YEARBOOK

2000
2001

International
Master's/PhD Program

MOLECULAR BIOLOGY

International
Max Planck Research School

Göttingen,
Germany

Introduction

The Yearbook 2000/2001 is intended to inform about the new international M.Sc./Ph.D. program *Molecular Biology* in Göttingen, Germany which started in October 2000 for the first time. Both students and teaching faculty are introduced on the following pages together with some general information regarding the program.

The program is carried out by the Georg August University of Göttingen and the Max Planck Institute for Biophysical Chemistry. The participating departments and working groups of the University of Göttingen are joined together in the Göttingen Center for Molecular Biosciences (GZMB). The contribution to the program by the Max Planck Institute for Biophysical Chemistry is through the newly established International Max Planck Research School. The entire program is based on close cooperation between the two partner institutions.

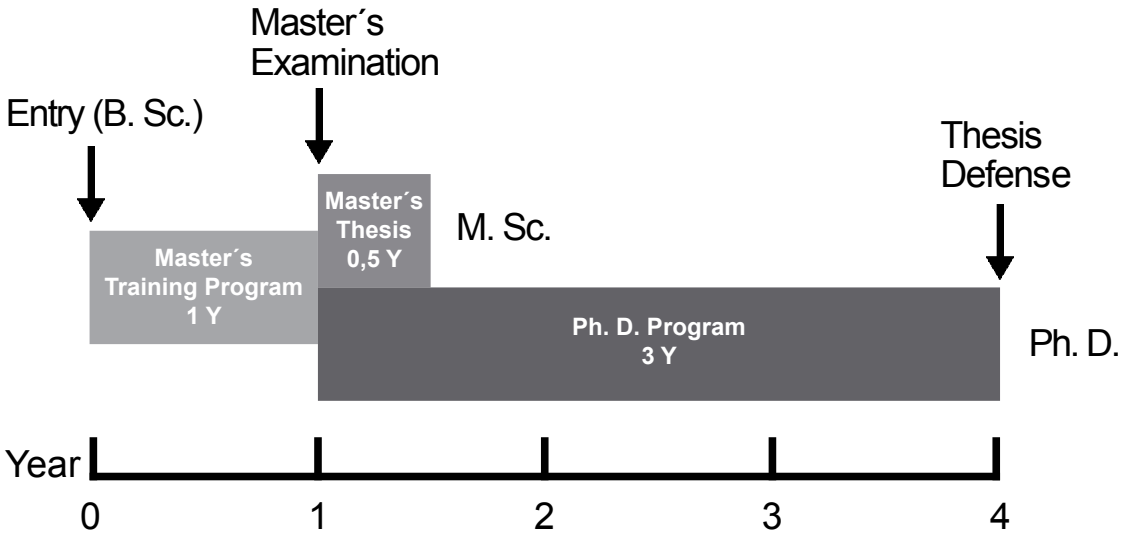
Funding

- Deutscher Akademischer Austauschdienst (DAAD), Bonn, Germany
- Max-Planck-Gesellschaft zur Förderung der Wissenschaften, München, Germany
- Niedersächsisches Ministerium für Wissenschaft und Kultur, Hannover, Germany

- Bayer AG, Leverkusen, Germany
- Bertha Heraeus und Kathinka Platzhoff Stiftung, Hanau, Germany
- DeveloGen AG, Göttingen, Germany
- IBA GmbH, Göttingen, Germany
- KWS Saat AG, Einbeck, Germany
- Sartorius AG, Göttingen, Germany
- Solvay Pharmaceuticals, Hannover, Germany
- Stifterverband für die Deutsche Wissenschaft, Essen, Germany

Overview

The University of Göttingen and the Max Planck Institute for Biophysical Chemistry offer an international graduate and postgraduate program in molecular biology leading to a Master of Science (M.Sc.) degree and a Ph.D./Dr.rer.nat. degree, respectively. The M.Sc. program comprises a one-year teaching program, followed by six months for the M.Sc. thesis based on an experimental research project. Alternatively, students may enter the three-years Ph.D. program directly (without a M.Sc. thesis) after successful completion of the first-year M.Sc. teaching program.



The intensive, research oriented M.Sc./Ph.D. program is taught by internationally renowned scientists. To assure individual training on a high standard, the number of participants in the program is limited to 20 students per year. A special emphasis is put on individual training in small groups. All courses are taught in English.

M.Sc. Teaching Program

The teaching program consists of

- lectures
- tutorials
- method course
- lab rotations
- seminars

Lectures

A. Biochemistry and structural biology

- evolution of cellular systems
- structure of proteins
- principles of enzymatic reactions
- principles of energy metabolism
- structure of nucleic acids

B. Molecular genetics and biotechnology

- DNA replication and repair
- transcription, RNA processing
- translation, regulation, signal transduction
- bioinformatics, genomics, biotechnology

C. Functional organization of the cell

- membranes, intracellular compartments, protein sorting, vesicular transport
- cytoskeleton, extracellular matrix
- cell adhesion
- cell division cycle, meiosis, fertilization
- apoptosis
- signalling
- mitochondria, chloroplasts

D. Model systems of molecular biology

- archaea, bacteria, fungi
- *C. elegans*, *Arabidopsis*, *Drosophila*, *Xenopus*, chicken, mouse
- human genetics
- immune system
- viruses and cancer

Tutorials

The goal of the tutorials is to repeat and further discuss the topics of the lecture course and to assist students with different previous training to achieve a common level. Tutorials are organized in four small groups of five students each. Each lecturer organizes the tutorial of his or her lecture block.

Method Course

During the first nine weeks of the program, every student participates in a method course which consists of 18 two-day experiments. In these experiments the students are introduced to principles and practical aspects of basic scientific techniques and of the handling of model organisms.

I 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

II Proteins
- protein preparation and characterization by gel electrophoresis and Western blot
- chromatographic protein separation
- identification of proteins by mass spectrometry
- structural analysis of proteins
- *in vivo* and *in vitro* expression of recombinant proteins
- analysis of protein-protein and nucleic acid-protein interaction

III Cell Biology and Genetics
- light microscopy
- electron microscopy
- biochemical cell fractionation
- cell culture
- yeast genetics
- expression analysis/ whole mount *in situ* hybridisation/ detection of reporter activity

Lab Rotation

Lab rotations start in January and take place in various research laboratories of the participating faculty. Every student participates in three rotations each of which consist of a seven-weeks research project followed by one week for data analysis and presentation. For each block a protocol needs to be completed that has the format of a scientific research paper. The protocol is rated by two lecturers including the one in whose laboratory the respective block was carried out. The lab rotations must cover three different subjects out of the following disciplines:
- biochemistry and structural biology
- developmental biology and developmental physiology
- microbiology and genetics
- neurobiology
- cell biology and molecular pharmacology

Seminars

Seminars start in January. The entire class meets weekly for two hours to discuss two student presentations. The presentations are small research reports based on work carried out during the lab rotations.

Ph.D. Training Program

Students who have successfully completed the first year of the M.Sc. teaching program can directly be admitted to the three-years Ph.D. program without being required to complete a Master's thesis first.

During the Ph.D. training program, they carry out their scientific research work in the laboratory of one of the participating faculty members. Furthermore, the students attend a seminar (at least 10 credit points) which includes student presentations and which deals with current research topics of general interest.

During the first months of the Ph.D. training program the student selects the members of the thesis committee. The thesis committee should include at least three members, one of whom is the thesis supervisor in whose laboratory the research is carried out. At least one committee member needs to be selected from the members of the Graduate Program Committee. The main goal of the thesis committee is to monitor the progress of the work, to advise the student in his or her work, and to be available for discussions between the formal meetings. The thesis committee also decides whether the results suffice for a dissertation and whether the student is admitted to the thesis defense.

Application, Selection and Admission

Applicants must hold a Bachelor of Science (B.Sc.) degree, or equivalent, in biology, biochemistry, chemistry, medicine, or agriculture. Candidates are required to document their proficiency in English. The age limit for application is 27 years.

In 2000, the program office received 293 applications from 64 countries. All applications were reviewed by an admission committee which included senior faculty members of the program. Based on their academic qualifications and recommendations, candidates were selected for personal interviews in Göttingen, in their home country, or by telephone, respectively.

Application and Admission 2000

Continent		Number of Applicants	Number of Admissions
Europe (total)		**67**	**15**
	Germany	14	4
other	West Europe	14	1
	East Europe	39	10
America (total)		**15**	**1**
	North America	3	0
	Latin America	12	1
Africa(total)		**85**	**1**
	North Africa	14	0
	Central/South Africa	71	1
Asia (total)		**126**	**3**
	Near East	19	0
	Central Asia/ Far East	107	3
Australia		**0**	**0**

Orientation, Language Courses

A special four-weeks preparatory course is offered to foreign students before the M.Sc. teaching program starts. This course is intended to inform students about life in Göttingen, the university, and the M.Sc./Ph.D. program. Assistance and advice is provided during these weeks of orientation regarding bank account, health insurance, housing, residence permit, enrollment, internet access, etc. Furthermore, the preparatory course provides the opportunity to meet faculty members and to visit laboratories at the participating institutes.

An intensive basic language course (four hours per day) in German is offered during the orientation weeks in cooperation with the University of Göttingen, Lektorat Deutsch als Fremdsprache to facilitate the start in Göttingen. Additionally, the entire first year of the program is accompanied by German classes (two hours per week).

M.Sc. Students 2000/2001

Name	Highest Degree	Home Country
Solomon Afelik	B.Sc. (Hons) Biochemistry	Ghana
Yu Shan Chia	B.Sc. (Hons) Biochemistry	Malaysia
Vlad Cojocaru	B.Sc. Physics, Chemistry	Romania
M. Kasim Diril	B.Sc. Molecular Biology, Genetics	Turkey
Gizem Dönmez	B.Sc. Molecular Biology, Genetics	Turkey
Olexandr Dybkov	M.Sc. Genetics	Ukraine
Gabriella Ficz	B.Sc. Biochemistry	Romania
Jens Gruber	Vordiplom Biology	Germany
Ramazan Karaduman	B.Sc. Mol. Biol., Genetics, Chemistry	Turkey
Mariana Lagos Quintana	B.Sc. Biology (Biotechnology)	Mexico
Christine Lang	Vordiplom Biology	Germany
Steffen Lemke	Vordiplom Biology	Germany
Liyi Li	B.Sc. Molecular Biology	P.R. China
Lingfei Luo	B.Sc. Biochemistry	P.R. China
Olga Mikhailova	B.Sc. Developmental Biology	Russia
Agnieszka Patkaniowska	M.Sc. Biotechnology	Poland
Krasimir Slanchev	M.Sc. Molecular Biology	Bulgaria
Jürg Stebler	Chemistry HTL (B.Sc.)	Switzerland
Abdullah Yalcin	M.Sc. Molecular Biology, Genetics	Turkey
Daniel Zwilling	Vordiplom Biology	Germany

Solomon Afelik

First Name:
Solomon

Last Name:
Afelik

Date of birth:
7 May 1976

Country:
Ghana

EDUCATION

College / University:
University of Ghana-Legon (1996 - 2000)
Highest Degree:
B.Sc. (Hons.), biochemistry, June 2000
Major Subjects:
Biochemistry, molecular biology, organic chemistry, botany, zoology
Lab Experience:
Chemistry: separation of a mixture of organic compounds based on differences in their functional groups
Molecular Biology: basic techniques in molecular biology and genetics
Biochemistry: analytical techniques in biochemistry
Projects / Research:
Assessment of the effect of aqueous extract of *Khaya senegalensis* on antioxidant status of human serum (major project)

SCIENTIFIC INTERESTS AND GOALS:

My main interests are in general in the field of immunology, cancer research, and molecular biology. Finishing my Ph.D.

Yu Shan Chia

First Name:
Yu Shan

Last Name:
Chia

Date of birth:
16 January 1977

Country:
Malaysia

EDUCATION

College / University:
1997 - 2000: University of Malaya, Kuala Lumpur, Malaysia
Highest Degree:
B.Sc. (Honours) (Class I)
Major Subjects:
Biochemistry
Lab Experience:
Trained in biochemical analysis and molecular biology techniques
Projects / Research:
PCR based molecular discrimination of *Aspergillus flavus* strains
Publications:
PCR Analysis of *Ligninola laevis* and *Aspergillus flavus* using the ITS regions
2000, 4th UNESCO National Workshop on Promotion of Microbiology in Malaysia

SCIENTIFIC INTERESTS AND GOALS:

I'm interested in studying parasites and transmittable diseases with an emphasis on the malaria parasite. I hope to be able to join the collaborative efforts of the scientific community to produce an effective vaccine against the malaria parasite.

Vlad Cojocaru

EDUCATION

College / University:
1995 - 1999**:** West University Timisoara, Romania, Physics and Chemistry Department
Highest Degree:
B.Sc. in physics and chemistry, June 1999
Major Subjects:
Physics and chemistry
Lab Experience:
1995 - 1999: Wide variety of experimental techniques in general, analytical, physical, inorganic, and organic chemistry; mechanics, optics, electricity and electromagnetism, nuclear physics, thermodynamics
1999 - 2000: Master program: molecular modelling based on HYPERCHEM and SYBYL, molecular mechanics and dynamics, conformational search; initial experience with the QSAR-COMFA model
Projects / Research:
Master's project „Chemistry of biologically active compounds", chemistry department, West University Timisoara; participation in the QSAR-COMFA project on carcinogen metabolites from polycyclic aromatic hydrocarbons
Scholarships:
Scholarship for good marks during every semester of my studies

SCIENTIFIC INTERESTS AND GOALS:

Connection between chemistry and life: biochemistry, molecular biology, molecular modelling and in general computational biochemistry; as goals: working in a very good lab and a great scientific career in one of the fields mentioned above beginning with a Ph.D. degree here in Göttingen.

First Name:
Vlad

Last Name:
Cojocaru

Date of birth:
15 July 1976

Country:
Romania

Kasim Diril

EDUCATION

College / University:
1996 - 2000: Bogazici University, Istanbul, Dept. of Molecular Biology and Genetics
Highest Degree:
B. Sc. degree in molecular biology and genetics, June 2000, Dept. of Molecular Biology and Genetics, Bogazici University
Major Subjects:
Molecular and cellular biology, biochemistry, Mendelian and molecular genetics, organic chemistry, immunology
Lab Experience:
Basic training in genetics, biochemistry and molecular biology laboratories during my undergraduate education
Scholarships:
1989 - 1996: Turkish Educational Ministry´s Scholarship
1996 - 1999: Turkish Prime Ministry´s Honorary Scholarship
1996 - 2000: Bogazici University Foundation´s Scholarship
2000 / 2001: KWS Stipend

SCIENTIFIC INTERESTS AND GOALS:

My major scientific interests are immunology, molecular cancer biology, cell differentiation and commitment to lineages. I aim to obtain the necessary theoretical and practical skills which will enable me to achieve elite scientific research in the near future.

First Name:
Muhammed Kasim

Last Name:
Diril

Date of birth:
18 January 1978

Country:
Turkey

Gizem Dönmez

First Name:
Gizem

Last Name:
Dönmez

Date of birth:
17 April 1978

Country:
Turkey

EDUCATION

College / University:
1996 - 2000: Middle East Technical University
Highest Degree:
B.Sc., Dept. of Molecular Biology and Genetics, Middle East Technical University, June 2000
Major Subjects:
Molecular biology and genetics
Lab Experience:
Most of the molecular biology techniques, experience in genetics lab, bioanalytical chemistry lab, and microbiology lab (analyzing the quality of drugs by using special bacteria); 5-month project (Effect of Radiation on Rat Brain Membrane and Tissue) in biophysics lab
Projects / Research:
Graduation project about „Effect of Radiation on Rat Brain Membrane and Tissue“ and research project about „Tamoxifen“
Scholarships:
1996 - 2000: Scholarship of Sabanci Group Holding which is given to students who take the highest points in university entrance examinations
1996 - 2000: Scholarship of Turkey Scientific and Technical Research Corporation which is given to students who will be scientists and take the highest points in university entrance examinations

SCIENTIFIC INTERESTS AND GOALS:

After finishing Ph.D. in Göttingen, I would like continue with post doctorate studies.

Olexandr Dybkov

First Name:
Olexandr

Last Name:
Dybkov

Date of birth:
1 May 1976

Country:
Ukraine

EDUCATION

College / University:
1993 - 1998: Kiev Taras Shevchenko University, Ukraine
Highest Degree:
M. Sc. in Genetics
Major Subjects:
Biology, genetics
Lab Experience:
1993 - 1998: Lab courses at Kiev Taras Shevchenko University (genetics, biochemistry, microbiology, cytology, physiology, molecular biology, biophysics); Extraction of nucleic acids, restriction of DNA, electrophoresis, blotting, polymerase chain reaction, DNA fingerprint technique, G-banding of human chromosomes
Projects / Research:
1997: Bachelor diploma „Application of the DNA fingerprinting to paternity testing“ (Institute of Molecular Biology and Genetics)
1998: Master diploma „Molecular genetic certificating of inbred mice lines“ (Institute of Molecular Biology and Genetics)
1998 - 2000: Research assistant in the Research Centre of Radiation Medicine, AMS of Ukraine, Kiev
Scholarships:
1997: Grant from the Civilian Research and Development Foundation for the research work „Investigation of molecular genetic mechanisms of blast transformation in patients with chronic myelocytic leukemia (CML)“ (Institute of Molecular Biology and Genetics, Kiev and University of California at La Jolla)

SCIENTIFIC INTERESTS AND GOALS:

Genetics, molecular and cell biology are of primary interest to me. Especially attractive topics seem to be the changes of genetic material in ontogenesis and the regulation of gene activity. I aim to improve my theoretical knowledge and practical skills and to prepare and defend my Ph.D. thesis.

Gabriella Ficz

EDUCATION

College / University:
1996 - 2000: „Alexandru Ioan Cuza“ University, Iasi, Romania
Highest Degree:
B. Sc., 2000
Major Subjects:
Biochemistry
Lab Experience:
Techniques in the field of biochemistry.
Projects / Research:
9/1999 - 1/2000: Study of the amine-oxidase gene expression in *Pisum sativum* after infecton with *Fusarium oxysporum*; Dept. of Biochemistry, Palacky University, Olomouc, Czech Republic
Scholarships:
1996 - 2000: Governmental scholarship

SCIENTIFIC INTERESTS AND GOALS:

Interests: molecular biology and topics related to it, nutrition and health, evolution, statistics, bionics.
Goals: to contribute significantly to the development of science.

First Name:
Gabriella

Last Name:
Ficz

Date of birth:
30 June 1978

Country:
Romania

Jens Gruber

EDUCATION

College / University:
1997 - 2000: Georg-August-Universität, Göttingen, Germany
Highest Degree:
Vordiplom, July 1999
Major Subjects:
Microbiology, immunology, immunogenetics
Lab Experience:
Molecular biological methods at the Georg-August-Universität, Göttingen during practical courses in microbiology (Institute for Microbiology and Genetics), biochemistry (Institute for Biochemistry of the Plant), immunogenetics (Dept. of Immunogenetics)

SCIENTIFIC INTERESTS AND GOALS:

At the moment I am mainly interested in medical topics of molecular biology, particularly in medical microbiology and immunology. However, I believe that during the Master's program we have a good chance to visit a variety of interesting laboratories, and to study a number of different topics in the wide field of molecular biology. I wish to get the best education possible to be prepared to work in the research area that fascinates me the most.

First Name:
Jens

Last Name:
Gruber

Date of birth:
23 August 1976

Country:
Germany

Ramazan Karaduman

First Name:
Ramazan

Last Name:
Karaduman

Date of birth:
30 August 1979

Country:
Turkey

EDUCATION

College / University:
Bogazici University
Highest Degree:
August 2000, B.Sc., Bogazici University, Istanbul, Turkey
Major Subjects:
Molecular biology and genetics & chemistry
Lab Experience:
July - August 1994 Basic techniques in molecular biology; summer internship supervised by Prof. George Simirnov, Dept of Microbiology, Gamelia Institute, Moscow, Russia
1998 - 1999: Techniques in biochemistry: chromatography, *in vitro* translation, *in vitro* enzyme kinetics supervised by Prof. Nes'e Bilgin, Dept of Molecular Biology and Genetics, Bogazici University, Istanbul, Turkey
Projects / Research:
1999 - 2000: Tetracycline inhibits EF-G function *in vitro*, supervised by Prof. Nes'e Bilgin, Dept.of Molecular Biology and Genetics, Bogazici University, Istanbul, Turkey (Project is finished and will be published)
Scholarships / Honors / Activities
2000 Giving a seminar on inhibition of EF-G function by tetracycline *in vitro*; invited by K. H. Nierhaus, ribosome group, MPI for Molecular Genetics, Berlin, Germany
1999 Organizing committee member in European Meeting on Elongation Factors, Antalya, Turkey
1995 - 1997: TUBITAK undergraduate scholarship
1995 - 2000: Turkish Education Foundation undergraduate scholarship
1995 Bronze medal in 6th Biology Olympiad, Bangkok, Thailand

SCIENTIFIC INTERESTS AND GOALS:

Undergraduate project with Prof. Nes'e Bilgin: biochemical techniques such as purification methods using chromatography -column, paper, TLC, HPLC-, *in vitro* enzyme kinetics. Finished project on inhibition of EF-G by tetracycline. After my graduation from two majors (molecular biology and chemistry) I decided to work on structural biology and biochemistry.

Mariana Lagos

First Name:
Mariana

Last Name:
Lagos Quintana

Date of birth:
7 September 1976

Country:
Mexico

EDUCATION

College / University:
1996 - 2000: Universidad de las Americas-Puebla, Puebla, Mexico
Highest Degree:
B. Sc. degree UDLA-P, September 2000
Major Subjects:
Biology with specialization in biotechnology
Lab Experience:
Laboratorios Clinicos de Puebla: different molecular biology techniques including PCR, sequencing PCR and protein modelling using bioinformatic tools
Projects / Research:
Bachelor thesis: Analysis of possible effects of a single base-pair mutation of coagulation factor XI in a mexican family in the structure/function of the protein. Optimization of methodology for metaphases obtention for FISH
Scholarships:
„Support to sciences" given by the Jenkins Foundation

SCIENTIFIC INTERESTS AND GOALS:

As a science student I would like to learn to solve problems using different techniques in the laboratory, I want to develop basic skills to address a scientific question. I am interested in many areas of biology that include cell biology and signal transduction, gene regulation in eukaryotes, plant physiology and development.

Christine Lang

EDUCATION

College / University:
1997 - 2000: Georg-August-Universität, Göttingen, Germany
Highest Degree:
Vordiplom, July 1999
Major Subjects:
Microbiology, pharmacology, immunology
Lab Experience:
Common techniques in microbiology and bacterial genetics, for example: isolation of bacteria, induction of enzyme transcription, yeast genetics, transfection with viral DNA, transposon mutagenesis, differentiation of filamental funghi
Immunological techniques, e.g.: ELISA, FACS, limiting-dilution, immunfluorescence, cell fusion, differentiation of cells, preparation of mice
Pharmacodynamics: digestion of DNA, DNA-agarose gel electrophoresis, ligation, transformation of DNA in *E.coli*, transfection, analyzing clones, sterile working with permanent cell cultures, Western blot, measuring enzyme activity, showing apoptose-induced DNA fragmentation in gel electropheresis
Pharmacokinetics: cultivating primary hepatocytes, measuring MDR1-activity, RNA-extraction and gel electrophoresis, Northern blot
organic chemistry: different reaction mechanisms

SCIENTIFIC INTERESTS AND GOALS:

Molecular biology, but especially pharmacology and immunology; getting the chance to study or to work in a foreign country.

First Name:
Christine

Last Name:
Lang

Date of birth:
26 January 1977

Country:
Germany

Steffen Lemke

EDUCATION

College / University:
Georg August Universität Göttingen, Germany
Highest Degree:
Vordiplom
Major Subjects:
biology: genetics, bioinformatics; chemistry: organic chemistry, NMR
Lab Experience:
1999 - 2000: Working as research assistant for one year in the lab of Dr. S. Reumann: Bioinformatic analyses of the *Arabidopsis* genome
Projects / Research:
Plant genetics: transcription factors
Genetics, drug design: *E. coli* cell surface display of conformationally constrained peptides
Bioinformatics: identification of novel peroxisomal proteins
Scholarships:
2000 / 2001: DeveloGen Stipend
Publications:
Steffen Lemke and Sigrun Reumann: Identification of Novel Proteins from Plant Peroxisomes by Bioinformatic Analyses, Botanikertagung 2000, Jena, Poster

SCIENTIFIC INTERESTS AND GOALS:

As molecular biology offers vast possibilities in research my interests focuses on the following aspects: I would like to find out more about cancer research (onkogenes), about brain function (how do we explain memory), embryonic pattern formation in *Drosophila*, the immune system and signal transduction cascades in higher eucaryots. In addition to that there must be a chance to build up new drugs when knowing the human genome sequence. My goal is to learn as much as possible in these different sectors and to find a project I like to work on.

First Name:
Steffen

Last Name:
Lemke

Date of birth:
29 January 1977

Country:
Germany

Liyi Li

First Name:
Liyi

Last Name:
Li

Date of birth:
28 May 1978

Country:
P.R. China

EDUCATION

College / University:
Peking University, P.R. China
Highest Degree:
B.Sc. from Peking University, July 1999
Major Subjects:
Molecular Biology Program
Projects / Research:
5/1998 - 11/1998: Envolved in the group studying the activities of Trichosanthin (TCS, a kind of ribosome inactivating protein) and its transduction to rice; directed by Prof. Zhangliang Chen, National Laboratory for Protein Engineering & Plant Gene Engineering (NLPE&PGE, Beijing)
12/1998 - 7/1999: Envolved in the group studying the HIV-1 maternal-fetus transmission; directed by Prof. Yunzhen Cao, National Center for AIDS Prevention & Control (NCAIDSC, Beijing); thesis for B.Sc. degree ("HIV-1 Clinical Tests")

SCIENTIFIC INTERESTS AND GOALS:

Most interested in membrane function and its compartments cooperation, structure study of proteins and nucleic acids and some interest in the field of immunology.
Goals: finding the most exciting time in my study life in biological sciences.

Lingfei Luo

First Name:
Lingfei

Last Name:
Luo

Date of birth:
4 November 1977

Country:
P.R. China

EDUCATION

College / University:
Nanjing University, P.R. China
Highest Degree:
B. Sc., July 1999
Major Subjects:
Biochemistry
Lab Experience:
Bioelectronic chemistry, in particular the use of electrochemical methods to study biomaterials, utilization of bioelectrode, etc. (Shanghai Institute of Biochemistry, Chinese Academy of Sciences)
Emphasis on: (1) opioid receptor and IL-2 downstream signal transduction, gene expression and regulation. I discovered a new gene whose expression was regulated by a selective delta-opioid receptor agonist, DPDPE; (2) IL-2´s analgesic mechanism; I put forward a new idea of "Intergrin" and developed ddPCR to enter this research area; (3) gene therapy for Parkinson´s disease; I participated in research on some steps of it
Projects / Research:
Bioelectronic chemistry; signal transduction, gene expression and regulation; IL-2's analgesic mechanism
Scholarships:
2000/2001: IBA Stipend

SCIENTIFIC INTERESTS AND GOALS:

Developmental biology; function of brain and crosslink of these two areas. Cell-to-cell communication, crosstalking, net interaction and regulation in and between nervous system and immune system. Signal transdution, genes expression and regulation in many systems.

Olga Mikhailova

First Name:
Olga

Last Name:
Mikhailova

Date of birth:
2 February 1978

Country:
Russia

EDUCATION

College / University:
Faculty of Biology and Soil Science, St-Petersburg State University 1994 - 2000
Highest Degree:
B.Sc., Juli 1998; one and a half years of Master's Program
Major Subjects:
Developmental biology
Lab Experience:
Cultivating vertebrate and invertebrate embryos, DNA and RNA extraction, PCR and RT-PCR, gene engineering, producing transgenic mice (DNA injection into the pronuclei)
Projects / Research:
B.Sc. project: development and body axis formation in free living sea nematodes. Their development seems to be very different from highly determined *C. elegans* development
Master's project: role of GGC-binding protein in murine development; microinjections of cDNA of the GGCBP gene in zygotes of mouse
Publications:
1999: Thesis in the „AIDS and Cancer Research conference", St-Petersburg
1999: Thesis in the „St-Petersburg University Young Scientists Conference"

SCIENTIFIC INTERESTS AND GOALS:

I'm interested in developmental biology. It could be studying patterns of gene expression in early development, or studying some TF and how they work, or genesis of germ cells, anything dealing with growth and development. It would be more interesting to work on mice, as they are more closely related to humans. My major goal is to have my own lab, but who knows ...

Agnieszka Patkaniowska

First Name:
Agnieszka

Last Name:
Patkaniowska

Date of birth:
9 August 1976

Country:
Poland

EDUCATION

College / University:
1995 - 2000: Biotechnology, Institute of Molecular Biology, Jagiellonian University, Krakow
Highest Degree:
M. Sc. in biotechnology (with distinction), June 2000
Major Subjects:
Biochemistry, molecular biology, cell biology and engineering
Lab Experience:
Practical lab courses in all learned subjects; personal experience in cell culture methods, microscopy techniques, flow cytometry, ELISA assays, luminescence measurements
Projects / Research:
Feb - Jul 1998: Nucleic acids (genes and oligonucleotides) transfer to mammalian cells by polylysine derivatives - study of uptake and biological activity, Laboratory of Glycobiology, CBM CNRS Orleans, France
Oct - Dec 1998: Monoclonal antibody production, Dept. of Animal Biochemistry, IBM UJ Krakow
1999 - 2000: Culture and differentiation of autologous human adipocytes for plastic surgery purposes, Dept. of Cell Biology, IBM UJ Krakow
Scholarships:
1997 - 2000: Scientific scholarship from Jagiellonian University, Krakow
Feb - Jul 1998: Tempus Mobility Grant
2000 / 2001: Solvay Pharmaceuticals Stipend

SCIENTIFIC INTERESTS AND GOALS:

I'd like to take part in discovering some basic mechanisms of life, trying to understand it and admiring its whole complexity. That is why I am interested in molecular biology and the influence that single molecules exert on whole cells and organisms. Searching for single molecules and establishing their roles may also be the first step of developing future therapies that are long awaited.

Krasimir Slanchev

First Name:
Krasimir

Last Name:
Slanchev

Date of birth:
11 May 1973

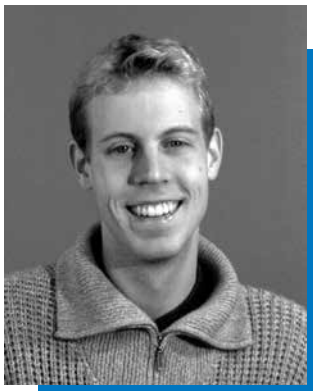
Country:
Bulgaria

EDUCATION

College / University:
Faculty of Biology, Sofia University „St. Kl. Ohridski“, Sofia, Bulgaria
Highest Degree:
M.Sc. (molecular biology)
Major Subjects:
Plant physiology. Master’s thesis: „The Effect of Anticytokinins on Overcoming Apical Dominance of Rose“
Lab Experience:
1997 - 1998: Internship, Institute of Gene Engineering, Kostinbrod, Bulgaria. *In vitro* cultures of plants; chemical composition of growth media; embryogenesis in somatic cells of *in vitro* cultures of *Rosa* Hybrida L.
1998 - 1999: Preparation of different organisms for chemical analysis; literature research on the chemistry of marine invertebrates. Specialist Laboratory for Natural Compounds, Institute of Organic Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria
1999 - 2000: Fellow researcher at the Institute of Organic Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria
Projects / Research:
International projects on the chemistry of marine organisms; separation of complex natural product mixtures (chromatography); determination of the isolated compounds through GC, GC/MS and NMR methods

SCIENTIFIC INTERESTS AND GOALS:

Molecular biology, particularly biotechnology and genetic engineering. Mechanisms of regulation of gene expression and the different techniques for DNA manipulation.



Jürg Stebler

First Name:
Jürg Andreas

Last Name:
Stebler

Date of birth:
10 February 1977

Country:
Switzerland

EDUCATION

College / University:
1993 - 1996: Graduation from the „Technical Professional Maturity”; Laboratory assistant at Ciba Geigy AG Basel
1996 - 1999: Zurich University of Applied Sciences Winterthur, Dept. of Chemistry and Biotechnology
Highest Degree:
Chemiker HTL (B.Sc.)
Major Subjects:
Biology, organic and (bio-)analytical chemistry, chemical engineering
Lab Experience:
1999 - 2000: Tissue and biochemical engineering, (bio-)analytical chemistry, Zurich University
Projects / Research:
Development of a process for the production of lipoteichoic acid (LTA) with a new *Streptococcus* sp. (ETH Zurich, Lunamed AG)
Development and validation of a method to quantify endotoxin for chondrocytes culture (collaboration with Sulzer-Medica)
Development of an improved method for „in time“ and online cell-density determination with bioelectrochemical impedance spectroscopy (Zurich University)
Scholarships:
1999: ETW-Award (best graduation, Dept. of Chemistry & Biotechnology) Zurich University; 2000/2001 Sartorius Stipend
Publications:
H Blaser, J Stebler, I.Mailand, G Peter, B Sonnleitner, 2000: Elektrochemische Impedanzspektroskopie, BioWorld

SCIENTIFIC INTERESTS AND GOALS:

Particular interest in micro-, cell-, molecular biology, (bio-)analytics, biochemistry, physics and organic chemistry. I’d like to work in a team which is highly motivated and may investigate in a field with an approach to diseases like cancer or parasites.

Abdullah Yalcin

First Name:
Abdullah

Last Name:
Yalcin

Date of birth:
16 June 1974

Country:
Turkey

EDUCATION

College / University:
Fatih College, Istanbul, Turkey
Bogazici University, Istanbul, Turkey
Highest Degree:
M. Sc. in molecular biology and genetics from Bilkent University, Ankara, Turkey (2000)
Major Subjects:
Molecular biology and genetics
Lab Experience:
Molecular cloning techniques, RT-PCR, cell culture, protein interaction assays, yeast two-hybrid screening.
Projects / Research:
Two years of research experience under the supervision of Gunay Cizmeci-Smith Ph.D., in M.Sc. project „Core protein interactions of membrane associated proteoglycan Syndecan-1 with PDZ domain proteins“
Scholarships:
Two year scholarship for research and teaching assistantship from Bilkent University, Ankara, Turkey

SCIENTIFIC INTERESTS AND GOALS:

Cell signalling pathways, receptor mediated cell fate determination and cancer.

Daniel Zwilling

First Name:
Daniel

Last Name:
Zwilling

Date of birth:
16 March 1974

Country:
Germany

EDUCATION

College / University:
1995 - 1997: Georg-August Universität Göttingen
1997 - 1998: University of California Los Angeles (UCLA)
1999 - 2000: Georg-August Universität Göttingen
Highest Degree:
Biology Vordiplom (B.Sc.)
Major Subjects:
Molecular genetics
Lab Experience:
Microbiology laboratory, biochemistry laboratory, molecular genetics on *Drosophila melanogaster*, techniques in molecular cell biology and genetics (UCLA)
Molecular genetics and cell biology (Göttingen University): transformation of bacteria and yeast, cloning, sequencing, Southern blot, protein purification, enzyme kinetics, drug design by means of directed evolution, working with radiolabeled RNA, crosses with fruit flies, enhancer trap, chromosome mapping, FALS
Scholarships:
1997 / 1998: Scholarship at the University of California Los Angeles (UCLA); Education Abroad Program (EAP)

SCIENTIFIC INTERESTS AND GOALS:

I am most interested in molecular genetics. I want to work on the organization of the genome. I am interested in protein-protein interactions, protein folding and signal transduction, interactions of molecules with DNA and RNA. My goal is to work in a variety of environments after I received my Ph.D.

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
Anke Schürer

GZMB Board Members

Prof. Dr. Kurt von Figura
Prof. Dr. Christiane Gatz
Prof. Dr. Tomas Pieler
Prof. Dr. Axel Zeeck
Dr. Rainer Merkl
Anke Schürer
Willi Gräber

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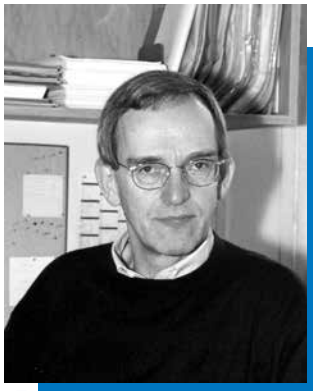
Teaching Faculty

Name	Institute	Department
Botho Bowien	U Göttingen	Molecular Microbiology and Molecular Physiology
Gerhard H. Braus	U Göttingen	Molecular Microbiology and Molecular Physiology
Bertram Brenig	U Göttingen	Molecular Biology of Livestock
Detlef Doenecke	U Göttingen	Molecular Biology
Wolfgang Engel	U Göttingen	Human Genetics
Kurt von Figura	U Göttingen	Biochemistry
Hans-Jochim Fritz	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dieter Gallwitz	MPI bpc	Molecular Genetics
Christiane Gatz	U Göttingen	General and Developmental Physiology of the Plant
Gerhard Gottschalk	U Göttingen	General and Applied Microbiology
Uwe Groß	U Göttingen	Bacteriology
Peter Gruss	MPI bpc	Molecular Cell Biology
Hans Walter Heldt	U Göttingen	Plant Biochemistry
Herbert Jäckle	MPI bpc	Molecular Developmental Biology
Reinhard Jahn	MPI bpc	Neurobiology
Thomas M. Jovin	MPI bpc	Molecular Biology
Kurt Jungermann	U Göttingen	Biochemistry
Michael Kessel	MPI bpc	Molecular Cell Biology
Willhart Knepel	U Göttingen	Molecular Pharmacology
Wolfgang Liebl	U Göttingen	General and Applied Microbiology
Reinhard Lührmann	MPI bpc	Cellular Biochemistry
Frank Mayer	U Göttingen	Structural Microbiology
Rainer Merkl	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Erwin Neher	MPI bpc	Membrane Biophysics
Mary Osborn	MPI bpc	Biochemistry and Cell Biology
Tomas Pieler	U Göttingen	Developmental Biochemistry
Thomas Schneider	U Göttingen	Structural Chemistry
George Michael Sheldrick	U Göttingen	Structural Chemistry
Axel Zeeck	U Göttingen	Biochemistry and Bioorganics



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

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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.

Selected Recent Publications:

Kusian, B., B. Bowien. Organization and regulation of *cbb* CO_2 assimilation genes in autotrophic bacteria. FEMS Microbiol. Rev. 21: 135-155, 1997.

Jeffke, T., N.-H. Gropp, C. Kaiser, C. Grzeszik, B. Kusian, B. Bowien. Mutational analysis of the *cbb* operon (CO_2 assimilation) promoter of *Ralstonia eutropha*. J. Bacteriol. 181: 4374-4380, 1999.

Grzeszik, C., T. Jeffke, J. Schäferjohann, B. Kusian, B. Bowien. 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, 2000.

Oh, J.-I., B. Bowien. Structural analysis of the *fds* operon encoding the NAD^+-linked formate dehydrogenase of *Ralstonia eutropha*. J. Biol. Chem. 273: 26349-26360, 1998.

Oh, J.-I., B. Bowien. Dual control by the regulatory gene *fdsR* of the *fds* operon encoding the NAD^+-linked formate dehydrogenase of *Ralstonia eutropha*. Mol. Microbiol. 34: 365-376, 1999.

Gerhard H. Braus

Full Professor of Microbiology and Head of the Dept. of Molecular Microbiology

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

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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 coordinately regulates more than 50 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:

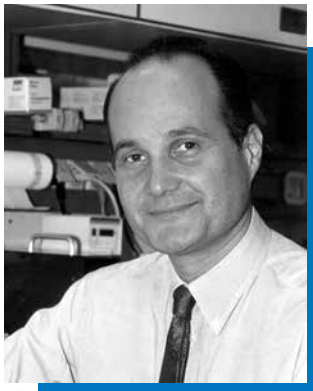
Hoffmann B, Wanke C, Kirchner SK, Braus GH (2000) c-Jun and RACK1 homologs regulate a control point for sexual development in *Aspergillus nidulans*. **Mol. Microbiol.** 37, 28-41.

Irniger S, Bäumer M, Braus GH (2000) Glucose and RAS activity influence the ubiquitin ligases APC and SCF in *Saccharomyces cerevisisae*. **Genetics**. 154, 1509-1521.

Krappmann S, Lipscomb WN, Braus GH (2000) Co-evolution of transcriptional and allosteric regulation of enzyme activities at the metabolic branch point in *Saccharomyces cerevisiae*. **Proc. Natl. Acad. Sci. USA**. In press.

Mösch HU, Köhler T, Braus GH (2001) Different domains of the essential GTPase Cdc42 required for growth and development of *S. cerevisiae*. **Mol. Cell. Biol.** In press.

Taheri N, Köhler T, Braus GH, Mösch HU (2000) Asymmetrically localized Bud8p and Bud9p proteins control yeast cell polarity and development. **EMBO J**. In press.



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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Major Research Interests:

The main interest of the laboratory is in the structural and functional analysis of mammalian genes and genomes. So far our main focus was on porcine genes and their function. However, in recent years we have also started to look at genes in other species, e.g. cattle, dog, sheep, and buffalo. The molecular analysis of complex eukaryotic organisms needs several sophisticated tools. For the mapping and identification of novel genes genome screening and megabase cloning techniques are required. We have cloned several megabase libraries of pig, which are used by a number of labs around the world.

Since several years we are analysing genes in skeletal muscle development and differentiation, e.g. RYR1, SMTRD, and DAG. Our starting point was the ryanodine receptor I gene which is mutated in malignant hyperthermia in pigs. The ryanodine receptor I is the major calcium release channel in skeletal muscle and is located in the trias. Currently, there are three isoforms (ryr1, ryr2, ryr3) known that are expressed in different tissues. The skeletal muscle isoform (ryr1) is associated with a number of smaller proteins, e.g. triadin and FKBP12. The function of triadin is not yet clear and therefore we are studying its function using knock-out mice. Very little is also known about the regulation of the ryr1 gene. Therefore we have studied the promoter and regulating transcription factors. We have identified FHL1 which seems to play a key role in the tissue specific expression of the ryr1 gene.

Another interest of the laboratory is in the analysis of disorders in mammals. Currently we are investigating the cause of different economical important genetic defects in livestock and other domesticated animals, e.g. „pink tooth“ disease in sheep, Morbus Perthes disease in dogs, cryptorchidism and hernia inguinalis in dogs and pigs, and bulldog in Dexter cattle.

Selected Recent Publications:

Leeb, T., and B. Brenig. 1998. cDNA cloning of the human ryanodine receptor 3 gene reveals a novel alternative splice site. FEBS Letters **423**: 367-370.

Leeb, T., B. Kriegesmann, B. G. Baumgartner, C. Klett, M. Yerle, H. Hameister, and B. Brenig. 1997. Molecular cloning of the porcine ß-1,2-N-acetylglucosaminyltransferase II gene and assignment to chromosome 1q23-q27. Biochim. Biophys. Acta **1336**: 361-366.

Leeb, T., S. Neumann, A. Deppe, M. Breen, and B. Brenig. 1999. Genomic organization of the dog dystroglycan gene (DAG1) locus on chromosome 20q15.1-q15.2. Genome Res., in press.

Schmoelzl, S., T. Leeb, H. Brinkmeier, G. Brem, and B. Brenig. 1996. Regulation of tissue-specific expression of the skeletal muscle ryanodine receptor gene. J. Biol. Chem. **271**: 4763-4769.

Detlef Doenecke

Professor of Biochemistry
Head of Dept. Molecular Biology
Institute of Biochemistry and Molecular Cell Biology

MD, 1967, University Saarland Medical School

Postdoc at the Universities of San Francisco (UCSF) and Marburg

Professor of Biochemistry, 1987, University of Göttingen

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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 project deals with the factors mediating the transport of histone proteins from the cytoplasm to the nucleus. Thirdly, we work on structural transitions of chromatin during programmed cell death.

Selected Recent Publications:

Albig, W., Kioschis, P., Poustka, A., Meergans, K. & Doenecke, D. (1997) Human histone gene organization: nonregular arrangement within a large cluster. Genomics 40: 314-322

Meergans, T., Albig, W. & Doenecke, D. (1998) Conserved sequence elements in human main-type H1 histone gene promoters: their role in H1 gene expression. Eur. J. Biochem. 256: 436-446

Kratzmeier, M., Albig, W., Meergans, T. & Doenecke, D. (1999) Changes in the protein pattern of H1 histones associated with apoptotic DNA fragmentation. Biochem. J. 337: 319-327

Jäkel, S., Albig, W., Kutay, U., Bischoff, F.R., 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

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:

7% of men are infertile and in about 37% of them, infertility is suggested to be due to genetic defects. We are interested in the isolation, characterization and functional analysis of genes which are involved in the differentiation of male germ cells. Functional analysis is studied in transgenic and knock-out mice. The characterized genes could be candidate genes for male infertility.

Cryptorchidism (abdominal or inguinal position of the testes) occurs in 0.5 to 1% of men and results in male infertility. Furthermore, cryptorchid men have an increased risk for testicular tumors. We have isolated the Insl3 gene which is only expressed in testicular Leydig cells. Mice deficient for the Insl3 gene show bilateral, abdominal cryptorchidism. Therefore these mice can be used as a model system for the study of cryptorchidism in human and for the evaluation of downstream and upstream target genes in the gene cascade.

Testicular seminomas are the most frequently occuring tumors in young men. To date it is unknown from which type of germ cells seminomas derive from. Using transgenic mice, in which an oncogene is under the control of germ cell specific promoters, this question can be answered. Furthermore, these mouse models are suitable for the isolation and characterization of genes which are involved in malignant germ cell transformation and seminoma development.

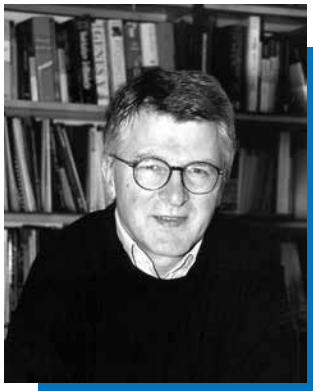
Selected Recent Publications:

Zimmermann, S., Schwärzler, A., Buth, S., Engel, W., Adham, I. M.: Transcription of the Leydig Insulin-like gene is mediated by steroidogenic factor-1. Molecular Endocrinology **12,** 706-713 (1998)

Zimmermann, S., Steding, G., Emmen, J.M.A., Brinkmann, A.O., Nayernia, K., Holstein, A.F., Engel, W., Adham, I.M.: Targeted disruption of the *Insl3* gene causes bilateral cryptorchidism. Molecular Endocrinology **13**, 681-691 (1999)

Shamsadin, R., Adham, I.M., Nayernia, K., Heinlein, U.A.O., Oberwinkler, H., Engel, W.: Male mice deficient for germ-cell Cyritestin are infertile. Biology of Reproduction **61**, 1445-1451 (1999)

Tascou, S., Nayernia, K., Samani, A., Schmidtke, J., Vogel, T., Engel, W., Burfeind, P.: Immortalization of Murine Male Germ Cells at a Discrete Stage of Differentiation by a Novel Directed Promotor-Based Selection Strategy. Biology of Reproduction **63**, 1555-1561 (2000)



Kurt von Figura

Professsor 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, the generation of transgenic mice to study the function of genes encoding lysosomal proteins and proteins involved in lysosome biogenesis and the use of mouse models for human congenital disorders to study the pathophysiology of the diseases 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, on the function of several major lysosomal membrane proteins, on a novel protein modification that so far has been found only in the catalytic center of sulfatases, and the molecular defects and pathophysiology in a new group of congenital disorders in which the N-glycosylation of glycoproteins is defective.

Selected Recent Publications:

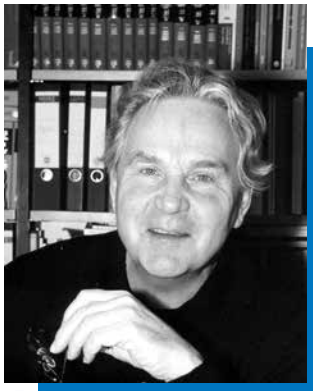
Grimme, S., Höning, S., von Figura, K., Schmidt, B.: Endocytosis of insulin-like growth factor II by a mini-receptor based on repeat 11 of the mannose 6-phosphate/insulin-like growth factor II receptor. J. Biol. Chem. 275, 33697-33703 (2000)

Meyer, C., Zizioli, D., Lausmann, S., Eskelinen, E.L., Hamann, J., Saftig, P., von Figura, K., Schu P.: µ1A-adaptin-deficient mice: lethality, loss of AP-1 binding and rerouting of mannose 6-phosphate receptors. EMBO J. 19, 2193-2203 (2000)

Tanaka, Y., Guhde, G., Suter, A., Eskelinen, E.L., Hartmann, D., Lüllmann-Rauch, R., Janssen, P.M.L., Blanz, J., von Figura, K., Saftig, P.: Accumulation of autophagic vacuoles and cardiomyopathy in LAMP-2-deficient mice. Nature 406, 902-906 (2000)

Tikkanen, R., Obermüller, S., Denzer, K., Pungitore, R., Geuze, H. J., von Figura, K., Höning, S.: The dileucine motif within the tail of MPR 46 is required for sorting of the receptor in endosomes. Traffic 1; 631-640 (2000)

Körner, C., Knauer, R., Stephani, U., Marquardt, T., Lehle, L., von Figura, K.: Carbohydrate-deficient glycoprotein syndrome type IV: Deficiency of dolichyl-P-Man:Man5GlcNAc2-PP-dolichyl mannosyltransferase. EMBO J. 18, 6816-6822 (1999)



Dieter Gallwitz

Professor, Director
Department of Molecular Genetics Max Planck Institute for Biophysical Chemistry

M.D. degree, University of Frankfurt/Main, Germany, (1964)

Postdoctoral Fellow, Dept. Physiological Chemistry, Univ. of Marburg, Germany, (1965-1967) and McArdle Laboratory for Cancer Research, Univ. of Wisconsin,
Madison, Wisc. USA (1967-1969)

Research Assistant and Professor, Dept. Physiological Chemistry, Univ. of Marburg, Germany (1970-1986)

Visiting Professor, Dept. Biochemistry and Biophysics, UC San Francisco,
USA (1977)

Professor, Director, Dept. Molecular Genetics, Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany (1986-present)

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Selected Recent Publications:

Rak, A., Fedorov, R., Alexandrov, K., Albert, S., Goody, R.S., Gallwitz, D. and Scheidig, A.J. (2000). Crystal structure of the GAP domain of Gyp1p: first insights into interaction with Ypt/Rab proteins. *EMBO J.* **19**, 5105-5113.

Matern, H., Yang, X., Andrulis, E., Sternglanz, R., Trepte, H.-H. and Gallwitz, D. (2000). A novel Golgi membrane protein is part of a GTPase-binding protein complex involved in vesicle targeting. *EMBO J.* **19,** 4485-4492.

Peng, R., De Antoni, A. and Gallwitz, D. (2000). Evidence for overlapping and distinct functions in protein transport of coat protein Sec24p family members. *J. Biol. Chem.* **275**, 11521-11528.

Albert, S., Will, E. and Gallwitz, D. (1999). Identification of the catalytic domains and their functionally critical arginine residues of two yeast GTPase-activating proteins specific for Ypt/Rab transport GTPases. *EMBO J.* **18**, 5216-5225.

Tsukada, M., Will, E. and Gallwitz, D. (1999). Structural and functional analysis of a novel coiled-coil protein involved in Ypt6 GTPase-regulated protein transport in yeast. *Mol. Biol. Cell* **10**, 63-75.

Major Research Interests:

Molecular mechanisms governing protein traffic in exo- and endocytosis

We study various aspects of vesicular protein and membrane traffic in eukaryotic cells. The focus of our group is on the role and the mode of action of Ras-like GTPases (Ypt/Rab), key regulators of protein transport that we first discovered in yeast and in mammalian cells some 15 years ago. An important area of interest is the structure-function relationship of proteins that directly interact with these regulators, organelle-specific receptors, GTPase-activating and guanine nucleotide exchange proteins. By using genetic and biochemical approaches, we have also isolated and are studying different components of the complex machineries involved in budding, targeting and fusion of transport vesicles at different cellular organelles in yeast (endoplasmic reticulum, Golgi, lysosome/vacuole).

Christiane Gatz

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Dr. rer.nat. (1985) at the Institute for Biochemistry, Technical University Darmstadt

Postdoctoral fellow at the University of Wisconsin, Madison, USA

Habilitation in Molecular Genetics at the Freie Universität Berlin in 1992

Professor at the University of Bielefeld (1993–1995)

Awards: Alfred Krupp von Bohlen und Halbach-Prize for young University lecturers (1994)

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Major Research Interests:

Plants are constantly exposed to pathogen attack, e.g. to fungi, viruses, bacteria, insects and nematodes. As a result of this selection pressure, plants have evolved efficient defense responses, many of them requiring induction of gene expression. A particularly interesting phenomenon is the systemically acquired resistance (SAR). If a pathogen is locally recognized by the plant, hypersensitive cell death occurs at the site of the infection, which limits spread of the pathogen. Subsequently, the levels of salicylic acid (SA) rise throughout the plant. SA is sufficient and necessary to induce a subset of defense genes. Our group is interested in the molecular mechanisms, how expression of defense genes is activated by SA.

We are focussing on promotors encoding a specific regulatory DNA-sequence, the *as-1* element. Presently we have isolated five different cDNAs encoding bZIP transcription factors (TGA factors) binding to the element. A heterodimer of a subset of two different bZIP transcription factors seems to be the activating principle. Ongoing research activities concentrate on the isolation of interacting proteins regulating the activity of this heterodimer.

Selected Recent Publications:

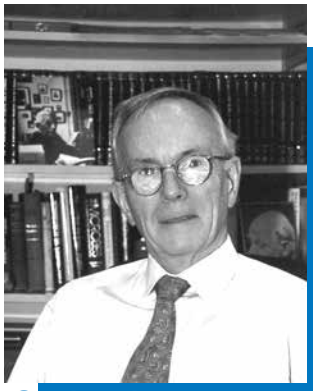
Rieping, M., Fritz, M., Prat, S., Gatz, C. (1994) A dominant negative mutant of PG13 suppresses transcription from a Cauliflower Mosaic Virus 35S truncated promoter in transgenic tobacco plants. Plant Cell 6, 1087-1098.

Thiele, A., Herold, M., Lenk, I., Quail, P.H., Gatz, C. (1999) Heterologous expression of *Arabidopsis thaliana* phytochrome B in transgenic potato influences photosynthetic performance and tuber development. Plant Phys. 120, 73-82.

Böhner, S., Lenk, I., Rieping, M., Herold, M., Gatz, C. (1999) Transcriptional activator TGV mediates dexamethasone-inducible and tetracycline-inactivatable gene expression. Plant J. 19, 87-95.

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.



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Major Research Interests:

Our work focusses on various aspects of the biochemistry, bioenergetics and genetics of Archaea and Bacteria. Current research topics are:
Membrane-bound electron transfer and mechanisms of energy conservation in methanogenic archaea (together with Uwe Deppenmeier), recently a new cofactor, methanophenazine, was discovered; molecular and biochmical characteriza-tion of genes and geneproducts involved in the anaerobic conversion of glycerol to 1,3-propanediol (together with Rolf Daniel), studies concentrate now on coenzyme B12-containing glycerol-dehydratase.
Screening of environmental DNA libraries for enzymes of interest and sequence analysis (together with Ruth Schmitz and Rolf Daniel), new lipases were discovered; functional and sequence analysis of linear plasmids from *Rhodococcus* species (together with Beate Averhoff), the currently studied linear plasmid pBD2 contains genes for the degradation of aromatic compounds and for arsenite and mercury resistence.
Role of sodium ion translocating NADH dehydrogenases in marine organisms (together with Vera Allerheiligen); anaerobic oxidations coupled to ferric III-reduction (together with Rolf Daniel), a syntrophic system of methanol oxidation and ferric reduction was just discovered.
We are involved in the Göttingen Genomics Laboratory and are currently sequencing the genome of *Methanosarcina mazei* strain Gö1.

Selected Recent Publications:

Deppenmeier, U., Lienard, T., Gottschalk, G. Novel reactions involved in energy conservation by methanogenic archaea. FEBS Letters 457, 291-297 (1999)

Daniel, R., Bobik, T., Gottschalk, G. Biochemistry of coenzyme B_{12}-dependent glycerol and diol dehydratases and organization of the encoding genes. FEMS Microbiology Reviews 22, 553-566 (1999)

Henne, A., Daniel, R., Schmitz, R. A., Gottschalk, G. Construction of environmental DNA libraries in *Escherichia coli* and screening for the presence of genes conferring utilization of 4-Hydroxy-butyrate. Appl. and Environm. Microbiol. Vol. 65, No. 9, 3901-3907 (1999)

Saeki, H., Akira, M., Furuhashi, K., Averhoff, B., Gottschalk, G. Degradation of trichlorethene by a linear-plasmid-encoded alkene monooxygenase in *Rhodococcus corallinus* (*Nocardia corallina*) B-276. Microbiology 145, 1721-1730 (1999)

Daniel, R., Warnecke, F., Potekhina, J. S., Gottschalk, G. Identification of the syntrophic partners in a coculture coupling anaerobic methanol oxidation to Fe(III) reduction. FEMS Microbiol. Lett. 180, 197-203 (1999)

Uwe Groß

Professor of Bacteriology

M.D., University of Hamburg 1987

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Professor of Medical Parasitology, University of Würzburg 1998/1999

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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 immuno-compromised individuals (i. e. patients suffering from AIDS). This parasite serves as a model organism for studying evasion mechanisms of intracellular pathogens.

We are interested in the cross-talk between the parasite and its host cell on a molecular level. We could demonstrate that the parasite (i) modulates the host cell capacity for MHC-restricted antigen presentation and (ii) inhibits apoptosis of the infected cell. Both mechanisms allow intracellular persistence. Vice versa, the host's immune response determines the fate of the parasite by direct interference with differentiation processes of *Toxoplasma gondii*. The precise molecular events for these strategies of intense interplay between both partners are currently under our investigation.

Selected Recent Publications:

Bohne, W., U. Groß, D. J. P. Ferguson, and J. Heesemann. 1995. Cloning and characterization of a bradyzoite-specifically expressed gene (*hsp30/bag1*) of *Toxoplasma gondii*, related to genes encoding small heat-shock proteins of plants. Mol. Microbiol. 16: 1221-1230.

Bohne, W., A. Wirsing, and U. Groß. 1997. Bradyzoite-specific gene expression in *Toxoplasma gondii* requires minimal genomic elements. Mol. Biochem. Parasitol. 85: 89-98.

Lüder, C. G. K., T. Lang, and U. Groß. 1998. Down-regulation of MHC class II molecules on murine macrophages after infection with *Toxoplasma gondii*. Clin. Exp. Immunol. 112: 308-316.

Bohne, W., C. A. Hunter, M. W. White, D. J. P. Ferguson, U. Groß, and D. S. Roos. 1998. Targeted disruption of the bradyzoite-specific gene *BAG1* does not prevent tissue cyst formation in *Toxoplasma gondii*. Mol. Biochem. Parasitol. 92: 291-301.

Goebel, S., C. G. K. Lüder, and U. Groß. 1999. Invasion by *Toxoplasma gondii* protects human-derived HL-60 cells from actinomycin D-induced apoptosis. Med. Microbiol. Immunol. 187: 221-226.

Peter Gruss

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Honorary Professor at the University of Göttingen (since 1990).

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Major Research Interests:

Molecular mechanisms of mammalian development
(Eye Development):
The visual system can serve as an excellent model system to study the molecular aspects of the development of complex structures. Eye development was experimentally approached already by Hans Speman around the turn of the century. Ever since, the questions asked by Speman as to the precise functions of the tissue interactions in generating either the lens or the retina have not been answered satisfactorily. We have identified a number of vertebrate genes, defined their function and placed the genes in the hierarchy of events required to build a functional eye. Our laboratory initially discovered and subsequently studied *Pax6*, *Pax2*, *Prox1*, *Vax1* and the *Sine occulis* family members, *Six3* and *Six6*, all of which play a distinct role in eye development. Functions were assigned by knockout experiments in mice or dominant gain experiments in mice, frogs or fish. With the help of these tools, we were able to identify the interactions required for the development of the lens as well as the retina and optic nerve. These data revealed that even though the same key players are active in lens and retina development, their interactions are quite distinct. These experiments allowed us to address some of the questions originally asked by Speman and provide a definite answer. In particular, our recent set of experiments in which we conditionally ablated *Pax6* in the surface ectoderm clearly revealed an autonomous function of *Pax6* in lens development. They also revealed that the lens is not required for the generation of an appropriately structured retina. These studies further showed that *Pax6* is critical to maintain the pluripotent state of retina precursor cells. In absence of *Pax6*, only Amacrine cells are being formed, indicating that the potency of the precursor cells is limited.

(Brain development):
The emphasis has been on the regionalization and differentiation processes in the forebrain and will further shift towards the cerebral cortex. We have used the winged helix transcription factor Foxb1 as a model, which is being expressed in the mamillary body. Our detailed analyses indicate that Foxb1 is essential for the diencephalic histogenesis and that it exerts its effect by controlling access to one target (the thalamus) by one particular axonal branch. To study the development of the telencephalon as well as the most complex structure of mammals, the cerebral cortex, we have initially utilized available genes that appeared to be good candidates for controlling cerebral cortex development. We also initiated a number of attempts that allow us to identify novel genes involved in either the lamination or the area specification of the cerebral cortex. In an attempt to identify new genes involved either in governing the lamination or the areal specification process we established a substractive hybridization screen that revealed interesting candidates. One of the genes cloned, *Svet1*, is specifically expressed in the cells of the subventricular, but not the ventricular zone. By help of this marker, we were able to show that the specification of deep cortical layers occurs in the ventricular zone, while the subventricular zone is important for the proper specification of upper layers.

Selected Recent Publications:

Schwarz, M., F. Cecconi, G. Bernier, N. Andrejewski, Birgitta Kammandel and P. Gruss (2000). Spatial specification of mammalian eye territories by reciprocal transcriptional repression of Pax2 and Pax6. *Development* **127**, 4325-4334.

Stoykova, A., M. Götz, D. Treichel, M. Hallonet and P. Gruss (2000). Pax6 modulates the dorso-ventral patterning of the mammalian telencephalon. *Journal of Neuroscience* **20**, 8042-8050.

Ashery-Padan, R., T. Marquardt, X. Zhou and P. Gruss (2000). Pax6 activity in the lens primordium is required for lens formation and for correct placement of a single retina in the eye. *Genes & Development* **14**, 2701-2711.

Thomas, T., A. Voss, K. Chowdhury and P. Gruss (2000). Querkopf, a MYST family histone acetyltransferase, is required for normal cerebral cortex development. *Development* **127**, 2537-2548.

Seale, P., L. A. Sabourin, A. Girgis-Gabardo, A. Mansouri, P. Gruss and M. A. Rudnicki (2000). Pax7 is required for the specification of myogenic satellite cells from pluripotential muscle stem cells. *Cell* **102**, 777-786.

Hans W. Heldt

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Study of Chemistry, Universities of Insbruck, Edinburgh and Marburg;

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Major Research Interests:

Elucidation of metabolic transport processes.
In the past we have discovered and characterized various metabolite translocators in chloroplasts and mitochondria of higher plant cells. Recently, we have found that the transfer of metabolites across the peroxisomal membrane proceeds via a porin-like channel (6). The protein structure of this porin is presently investigated. Other studies deal with the transport processes involved in the loading of the phloem for long-distance transport of photoassimilates in plants (3). 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 (5). Other research topics are the mechanism of the acclimation of plants to a decreased water supply or to elevated CO2 concentration in the air (4). A biotechnologically oriented project deals with the identification of enzymes involved in a-tocopherol biosynthesis of Capsicum fruits (1).

Selected Recent Publications:

(1) Arango, Y., Heise, K.-P. Tocopherol synthesis from homogentisate in Capsicum annuum L. (Yellow pepper) chromoplast membranes: evidence for tocopherol cyclase (1998). Biochem. J. 336, 531-533.

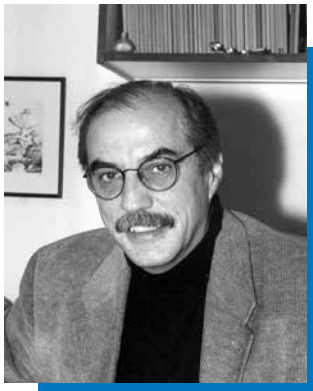
(2) Heldt, H.W.(1997) Plant biochemistry and molecular Biology. Textbook, Oxford University Press, Oxford, New York, Tokyo, pp.1-522.

(3) Lohaus, G., Büker, M., Hußmann, M., Soave, C., Heldt, H.W. (1998) Transport of amino acids with special emphasis on the synthesis and transport of asparagine in the Illinois low protein and Illinois high protein strains of maize. Planta 205,181-188.

(4) Heineke D., F. Kauder, W. Frommer, C. Kühn, B. Gillissen, F. Ludewig, U. Sonnewald (1999) Application of transgenic plants in understanding responses to atmospheric change. Plant Cell &Environment 22, 623-628.

(5) Pawlowski, K., Twigg, P., Dobritsa, S., Guan, C., Mullin, B.C. (1997) A nodule-specific gene family from Alnus glutinosa encodes glycine- and histidine-rich proteins expressed in the early stages of actinorhizal nodule development. Mol. Plant Microbe Interact. 10, 656-64.

(6) Reumann, S., Maier, E., Benz, R., Heldt, H.W. The membrane of leaf peroxisomes contains a porin-like channel. J. Biol. Chem. 270 (1995) 17559-17565.



Herbert Jäckle

Director at the Max-Planck-Institute for Biophysical Chemistry (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, H. Taubert, Purnell B.A. and Jäckle H. 2000. Phenotypic supression of *empty spiracles* is prevented by buttonhead. Nature 405: 351-354.

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

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

Carrera, P., A. Nakamura, O. Johnstone, J. Casanova, H. Jäckle and P. Lasko. 2000. Vasa mediates translation through interaction with a Drosophila yIF2 homolog. Mol. Cell 5:181-187.

Schöck, F., F. Sauer, H. Jäckle and B.A. Purnell. 1999. *Drosophila* head segmentation factor Buttonhead interacts with the same TATA box-binding protein-associated factors and in vivo DNA targets as human Sp1 but executes a different biological program. Proc. Natl. Acad. Sci. USA 96: 5061-5065.

Reinhard Jahn

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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 and analyze fusion in intact neurons with high time-resolution using electrophysiological methods. 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:

Jahn, R., Hanson, P.I. (1998) SNAREs line up in new environment *Nature* 393, 14-15

Jahn, R., Südhof, T.C. (1999) Membrane fusion and exocytosis. *Annu. Rev. Biochem.* 68, 863-911

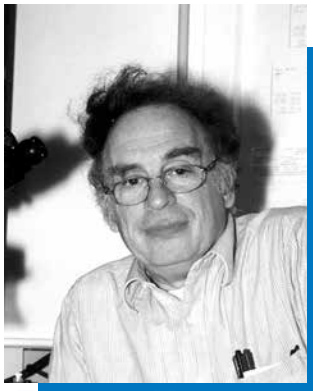
Xu, T., Rammner, B., Margittai, M., Artalejo, A.R., Neher, E., Jahn, R. (1999) Inhibition of SNARE complex assembly affects kinetic components of exocytosis. *Cell* 99, 713-722

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

Avery,J., Ellis, D.J., Holroyd, P., Lang, T., Riedel, D., Henderson, R.M., Edwardson, J.M., Jahn, R. (2000) A cell-free system for regulated exocytosis in PC12 cells. *J. Cell Biol.* 148, 317-324

Bruns, D., Klingauf, J., Jahn, R. (2000) Quantal release of serotonin *Neuron* 28, 205-220

Ossig, R., Schmitt, H. D., Riedel, D., Keränen, S., Ronne, H., Jahn, R. (2000) Exocytosis requires asymmetry in the central layer of the SNARE complex. *EMBO J.*,19, 6000-6010



Thomas M. Jovin

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Major Research Interests:

-structural studies of nucleic acids; complexes with proteins and ligands
parallel-stranded (ps) DNA (and RNA): sequence-specific helical parameters and properties
ligand-DNA: binding of the anti-tumor drug actinomycin to single-stranded DNA; spectroscopy, thermodynamics/kinetics, molecular modeling, and crystallization (in collaboration with the group of Dr. George Sheldrick).
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
-optical and scanning probe microscopy of molecules and cells
Development and application of novel microscopes for cell biological and molecular studies: scanning force (SFM) and near-field optical (SNOM), fluorescence lifetime (FLIM), Fluorescence Correlation (FCM), and Programmable Array (PAM).
-signal transduction in eucaryotic cells
Application of the above quantitative microscope techniques to spatio-temporal relationships in the cell. Fusions of green fluorescent protein (GFP) with the EGF receptor and erbB2 (oncogene involved in most breast tumors) for studying receptor tyrosine kinase activation, internalization, mitogenic induction, and tyrosine kinase inhibitors. Further development of Fluorescence Resonance Energy Transfer (FRET) as a probe of protein-protein interactions in the cell. Studies of the unique photophysical properties of GFPs.

Selected Recent Publications:

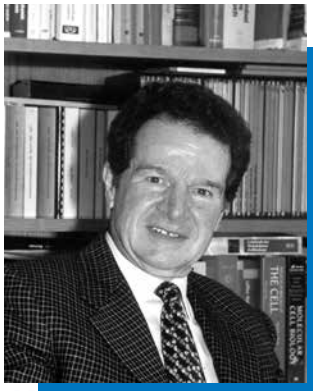
Brock, R., V‡mosi, G., Vereb, G. and Jovin, T. M. (1999). Rapid characterization of green fluorescent protein fusion proteins on the molecular and cellular level by fluorescence correlation microscopy. *Proc. Natl. Acad. Sci. USA* **96**, 10123-10128.

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

Jett, S. D., Cherny, D. I., Subramaniam, V. and Jovin, T. M. (2000). Scanning force microscopy of the complexes of p53 core domain with supercoiled DNA. *J. Mol. Biol.* **299**, 587-594.

Nagy, P., Jenei, A., Kirsch, A. K., Szˆllˆsi, J., Damjanovich, S. and Jovin, T. M. (1999). Activation dependent clustering of the erbB2 receptor tyrosine kinase detected by scanning near-field optical microscopy. *J. Cell Sci.* **112**, 1733-1741.

Shchyolkina, A. K., Borisova, O. F., Livshits, M. A., Pozmogova, G. E., Chernov, B. K., Klement, R. and 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.



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Major Research Interests:

The aim of our studies is the elucidation of major functions of liver and small intestine on the cellular and molecular level: The liver is an effector and sensor organ. It is the glucose store of the organism, the main site of plasma protein synthesis and an important blood reservoir. The small intestine is *the* nutrient absorbing organ and the endocrine pancreas is the site of synthesis of the hormones insulin and glucagon; they are placed into the blood circulation directly before the liver (Fig). Therefore the liver is also a sensor for nutrients and hormones. The studies are focussed on

-Regulation of metabolism and hemodynamics of the liver as well as of absorption in the intestine by autonomic nerves, circulating hormones and mediators, focussing on intestinal glucose absorption regulated by hepatoenteral (between liver and intestine) nerves possibly involving glucagon-37 and prostaglandin E2. (Lab Molecular Physiology, Frank Stümpel)

-Communication between non-parenchymal and parenchymal cells in the liver, focussing on anaphylatoxin-induced prostanoid-mediated glucose output (Lab Cell Physiology, Irmelin Probst; Lab Molecular Cell Biology, Henrike Schieferdecker)

-Regulation of gene expression and its periportal-perivenous zonation in liver, focussing on the modulation by oxygen of the expression of the phospho-enol-pyruvate carboxykinase and glucokinase genes (Lab Cellular Biochemistry, Thomas Kietzmann)

Selected Recent Publications:

Stümpel F, Scholtka B, Hunger A, Jungermann K. *Enteric glucagon-37 rather than pancreatic glucagon-29 stimulates glucose absorption in rat intestine.* Gastroenterology 115 (1998) 1163-1171.

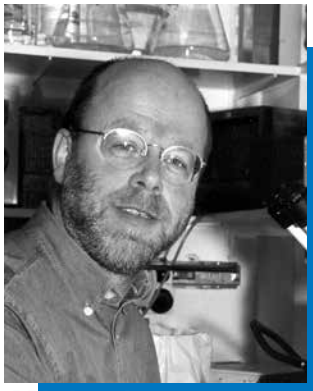
Scholtka B, Stümpel F, Jungermann K. *Acute increase, stimulated by prostaglandin E2, in glucose absorption via sodium dependent glucose transporter-1 in rat intestine.* Gut 44 (1999) 490-496.

Schieferdecker H, Pestel S, Püschel GP, Götze O, Jungermann K. *Increase by anaphylatoxin C5a of glucose output in perfused rat liver via prostanoids derived from non-parenchymal cells: Direct action of prostaglandins and indirect action of thromboxane on hepatocytes.* Hepatology 30 (1999) 454-461.

Kietzmann T, Roth U, Jungermann K. *Induction of the plasminogen activator inhibitor-1 gene expresion by mild hypoxia via a hypoxia response element binding the hypoxia-inducible factor-1 in rat hepatocytes.* Blood 99 (1999) 4177-4185.

Jungermann K, Kietzmann T. *Oxygen: Modulator of metabolic zonation and liver disease. Hepatology 31* (2000) 255-260.

Schieferdecker HL, Schlaf G, Koleva M, Götze O, Jungermann K. *Induction of functional anaphylatoxin C5a receptors on hepatocytes by in vivo treatment of rats with interleukin-6.* J Immunol 164 (2000) 5453-5458.



Michael Kessel

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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

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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 we follow three major lines of interest

1. We study neural crest formation by focussing on a newly isolated gene („Cresto“), which triggers not only an extensive expression profile typical for early crest cells, but also cellular migration.
2. We analyze processes involved in the induction of the forebrain anlage by signals from the anterior mesendoderm.
3. We investigate patterning processes in the early, prospective liver endoderm, in particular a novel gene expressed at the intestinal portal and capable of inducing early endodermal genes.

Selected Recent Publications:

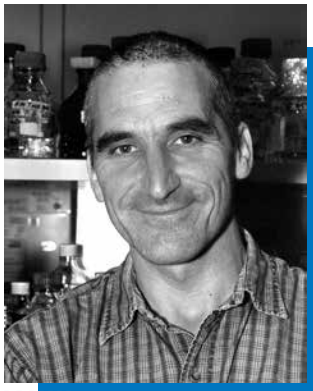
E. Pera, S. Stein and M. Kessel. Ectodermal patterning in the avian embryo: Epidermis versus neural plate. Development 126, 63-73, 1999.

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

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

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

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



Willhart Knepel

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Dr. rer. nat., University of Freiburg i. Br., Germany, 1980;

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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 α 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:

Fürstenau U, Schwaninger M, Blume R, Jendrusch EM, Knepel W. Characterization of a novel calcium response element in the glucagon gene. J Biol Chem 274:5851-5860, 1999

Beimesche S, Neubauer A, Herzig S, Grzeskowiak R, Diedrich T, Cierny I, Scholz D, Alejel T, Knepel W. 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, 1999

Siemann G, Blume R, Grapentin D, Oetjen E, Schwaninger M, Knepel W. 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, 1999

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

Grzeskowiak R, Amin J, Oetjen E, Knepel W. 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, 2000

Wolfgang Liebl

Professor of Microbiology

1984 Diploma (Biology), Technische Universität München

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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 have detected and analysed 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* and other extremely thermophilic organisms. 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 molecular biology of symbiotic rhizobia, with focus on the investigation of biotin- and stationary phase-regulated processes in *Sinorhizobium meliloti* and *Rhizobium* NGR234 (Dr. W. Streit). Finally, we are engaged in the characterization of microbial biotin biosynthesis genes isolated from environmental DNA libraries.

Selected Recent Publications:

Meissner, H., and Liebl, W. (1998) *Thermotoga maritima* maltosyltransferase, a novel type of maltodextrin glycosyltransferase acting on starch and malto-oligosaccharides. Eur. J. Biochem. 250:1050-1058.

Hoffmann, K., Heinz, E. B., Charles, T. C., Hoppert, M., Liebl, W., and Streit, W. R. (2000) *Sinorhizobium meliloti* strain 1021 *bioS* and *bdhA* gene transcriptions are both affected by biotin available in defined medium. FEMS Microbiol. Lett. 182:41-44.

Wassenberg, D., Liebl, W., und Jaenicke, R. (2000) Maltose-binding protein from the hyperthermophilic bacterium *Thermotoga maritima*: Stability and binding properties. J. Mol. Biol., 295:279-288.

Meissner, K., Wassenberg, D., and 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.

Raasch, C., Streit, W., Schanzer, J., Bibel, M., Gosslar, U., and Liebl, W. (2000) *Thermotoga maritima* AglA, an extremely thermostable NAD^+-, Mn^{2+}-, and thiol-dependent -glucosidase. Extremophiles 4:189-200.

Reinhard Lührmann

Director of the Department of Cellular Biochemistry

Ph.D. 1975 University of Münster
Postdoctoral work at the Max-Planck- Institute of Molecular Genetics, Berlin

1981-1988 Leader of an Independent Research Group at the Otto-Warburg-Laboratory of the Max-Planck- Institute of Molecular Genetics, Berlin

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Major Research Interests:

Processing and Transport of RNA

Splicing of nuclear pre-mRNA is an essential and regulated step of gene expression, which is catalyzed by a large multi-component molecular machine termed the spliceosome. Spliceosomes consist of the small nuclear ribonucleoproteins (snRNPs) U1, U2, U4/U6 and U5 and numerous non-snRNP proteins. The spliceosome is a dynamic molecular machine which forms anew onto each pre-mRNA intron. We are investigating the structure and function of the spliceosomal UsnRNPs and the assembly of the splicing machinery. We have purified the UsnRNPs from both human (HeLa) cells and the yeast *S. cerevisiae* and have characterized their protein components. The snRNPs contain more than 50 distinct proteins, most of which are evolutionarily highly conserved. We are now analyzing the function of the snRNP proteins, as well as non-snRNP splicing factors, in the recognition and functional pairing of the splice sites during spliceosome formation, and in splicing catalysis. As multiple snRNA-snRNA and snRNA-pre-mRNA interactions are formed and undergo dramatic conformational changes during splicing, we are particularly interested in understanding the role of snRNP proteins in the remodeling of the spliceosomal RNA network. The functional studies are carried out *in vitro* in HeLa cell, nuclear splicing extracts using biochemical methods, as well as *in vivo* employing yeast molecular genetic techniques. We are also aiming to reconstitute the spliceosome, at various stages of its assembly, from purified or reconstituted snRNPs and non-snRNP splicing factors.

In addition, we are investigating the ultrastructure of spliceosomal complexes using biochemical and structural biology techniques. High resolution cryo-electron microscopy is being employed to understand the 3D architecture of purified UsnRNPs and spliceosomes at defined functional stages. X-ray crystallography is being used to investigate the atomic structure of smaller spliceosomal RNA-protein and protein-protein complexes. The long-term objectives are to understand the chemical basis of pre-mRNA splicing and RNA-protein interactions in the spliceosome.

A third interest of my group is related to the cell biology of the splicing machinery. The biosynthesis of snRNPs occurs in both nuclear and cytoplasmic compartments and therefore nucleocytoplasmic transport plays an important role in this process. We are studying the cytoplasmic assembly of snRNPs and the mechanism of nuclear import of snRNPs using biochemical, microinjection, as well as real time light microscopy techniques. Moreover, we would like to understand the structural requirements for the intranuclear targeting of UsnRNPs and other splicing factors to certain nuclear structures termed „speckles“ and „coiled bodies“.

Selected Recent Publications:

The HIV-1 Rev activation domain is a nuclear export signal that accesses an export pathway used by specific cellular RNAs. Fischer, U., Huber, J., Mattaj, I. W. and Lührmann, R. (1995) Cell 82, 475-483

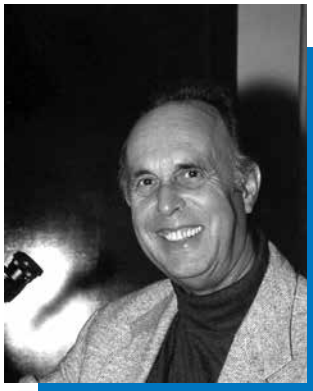
Protein functions in pre-mRNA splicing. Will, C.L. and Lührmann, R. (1997) Current Opinion in Cell Biology 9, 320-328

Snurportin1, an m3G-cap-specific nuclear import receptor with a novel domain structure. Huber, J., Cronshagen, U., Kadokura, M., Marshallsay, C., Wada, T., Sekine, M. and Lührmann, R. (1998) EMBO J. 17, 4114-4126

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

Crystal structures of two Sm protein complexes and their implications for the assembly of the spliceosomal snRNPs. Kambach, C., Walke, S., Young, R., Avis, J.M., de la Fortelle, E., Raker, V.A., Lührmann, R., Li, J., and Kiyoshi, N. (1999) Cell 96, 375-387

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



Frank Mayer

Professor of Microbiology and Head of the Dept. of Structural Microbiology

Universities (1959-1965):
Tübingen, Hamburg, Erlangen

Dr. rer. nat. (Plant Physiology)
University Tübingen, 1965

Research Fellow - Wiss.Rat -University Erlangen, 1965 - 1970

Habilitation (Biology) University Erlangen, 1970

Prof. of Microbiology, University Göttingen, since 1973

Founder (1999) and Head of R&D of the Biotech Company IBIS GmbH Bio Innovations (www.ibis-bio.com)

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Major Research Interests:

Location and macromolecular architecture of enzymes determine their modes of action and their interrelationships with other cellular components and the environment. Hence, these parameters are most important for the living cell. Equally important for a better understanding of the biology of Prokaryotes is a detailed knowledge of structural organization at the cellular level.
By combination of various techniques (Biochemistry, Enzymology, Molecular Biology, Electron Microscopy, Immunology) we describe tertiary and quaternary enzyme structure, location of catalytic centers, location of enzymes within various functional compartments in the prokaryotic cell (cytoplasm, periplasm, membrane, extracellular), and influence of the organization of the immediate environment of the enzyme (water, surfaces) on enzyme activity and stability.
We are interested in a further substantiation of our preliminary finding pointing to the existence of a cytoskeleton also in the prokaryotic cell. To this end, respective proteins are isolated and characterized, and the genes coding for the structural components of such a cytoskeleton will have to be identified.

Activities of IBIS GmbH
We defined two major fields of interest:
-Innovative applications of poly-saccharides
-Design of bio-nanostructural elements for application in pharma, medicine, and cosmetics

Selected Recent Publications:

Mayer F, Hillebrandt JO (1997) Potato pulp: Microbiological characterization, physical modification, and application of this agricultural waste product. ***Appl.Microbiol.Biotechnol.*** 48, 435 - 440.

Ducki A, Grundmann O, Konermann L, Mayer F, Hoppert M (1998) Glucoamylase from *Thermoanaerobacterium thermosaccharolyticum:* Sequence studies and analysis of macromolecular architecture of the enzyme. ***J.Gen. Appl.Microbiol.*** 44, 327 - 335.

Mayer F, Vogt B, Poc C (1998) Immunoelectron microscopic studies indicate the existence of a cell shape preserving cytoskeleton in Prokaryotes. ***Naturwissensch.*** 85, 278 - 282.

Hoppert M, Mayer F (1999) Principles of macromolecular organization and cell function in Bacteria and Archaea. ***Cell Biochem.Biophys.*** 31, 247 - 283.

Hoppert M, Mayer F (1999) Prokaryotes. Even without membrane-bounded compartments, prokaryotes display a high degree of subcellular organization. ***Am.Sci.*** 87, 518 - 525.

Regula JT, Boguth G, Görg A, Hegermann J, Mayer F, Frank R, Herrmann (in press) The protein composition of the Triton X-100 insoluble fraction of the bacterium *Mycoplasma pneumoniae* determined by 2-D gel electrophoresis and mass spectroscopy. ***Microbiology.***

Rainer Merkl

Computer Scientist

Dipl.-Ing. (Biomedical Engineering)

Dipl.-Inf. (Computer Scientist)

Dr. rer. nat., Georg-August-Universität Göttingen (1996)

Akademischer Rat since 1996

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Major Research Interests:

Bioinformatics: The Göttingen Genomics Laboratory (G2L) at the Institute of Microbiology and Genetics is a major centre for microbial genome research within Germany. At the G2L I support all activities of automation and computation. G2L offers via www services to query the inhouse generated databases and genomic sequences.

Selected Recent Publications:

R. Merkl, A survey of codon frequency bias in microbial genomes (submitted).

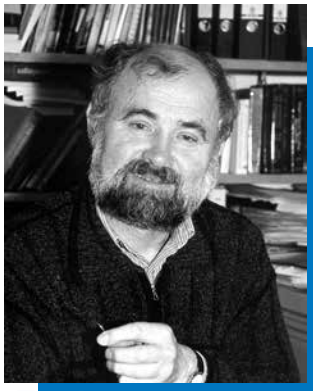
A. Zehl, A. Starke, D. Cech, T. Hartsch, R. Merkl, H. -J. Fritz, Efficient and flexible access to fully protected trinucleotides suitable for DNA synthesis by automated phosphoramidite chemistry, Journal of the Chemical Society / Chemical communications, 23:2677-2678, 1996.

R. Merkl, H.-J. Fritz, Statistical evidence for a biochemical pathway of natural, sequence-targeted G-C to C-G transversion mutagenesis in Haemophilus influenzae Rd. Nucleic Acids Research, 24:4146-4151, 1996.

W. Gläsner, R. Merkl, V. Schellenberger, H.-J. Fritz, Substrate preferences of Vsr DNA mismatch endonuclease and their consequences for the evolution of the E. coli K-12 genome. Journal of Molecular Biology, 245:1-7, 1995.

The composition of DNA is a subject of modifications induced by both external, i.e. environmental, and internal, i.e. species-specific, factors. Examples for external forces varying DNA composition are oxidative or radiation-induced chemical modifications. The species-specific GC-content of a genome or variations in codon usage are indicators for the influence of internal factors like properties of the translational apparatus. Such alterations gradually adapt the DNA sequence to species-specific demands. I am interested in characterizing factors that might have an impact on the composition of DNA by using algorithms based on statistical methods or information-theoretic approaches. Thus it was possible to correlate the under- and overrepresentation of tetranucleotides with substrate preferences of the vsr DNA mismatch endonuclease of E. coli K-12. In microbial genomes, codon usage of strongly expressed genes is biased; the preferential use of a small set of codons is assumed to aid translational efficiency. I developed algorithms to identify preferentially used codons and to quantify codon usage bias. Such a measure contributes to the characterization of genes with unknown function.

Scientific Instrumentation: The incorporation of trinucleotides allows a controlled randomization of residues in synthetic genes. For this purpose we have developed a modified DNA-synthesizer. Fluorescence activated cell sorting is a technique that allows to screen rapidly large numbers of cells (up to 100 000 per sec) and to pick individual cells depending on fluorescence signals. I work on the optimization of a commercial cell sorter to further increase sensitivity and selectivity of the instrument.



Erwin Neher

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M.Sc. (Physics), University of Wisconsin, (1967)

Ph.D. (Physics), Institute of Technology, Munich (1970)

Research associate at the Max-Planck-Institute for Biophysical Chemistry in Göttingen, Germany (1972 - 1975 and 1976 – 1982) and as a guest in the laboratory of Dr. Ch.F. Stevens at Yale University, Dept. of Physiology, New Haven, Conn. (1975 – 1976)

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Major Research Interests:

Molecular Mechanisms of Exocytosis; Neurotransmitter and Release, and Short Term Synaptic Plasticity
In order to understand how the brain handles its information flow and adjusts synaptic connections o the second and subsecond timescale, one has to understand all aspects of synaptic transmission ranging from availability of presynaptic 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 presynaptic Ca^{++} fluxes and rates of transmitter release, and of the factors causing short term plastic changes.

Selected Recent Publications:

Klingauf, J. and 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.

Xu, T., Binz, T., Niemann, H. and E. Neher (1998). Multiple kinetic components of exocytosis distinguished by neurotoxin sensitivity. Nature Neuroscience 1, 192-200.

Voets, T., Neher, E. and T. Moser (1999). Mechanisms underlying phasic and sustained secretion in chromaffin cells from mouse adrenal slices. Neuron 23, 607-615.

Xu, T., Rammner, B., Margittai, M., Artalejo, A.R., Neher, E. and R. Jahn (1999). Inhibition of SNARE complex assembly differentially affects kinetic components of exocytosis. Cell 99, 713-722.

Wei, S.-H., Xu, T., Ashery, U., Kollewe, A.,Matti, U., Antonin, W., Rettig, J. and Neher, E. (2000). Exocytotic mechanism studied by truncated and zero layer mutants of the C-terminus of SNAP-25. EMBO J. 19, 1279-1289.

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

Mary Osborn

Scientist at the MPI
Honorary Professor, University of Göttingen (Medical Faculty)

PhD, Pennsylvania State University, State College, Pa, 1967

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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, Sczeczin, Poland 1997

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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.

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 are directed towards identifying and characterising proteins that bind to NuMA.

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.

Selected Recent Publications:

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

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

Harborth, J., K. Weber and M. Osborn. Epitope mapping and direct visualization of the parallel, in-register arrangement of the double-stranded coiled-coil in the NuMA protein. EMBO J. 14: 2447-2460, 1995.

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

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

Tomas Pieler

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Dept. Developmental Biochemistry
Georg-August-Universität Göttingen

Dr. rer. nat. Biochemistry, Freie Universität Berlin, 1984

Guest Investigator, Rockefeller University, New York (1985/86)

Heisenberg fellow, Freie Universität Berlin and Rockefeller University, New York (1986/87)

Junior group leader, Max Planck Institut für Molekulare Genetik, Berlin (1988-92)

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:

-nucleocytoplasmic transport routes for RNA and proteins
-signal transduction pathways in early vertebrate development (retinoic acid, Hedgehog, Notch and TGF- signalling)
-organogenesis: formation of brain, eye and liver in vertebrate embryos.

Selected Recent Publications:

Rudt, F. and Pieler, T. (1996) Cytoplasmic retention and nuclear import of 5S ribosomal RNA containing RNPs. EMBO J. 15, 1383-1391.

Bellefroid, E., Bourguignon, C., Hollemann, T., Ma, Q., Anderson, D.J., Kintner, C. and Pieler, T. (1996) X-MyT1a Xenopus C2HC type zinc finger protein with a regulatory function in neuronal differentiation. Cell 87, 1191-1202.

Panitz, F., Krain, B., Hollemann, T., Nordheim, A. and Pieler, T. (1998) The Spemann organizer-expressed zinc finger gene Xegr-1 responds to the MAP kinase/Ets-SRF signal transduction pathway. EMBO J. 17, 4414-4425.

Hollemann, T., Chen, Y., Grunz, H. and Pieler, T. (1998) Regionalized metabolic activity establishes boundaries of retinoic acid signalling. EMBO J. 17, 7361-7372.

Hollonet, M., Hollemann, T., Pieler, T. and Gruss, P. (1999). Mutation of *Vax1*, a novel homeobox-containing gene, leads to defective development of the basal forebrain and visual system. Genes and Dev., 13: 3106-3114.

Thomas R. Schneider

Habilitand in Structural Chemistry

Physics Diploma, Technical University of Munich, 1991.

PhD, European Molecular Biology Laboratory & Technical University of Munich, 1996.

Postdoc, Max-Planck-Institute for Molecular Physiology, Dortmund, Germany 1996 - 1997.

Research Assistant (Habilitand) in Structural Chemistry since 1997.

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Major Research Interests:

Methods for Macromolecular Crystallography & Structural Aspects of Enzyme Catalysis

Selected Recent Publications:

Schneider TR. Objective comparison of protein structures: error-scaled difference distance matrices. Acta Cryst. D56, 714-721 (2000).

Schneider TR, Kärcher J, Pohl E, Lubini P, Sheldrick GM. Ab initio structure determination of the lantibiotic mersacidin. Acta Cryst. D56, 705-713 (2000).

Schneider TR, Gerhardt E, Lee M, Lian P, Anderson KS, Schlichting I. Loop Closure and Intersubunit Communication in Tryptophan Synthase. Biochemistry, 37:5394-5406 (1998).

Garman EF, Schneider TR. Macromolecular Cryocrystallography. J.Appl. Cryst. 30:211-237 (1997).

Sheldrick GM, Schneider TR. SHELXL: High Resolution Refinement. Methods in Enzymology (R.M. Sweet and C.W. Carter Jr., eds.), Academic Press; Orlando, Florida, 277:319-343 (1997).

Crystal structures of biological macromolecules and their assemblies are the corner stones of modern structural biology. The determination of a crystal structure still is an exciting endeavour and requires expertise in areas as diverse as molecular biology, protein chemistry, and experimental and computational crystallography.

To tackle ever more challenging problems, the methods for macromolecular crystallography need constant development. We are concentrating on the development of computational methods to facilitate the determination of larger and more complicated structures with the highest possible accuracy. In particular, we are interested in pushing the limits of MAD phasing and in the determination of protein structures at atomic (better than 1.2 Å) resolution. Another focus of our work is the development of algorithms for the objective comparison of three-dimensional structures.

On the experimental side, we are trying to understand the mechanism and the regulation of enzymes on a structural level, for example for enzymes envolved in the biosynthesis of aromatic amino acids. In order to exploit the full repertoire of modern biology, these projects are done in close interdisciplinary collaboration with biologically oriented groups in Göttingen and elsewhere.

George M. Sheldrick

Professor of Structural Chemistry (since 1978) 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.

Meldola Medal (1970), Corday-Morgan Medal (1978), Royal Society of Chemistry Award for Structural Chemistry (1981), Leibniz Prize of the Deutsche Forschungsgemeinschaft (1989), Patterson Prize of the American Crystallographic Association (1993) and Carl-Hermann Medal of the Deutsche Gesellschaft fuer Kristallographie (1999); most permanent honor was the naming of a mineral „Sheldrickite“

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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Selected Recent Publications:

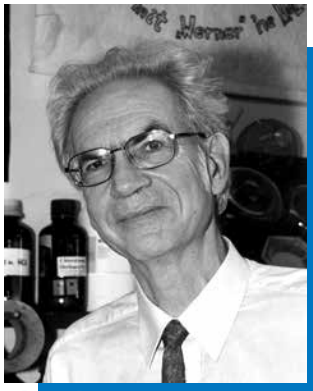
Schaefer, M., Schneider, T.R. & Sheldrick, G.M. Crystal structure of vancomycin. Structure 4 (1996) 1509-1515.

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

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

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. For a recent review see Current Opinion in Structural Biology, 9 (1999) 643-648.



Axel Zeeck

Professor of Biomolecular Chemistry

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Habilitation 1974

Professor since 1980

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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:

I. Sattler, R. Thiericke and A. Zeeck: The manumycin-group metabolites (Review). Nat. Prod. Rep.1998, 15, 221-240.

S. Grabley, R. Thiericke and A. Zeeck: The chemical screening approach. In Drug discovery from nature (Eds S. Grabley, R. Thiericke), p. 124-148, Springer, Berlin 1999.

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

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

Staff Method Course

In addition to the teaching faculty, the following scientists organized and supervised the method courses:

Dr. Tilmann Achsel	MPI bpc	Cellular Biochemistry
Thorsten Adams	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dr. Stefan Albert	MPI bpc	Molecular Genetics
PD Dr. Werner Albig	U Göttingen	Molecular Biology
Dr. Thomas Anthony	MPI bpc	Molecular Biology
Stephen Blanke	MPI bpc	Molecular Developmental Biology
Gabor Bunkoczi	U Göttingen	Structural Chemistry
Andreas Christmann	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Judith Debreczeni	U Göttingen	Structural Chemistry
Heinz-Jürgen Dehne	MPI bpc	Biochemistry and Cell Biology
Dr. Uwe Deppenmeier	U Göttingen	General and Applied Microbiology
Rüdiger Dietrich	U Göttingen	Molecular Genetics and Preparative Molecular Biology
PD Dr. Birgit Drabent	U Göttingen	Molecular Biology
Alexander Frey	U Göttingen	General and Developmental Physiology
Dr. Stefan Goebel	U Göttingen	Bacteriology
Dr. Jens Harborth	MPI bpc	Biochemistry and Cell Biology
Dr. Klaus Hartmuth	MPI bpc	Cellular Biochemistry
René Hempel	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dr. Stefan Hoening	U Göttingen	Biochemistry and Molecular Cell Biology
Matthias Holpert	U Göttingen	Bacteriology
Dr. Michael Hoppert	U Göttingen	Structural Microbiology
Dr. Stefan Irniger	U Göttingen	Molecular Microbiology and Molecular Physiology
Dr. med. Thomas Kietzmann	U Göttingen	Biochemistry – Cellular Biochemistry
Christian Knop	U Göttingen	Plant Biochemistry
Bernhard Kusian	U Göttingen	Molecular Microbiology and Molecular Physiology
Dr. Gertrud Lohaus	U Göttingen	Plant Biochemistry
Dr. Guido Lyss	U Göttingen	General and Developmental Physiology
Sharif Mansour	MPI bpc	Molecular Cell Biology
Dr. Ahmed Mansouri	MPI bpc	Molecular Cell Biology
André Möller	MPI bpc	Molecular Developmental Biology
Dr. Hans-Ulrich Mösch	U Göttingen	Molecular Microbiology and Molecular Physiology
Peter Müller	U Göttingen	Structural Chemistry
Milena Nincovic	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dr. Elke Oetjen	U Göttingen	Molecular Pharmacology
Dr. Ina Papustavrou	U Göttingen	Biochemistry and Bioorganics
Thomas Pape	U Göttingen	Structural Chemistry
Annette Peter	MPI bpc	Molecular Developmental Biology
Dr. Ina Pfeiffer	U Göttingen	Molecular Biology of Livestock
Dr. Olaf Piepenburg	MPI bpc	Molecular Developmental Biology
Dr. Rolando Rivera Pomar	MPI bpc	Molecular Biology
Prof. Dr. Irmelin Probst	U Göttingen	Biochemistry – Cell Physiology
Dr. Sigrun Reumann	U Göttingen	Plant Biochemistry
Dr. Dietmar Riedel	MPI bpc	Neurobiology
Dr. Falko Rudt	U Göttingen	Developmental Biochemistry
Dr. Henrike Schieferdecker	U Göttingen	Biochemistry – Molecular Cell Biology

Dr. Bernhard Schmidt	U Göttingen	Biochemistry and Molecular Cell Biology
Dr. Hans-Dieter Schmitt	MPI bpc	Molecular Genetics
Dr. Peter Schu	U Göttingen	Biochemistry and Molecular Cell Biology
Dr. Ekkehard Schulze	U Göttingen	Developmental Biology
Anke Schürer	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dr. Holger Stark	MPI bpc	Cellular Biochemistry
Michael Stauber	MPI bpc	Molecular Developmental Biology
Dr. Wolfgang Streit	U Göttingen	General and Applied Microbiology
PD Dr. med. Frank Stümpel	U Göttingen	Molecular Physiology
Mladen Tzvetkov	U Göttingen	General and Applied Microbiology
Dr. Thomas Tuschl	MPI bpc	Cellular Biochemistry
Aaron Voigt	MPI bpc	Molecular Developmental Biology
Dr. Hans-Peter Vornlocher	MPI bpc	Cellular Biochemistry
Dr. Jian Wang	MPI bpc	Biochemistry and Cell Biology
Dennis Wegener	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Dr. Ralf Weigel	U Göttingen	General and Developmental Physiology
Alexander Wentzel	U Göttingen	Molecular Genetics and Preparative Molecular Biology
Julia Wittmann	U Göttingen	Molecular Genetics and Preparative Molecular Biology

Index

participating institutes:

Georg August University Göttingen
- Faculty of Biology
- Faculty of Medicine
- Faculty of Chemistry
- Faculty of Agriculture

Max Planck Institute for Biophysical Chemistry
- Dept. of Molecular Genetics
- Dept. of Molecular Cell Biology
- Dept. of Molecular Developmental Biology
- Dept. of Neurobiology
- Dept. of Molecular Biology
- Dept. of Cellular Biochemistry
- Dept. of Membrane Biophysics
- Dept. of Biochemistry
- Dept. of Cell Biology