarship for academic excellence, Sofia University "St. Kl. Ohridski", Sofia, Bulgaria
2003 - 2004 Stipend International Max Planck Research School
Poster presentation:
Yakulov T, Savov A, Laplanche JL, Kremensky I (2002) Met129Val Prion Protein Polymorphism Genotyping in Bulgarian and Roma Population. 5th Balkan Congress on Human Genetics, Sofia, Bulgaria

SCIENTIFIC INTERESTS AND GOALS:

In his nobel lecture in 1977 Prof. Ilya Prigogine wrote that non-equilibrium may be a source of order. Irreversible processes may lead to a new type of dynamic states of matter which he called "dissipative structures". These structures manifest a coherent, supermolecular character which leads to new, quite spectacular manifestations. Such structures in biology are my special area of interest.

Zafeiris Zafeiriou



First Name:
Zafeiris

Last Name:
Zafeiriou

Date of birth:
29 September 1977

Country:
Greece

EDUCATION

College / University:
1996 - 2003 Aristoteles University of Thessaloniki, Greece
Highest Degree:
M.D.
Major Subjects:
Internal medicine, surgery, psychiatry, basic sciences
Lab Experience:
RNA/DNA extraction, PCR, point mutation detection
Projects / Research:
2003 "Factor V-Leiden and Prothrombin G20210A as risk factors for hepatic venoocclusive disease after stem cell transplantation ", Hematological Clinic, Papanikolau General Hospital, Thessaloniki
Scholarships:
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

Cellular systems and molecular mechanisms except for constituting very interesting areas of study and research may also hide the key for intractable or not sufficiently treatable diseases. I enrolled in this course in anticipation of obtaining the theoretical background and the practical skills that will enable me to participate in research contributing to a better understanding of disease or even to the alleviation of pain and suffering.

Beata Zygmunt

First Name:
Beata

Last Name:
Zygmunt

Date of birth:
18 August 1979

Country:
Poland

EDUCATION

College / University:
1998 - 2003 Warsaw University
Highest Degree:
M.Sc.
Major Subjects:
Molecular biology
Lab Experience:
Major techniques in molecular biology, biochemistry and genetics
Projects / Research:
2001/2003 Research on repair mechanism of DNA damage resulting from deamination of C5methylcytosine in *Neisseria meningitis* serogroup C strain 2120
Scholarships:
1999 - 2000 Scientific Scholarship of the Warsaw University
2003 - 2004 Stipend International Max Planck Research School

SCIENTIFIC INTERESTS AND GOALS:

My interests include molecular biology and genetics. In my studies, I have focused on these two subjects. I haven't decided yet on the subject of my future research, but I am sure that I would like my work to be directly connected with such issues as treatment of genetic and infectious diseases.

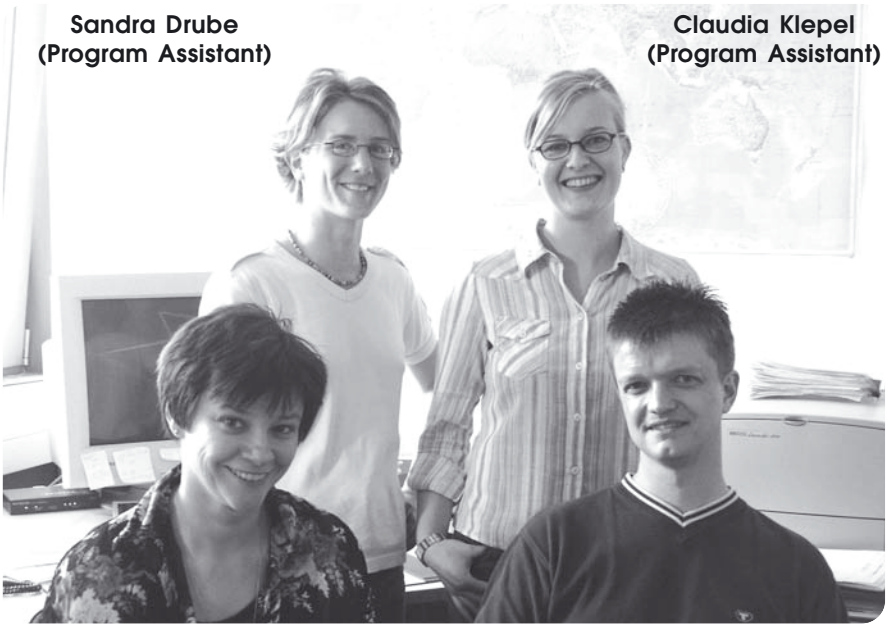
Graduate Program Committee

Prof. Dr. Gerhard Braus
Prof. Dr. Reinhard Jahn
Prof. Dr. Wolfgang Liebl
Prof. Dr. Tomas Pieler
Prof. Dr. Christiane Gatz
Dr. Wilfried Kramer
Ralf Jauch
Roland Graf
Nadine Herold

GZMB Board Members

Prof. Dr. Tomas Pieler
(executive director)
Prof. Dr. Gerhard Braus
Prof. Dr. Ivo Feußner
Prof. Dr. Axel Zeeck
Dr. Christian Knorr
Marco Winkler
Katja Bensmann

Program Coordination



Sandra Drube
(Program Assistant)

Claudia Klepel
(Program Assistant)

Dr. Simone Cardoso de Oliveira
(Program Coordinator)

Dr. Steffen Burkhardt
(Program Coordinator)

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(Senior Faculty, Group Leaders, Lecturers)

Donna J.	Arndt-Jovin	Molecular Biology	MPI bpc
Mathias	Bähr	Neurology	U Göttingen
Botho	Bowien	Microbiology	U Göttingen
Gerhard H.	Braus	Molecular Microbiology	U Göttingen
Bertram	Brenig	Molecular Biology of Livestock	U Göttingen
Nils	Brose	Molecular Neurobiology	MPI em
Detlef	Doenecke	Biochemistry	U Göttingen
Wolfgang	Engel	Human Genetics	U Göttingen
Ivo	Feußner	Plant Biochemistry	U Göttingen
Ralf	Ficner	Molecular Structural Biology	U Göttingen
Kurt	Figura, von	Biochemistry	U Göttingen
Gabriele	Fischer-v.-Mollard	Biochemistry	U Göttingen
Hans-Joachim	Fritz	Molecular Genetics	U Göttingen
Christiane	Gatz	General and Developmental Physiology of the Plant	U Göttingen
Christian	Griesinger	NMR-based Structural Biology	MPI bpc
Uwe	Groß	Bacteriology	U Göttingen
Eberhard	Günther	Immunogenetics	U Göttingen
Heidi	Hahn	Human Genetics	U Göttingen
Volker	Haucke	Biochemistry and Molecular Cell Biology	U Göttingen
Herbert	Jäckle	Molecular Developmental Biology	MPI bpc
Reinhard	Jahn	Neurobiology	MPI bpc
Thomas	Jovin	Molecular Biology	MPI bpc
Michael	Kessel	Molecular Biology	MPI bpc
Willhart	Knepel	Molecular Pharmacology	U Göttingen
Kerstin	Krieglstein	Neuroanatomy	U Göttingen
Wolfgang	Liebl	Microbiology	U Göttingen
Reinhard	Lührmann	Cellular Biochemistry	MPI bpc
Ahmed	Mansouri	Molecular Developmental Genetics	MPI bpc
Burkhard	Morgenstern	Bioinformatics	U Göttingen
Hans-Ulrich	Mösch	Microbiology and Genetics	U Göttingen
Erwin	Neher	Membrane Biophysics	MPI bpc
Mary	Osborn	Biochemistry and Cell Biology	MPI bpc
Tomas	Pieler	Developmental Biochemistry	U Göttingen
Irmelin	Probst	Biochemistry and Molecular Cell Biology	U Göttingen
Erez	Raz	Developmental Biology	MPI bpc
Christian	Rosenmund	Membrane Biophysics	MPI bpc
Markus	Rudolph	Structural Biology	U Göttingen
Ruth A.	Schmitz-Streit	Microbiology	U Göttingen
George Michael	Sheldrick	Structural Chemistry	U Göttingen
Jörg	Stülke	General Microbiology	U Göttingen
Michael	Thumm	Molecular Cell Biology	U Göttingen
Markus	Wahl	X-Ray Crystallography	MPI bpc
Ernst	Wimmer	Developmental Biology	U Göttingen
Axel	Zeeck	Biomolecular Chemistry	U Göttingen
Martin	Zeidler	Developmental Biology	MPI bpc

Donna J. Arndt-Jovin

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

A.B., Chemistry, Hiram College, 1963
Ph.D., Biochemistry, Yale University, 1969
Fellow of the Jane Coffin Childs Memorial Fund for Medical Research, Department of Biochemistry, Stanford University School of Medicine, 1969 - 1971
Research Scientist, Max Planck Institute for Biophysical Chemistry, 1971 - 1993
Senior Research Scientist, Max Planck Institute for Biophysical Chemistry, 1993 - present

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Further Information:

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Major Research Interests:

Chromatin structure and function *in vivo*,

(a) the study of nuclear architecture using immunochemistry, *in situ* hybridization, and 3-D image microscopy

(b) the role of DNA conformation in gene expression and development of Dipteran embryos with focus on polycomb group proteins and chromatin modulating enzymes

Signal transduction processes: cell surface antigen-receptor proximities and mobilities focused on the erb B receptor family in living tissue culture cells.

DNA structure and function: biological roles of unusual helical DNA structures.

Selected Recent Publications:

Buchenau P, Hodgson J, Strutt H, Arndt-Jovin DJ (1998) The distribution of Polycomb-group proteins during cell division and development in *Drosophila* embryos: impact on models for silencing. Journal of Cell Biology 141:469-481

Gemkow MJ, Dichter J, Arndt-Jovin DJ (2001) Developmental regulation of DNA-topoisomerases during *Drosophila* embryogenesis. Exp Cell Res 262: 114-121

Heintzmann R, Hanley QS, Arndt-Jovin DJ, Jovin TM (2001) A dual path programmable array microscope (PAM): simultaneous acquisition of conjugate and non-conjugate images. J Microsc 204: 119-135

Nagy P, Arndt-Jovin DJ, Jovin TM (2003) Small interfering RNAs suppress the expression of endogenous and GFP-fused epidermal growth factor receptor (erbB1) and induce apoptosis in erbB1-overexpressing cells. Experimental Cell Research 285: 39-49

Shchyolkina A, Kaluzhny DN, Borisova OF, Hawkins ME, Jernigan RL, Jovin TM, Arndt-Jovin DJ, Zhurkin VB (2003) Formation of intramolecular DNA triplex monitored by fluorescence of 2-aminopurine or 6MI pteridine incorporated in the third strand. Nucl Acids Res, in press.

Humbert-Lan G, Ploeger G, Staehr B, Arndt-Jovin DJ (2003) Chromatin organization in *Drosophila melanogaster* and factors that promote homologous pairing of chromosomes, submitted

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

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Neurological Medicine
Neurology
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Germany

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

Further Information:

http://www.mi.med.uni-goettingen.de/baehr-lab/

Major Research Interests:

We are interested to understand 2 basic questions in cellular and molecular neurobiology:

1. Which factors support survival of adult CNS neurons?
2. What kills these cells under pathological conditions?

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

Selected Recent Publications:

Meyer R, Weissert R, de Graaf K, Diem R, Bähr M (2001) Acute neuronal apoptosis in a rat model of multiple sclerosis. J Neurosci 21: 6214-6220

Dietz GPH, Kilic E, Bähr M (2002) Inhibition of apoptosis *in vitro* and *in vivo* using TAT-mediated protein transduction. Mol Cell Neurosci 21 (1): 29-37

Kilic E, Dietz GPH, Herrmann DM, Bähr M (2002) Intravenous TAT-Bcl-XL is protective when delivered before and after middle cerebral artery occlusion in mice. Ann Neurol 52(5): 617-22

Kilic E, Herrmann DM, Kügler S, Kilic Ü, Holzmüller H, Schmeer C, Bähr M (2002) Adenovirus-mediated Bcl-Xl expression using a neuron-specific promoter protects against disseminated neuronal injury and brain infarction following focal cerebral ischemia in mice. Neurobiol Dis 11: 275-284

Kügler S, Kilic E, Bähr M (2003) Human synapsin 1 gene promoter confers highly neuron pecific long-term transgene expression from an adenoviral vector in the adult rat brain depending on the transduced area. Gene Therapy 10(4): 337-47

Diem R, Hobom M, Maier K, Weissert R, Storch MK, Meyer R, Bähr M (2003) Methyprednisolone increases neuronal apoptosis during autoimmune CNS inflammation by inhibition of an endogenous neuroprotective pathway. J Neurosci 23(18): 6993-7000

Botho Bowien

Professor of Microbiology

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

Major Research Interests:

Carbon dioxide (CO_2) is an essential gas for all organisms. Assimilation of CO_2 by autotrophs such as the photosynthetic higher plants, algae and cyanobacteria constitutes the primary biosynthetic activity in the biosphere. In addition to these organisms there is a great diversity of photo- and/or chemoautotrophic bacteria and archaea. Such organisms are often facultative autotrophs, i.e. they are able to grow either autotrophically or heterotrophically. The mutual shift between autorophy and heterotrophy requires a sophisticated regulation on the metabolic as well as genetic level.

Ralstonia eutropha is an aerobic, facultatively chemoautotrophic bacterium that assimilates CO_2, like the majority of autotrophs, via the Calvin-Benson-Bassham (CBB) carbon reduction cycle. A main interest of our laboratory concerns the transcriptional control of the *cbb* operons encoding most of the CBB enzymes in *R. eutropha*. The regulatory components of the *cbb* system, their response to metabolic signals and the interlocking of the *cbb* control with larger regulatory networks are the prime research subjects.

Apart from hydrogen formate serves as an energy source during organoautotrophic growth of *R. eutropha*. Formate is oxidized to CO_2 by formate dehydrogenases which are molybdo- or tungstoenzymes in this organism. Another research topic addresses the genetic organization and transcriptional regulation of the formate dehydrogenases. We are also interested in the biosynthesis of the molybdo-/tungstopterin cofactor. The third field of research is the basal CO_2 metabolism in *R. eutropha* and *Escherichia coli*. It focusses on the physiological role(s) of carbonic anhydrase(s) and potential CO_2/bicarbonate uptake systems.

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e-mail: bbowien@gwdg.de

Further Information:

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

Selected Recent Publications:

Kusian B, Sültemeyer D, Bowien B (2002) Carbonic anhydrase is essential for growth of *Ralstonia eutropha* at ambient CO_2 concentrations. J Bacteriol 184: 5018-5026

Bowien B, Kusian B (2002) Genetics and control of CO_2 assimilation in the chemoautotroph *Ralstonia eutropha*. Arch Microbiol 178: 85-93

Burgdorf T, Bömmer D, Bowien B (2001) Involvement of an unusual mol operon in molybdopterin cofactor biosynthesis in *Ralstonia eutropha*. J Mol Microbiol Biotechnol 3: 619-629

Grzeszik C, Jeffke T, Schäferjohann J, Kusian B, Bowien B (2000) Phosphoenolpyruvate is a signal metabolite in transcriptional control of the cbb CO_2 fixation operons in *Ralstonia eutropha*. J Mol Microbiol Biotechnol 2: 311-320

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 (Switzerland), 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

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e-mail: gbraus@gwdg.de

Further Information:

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

Major Research Interests:

Metabolism and Development in Yeasts and Filamentous Fungi
Amino acids are essential precursors of translation and their biosynthesis is carefully regulated at both the transcriptional and the enzymatic level. In yeast and filamentous fungi, amino acid starvation activates a complex genetic network including a signal transduction pathway and the transcriptional activator Gcn4p/CpcAp. This network co-ordinately regulates hundreds of genes in numerous biosynthetic pathways.
We are interested in the components of this genetic system, the crosstalk to other metabolic genetic networks in the cell (N-metabolism, purine biosynthesis), the trancriptional regulation and the chromatin structure of target genes.
In addition, the amino acid network interacts with developmental programs like filamentous growth in yeast or the formation of fruitbodies in the filamentous fungus *A. nidulans*. We analyse the control points and the molecular switches which connect metabolism and development.
Another interest of the laboratory is the construction of amino acid biosynthetic enzymes with altered regulatory response. Therefore we analyse the intramolecular signal transduction pathway within regulated allosteric enzymes from the regulatory site to the catalytic center. The crystal structures of several mutant chorismate mutases served as one example which gave us first hints how different effectors act on this enzyme.

Selected Recent Publications:

Bolte M, Steigemann P, Braus GH, Irniger S (2002) Inhibition of APC-mediated proteolysis by the meiosis-specific protein kinase Ime2. Proc Natl Acad Sci USA 99: 4385-4380

Düvel K, Valerius O, Mangus DA, Jacobson A, Braus GH (2002) Replacement of the yeast TRP4 3'untranslated region by a hammerhead ribozyme results in a stable and efficiently exported transcript that lacks a poly(A) tail. RNA 8: 336-344

Valerius O, Brendel C, Düvel K, Braus GH (2002) Multiple factors prevent transcriptional interference at the yeast. ARO4-HIS7 locus. J Biol Chem 277: 21440-21445

Helmstaedt K, Heinrich G, Lipscomb WN, Braus GH (2002) A refined molecular hinge between allosteric and catalytic domain determines allosteric regulation and stability of fungal chorismate mutase. Submitted for publication. Proc Natl Acad Sci USA 10: 6631-6636

Pries R, Irniger S, Bömeke K, Grundmann O, Braus GH (2002) Amino acid dependent Gcn4p stability regulation occurs excludively in the yeast nucleus. Euk Cell 1: 663-672

Hartmann M, Schneider TR, Pfeil A, Heinrich G, Lipscomb WN, Braus GH (2003) Evolution of feedback-inhibited α/β barrel isoenzymes by gene duplication and a single mutation. Proc Natl Acad Sci USA 100: 862-867

Busch S, Eckert SE, Krappmann S, Braus GH (2003) The COP9 sigalosome is an essential regulator of development in the filamentous fungus *Aspergillus nidulans*. Mol Microbiol 49: 717-730

Braus GH, Grundmann O, Brückner S, Mösch HU (2003) Amino acid starvation and Gcn4p regulate adhesive growth and FLO11 expression in *Saccharomyces cerevisiae*. Mol Biol Cell 14: 4272-4284

Bertram Brenig

Full Professor of Molecular Biology of Livestock

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

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e-mail: bbrenig@gwdg.de

Further Information:

http://www.gwdg.de/~bbrenig/

Major Research Interests:

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

Selected Recent Publications:

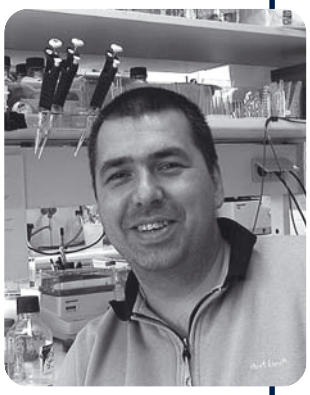
Brenig B, Baumgartner BG, Kriegesmann B, Habermann F, Fries R, Swalve H-H (2003) Molecular cloning, mapping and functional analysis of the bovine sulfate transporter SLC26a2 gene. Gene, in press

Kierstein G, Vallinoto M, Silva A, Schneider MP, Lannuzzi L, Brenig B (2003) Analysis of mitochondrial D-loop region casts new light on domestic water buffalo (*Bubalis bubalis*) phylogeny. Mol Phylogenet Evol, in press

Martins-Wess F, Milan D, Drögemüller C, Voß-Nemitz R, Brenig B, Robic A, Yerle M, Leeb T (2003) A high resolution physical and RH map of pig chromosome 6q1.2 and comparative analysis with human chromosome 19q13.1. BMC Genomics 4: 1-9

Sena L, Schneider M P, Brenig B, Honeycutt RL , Womack JE, Skow LC (2003) Polymorphisms in MHC-DRA and -DRB alleles of water buffalo (*Bubalus bubalis*) reveal different features from cattle DR alleles. Anim Genet 34: 1-10

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

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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 10^{12} nerve cells are connected by 10^{15} 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 of the Neuroligin family and their role in synapse formation. Studies on the molecular mechanisms of neurotransmitter release focus on components of the presynaptic active zone (Munc13s, RIM, Complexins) and their regulatory function in synaptic vesicle fusion.

Selected Recent Publications:

Augustin I, Korte S, Rickmann M, Kretzschmar HA, Südhof TC, Herms JW, Brose N (2001) The cerebellum-specific Munc13 isoform Munc13-3 regulates cerebellar synaptic transmission and motor lerning in mice. J Neurosci 21: 10-17

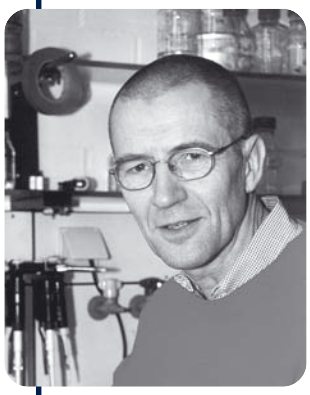
Reim K, Mansour M, Varoqueaux F, McMahon HT, Südhof TC, Brose N, Rosenmund C (2001) Complexins regulate a late step in Ca^{2+}-dependent neurotransmitter release. Cell 104: 71-81

Betz A, Thakur P, Junge HJ, Ashery U, Rhee JS, Scheuss V, Rosenmund C, Rettig J, Brose N (2001) Functional interaction of the active zone proteins Munc13-1 and RIM1 in synaptic vesicle priming. Neuron 30: 183-196

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

Varoqueaux F, Sigler A, Rhee JS, Brose N, Enk C, Reim K, Rosenmund C (2002) Total arrest of spontaneous and evoked synaptic transmission but normal synaptogenesis in the absence of Munc13-mediated vesicle priming. Proc Natl Acad Sci USA 99: 9037-9042

Detlef Doenecke



Professor of Biochemistry

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

Major Research Interests:

The main interest of the laboratory is in mammalian histones and histone genes, and in the multiple subtypes of individual histone classes. Histones are the major structural proteins of eukaryotic chromosomes. DNA replication during the S-phase of the cell cycle requires the coordinate synthesis of histones (H1, H2A, H2B, H3 and H4) in stoichiometric amounts for the assembly of chromatin on replicated DNA. The major human histone gene cluster has been mapped to chromosome 6p21.1-6p22.2. It was isolated and more than 50 histone genes were identified and sequenced. In contrast to these clustered, S phase-dependent genes, several S phase-independent histone genes (replacement histone genes) map as solitary genes to other chromosomes. Current work in this project is focused on the regulation of individual histone gene subtypes.

A second major project deals with the factors mediating the transport of histone proteins from the cytoplasm to the nucleus. This work concentrates on the differential role of nuclear import receptors and specific protein-protein interactions during the nuclear transport of linker and core histone proteins. The third topic of research deals with the structural transitions of chromatin during programmed cell death. The focus of this project is on the role of histone modifications and on the control of DNA fragmentation during the apoptotic process.

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Selected Recent Publications:

Albig W, Doenecke D (1997) The human histone gene cluster at the D6S105 locus. Hum Genet 101: 284-294

Jäkel S, Albig W, Kutay U, Bischoff FR, Schwamborn K, Doenecke D, Görlich D (1999) The importin ß/importin 7 heterodimer is a functional import receptor for histone H1. EMBO J 18: 2411-2423

Drabent B, Saftig P, Bode C, Doenecke D (2000) Spermatogenesis proceeds normally in mice without linker histone H 1t. Histochem Cell Biol 113: 433-442

Kratzmeier W, Albig W, Hänecke K, Doenecke D (2000) Rapid dephosphorylation of H1 histones after apoptosis induction. J Biol Chem 275: 30478-30486

Baake M, Doenecke D, Albig W (2001) Characterization of nuclear localisation signals of the four human core histones. J Cell Biochem 81: 333-346

Olins AL, Herrmann H, Lichter P, Kratzmeier M, Doenecke D, Olins DE (2001) Retinoic acid and phorbol ester induced changes in nuclear components of HL-60 cells. Exp Cell Res 268: 115-127

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

Frank D, Doenecke D, Albig W (2003) Differential expression of human replacement and cell cycle dependent H3 histone genes. Gene 312: 135-143

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

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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.

Selected Recent Publications:

Trappe R, Laccone F, Cobilanschi J, Meins M, Huppke P, Hanefeld F, Engel W (2001) MECP2 mutations in sporadic cases of Rett-syndrome are almost exclusively of paternal origin. American Journal of Human Genetics 68: 1093-1101

Mendoza-Lujambio I, Burfeind P, Dixkens C, Meinhardt A, Hoyer-Fender S, Engel W, Neesen J (2002) The Hook 1 gene is non-functional in the abnormal spermatozoon head shape (azh) mutant mouse. Human Melecular Genetics 11: 1647-1658

Lee H-J, Adham IM, Schwarz G, Kneussel M, Sass JO, Engel W, Reiss J (2002) Molybdenum cofactor-deficient mice resemble the phenotype of human patients. Human Molecular Genetics 26: 3309-3317

Böhm D, Schwelger H, Kotthaus L, Nayernia K, Rickmann M, Köhler M, Rosenbusch J, Engel W, Flügge G, Burfeind P (2002) Disruption of PLC -b1-mediated signal transduction in mutant mice causes age-dependent hippocampal mossy fiber sprouting and neurodegeneration. Molecular and Cellular Neuroscience 21: 584-601

Tascou S, Kang TW, Trappe R, Engel W, Burfeind P (2003) Identification and characterization of NIF3L1 BP1, a novel cytoplasmic interaction partner of the NIF3L1 protein. Biochemical and Biophysical Research 309: 440-448

Ivo Feußner

Professor of Biochemistry

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

Major Research Interests:

Plant Metabolic Pathways

Our laboratory is currently studying the primary metabolism of plants with main focus on the metabolism of lipids. For this purpose, different approaches ranging from analytical chemistry to biochemistry and molecular biology were used.

Plant Lipid Metabolism: We are interested in physiological functions of specific lipoxygenases, i.e. their involvement in the degradation of storage lipids during germination and in the destruction of organellar membranes during stress. Another research topic is the analysis of their catalytic mechanism. In addition, lipid peroxidation reactions were analysed in general by metabolomic approaches and by studying the biosynthesis of aldehydes (fruit aromas), hydroxy fatty acids and divinyl ether fatty acids (plant defence). Moreover, enzymes which introduce new functionalities (i.e. conjugated double bonds) in the fatty acid backbone were isolated and characterized in order to obtain new seed oils for biotechnological and medical purposes. In relation to that we are manipulating the primary metabolism and organelle development of seeds in order to increase the oil content of seeds.

Metabolic transport processes: Another research topic is the analysis of the mechanism and regulation of transport processes across the peroxisomal membrane. Other studies deal with transport processes involved in the loading of the phloem for long-distance transport of photoassimilates. Moreover, transport processes in root nodules in the course of symbiotic nitrogen fixation by plants and the mechanism of the induction of root nodules are investigated at the molecular level.

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Selected Recent Publications:

Feussner I, Wasternack C (2002) The lipoxygenase pathway, Ann. Rev. Plant Biol. 53: 275-297

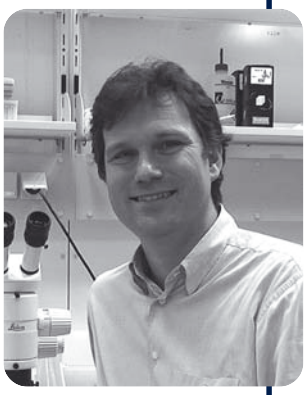
Weichert H, Kolbe A, Kraus A, Wasternack C, Feussner I (2002) Metabolic profiling of oxylipins in germinating cucumber seedlings – lipoxygenase-dependent degradation of triacylglycerols and biosynthesis of volatile aldehydes. Planta 215: 612-619

Hornung E, Pernstich C, Feussner I (2002) Formation of conjugated Δ^{11}, Δ^{13}-double bonds by Δ^{12}-linoleic acid (1,4)-acyl-lipid-desaturase in pomegranate seeds. Eur J Biochem 269: 4852-4859

Bachmann A, Hause B, Maucher H, Garbe E, Vörös K, Weichert H, Wasternack C, Feussner I (2002) Jasmonate-induced lipid peroxidation in barley leaves initiated by distinct 13-LOX forms of the chloroplast. Biol Chem 383: 1645-1657

Op den Camp RGL, Przybyla D, Ochsenbein C, Laloi C, Kim C, Danon A, Wagner D, Hideg E, Göbel C, Feussner I, Nater M, Apel K (2002) Rapid induction of distinct stress responses after the release of singlet oxygen in Arabidopsis. Plant Cell 15: 2320-2332

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

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Major Research Interests:

Our major interest is the structure – function relationship of biological macromolecules. We determine the three-dimensional structure of proteins and protein-RNA complexes by means of X-ray crystallography to understand their function at atomic level. Besides the crystal structure analysis, the overexpression, purification and crystallization of proteins is an important aspect of our work. We are currently working on proteins involved in the splicing and modification of RNA and, as well, on proteins required for the nucleocytoplasmic transport.

Selected Recent Publications:

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

Reidt U, Wahl MC, Fasshauer D, Horowitz DS, Lührmann R, Ficner R (2003) Crystal structure of a complex between human spliceosomal cyclophilin H and a U4/U6 snRNP-60K peptide. J Mol Biol 331: 45-56

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

Grimm C, Maser E, Möbus E, Klebe G, Reuter K, Ficner R (2000) The crystal structure of α-hydroxysteroid dehydrogenase/carbonyl reductase from *Comamonas testosteroni* shows a novel oligomerisation pattern within the short chain dehydrogenase/reductase family J Biol Chem 275: 41333-41339

Reuter K, Mofid M R, Marahiel M A, Ficner R (1999) Crystal structure of the surfactin synthetase activating enzyme Sfp: a prototype of the 4'-phosphopantetheinyl transferase superfamily. EMBO J 18: 6823-6831

Reuter K, Nottrott S, Fabrizio P, Lührmann R, Ficner R (1999) Identification, characterization and crystal structure analysis of the human spliceosomal U5 snRNP-specific 15kD protein. J Mol Biol 294: 515-525

Kurt von Figura

Professor of Biochemistry

M.D., University of Tübingen, 1970.
Appointed 1986 as head of the Department of Biochemistry II in the Center of Biochemistry and Molecular Cell Biology, Georg August University Göttingen.

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Major Research Interests:

The interest of our group in the biogenesis of lysosomes is stimulated by the existence of a spectrum of congenital disorders in man that affect the function of lysosomes. Our work includes the identification of new molecular defects in human congenital disorders. Transgenic mice are generated to study the function of lysosomal proteins and proteins involved in lysosome biogenesis and used as models for human congenital disorders for the study of the pathophysiology and the effectiveness of new therapeutic approaches. A number of studies have focussed on the identification of lysosomal trafficking signals in membrane proteins, and their recognition by the transport machinery. Current projects focus on the regulation of the interaction of cytoplasmic adaptors with the lysosomal transport signals in membrane proteins, the function of several major lysosomal membrane proteins, a novel protein modification that is required for the catalytic activity of sulfatases and deficient in a human disease and the molecular defects and pathophysiology of a new group of human congenital disorders in which the N-glycosylation of glycoproteins is defective.

Selected Recent Publications:

Lübke T, Marquardt T, Etzioni A, Hartmann E, von Figura K, Körner C (2001) Complementation cloning identifies CDG-IIc, a new type of congenital disorders of glycosylation, as a GDP-fucose transporter deficiency. Nature Genetics 28: 73-76

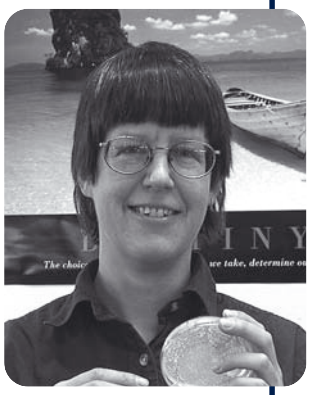
Hanßke B, Thiel C, Lübke T, Hasilik M, Höning S, Peters V, Heidemann PH, Hoffmann GF, Berger EG, von Figura K, Körner C (2002) Deficiency of UDP-galactose: N-acetylglucosamine β-1,4-galactosyltransferase I causes the congenital disorder of glycosylation type IId. J Clin Invest 109: 725-733

Ricotta D, Conner SD, Schmid SL, von Figura K, Höning S (2002) Phosphorylation of the AP2 μ-subunit by AAK1 mediates high-affinity binding to membrane protein sorting signals. J Cell Biol 156: 791-795

Marquordt C, Fang Q, Will E, Peng J, von Figura K, Dierks T (2003) Posttranslational modification of serine to formylglycine in bacterial sulfatases: Recognition of the modification motif by the iron sulfur protein AtsB. J Biol Chem 278: 2212-2218

Dierks T, Schmidt B, Borissenko LV, Peng J, Preusser A, Mariappan Malaiyalam, von Figura K (2003) Multiple Sulfatase Deficiency is caused by mutations in the gene encoding the human Ca-formylglycine generating enzyme. Cell 113: 435-444

Gabriele Fischer von Mollard



Junior Group Leader at the Department of Biochemistry II

Dr. rer. nat. (Ph.D.) 1992, Freie Universität Berlin
Postdoctoral fellow, University of Oregon, Eugene (USA), 1994 - 1998
Junior group leader in the Department of Biochemistry II, Medical Faculty, Universität Göttingen since 8/1998

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Major Research Interests:

One of the fundamental questions in cell biology is how proteins are transported between different organelles. This transport requires transport vesicles which bud from the donor and fuse with the target organelle. Our group is interested in the family of SNARE proteins which are required for recognition between transport vesicle and target membrane and for their subsequent fusion. Different SNARE proteins are found on transport vesicle and target membranes and form specific complexes. We focus on SNAREs which are required in transport between the Golgi, endosome and lysosome/vacuole. As these proteins are conserved in evolution we can study similar processes in yeast and mammals.

We use baker's yeast as one model system because of powerful genetic approaches. Mutant genes can be generated easily and defects analyzed. Genes required in the same step can be identified by genetic interactions. Using these techniques we demonstrated that two SNAREs act in several different transport pathways and found a novel SNARE acting in retrograde traffic from the Golgi to the ER.

Our second focus are endosomal SNAREs in mouse. We are studying their subcellular distribution using immunofluorescence and are identifying SNARE partners by co-immunoprecipitation. Currently, we are using the yeast two hybrid system to identify new binding proteins for SNAREs. We generated SNARE knock out mice and are studying their phenotypes as well as cell lines derived from these mice.

Selected Recent Publications:

Antonin W, Riedel D, Fischer von Mollard G (2000) The SNARE Vti1α-β is localized to small synaptic vesicles and participates in a novel SNARE complex. J Neuroscience 20: 5724-5732

Dilcher M, Köhler B, Fischer von Mollard G (2001) Genetic interactions with the yeast Q-SNARE *VTI1* reveal novel functions for the R-SNARE *YKT6*. J Biol Chem 276: 34537-34544

Kreykenbohm V, Wenzel D, Antonin W, Atlachkine V, Fischer von Mollard G (2002) The SNAREs vti1a and vti1b have different localization and SNARE complex partners. Eur J Cell Biol 81: 273-280

Atlashkin V, Kreykenbohm V, Eskelinen EL, Wenzel D, Fayyazi A, Fischer von Mollard G (2003) Deletion of the SNARE vti1b in mice results in loss of a single SNARE partner, syntaxin 8. Mol Cell Biol 23: 5198-5207

Dilcher M, Veith B, Chidambaram S, Hartmann E, Schmitt HD, Fischer von Mollard G (2003) Use1p is a yeast SNARE protein required for retrograde traffic to the ER. EMBO J 14: 3664-3674

Hans-Joachim Fritz

Professor of Molecular Genetics

Diplomchemiker Degree, University of Stuttgart 1969
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Massachusetts Institute of Technology 1974 - 1976
Institute of Genetics, University of Cologne 1977 - 1984
Max-Planck-Institute of Biochemistry, Martinsried 1984 - 1988

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Major Research Interests:

Pathways of Spontaneous Mutation, DNA Repair and the Stability of Genetic Information:
The integrity of genetic information is constantly challenged by thermal noise in a variety of different ways; consequently, numerous mechanisms have evolved to protect the genome by DNA repair. For a number of years, we have been studying various endogenous sources of spontaneous mutation and their respective DNA repair pathways - in most recent years with emphasis on thermophilic microorganisms and hydrolytic deamination of cytosine and 5-methylcytosine residues.

Conformational Stability of Proteins and their Interactions with other Macromolecules and with Ligands:
One of the major impacts genomic research has on molecular biology as a whole is the growing appreciation of protein function as a consequence of a complex web of macromolecular interactions. We have developed and are using genetic tools to detect and to analyze protein/protein and protein/ligand interactions as well as the conformational stability of proteins.

Selected Recent Publications:

Usón I, Bes MT, Sheldrick GM, Schneider TR, Hartsch T, Fritz H-J (1997) X-ray crystallography reveals stringent conservation of protein fold after removal of the only disulfide bridge from a stabilized immunoglobulin variable domain. Folding and Design 2: 357-361

Drotschmann K, Aronshtam A, Fritz H-J, Marinus MG (1998) The *Escherichia coli* MutL protein stimulates binding of Vsr and MutS to heteroduplex DNA. Nucleic Acids Research 26: 948-953

Dziejman M, Kolmar H, Fritz H-J, Mekalanos JJ (1999) ToxR co-operative interactions are not modulated by environmental conditions or periplasmic domain conformation. Molecular Microbiology 31: 305-317

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

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Major Research Interests:

Plants are constantly exposed to attack by pathogenic microorganisms like fungi, viruses and bacteria. To combat these infections, plants have evolved efficient defense responses, many of them requiring induction of gene expression. A particularly interesting phenomenon is the systemic acquired resistance (SAR). If a pathogen is recognized by a specific plant resistance machinery, hypersensitive cell death occurs at the site of the infection, which limits spread of the pathogen. Subsequently, levels of salicylic acid (SA) rise throughout the plant. SA is sufficient and necessary to induce a subset of defense gene, which leads to resistance against a broad range of pathogens, which would normally be highly infectious. We are interested in the transcriptional regulation of defense genes by SA. We have isolated transcription factors whose activity is regulated by SA by a yet unknown mechanism. We are addressing the question of regulation using genetic, molecular and biochemical tools.

The second project deals with "indirect defense" mechanisms of plants against insects. When insects feed on plants, plants emit volatiles to attract the enemies of the insect. We are interested in the transcriptional regulation of biosynthetic genes leading to the synthesis of volatiles.

Selected Recent Publications:

Niggeweg R, Thurow C, Weigel R, Pfitzner U, Gatz C (2000) Tobacco TGA factors differ with respect to interaction with NPR1, activation potential and DNA-binding properties. Plant Mol Biol 42: 775-788

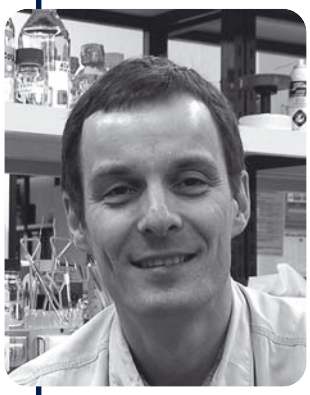
Niggeweg R, Thurow C, Kegler C, Gatz C (2000) Tobacco transcription factor TGA2.2 is the main component of ASF-1/SARP and is involved in salicyclic acid- and auxin-inducible expression of as-1-containing target promoters. J Biol Chem 275: 19897-19905

Böhner S, Gatz C (2001) Characterisation of novel target promoters for the dexamethasone-inducible/tetracycline-inactivatable regulator TGV using luciferase and isopentenyl transferase as sensitive reporter genes. Mol Gen Gen 264: 860-870

Krawczyk S, Thurow C, Niggeweg R, Gatz C (2001) Analysis of the spacing between the two palindromes of activation sequence-1 with respect to binding to different TGA factors and transcriptional activation potential. Nucleic Acids Res 30: 775-781

Schiermeyer A, Thurow C, Gatz C (2003) Tobacco bZIP factor TGA10 is a novel member of the TGA family of transcription factors. Plant Mol Biol 51: 817-829

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:

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

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Selected Recent Publications:

Reif B, Hennig M, Griesinger C (1997) Direct Measurement of Angles between Bond Vectors in High Resolution NMR. Science 276: 1230-1233

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

Bartoschek S, Johannson M, Geierstanger BH, Okun JG, Lancaster CRD, Humpfer E, Yu L, Yu CA, Griesinger C, Brandt U (2001) Three Molecules of Ubiquinone Bind Specifically to Mitochondrial Cytochrome bc1 Complex, J Biol Chem 276: 35231-35234

Peti W, Meiler J, Brüschweiler R, Griesinger C (2002) Model free Analysis of Protein Backbone Motion from Residual Dipolar Couplings. J Am Chem Soc 124: 5822-5833

Carlomagno T, Blommers MJJ, Meiler J, Jahnke W, Schupp T, Petersen F, Schinzer D, Altmann K-H, Griesinger C (2003) The High-Resolution Solution Structure of Epothilone A Bound to Tubulin: An Understanding of the Structure-Activity Relationships for a Powerful Class of Antitumor Agents. Angew Chem 115: 2615-2619, Angew Chem Int Ed 42: 2511-2515

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

Uwe Groß

Professor of Bacteriology

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 Bacteriology, University of Göttingen

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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 immunocompromised 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 as well have started to analyse host-pathogen crosstalk of *Chlamydia pneumoniae* in order to compare the pathogenesis of intracellular eukaryotes with those of procaryotes. In this respect, we concentrate on the type III secretion system of *Chlamydia* which by injecting effector proteins into the cytosol of its host cell is able to modulate important functions such as antigen presentation and apoptosis.

Selected Recent Publications:

Lüder CGK, Algner M, Lang C, Bleicher N, Groß U (2003) Reduced expression of the inducible nitric oxide synthase after infection with *Toxoplasma gondii* facilitates parasite replication in activated murine macrophages. Int J Parasitol 33: 833-844

Lüder CGK, Lang C, Giraldo-Velasquez M, Algner M, Gerdes J, Groß U (2003) *Toxoplasma gondii* inhibits MHC class II expression in neural antigen-presenting cells by down-regulating the class II transactivator CIITA. J Neuroimmunol 134: 12-24

Lugert R, Kuhns M, Polch T, Groß U (2003) Expression and localization of type III secretion-related proteins of *Chlamydia pneumoniae*. Med. Microbiol. Immunol., in press.

Lüder CGK, Groß U, Lopes MF (2001) Intracellular protozoan parasites and apoptosis: diverse strategies to modulate parasite-host interactions. Trends Parasitol 17:480-486

Goebel S, Groß U, Lüder CGK (2001) Inhibition of host cell apoptosis by *Toxoplasma gondii* is accompanied by reduced activation of the caspase cascade and alterations of poly(ADP-ribose) polymerase expression. J Cell Science 114:3495-3505

Lüder CGK, Walter W, Beuerle B, Maeurer MJ, Groß U (2001) *Toxoplasma gondii* down-regulates MHC class II gene expression and antigen presentation by murine macrophages via interference with nuclear translocation of STAT1 alpha. Eur J Immunol 31:1475-1484

Eberhard Günther

Professor of Immunogenetics

Dr. med. University of Freiburg/Br. 1968
Physician at the University Hospital in Freiburg and other hospitals
Postdoctoral fellow and then scientific assistant at the Max Planck Institute for Immunobiology in Freiburg/Br.
Appointed as head of the Department of Immunogenetics, University of Göttingen, 1982

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Major Research Interests:

Our main research interest are function, genetics, genomics and evolution of the major histocompatibility complex. This group of genes has first been described because of its major role in determining graft rejection. It then turned out to control antigen-specific immune responsiveness, innate immune reactions and susceptibility to various diseases. Recently the complete nucleotide sequence of the human MHC, the HLA complex, has become available and revealed the presence of more than 120 expressed genes in this region of about 4 Mb. We are studying the MHC of the rat and of certain non-human primates. The rat is of particular interest because it provides several models of MHC-controlled diseases. We have physically mapped the complete rat MHC, and are now studying the expression of the various genes from different MHC genotypes in normal and diseased tissues. The function of certain MHC linked genes, Sacm2l and Hsp70, is analysed in greater detail. A particular focus is the role of Hsp70 genes during the immune response.

Selected Recent Publications:

Dressel R, Lübbers M, Walter L, Herr W, Günther E (1999) Enhanced susceptibility to cytotoxic T lymphocytes without increase of class I antigen expression after conditional overexpression of heat shock protein 70 in target cells. Eur J Immunol 29: 3925-3935

Walter L, Günther E (2000) Physical mapping and evolution of the centromeric class I gene containing region of the rat MHC. Immunogenetics 51: 829-837

Dressel R, Elsner L, Quentin T, Walter L, Günther E (2000) Heat shock protein 70 is able to prevent heat shock-induced resistance of target cells to CTL. J Immunol 164: 2362-2371

Seo JW, Walter L, Günther E (2001) Genomic analysis of MIC genes in rhesus macaques. Tissue Antigens 58: 159-165

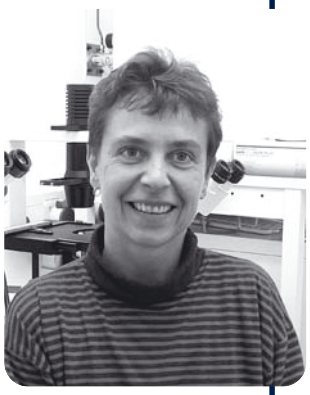
Ioannidu S, Walter L, Dressel R, Günther E (2001) Physical map and expression profile of genes of the telomeric class I region of the rat MHC. J Immunol 166: 3957-3965

Walter L, Stark S, Helou K, Flugge P, Levan G, Günther E (2002) Identification, characterization and cytogenetic mapping of a yeast Vps54 homolog in rat and mouse. Gene 285: 213-220

Walter L, Hurt P, Himmelbauer H, Sudbrak R, Günther E (2002) Physical mapping of the major histocompatibility complex class II and class III regions of the rat. Immunogenetics 54: 268-275

Dressel R, Grzeszik C, Kreiss M, Lindemann D, Herrmann T, Walter L, Günther E (2003) Differential effect of acute and permanent heat shock protein (Hsp) 70 overexpression in tumor cells on lysability by cytotoxic T lymphocytes. Cancer Res, in press

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

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Major Research Interests:

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

Selected Recent Publications:

Hahn H, Wojnowski L, Specht K, Kappler R, Calzada-Wack J, Potter D; Zimmer AM, Müller U, Samson E, Quintinilla-Martinez, Zimmer A (2000) Patched target IGF2 is indispensable for the formation of medulloblastoma and rhabdomyosarcoma. JBC 275 (37): 28341-4

Calzada-Wack J, Kappler R, Schnitzbauer U, Richter T, Nathrath M, Rosemann M, Wagner SN, Hein R, Hahn H (2002) Unbalanced overexpression of the mutant allele in murine Patched mutants. Carcinogenesis 23(5): 727-734

Calzada-Wack J, Schnitzbauer U, Walch A, Wurster KH, Kappler R, Nathrath M, Hahn H (2002) Analysis of the PTCH coding region in human rhabdomyosarcoma. Hum Mutat 20(3): 233-4

Pazzaglia S, Mancuso M, Atkinson M, Tanori M, Rebessi S, Di Majo V, Covelli V, Hahn H, Saran A (2002) High incidence of medulloblastoma following X ray-irradiation of newborn ptch heterozygous mice. Oncogene 21(49): 7580-4

Kappler R, Calzada-Wack J, Schnitzbauer U, Piontek G, Graedler F, Adamski J, Heinzmann U, Schlegel J, Hemmerlein B, Quintanilla-Martinez L, Hahn H (2003) Molecular characterisation of Patched-associated rhabdomyosarcoma. J of Pathology, 200(3): 348-56

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

Volker Haucke

Professor of Biochemistry

Dr. phil. (Ph.D.) 1997, University of Basel, Switzerland
Postdoctoral Fellow at Yale University School of Medicine, New Haven, CT, USA 1997 - 2000
Head of an independent Junior Research Group at the Zentrum für Biochemie & Molekulare Zellbiologie 2000-2003
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Major Research Interests:

Our laboratory is interested in the molecular mechanisms of endocytosis and synaptic vesicle formation in neurons. Synaptic vesicles are small membrane-bounded organelles that store and secrete non-peptide neurotransmitters. Following exocytosis and the concomitant insertion of synaptic vesicle proteins and lipids into the presynaptic plasmalemma synaptic vesicles are retrieved by clathrin-mediated endocytosis. During this process the clathrin adaptor complex AP-2 is recruited to the presynaptic plasmamembrane along with a growing number of accessory proteins which assist in the formation and maturation of clathrin-coated pits. These coated pits eventually pinch off in a dynamin-dependent reaction giving rise to free clathrin-coated vesicles which become refilled with neurotransmitter and finally shed their coat resulting in the regeneration of synaptic vesicles.
We are interested in how the endocytic process is regulated at the molecular level both by proteins and lipids and how synaptic vesicles are formed in differentiating neuronal precursor cells. We have identified hStnB/ stonin 2, a novel component of the endocytic machinery which we hypothesize to negatively regulate the interaction of clathrin/AP-2 with the membrane. How this protein precisely acts at the synapse is currently under intense investigation by the combined use of molecular biological, biochemical, and physiological techniques. Other projects are directed towards dissecting the role of phosphoinositides, a certain class of membrane lipids which interact with several components of the endocytic machinery, in clathrin-mediated endocytosis at the synapse.
Finally, we are trying to understand the biogenesis pathway of synaptic vesicles during neuronal differentiation by establishing an *in vitro* system that allows the formation of neurons from differentiating non-neuronal precursor cells.

Selected Recent Publications:

Krauss M, Kinuta M, Wenk MR, De Camilli P, Takei K, Haucke V (2003) ARF6 stimulates clathrin/AP-2 recruitment to synaptic membranes by activating phosphatidylinositol phosphate kinase type Iγ. J Cell Biol, 162: 113-124

Rohde G, Wenzel D, Haucke V (2002) A phosphatidylinositol (4,5)-bisphosphate binding site within μ2-adaptin is required for clathrin-mediated endocytosis. J Cell Biol 158: 209-214

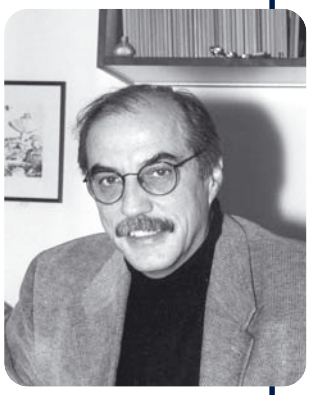
Takei K, Haucke V (2001) Clathrin-mediated endocytosis: membrane factors pull the trigger. Trends Cell Biol 11: 385-391

Walther K, Krauss M, Diril MK, Lemke S, Ricotta D, Höning S, Kaiser S, Haucke V (2001) Human stoned B interacts with AP-2 and synaptotagmin and facilitates clathrin-coated vesicle uncoating. EMBO Rep 2: 634-640

Haucke V (2000) Dissecting the ins and outs of excitement: glutamate receptors on the move. Nature Neurosci 3: 1230-1232

Haucke V, De Camilli P (1999) AP-2 recruitment to synaptotagmin stimulated by tyrosine-based endocytic motifs. Science 285: 1268-1271

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 Developmental Biology, Tübingen (1982 - 1988)
Professor and Chairman, Dept. of Genetics and Microbiology, Univ. of Munich (1988 - 1991)

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Major Research Interests:

How is the embryo generated from a single cell, the egg? We address this question by using the *Drosophila* embryo as an experimental system, applying the combined tools of classical embryology, genetics, molecular biology and biochemistry. We have focussed our efforts to isolate and characterize the factors underlying early pattern formation along the anterior-posterior axis of the embryo. We sought to unravel their mode of action und the molecular mechanism in which they function.
Many of the factors required to establish the basic body plan are also necesssary for organ formation, a process which involves local inductive interactions between groups of cells and/or epithelial cell layers. We have started to identify the genetic components and regulatory circuitries involved in organogenesis as well as in neural conductivity and function. We also use the fly to identify the components of novel biochemical pathways and cellular key components that control and maintain homeostasis and energy balance, and we initiated a gene discovery program to systematically characterize the function of genes on the *Drosophila* X-chromosome.

Selected Recent Publications:

Schöck F, Reischl J, Wimmer E, Taubert H, Purnell BA, Jäckle H (2000) Phenotypic supression of *empty spiracles* is prevented by buttonhead. Nature 405: 351-354

Piepenburg O, Vorbrüggen G, Jäckle H (2000) *Drosophila* segment borders result from unilateral repression of hedgehog activity by Wingless signaling. Molecular Cell 6: 203-209

Niessing D, Sprenger F, Driever W, Taubert H, Jäckle H, Rivera-Pomar R (2000) Homeodomain position 54 specifies transcriptional versus translational control by Bicoid. Mol. Cell 5: 595-401

Linder B, Gerlach N, Jäckle H (2001) The *Drosophila* homolog of the human AF10 is a HP1-interacting suppressor of position effect variegation. EMBO reports 2: 211-216

Benos PV *et al*. (2001) From first base: The sequence of the tip of the *X*-chromosome of *Drosophila melanogaster*, a comparison of two sequencing strategies. Genome Research 11: 710-730

Reinhard Jahn

Professor, Director at the Max Planck Institute for Biophysical Chemistry

Dr. rer. nat. (Ph.D.) 1981, University of Göttingen
Professor (since 1997 Adjunct Professor) of Pharmacology, Yale University School of Medicine
Appointed as Director at the Max-Planck-Institute for Biophysical Chemistry 1997

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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:

Takamori S, Rhee JS, Rosenmund C, Jahn R (2000) Identification of a vesicular glutamate transporter that defines a glutamatergic phenotype in neurons. Nature 407: 189-194

Lang T, Bruns D, Wenzel D, Riedel D, Holroyd P, Thiele C, Jahn R (2001) SNAREs are concentrated in cholesterol-dependent clusters that define docking and fusion sites for exocytosis. EMBO J 20: 2202-2213

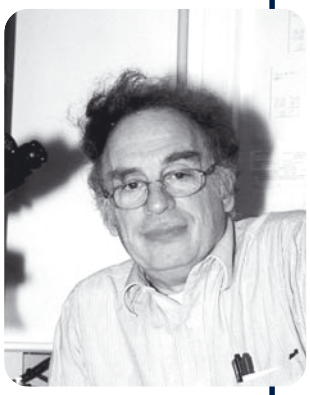
Antonin W, Fasshauer D, Becker S, Jahn R, Schneider TR (2002) Crystal structure of the endosomal SNARE complex reveals common structural principles of all SNAREs. Nature Struct Biol 9: 107-111

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

Jahn R, Grubmüller H (2002) Membrane fusion. Curr Opinion in Cell Biology 14: 488-495

Lang T, Margittai M, Hölzler, H, Jahn R (2002) SNAREs in native plasma membranes are active and readily form core complexes with endogenous and exogenous SNAREs. J Cell Biol 158: 751-760

Thomas M. Jovin



Chairman, Department of Molecular Biology and Director at the Max Planck Institute for Biophysical Chemistry

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Scientific Member, Max Planck Society 1969

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Major Research Interests:

- structural studies of nucleic acids; complexes with proteins and ligands

interactions of the tumor-suppressor protein p53 with DNA: binding of p53 (wild-type and the DNA-binding core domain) with supercoiled closed circular plasmid DNA and linear fragments; scanning force microscopy (SFM) and electron microscopy

DNA binding of the homeodomain protein Bicoid involved in Drosophila development

parallel-stranded (ps) DNA: sequence-specific helical parameters and properties

ligand-DNA: binding of the actinomycin to single-stranded DNA

- signal transduction of eukaryotic cells

Receptor tyrosine kinase activation and internalization, downstream signaling (MAPR cascade), and the mechanism of antibody-based tumor therapy. Further development of Fluorescence Resonance Energy Transfer (FRET) as a probe of protein-protein interactions in the cell, application of the quantitative microscope, and fusions of green fluorescent protein (GFP) with the EGF receptor and erB2 (oncogene involved in most breast tumors).

- optical and scanning-probe microscopy

Development of novel microscopes for cellular and molecular studies: scanning force (SFM) and near-field optical (SNOM), fluorescence lifetime (FLIM), fluorescence correlation (FCM) and programmable array (PAM).

Selected Recent Publications:

Brock R, Jovin T M (2001) Heterogeneity of signal transduction at the subcellular level: Microsphere-based focal EGF receptor activation and stimulation of Shc translocation. J Cell Sci 114: 2437-2447

Creemers T M H, Lock A J, Subramaniam V, Jovin T M, Völker S (2000) Photophysics and optical switching in green fluorescent protein mutants. Proc Natl Acad Sci USA 97: 2974-2978

Heintzmann R, Hanley Q S, Arndt-Jovin D, Jovin T M (2001) A dual path programmable array microscope (PAM): Simultaneous acquisition of conjugate and non-conjugate images. J Microsc 204: 119-135

Jiao Y, Cherny D I, Heim G, Jovin T M, Schäffer T E (2001) Dynamic interactions of p53 with DNA in solution by time-lapse atomic force microscopy. J Mol Biol 314: 221-231

Shchyolkina A K, Borisova O F, Livshits M A, Pozmogova G E, Chernov B K, Klement R, Jovin T M (2000) Parallel-stranded DNA with mixed AT/GC composition: role of *trans* G·C base pairs in sequence dependent helical stability. Biochemistry 39: 10034-10044

Subramaniam V, Jovin T M, Rivera-Pomar R V (2001) Aromatic amino acids are critical for stability of the Bicoid homeodomain. J Biol Chem 276: 21506-21511

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, Goettingen

Major Research Interests:

The group studies patterning processes in early chick and mouse embryos, in particular during gastrula and neurula stages. The primitive embryonic ectoderm, the epiblast, gives rise to the three germ layers, the definitive ecto-, endo- and mesoderm, which interact during the transition from pattern formation to organogenesis. We study these processes by applying molecular and embryological techniques, including expression analysis, transplantation in embryo culture, large scale screening of expressed sequence tags, *in vivo* gene transfer by electroporation, and gene knock-out technology. At present major lines of interest are

1. The analysis of a secreted factor that is highly restricted in the secondary heart field, which contributes cells to the outflow tract of the heart.

2. We identified the Geminin protein as a mediator between cell cycle progression and the control of axial specification. Geminin interacts with homeodomain proteins of the Hox family and inhibits their binding to DNA and their function as transcriptional activators. In addition, Geminin is a transient member of the Polycomb complex, where it is involved in the maintenance of Hox gene repression. Our goal is an understanding of the coordination between proliferation and pattern formation.

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Selected Recent Publications:

Pera E, Stein S, Kessel M (1999) Ectodermal patterning in the avian embryo: Epidermis versus neural plate. Development 126: 63-73

Knoetgen H, Viebahn C, Kessel M (1999) Head induction in the chick by primitive endoderm of mammalian, but not avian origin. Development 126: 815-125

Boettger T, Wittler L, Kessel M (1999) FGF8 functions in the specification of the right body side. Current Biology 9: 277-280

Roeser T, Stein S, Kessel M (1999) Nuclear localization of b-catenin in normal and LiCl exposed chick embryos. Development 126: 2955-2965

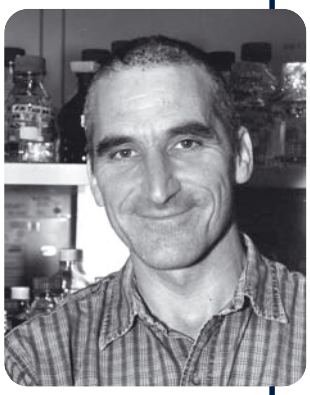
Knoetgen H, Teichmann U, Wittler L, Viehbahn C, Kessel M (2000) Anterior neural induction by nodes from rabbits and mice. Developmental Biology 225: 370-380

Boettger T, Knoetgen H, Wittler L, Kessel M (2001) The avian organizer. International Journal of Developmental Biology 45: 285-287

Wittler L, Spieler D, Kessel M (2003) Hensen's node: The embryonic organizer of the chick. In: Spemann's Organizer (Ed H Grunz) Springer, Heidelberg, in press

Richter U, Wittler L, Kessel M (2003) Restricted expression domains of Ezrin in developing epithelia of the chick. Mech Dev/GEP, in press

Willhart Knepel



Professor of Molecular Pharmacology

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Research Fellow, Laboratory of Molecular Endocrinology, Harvard Medical School, Boston, MA, USA, 1987 - 1990
Joined Medical Faculty of the University of Göttingen 1991

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Major Research Interests:

The main interest of the laboratory is in the molecular mechanisms of gene transcription. Transient transfections of reporter fusion genes, transgenic mice, and other molecular biology techniques are used to study the mechanisms of cell-specific and signal-induced gene transcription, and how drugs interfere with these mechanisms to produce pharmacological effects. 1. The pancreatic islet hormone glucagon is a biological antagonist of insulin and regulates blood glucose levels. Enhanced synthesis and secretion of glucagon contributes to increased hepatic glucose output and hyperglycemia in diabetes mellitus. We study the mechanisms which activate the glucagon gene in pancreatic islet a cells as well as signaling pathways to the glucagon gene induced by cAMP, membrane depolarization, and insulin. 2. We study the regulation of glucagon gene transcription by the new group of oral antidiabetic drugs, the thiazolidinediones. These so-called 'insulin sensitizers' may improve insulin action in part through an effect on glucagon. 3. The ubiquitously expressed, cAMP- and calcium-regulated transcription factor CREB is affected by several classes of drugs. We study how the immunosuppressive drugs cyclosporin A and FK506 (tacrolimus) inhibit CREB-mediated transcription. This effect may underlie their pharmacological effects, both desired and undesired. Using transgenic mice and an animal model of depression, we also study whether treatment with antidepressants alters CREB-mediated transcription in order to better understand the molecular mechansims of action of antidepressant drugs.

Selected Recent Publications:

Beimesche S, Neubauer A, Herzig S, Grzeskowiak R, Diedrich T, Cierny I, Scholz D, Alejel T, Knepel W (1999) Tissue-specific transcriptional activity of a pancreatic islet cell-specific enhancer sequence/Pax6-binding site determined in normal adult tissues *in vivo* using transgenic mice. Mol Endocrinol 13: 718-728

Siemann G, Blume R, Grapentin D, Oetjen E, Schwaninger M, Knepel W (1999) Inhibition of cyclic AMP response element-binding protein/cyclic AMP response element-mediated transcription by the immunosuppressive drugs cyclosporin A and FK506 depends on the promoter context. Mol Pharmacol 55: 1094-1100

Herzig S, Füzesi L, Knepel W (2000) Heterodimeric Pbx-Prep1 homeodomain protein binding to the glucagon gene restricting transcription in a cell type-dependent manner. J Biol Chem 275: 27989-27999

Grzeskowiak R, Amin J, Oetjen E, Knepel W (2000) Insulin responsiveness of the glucagon gene conferred by interactions between proximal promoter and more distal enhancer-like elements involving the paired-domain transcription factor Pax6. J Biol Chem 275: 30037-30045

Schinner S, Dellas C, Schröder M, Heinlein C, Chang C, Fischer J, Knepel W (2002) Repression of glucagon gene transcription by peroxisome proliferator-activated receptor γ through inhibition of Pax6 transcriptional activity. J Biol Chem 277: 1941-1948

Kerstin Krieglstein

Professor of Anatomy/Neuroanatomy

Dr. rer. nat., University of Gießen, Germany, 1990
Postdoctoral fellow, University of California, Irvine, 1990 - 1992
Professor of Anatomy, University of Saarland, 1999 - 2001
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Major Research Interests:

The nervous system is a complex network of billions of neurons building appropriate connections and transmitting the information required. Although the nervous system has a lifelong synaptic plasticity, it is essentially built just once with very little regenerative capacity, meaning that neurons have to survive and function for lifetime. Loss of neurons will eventually lead to functional impairments such as those found in Alzheimer's, Parkinson's or ALS patients.
We are interested in the understanding of the regulation of neuronal survival and death. Recent advancements in the field have provided clear evidence that neuronal survival is caused by synergistic actions of neurotrophic factors along with other cytokines most prominently from the TGF-ß superfamily. Synergisms of TGF-ß in combination with neurotrophic factors, like GDNF or NGF, will be studied to establish their role in nervous system development and their therapeutic potential in brain repair. Specifically, we shall investigate such synergisms by utilising mouse mutants to understand the developmental role and by emplying genomic screens to identify new target genes for the establishment of new therapeutic strategies for human neurodegenerative disorders. Furthermore, as growth factors function not only in the decision of neuron survival or death, we shall explore their morphogenetic and differentiation capacities employing the powerful potential of embryonic (ES) and CNS stem cells.

Selected Recent Publications:

Krieglstein K, Henheik P, Farkas L, Jaszai J, Galter D, Krohn K, Unsicker K (1998) GDNF requires TGF-ß for establishing its neurotrophic activity. J Neurosci 18: 9822-9834

Schober A, Hertel R, Arumäe U, Farkas L, Jaszai J, Krieglstein K, Saarma M, Unsicker K (1999) GDNF rescues target-deprived spinal cord neurons but requires TGF-ß as co-factor *in vivo*. J Neurosci 19: 2008-2015

Krieglstein K, Richter S, Farkas L, Schuster N, Dünker N, Oppenheim R W, Unsicker K (2000) Reduction of endogenous transforming growth factor beta prevents ontogenetic neuron death. Nature Neuroscience 3: 1085-1091

Peterziel H, Unsicker K, Krieglstein K (2002) TGFbeta induces GDNF responsiveness in neurons by recruitment of GFRalphal to the plasma membrane. J Cell Biology 159: 157-167

Farkas L, Dünker N, Roussa E, Unsicker K, Krieglstein K (2003) Transforming growth factor-beta(s) are essential for the development of midbrain dopaminergic neurons *in vitro* and *in vivo*. J Neurosci. 23: 5178-5186

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Professor of Microbiology

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1986 - 1988 Postdoctoral Fellow, Massachusetts Institute of Technology, Cambridge, MA, USA
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Major Research Interests:

One of the main interests of our group is the analysis of polysaccharide and oligosaccharide breakdown and utilization by microorganisms. In the last few years, we have focussed our work on xylan and starch degrading enzyme systems from hyperthermophiles, i. e. organisms that grow optimally at 80°C or higher. These organisms represent very deep branches within the prokaryotic lineages of the phylogenetic tree of organisms. We are interested in unusual glycosyl hydrolases and transferases from *Thermotoga maritima*, the model organism of hyperthermophilic bacteria. Current projects are aimed at the elucidation of the biochemical properties, the molecular structure and catalytic mechanism, the function(s) of non-catalytic domains, and the cellular localization of selected enzymes of *T. maritima*. Other projects in the field of extremophilic microorganisms deal with the enzymology and molecular biology of thermoalkaliphiles and thermoacidophiles. We are presently engaged in the analysis of the genome sequence and of selected enzymes of the extreme thermoacidophilic archaeon *Picrophilus torridus*.
Another group of bacteria studied in the laboratory are the Gram-positive bacteria with a high G+C content. We employ molecular biological techniques to study and modify physiological traits of amino acid-producing corynebacteria and micrococci.
Also, the group is interested in the characterization of genome (metagenome) structures of various microbial habitats (PD Dr. W. Streit, PD Dr. R. Daniel). DNA libraries are constructed from microbial consortia and biofilms in order to explore the genetic diversity of the different environments. Also, classical activity-based screens are used for the isolation of novel enzymes useful for biotechnology.

Selected Recent Publications:

Meissner K, Wassenberg D, Liebl W (2000) The "thermostabilising domain" of the modular xylanase XynA of the hyperthermophilic bacterium *Thermotoga maritima* represents a novel xylan-binding domain. Mol Microbiol 36: 898-912

Entcheva P, Liebl W, Johann A, Hartsch T, Streit W (2001) Direct cloning from enrichment cultures, a reliable strategy for isolation of complete operons and genes from microbial consortia. Appl Environ Microbiol 67: 89-99

Daniel R (2002) Construction of environmental libraries for functional screening of enzyme activity. In: Directed molecular evolution of proteins. K. Johnson, S. Brakmann (eds.), pp. 63-78, Wiley-VCH, Weinheim.

Liebl W, Kloos WE, Ludwig W (2002) Plasmid-borne macrolide resistance in *Micrococcus luteus*. Microbiology 148: 2479-2487

Raasch C, Armbrecht M, Streit W, Höcker B, Sträter N, Liebl W (2002) Identification of residues important for NAD^+-binding by the *Thermotoga maritima* α-glucosidase AglA, a member of glycoside hydrolase family 4. FEBS Lett 517: 267-271

Lodge JA, Maier T, Liebl W, Hoffmann V, Sträter N (2003) Crystal structure of Thermotoga maritima α-glucosidase AglA defines a new clan of NAD^+-dependent glycosidases. J Biol Chem 278: 19151-19158

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Dr. rer. nat (Ph. D.), University of Münster (1975)
Research group leader, Max Planck Institute for Molecular Genetics, Berlin (1981 - 1988)
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Major Research Interests:

Introns are removed from nuclear pre-mRNAs by the spliceosome, a large ribonucleoprotein complex that is formed by interaction of the pre-mRNA with small nuclear ribonucleoproteins (snRNPs U1, U2, U4/U6 and U5) and more than 100 non-snRNP splicing factors. Assembly and subsequent dismantling of the spliceosome proceeds sequentially by way of several intermediate complexes that differ in their composition and in the interactions between their components. Thus the spliceosome is a highly dynamic molecular machine, undergoing major structural changes during its assembly and catalytic action. We are pursuing two major goals. The first one concerns the question of how the spliceosome specifically recognizes and binds introns and discriminates them from exons. Second, we aim at a structural and mechanistic understanding of the catalytic core of the spliceosome to answer the question whether the spliceosome is a ribozyme or whether proteins also function at the catalytic core. As a prerequisite, we have established novel affinity-based methods to isolate and study spliceosomal complexes at defined functional stages (e. g. pre-catalytic as well as catalytically activated spliceosomes). These methods, as well as chemical RNA structure probing and site-directed crosslinking techniques combined with high throughput mass spectrometry are being used to chart the dynamics of the RNA-RNA, RNA-protein and protein-protein network of the spliceosome during its action cycle. The role of the spliceosomal proteins in the assembly of the spliceosome and in promoting the formation of the catalytic core is being investigated by RNA interference in vivo and in vitro in HeLa, nuclear splicing extracts, using biochemical methods. Ultimately, we aim to reconstitute the spliceosome from purified snRNPs and splicing factors. In addition, we are investigating the 3D structure of spliceosomal complexes using high resolution cryo-electron microscopy and x-ray crystallography.
A third interest of my group is related to the cell biology of the splicing machinery. Specifically we would like to understand the role of certain nuclear compartments such as "cajal bodies" and "speckles" in the assembly, transport and recycling of spliceosomal RNP complexes employing microinjection in combination with RNA interference, as well as high resolution light microscopy techniques.

Selected Recent Publications:

Will CL, Schneider C, Reed R, Lührmann R (1999) Identification of both shared and distinct proteins in the major and minor spliceosomes. Science 284: 2003-2005

Watkins NJ, Segault V, Carpentier B, Nottrott S, Fabrizio P, Bachi A, Wilm M, Rosbash M, Branlant C, Lührmann R (2000) A common core RNP structure shared between the small nuclear box C/D RNPs and the spliceosomal U4 snRNP. Cell 103: 457- 466

Will CL, Lührmann R (2001) Spliceosomal U snRNP biogenesis, structure and function. Current Op Cell Biol 13: 290-301

Hartmuth K, Urlaub H, Vornlocher HP, Will CL, Gentzel M, Wilm M, Lührmann R (2002) Comprehensive analysis of the protein composition of native, human prespliceosomes isolated by a novel tobramycin affinity-selection method. Proc Natl Acad Sci 99: 16719-16724

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

Golas M.M, Sander B, Will CL, Lührmann R, Stark H (2003) Molecular architecture of the multiprotein splicing factor SF3b. Science 300: 980-984

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Molecular Developmental Genetics

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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

Major Research Interests:

Molecular mechanisms of mammalian development and stem cell biology

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

Selected Recent Publications:

Friedrichsen S, Christ S, Heuer H, Schafer MK, Mansouri A, Bauer K, Visser TJ (2003) Regulation of iodothyronine deiodinases in the Pax8-/- mouse model of congenital hypothyroidism. Endocrinology. 144(3): 777-84

Collombat P, Mansouri A, Hecksher-Sorensen J, Serup P, Krull J, Gradwohl G, Gruss P (2003) Opposing actions of Arx and Pax4 in endocrine pancreas development. Genes & Dev 17(20): 2591-2603

Treichel D, Schöck F, Jäckle H, Gruss P, Mansouri A (2003) mBtd is required to maintain signaling during murine limb development. Genes & Dev 17(21), in press

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

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 Senior Scientist at 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
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Major Research Interests:

The focus of our work is on algorithm development for comparative DNA and protein sequence analysis. We are particularly interested in multiple sequence alignment; the alignment program DIALIGN is developed and maintained by our department.

In recent years, alignment of large genomic sequences became a powerful tool for genome analysis and annotation, it has been used to detect functional elements such asgenes or regulatory sites and to identify signature sequences for pathogen microorganisms. We are developing novel alignment approaches that combine sensitivity and speed for long-range genomic alignment.

Other areas of interest are phylogeny reconstruction and gene prediction. Here, we combine new homology-based approaches with more traditional Hidden Markov Models for improved gene-prediction accuracy.

Selected Recent Publications:

Morgenstern B, Rinner O, Abdeddaïm S, Haase D, Mayer K, Dress A, Mewes HW (2002) Exon Discovery by Genomic Sequence Alignment. Bioinformatics 18: 777-787.

Brudno M, Morgenstern B (2002) Fast and sensitive alignment of large genomic sequences. Proceedings IEEE Computer Society Bioinformatics Conference, Stanford University, pp. 138-147.

Rinner O, Morgenstern B (2002) AGenDA: Gene prediction by comparative sequence analysis. In Silico Biology 2: 119-205.

Morgenstern B, Atchley WR (1999) Evolution of bHLH transcription factors: modular evolution by domain shuffling? Mol. Biol. Evol. 16: 1654-1663.

Morgenstern B, Dress A, Werner T (1996) Multiple DNA and protein sequence alignment based on segment-to-segment comparison. Proc. Natl. Acad. Sci. USA 93: 12098-12103

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1991 - 1993 Postdoctoral fellow, ETH Zürich, Switzerland
1993 - 1996 Postdoctoral fellow, Whitehead Institute for Biomedical Research, Cambridge (MA), U.S.A.
2001 Habilitation (Microbiology & Genetics), Georg-August-University, Göttingen, Germany
Since 2003 Professor of Genetics and Microbiology, Georg-August-University, Göttingen, Germany

Major Research Interests:

Signal Transduction and Cell Polarity in Fungal Development

The development of metazoa from unicellular organisms represents one of the landmarks in evolution. Many pathogenic fungi are able to perform a transition in life cycle - termed "dimorphism" - from a unicellular yeast-form to a multicellular filamentous form. In human fungal pathogens, dimorphism is a significant virulence factor. A clear understanding of the gene products involved in hyphal growth is a promising avenue to provide molecular targets for drug development.

We are studying dimorphism in the baker's yeast *Saccharomyces cerevisiae*, one of the most well studied model systems for molecular genetic analysis and genomics. Pseudohyphal growth of *S. cerevisiae* is initiated by the nutritional signal nitrogen starvation and is accompanied by changes in cell polarity and morphogenesis. The budding pattern of cells changes, resulting in linear filamentous chains of cells. Cell morphogenesis is altered from ellipsoidal shaped yeast form cells to long thin pseudohyphal cells. Therefore, yeast and pseudohyphal forms of *S. cerevisiae* are thought to be distinct cell types.

We are investigating the genes and gene products that constitute the signaling pathways transducing environmental stimuli and that establish and regulate cell polarity during pseudohyphal development. Specifically, we are interested in the role of small GTP-binding proteins of the Ras superfamily as molecular switches of intracellular signaling. We are analyzing the molecular mechansims, by which the Ras2p and Cdc42p GTPases control intracellular signaling cascades during pseudohyphal development. These pathways include a pseudohyphal-specific mitogen-activated protein kinase (MAPK) cacade and the cyclic AMP (cAMP) pathway of *S. cerevisiae*.

In a further project, we investigate the identity and function of molecular landmarks that control selection of cell division sites. We are studying the molecular mechanisms, by which two asymmetrically localized proteins, Bud8p and Bud9p, regulate the function of Rsr1p, a small GTPase that acts as central regulator of yeast cell polarity.

Selected Recent Publications:

Roberts R, Mösch HU, Fink GR (1997) 14-3-3 proteins are essential for RAS/MAPK cascade signaling during pseudohyphal development in *S. cerevisiae*. Cell 89: 1055-1065

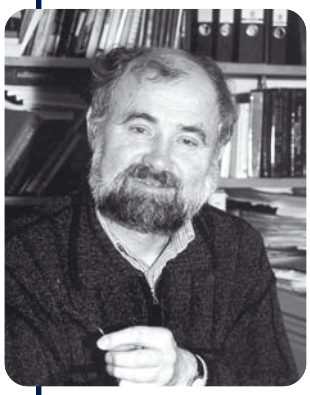
Mösch HU (2000) Pseudohyphal growth of *Saccharomyces cerevisiae*. Contrib Microbiol 5: 185-200

Taheri N, Köhler T, Braus GH, Mösch HU (2000) Asymmetrically localized Bud8p and Bud9p proteins control yeast cell polarity and development. EMBO J 19: 6686-6696

Mösch HU, Köhler T, Braus GH (2001) Different domains of the essential Rho-type GTPase Cdc42p required for growth and development of *S. cerevisiae*. Mol Cell Biol 21: 235-248

Köhler T, Wesche S, Taheri N, Braus GH, Mösch HU (2002) Dual role of the TEA/ATTS family transcription factor Tec1p in regulation of gene expression and development. Eukaryot Cell, in press

Erwin Neher



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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)
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Major Research Interests:

Molecular Mechanisms of Exocytosis, Neurotransmitter Release, and Short Term Synaptic Plasticity

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

Selected Recent Publications:

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

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

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

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

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

Soerensen J, Nagy G, Varoqueaux F, Nehring RB, Brose N, Wilson MC, Neher E (2003) Differential control of the releasable vesicle pools by SNAP-

Voets T, Moser T, Lund P-E, Chow RH, Geppert M, Suedhof TC, Neher E (2001) Intracellular calcium dependence of large dense-core vesicle exocytosis in the absence of synaptotagmin I. PNAS 98: 11680-11680

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PhD, Pennsylvania State University, State College, Pa, 1967
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Positions:
MRC Laboratory Molecular Biology, Cambridge, England, 1969 - 1972
Cold Spring Harbor Laboratory, CSH, NY, 1972 - 1975
Max Planck Institute for Biophysical Chemistry, 1975
Honorary Professor, University of Göttingen, 1989
Doctorate "honoris causa", Pomeranian Medical Academy, Szczecin, Poland 1997

Major Research Interests:

Cellular organisation is based on a complex series of events involving gene expression, signal transduction, membrane traffic and the function of dynamic cytoskeletal networks. This department has pioneered the use of antibodies in immunofluorescence microscopy to understand the distribution and function of the two ubiquitous filament systems - microfilaments and microtubules - which have as their major proteins actin and tubulin respectively. Antibodies also allowed us to show that intermediate filaments in different cell types are built from distinct but related proteins. Applying this knowledge we showed that intermediate filament proteins are useful markers in differential tumor diagnosis, where they can distinguish the major tumor types
Certain antibodies also allow a particular cytoskeletal organisation to be manipulated. When microinjected into live cells they not only find their target but also disturb the organisation creating a new phenotype which can be detected by immunofluorescence microscopy. Fine analyses of complexes within particular supermolecular organisations have been helped by the use of recombinantly expressed proteins or their individual domains. These can be analysed *in vivo* by transfecting the corresponding cDNA constructs into cultured cells. A more recent way to disturb the function of proteins in cells is to use RNA interference.
One example of this approach is work on NuMA. NuMA is an insoluble protein during interphase and translates to the spindle poles at mitosis. Microinjection of a particular NuMA antibody causes the formation of aberrant spindles and mitotic arrest as well as resulting in the formation of micronuclei. Transient overexpression of NuMA in HeLa cells also induced the formation of a three-dimensional lattice that fills the nucleus of interphase cells. This lattice can be observed by electron microscopy and use of mutant constructs showed that the lattice spacing is dependent on the length of the rod domain. *In vitro* experiments show that recombinant NuMA builds multiarm oligomers. Computer modeling with a 12-arm oligomer as the structural unit can explain the observed nuclear lattices and suggests that the same mechanism might be used to build more restricted NuMA lattices in normal cells. Other experiments have shown that GAS 41 binds to NuMA, and that knockdown of NuMA by RNA interference leads to apoptosis.
Thus, the research interests of the group are in the general area of cell biology and pathology - more specifically in certain proteins of the cell nucleus, in the cytoskeleton, and in the use of antibodies in cancer diagnosis. Currently a major emphasis is directed towards using RNA interference to assay protein function.

Selected Recent Publications:

Gueth-Hallonet C, Wang J, Harborth J, Weber K, Osborn M (1998) Induction of a regular nuclear lattice by overexpression of NuMA. Exp Cell Res 243: 434-452

Harborth J, Wang J, Gueth-Hallonet C, Weber K, Osborn M (1999) Self assembly of NuMA: multiarm oligomers as structural units of a nuclear lattice. EMBO J 18: 1689-1700

Harborth J, Weber K, Osborn M (2000) GAS41, a highly conserved protein in eukaryotic nuclei, binds to NuMA. J Biol Chem 275: 31979-31985

Osborn M (1998) Immunofluorescence microscopy of cultured cells. In: Cell Biology: A Laboratory Handbook, Academic Press: 462-468

Harborth J, Elbashir S, Beckert K, Tuschl T, Weber K (2001) Identification of essential genes in cultured mammalian cells using small interfering RNAs. J Cell Sci 114: 4557-4565

Tomas Pieler

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Heisenberg fellow, Freie Universität Berlin and Rockefeller University, New York (1986/87)
Junior group leader, Max Planck Institut für Molekulare Genetik, Berlin (1988 - 92)
Professor of Biochemistry, Georg August Universität Göttingen (since 1992)
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Major Research Interests:

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

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

Selected Recent Publications:

Souopgui J, Sölter M, Pieler T (2002) Xpak3 promotes cell cycle withdrawal during primary neurogenesis in *Xenopus laevis*. EMBO J 21: 6429-6439

Chen Y, Jürgens K, Hollemann T, Claußen M, Ramadori G, Pieler T (2003) Cell-autonomous and signal-dependent expression of liver and intestine marker genes in endodermal precursor cells from *Xenopus* embryos. Mech Dev 120: 277-288

Perron M, Boy S, Amato MA, Viczian A, Koebernick K, Pieler T, Harris WA (2003) A novel function for Hedgehog-signalling in retinal pigment epithelium differentiation. Development 130: 1565-1577

Irmelin Probst

Professor of Biochemistry

Diploma (Biology), Georg-August-University, Göttingen (Germany), 1972
Dr. rer. nat., Dep. Microbiology, University Göttingen, 1975
Postdoctoral Fellow University of Illinois , Urbana, USA, 1977/78
Postdoctoral Fellow University of California, Berkeley, USA, 1978/79
Habilitation (Biochemistry), Dep. Biochemistry, University Göttigen, 1986
apl. Professor, Dep. Biochemistry, Univ. Göttingen since 1993

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Major Research Interests:

Hepatocytes, the parenchymal cells of the liver, exert fundamental metabolic tasks (glucose homeostasis, urea and plasma protein production, biotransformation); gene expression and thus metabolic rates are tightly controlled by a network of signals from nerves, hormones and neighbouring liver non-parenchymal stromal cells (endothelium, macrophages, fat-storing perisinusoidal cells).

The research of the Dep. Biochemistry I focusses on hepatic metabolic regulation and on glucose resorption by the gut. Experiments aim to understand mechanisms of the whole organism using biochemical/molecular biology techniques with cultured cells as well as joint organ perfusions and the whole organism. At present the main research areas are:

- Regulation of defense reactions in the liver under normal and inflammatory conditions
- Oxygen as regulator of gene expression
- Intestinal glucose absorption: Modulation by hormones and nerves
- Cell-cell communication in the processes of hepatic differentiation and proliferation

Selected Recent Publications:

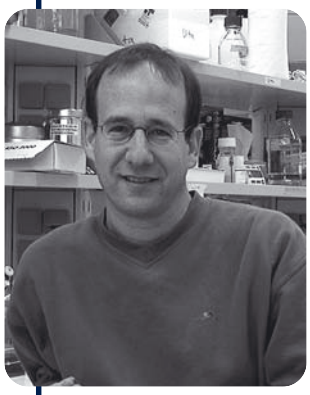
Koleva M, Schlaf G, Jungermann K, Götze O, Landmann R, Schieferdecker HL (2002) Induction of anaphylatoxin C5a receptors in rat hepatocytes by lipopolysaccharide *in vivo*: Mediation by interleukin-6 from Kupffer cells. Gastroenterology 122: 697-708

Samoylenko A, Roth U, Jungermann K, Kietzmann T (2001) The upstream stimulatory factor-2a inhibits the plasminogen activator inhibitor-1 gene expression by binding to promotor element adjacent to the hypoxia inducible factor-1 binding site. Blood 97: 2657-2666

Stümpel F, Burcelin R, Jungermann K, Thorens B (2001) Normal kinetics of intestinal glucose absorption in the absence of GLUT2: evidence for a transport pathway requiring glucose phosphorylation and transfer into the endoplasmic reticulum. Proc Natl Acad Sci USA 98: 11330-11335

Ries K, Krause P, Solsbacher M, Schwartz P, Unthan-Fechner K, Christ B, Markus PM, Probst I (2000) Elevated expression of hormone-regulated rat hepatocyte functions in a new serum-free hepatocyte-stromal cell coculture model. In Vitro Cell Dev Biol - Animal 36: 502-512

Erez Raz



Group Leader at the Max Planck Institute for Biophysical Chemistry

Ph.D. 1994, The Weizmann Institute of Science, Rehovot, Israel
Group leader at the University of Freiburg, Department of Developmental Biology, Freiburg, 1997
Group leader at the at the Max Planck Institute for Biophysical Chemistry

Major Research Interests:

We are using the zebrafish system to study the molecular mechanisms of cell migration and cell fate maintenance, two processes that are central for animal development (e.g. organogenesis) and are highly relevant for pathological conditions (e.g. cancer and inflammation).
Similar to other organisms, the primordial germ cells (PGCs) of zebrafish originate at positions that are distinct from the position where the gonad develops. Therefore, during early development the cells migrate through the embryo towards their target where they differentiate into sperm and eggs. During their migration the cells have to obtain directional cues from surrounding tissues and maintain their cellular identity. The molecular nature of the directional signals was revealed in a screen in which the chemokine receptor CXCR4b and its ligand SDF-1a were identified. SDF-1a is expressed in tissues towards which the PGCs migrate. Conversely, knocking down CXCR4b or SDF-1a leads to loss of directional migration resulting in random distribution of the PGCs within the embryo. Currently, we are analyzing the molecular mechanisms downstream and upstream of the receptor that transform the signal into directional cell movement. In addition, we are studying the molecular mechanisms of PGC fate maintenance and motility by analysing the function of a number of molecules whose function is essential for normal PGC behaviour and development.

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Selected Recent Publications:

Raz E (2003) Primordial germ-cell development: the zebrafish perspective. Nature Reviews Genetics 4: 690-700

Weidinger G, Stebler J, Slanchev K, Dumstrei K, Wise C, Lovell-Badge R, Thisse C, Thisse B, Raz E (2003) Dead end, a novel vertebrate germ plasm component, is required for zebrafish primordial germ cell migration and survival. Current Biology 13: 1429-1434

Raz E (2002) Primordial germ cell development in zebrafish. Semin Cell Dev Biol 13: 489-495

Doitsidou M, Reichman-Fried M, Stebler J, Köprunner M, Dörries J, Meyer D, Esguerra VC, Leung T, Raz E (2002) Guidance of primordial germ cell migration by the chemokine SDF-1. Cell 111: 647-659

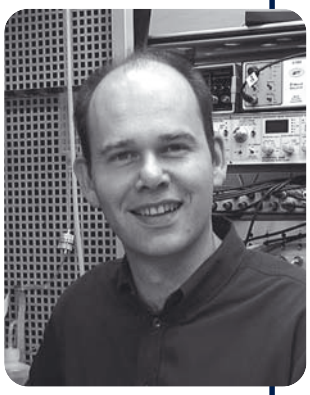
Ciruna B, Weidinger G, Knaut H, Thisse B, Thisse C, Raz E, Schier AF (2002) Production of maternal-zygotic mutant zebrafish by germ-line replacement. Proceedings of the National Academy of Science USA 99: 14919-14924

Raz E, Hopkins N (2002) Primordial germ-cell development in zebrafish. In Results Probl Cell Differ 40 Pattern Formation in Zebrafish. Ed. Solnica-Krezel, L. Springer-Verlag pp. 166-179

Wolke U, Weidinger G, Köprunner M, Raz E (2002) Multiple levels of posttranscriptional control lead to germline-specific gene expression in the zebrafish. Current Biology. 12: 289-294

Weidinger G, Wolke U, Köprunner M, Thisse C, Thisse B, Raz E (2002) Regulation of zebrafish primordial germ cell migration by attraction towards an intermediate target. Development 129: 25-36

Christian Rosenmund



Group Leader at the Max Planck Institute for Biophysical Chemistry

PhD Neurosciences, Vollum Institute, Portland, OR, USA 1993
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Helmholtz fellow, MPI for Biophysical Chemistry 1995 - 1997
Heisenberg fellow and independent group leader, Dept. Membrane Biophysics at the Max Planck Institute for Biophysical Chemistry, since 1998

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Major Research Interests:

Neurotransmission at the central synapse involves a series of functional highly coordinated steps. On the presynaptic site, synaptic vesicles tether, prime to fusion competence, and fuse Ca^{2+} triggered with the plasma membrane to release the neurotransmitter in the synaptic cleft. Postsynaptically, ionotropic receptors respond to binding of the neurotransmitter with distinct conformational steps that shape the postsynaptic response. We characterize synaptic properties with standard patch-clamp electrophysiology and optical techniques from cultured primary hippocampal neurons of transgenic mice that bear deletions or mutations of pre- or postsynaptic proteins. We have identified and/or characterized the vesicular neurotransmitter transporters VGLUT and VGAT, the vesicle priming factor Munc13, and the core complex associated proteins synaptotagmin 1 and complexin. Furthermore, knock-out mice are used to examine protein-domain and -residue function by gain of function rescue experiments by viral overexpression of wildtype and mutant proteins. Postsynaptically, we examine structural principles that control the gating properties of AMPA-type glutamate receptors.

Selected Recent Publications:

Varoqueaux F, Sigler A, Rhee SJ, Brose N, Enk C, Reim K, Rosenmund C (2002) Total arrest of spontaneous and evoked synaptic transmission but normal synaptogenesis in the absence of Munc13 mediated vesicle priming. PNAS 99: 9037-9042

Rosenmund C, Sigler A, Augustin I, Reim K, Brose N, Rhee JS (2002) Differential control of vesicle priming and short term plasticity by Munc13 isoforms. Neuron 33: 411-424

Rhee JS, Betz A, Pyott S, Reim K, Varoqueaux F, Augustin I, Hesse D, Südhof TC, Takahashi M, Rosenmund C, Brose N: β-phorbol ester- and diacylglycerol-induced augmentation of neurotransmitter release from hippocampal neurons is mediated by Munc13s and not by PKCs. Cell 108: 121-133

Mansour M, Nagarajan N, Nehring R, Clements J, Rosenmund C (2001) Heteromeric AMPA receptors assemble with a preferred subunit stoichiometry and spatial arrangement. Neuron 32: 841-853

Takamori S, Rhee JS, Rosenmund C, Jahn R (2000) Identification of a vesicular glutamate transporter that defines a glutamatergic phenotype in neurons. Nature 407: 189-94

Markus Rudolph

Junior Group Leader within the SFB 523

1995 Biochemistry Diploma, University of Bayreuth
1998 PhD, Max Planck Institute for Molecular Physiology, Dortmund & University of Bayreuth
1998 - 1999 Postdoc, Max Planck Institute for Molecular Physiology, Dortmund
1999 - 2002 Research Associate, The Scripps Research Institute, La Jolla, CA, USA
2002 Postdoc, Dept. of Molecular Structural Biology, Göttingen
Since 2003 independent junior group leader

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Major Research Interests:

Structural Aspects of Vesicular Transport

The research focus of the lab is on the structure and function of proteins involved in the regulation of vesicular transport of proteins in eukaryotic cells. X-ray crystallography is used to accurately determine the static structure of these proteins and their complexes. In addition, steady-state fluorescence and absorption spectroscopy are employed to gain thermodynamic and kinetic insight into the system under study. Both, structural and thermodynamic methods complement each other ideally to yield a more complete picture of the regulation processes involved in protein sorting than is possible from either approach alone. To accomplish our goals, a broad knowledge in molecular biology, biochemistry, spectroscopy, crystallography, and computational biology is vital.

Selected Recent Publications:

Rudolph MG, Wittinghofer A, Vetter IR (1999) Nucleotide binding to the G12V-mutant of Cdc42 investigated by X-ray diffraction and fluorescence spectroscopy: Two different nucleotide states in one crystal. Protein Science 8: 778-787

Wolan DW, Teyton L, Rudolph MG, Villmow B, Bauer S, Busch DH, Wilson IA (2001) Crystal structure of the murine NK cell activating receptor NKG2D at 1.95 Å resolution. Nature Immunology 3: 248-254

Rudolph MG, Linnemann T, Grünewald P, Wittinghofer A, Vetter IR, Herrmann C (2001) Thermodynamics of Ras/Effector and Cdc42/Effector interactions probed by isothermal titration calorimetry. J Biol Chem 276: 23914-23921

Rudolph MG, Kelker MS, Schneider TR, Yeates TO, Oseroff V, Heidary DK, Jennings PA, Wilson IA (2003) Use of multiple anomalous dispersion to phase highly merohedrally-twinned crystals of Interleukin-1ß. Acta Cryst D59: 290-298

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

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Privatdozent Microbiology

1989 Diploma (Biology), Philipps-University of Marburg, Germany
1992 Dr. rer. nat. (Microbiology) Philipps-University of Marburg, Germany
1993 Postdoctoral Fellow, Philipps-University Marburg, Germany
1994 - 1996 Postdoctoral Fellow, University of California, Berkeley, USA
Since 1996 group leader, Georg-August University of Göttingen, Department of Microbiology and Genetics
2001 Habilitation (Microbiology), Georg-August University of Göttingen

Major Research Interests:

The main interest of our group is the analysis of nitrogen metabolism in Prokarya. Our model organisms are the free-living nitrogen fixing bacterium *Klebsiella pneumoniae* and the methanogenic archaeon *Methanosarcina mazei* strain Gö1.

K. pneumoniae is able to reduce molecular nitrogen to ammonia under oxygen- and nitrogen-limitation. Synthesis of the key enzyme (nitrogenase) is regulated in response to environmental signals by the two regulatory proteins NifA and NifL. Our research is focused on the characterization of the oxygen and nitrogen signal transduction towards the two regulatory proteins by genetic, biochemical and molecular biological methods.

We further analyse the overall regulation of nitrogen metabolism in *M. mazei*. Besides classical genetic approaches our studies mainly concentrate on genome-wide transcription analysis using whole genome DNA-microarrays to analyze the regulatory network of nitrogen metabolism and potential cross talks between the nitrogen and carbon regulon in *M. mazei*.

Another interest of the laboratory together with the groups of Dr. Rolf Daniel and Dr. Wolfgang Streit is the construction of environmental libraries and screening for acquired abilities of the resulting recombinant organisms. It has been estimated that > 99 % of microorganisms observable in nature typically cannot be cultivated by using standard techniques. Thus, a large fraction of the diversity in an environment is still unknown. Our approach is to use the genetic diversity of the microorganisms in a certain environment as a whole to encounter new genes and gene products for various purposes. The genetic diversity is accessed by isolation of DNA followed by direct cloning of functional genes from environmental samples.

Selected Recent Publications:

Klopprogge K, Grabbe R, Hoppert M, Schmitz RA (2002). Membrane association of *Klebsiella pneumoniae* NifL is affected by molecular oxygen and combined nitrogen. Archives of Microbiology 117: 223-234

Ehlers C, Grabbe R, Veit K, Schmitz RA (2002) Characterization of GlnK1 from *Methanosarcina mazei* strain Gö1: Complementation of an *Escherichia coli* glnK mutant strain by *M. mazei* GlnK1. J Bacteriol 184: 1028-1040

Deppenmeier U, Johann A, Hartsch T, Merkl R, Schmitz RA, Lienard T, Henne A, Martinez-Arias R, Wiezer A, Jacobi C, Brüggemann H, Christmann A, Bäumer S, Bömeke M, Steckel S, Bhattacharyya A, Lykidis A, Overbeek R, Klenk HP, Gunsalus RP, Fritz HJ, Gottschalk G (2002) The genome of *Methanosarcina mazei*: evidence for lateral gene transfer between Bacteria and Archaea. J Mol Microbiol Biotechnol 4: 453-461

Grabbe R, Klopprogge K, Schmitz RA (2001) Fnr is Required for NifL-dependent Oxygen Control of nif Gene Expression in *Klebsiella pneumoniae*. Journal of Bacteriology 183: 1385-1393

Grabbe R, Schmitz RA (2003) Oxygen control of nif gene expression in *Klebsiella pneumoniae* is dependent on NifL reduction at the cytoplasmic membrane by electrons drived from the reduced quinone pool. European Journal of Biochemistry 270: 1555-1566

Schmeisser C, Stöckigt C, Raasch C, Wingender J, Timmis KN, Wenderoth DF, Flemming H-C, Liesegang H, Schmitz RA, Jaeger K-E, Streit WR (2003). Exploiting the metagenome of drinking water biofilms. Appl Environ Microbiol, in press.

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
Author of more than 700 scientific papers and of a computer program called SHELX (http://shelx.uni-ac.gwdg.de/SHELX/)
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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:

Schaefer M, Schneider TR, Sheldrick GM (1996) Crystal structure of vancomycin. Structure 4: 1509-1515

Sheldrick G M (1998) SHELX: applications to macromolecules. In Direct Methods for Solving Macromolecular Structures. Ed. S. Fortier. Dordrecht: Kluwer Academic Publisher pp. 401-411

Herbst-Irmer R, Sheldrick GM (1998) Refinement of twinned structures with SHELXL97. Acta Cryst B54: 443-449

Parasini E, Capozzi F, Lubini P, Lamzin V, Luchinat C and Sheldrick GM (1999) Ab initio solution and refinement of two high-potential iron protein structures at atomic resolution. Acta Cryst D55: 1773-1784

Usón I, Sheldrick GM (1999) Advances in direct methods for protein crystallography. Current Opinion in Structural Biology 9: 643-648

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

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Major Research Interests:

Our group is interested in the regulation of carbon and nitrogen metabolism in Gram-positive bacteria. We are following global ("post-genomic") and gene-specific approaches. Metabolism in *Bacillus subtilis* is studied by transcriptomics, protein arrays, and metabolome and fluxome analyses. Our specific interests are focussed on two key pathways: glycolysis and glutamate biosynthesis, the decisive link between carbon and nitrogen metabolism. We are studying three regulatory mechanisms of glycolysis: a controlled protein-RNA interaction, site-specific mRNA degradation and proteolysis. We discovered recently that genes for glutamate biosynthesis in *B. subtilis* are only expressed if rich carbon sources are available and we identified a regulatory protein-protein interaction that govern this sugar induction.
In another project, we study the regulation of gene expression in the pathogenic bacterium *Mycoplasma pneumoniae*. This is highly interesting because this bacterium is an important cause of pneumonia. Moreover, *M. pneumoniae* is one of the organisms with the smallest genetic equipment that is capable of independent life. Understanding *M. pneumoniae* means understanding life! So far, we have studied one of the few regulatory proteins of *M. pneumoniae* and determined its crystal structure. Interestingly, the mode of action of this protein is opposed to that of homologous proteins from other bacteria: a hint to the parasitic lifestyle of *M. pneumoniae*! We are now starting to study the metabolic responses of *M. pneumoniae* to the infection process. If we understand what happens upon infection, we may subsequently try to interrupt this chain of events.

Selected Recent Publications:

Stülke J, Hillen W (2000) Regulation of carbon catabolism in *Bacillus species*. Annu Rev Microbiol 54: 849-880

Ludwig H, Homuth G, Schmalisch M, Dyka FM, Hecker M, Stülke J (2001) Transcription of glycolytic genes and operons in *Bacillus subtilis*: Evidence for the presence of multiple levels of control of the gapA operon. Mol Microbiol 41: 409-422

Steinhauer K, Jepp K, Hillen W, Stülke J (2002) A novel mode of control of *Mycoplasma pneumoniae* HPr kinase/phosphatase activity reflects its parasitic life style. Microbiology 148: 3277-3284

Allen GS, Steinhauer K, Hillen W, Stülke J, Brennan RG (2003) Crystal structure of HPr kinase/phosphatase from *Mycoplasma pneumoniae.* J Mol Biol 326: 1203-1217

Blencke HM, Homuth G, Ludwig H, Mäder U, Hecker M, Stülke J (2003) Transcriptional profiling of gene expression in response to glucose in *Bacillus subtilis*: regulation of the central metabolic pathways. Metab Engn 5: 133-149

Schmalisch MH, Bachem S, Stülke, J (2004) Control of the *Bacillus subtilis* antiterminator protein GlcT by phosphorylation: Elucidation of the phosphorylation chain leading to inactivation of GlcT. J Biol Chem, in press. (doi:10.1074/jbc.M309972200)

Michael Thumm

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1997 Habilitation (Biochemistry), University of Stuttgart

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Major Research Interests:

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

Selected Recent Publications:

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

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

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

Barth H, Meiling-Wesse K, Epple UD, Thumm M (2002) Mai1p is essential for maturation of proaminopeptidase I but not for autophagy. FEBS Lett 512: 173-179

Markus Wahl

Ph.D. - Group Leader at the Max Planck Institute for Biophysical Chemistry

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

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Major Research Interests:

The three main steps of gene expression, transcription, pre-mRNA splicing and translation, are carried out by multi-component enzymes, which are, respectively, the RNA polymerases, the spliceosome and the ribosome. In addition, the catalytic cycles of these molecular machines are guided or modulated by large numbers of auxiliary factors. Our research group uses X-ray crystallography to study in atomic detail structures of proteins, RNAs and macromolecular complexes, which are part of these gene expression machineries. Along one strategy, we attempt to explore recombinantly produced individual components and lower order assemblies. Another goal is the investigation of natively purified spliceosomal small nuclear ribonucleoprotein particles (snRNPs), snRNP aggregates and multi-component sub-complexes of the snRNPs. In particular the work on pre-mRNA splicing is conducted in close cooperation with the laboratory of R. Lührmann.

Selected Recent Publications:

Jauch R, Bourenkov GP, Chung HR, Urlaub H, Reidt U, Jäckle H, Wahl MC (2003) The zinc finger associated domain of the *Drosophila* transcription factor Grauzone is a novel zinc-coordinating protein-protein interaction module. Structure 11: 1393-1402

Zengel JM, Jerauld A, Walker A, Wahl MC, Lindahl L (2003) The extended loops of ribosomal proteins L4 and L22 are not required for ribosome assembly or L4-mediated autogenous control. RNA 9: 1188-1197

Reidt U, Wahl MC, Fasshauer D, Horowitz D, Lührmann R, Ficner R (2003) Crystal structure of a complex between human spliceosomal cyclophilin H and a U4/U6 snRNP-60k peptide. Journal of Molecular Biology 331: 45-56

Steiner T, Kaiser JT, Marinkovic S, Huber R, Wahl MC (2002) Crystal structures of transcription factor NusG in light of its nucleic acid- and protein-binding activities. EMBO Journal 21: 4641-4653

Gabashvili IS, Gregory ST, Valle M, Grassucci R, Worbs M, Wahl MC, Dahlberg AE, Frank J (2001) The polypeptide tunnel system in the ribosome and its gating in erythromycin resistance mutants of L4 and L22. Molecular Cell 8: 181-188

Worbs M, Bourenkov GP, Bartunik HD, Huber R, Wahl MC (2001) An extended RNA binding surface through arrayed S1 and KH domains in transcription factor NusA. Molecular Cell 7: 1177-1189

Worbs M, Huber R, Wahl MC (2000) Crystal structure of ribosomal protein L4 shows RNA binding sites for ribosome incorporation and feedback control of the S10-operon. EMBO Journal 19: 807-818

Wahl MC, Bourenkov GP, Bartunik HD, Huber R (2000) Flexibility, conformational diversity, and two dimerization modes in complexes of ribosomal protein L12 from *Thermotoga maritima*. EMBO Journal 19: 174-186

Professor of Developmental Biology

1991 Diplom (Biology), Ludwig Maximilians University, Munich (Germany)
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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)
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Major Research Interests:

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

Selected Recent Publications:

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

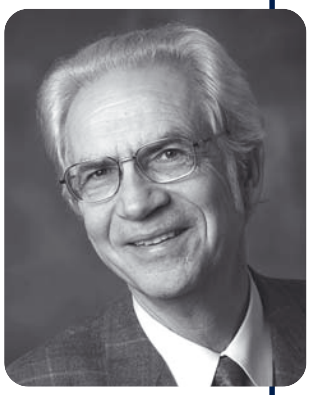
Ito J, Ghosh A., Moreira LA, Wimmer EA, Jacobs-Lorena M (2002) Transgenic anopheline mosquitoes impaired in transmission of a malaria parasite. Nature 417: 452-455

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

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

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

Axel Zeeck



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Major Research Interests:

Natural products chemistry and biochemistry

Microorganisms are an important source for novel natural products, such as antibiotics and other active substances. For the isolation of chemically new and biologically active compounds we especially use actinomycetes and fungi imperfecti. In the search for new secondary metabolites two approaches have been applied successfully, both, the biological and chemical screening. For the latter we use TLC with different types of staining reagents or HPLC with varying detection methods (UV, MS, CD) to record all metabolites produced in the culture extracts. Most of the strains evaluated were isolated from earth samples and cultivated up to 50-litre fermenters in my group.

The chemical work starts with the isolation and structure elucidation of the novel natural products. Structural problems were solved by using modern spectroscopic methods (e.g. MS, high field 2D-NMR, X-ray analysis). We have established several hundreds of metabolites, which belong to different chemical classes (e.g. peptides, macrolides, quinones, glycosides, polyenes). Further investigations focus on the biosynthesis of the novel compounds, starting with feeding experiments with stable isotope precursors. We are interested in new biosynthetic pathways and try to modify the metabolites by applying the precursor-directed biosynthesis and by changing the cultivation conditions. The biological activity of our metabolites and derivatives is established in different test systems, mostly in cooperation with colleagues and industry.

Selected Recent Publications:

Bode HB, Zeeck A (2000) Structure and biosynthesis of kendomycin, a carbocyclic ansa-compound from *Streptomyces*. J Chem Soc Perkin Trans 1: 323-328, 2665-2670

Höfs R, Walker M, Zeeck A (2000) Hexacyclinic acid, a polyketide from *Streptomyces* with a novel carbon skeleton. Angew Chem Int Ed Engl 39: 3258-3261

Dröse S, Boddien C, Gassel M, Ingenhorst G, Zeeck A, Altendorf K (2001) Semisynthetic Derivatives of Concanamycin A and C, as Inhibitors of V- and P-Type ATPases: Structure-Activity Investigations and Developments of Photoaffinity Probes. Biochemistry 40: 2816-2825

Bode HB, Bethe B, Höfs R, Zeeck A (2002) Big Effects from Small Changes: Possible Ways to Explore Nature's Chemical Diversity. Chem Bio Chem 3: 619-627

Martin Zeidler

Group Leader at the Max Planck Institute for Biophysical Chemistry

DPhil, EMBL, Heidelberg, Germany 1995
Postdoc Work with Prof. Norbert Perrimon, Harvard Medical School, Boston, USA
Emmy Noether Prize Holder at the Max Planck Institute for Biophysical Chemistry since 2001

Major Research Interests:

The fruit fly *Drosophila melanogaster* is a model organism that combines sophisticated genetics and well understood development in a small, fast, easy to manipulate package. Our group is using this system to study the components and requirements for the JAK/STAT signal transduction pathway. The JAK/STAT pathway is involved in blood cell production and the immune response in vertebrates and its mis-activation has been implicated in a number of cancers and leukemias. We are following two complementary approaches to better understand this important pathway. Firstly, we are using the genetics of *Drosophila* to identify new components of the pathway and gene products that interact and regulate the pathway. Traditional "forward" genetic screens and tissue culture based RNAi screens are being undertaken. Secondly, the developmental processes that require JAK/STAT signalling are being investigated and characterised. In this way we can hope to better understand what the pathway does and with what other signal transduction pathways it interacts with. The results from this research is being integrated with what is already known to extend our understanding of the pathway.

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Selected Recent Publications:

Zeidler MP, Bach EA, Perrimon N (2000) The roles of the JAK/STAT pathway in *Drosophila*. Oncogene 19: 2589-2606

Zeidler MP, Perrimon N, Strutt DI (1999) Four-jointed is required in the *Drosophila* eye for ommatidial polarity specification. Current Biology 9: 1363-1372

Zeidler MP, Perrimon N, Strutt DI (1999) Polarity determination in the *Drosophila* eye: a novel role for Unpaired and JAK/STAT signalling. Genes & Develop 13: 1342-1353

Karsten P, Häder S, Zeidler MP (2002) Cloning and expression of *Drosophila* SOCS36E and its potential regulation by the JAK/STAT pathway. MOD 117: 343-346

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Notes