Yearbook 2006/07

MSc/PhD/MD-PhD Neuroscience Program
at the University of Göttingen

International Max Planck Research School

Imprint

Publisher:	Coordination Office Neurosciences of the Georg August University Göttingen
Text:	Dr. Steffen Burkhardt Prof. Dr. Michael Hörner
Cover Design:	Rothe Grafik
Page Layout:	LifeTechMedia (M. Nolte)
Photographics:	Reprostelle MPI bpc (P. Goldmann)

Letter from the University

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

The two programs met with immediate success. By now, some 800 students from more than 70 countries apply for the 20 study places available in each of the programs every year. Over the past six years, both programs have introduced and combined elements of international recruitment, competitive admission procedures, advanced curricula, research training, social integration programs, extracurricular support and evaluation procedures into successful working structures. They have both achieved excellent recommendations in several external evaluations and have recently been awarded the 2004 prize for excellent support services for foreign students by the German Federal Foreign Office. For the newly established Georg August University School of Science (GAUSS) and two other graduate schools in Göttingen, the Molecular Biology and Neuroscience Programs are considered exemplary and serve as best practice models. In October 2006, the two programs were awarded the label "Top 10 International Master's Degree Courses made in Germany" by "Stifterverband für die Deutsche Wissenschaft" and the German Academic Exchange Service (DAAD) in a national contest, in which 121 Master's programs of 77 universities participated. The Göttingen Molecular Biology and Neuroscience programs were the only Master's programs in the natural sciences and medicine which received this award.

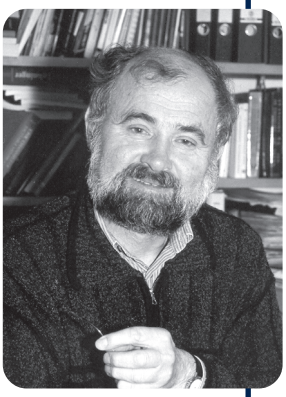
Five Göttingen University faculties, three Göttingen Max Planck Institutes as well as the German Primate Center participate in the programs. International guest lecturers are also involved. The Max Planck Society contributes through its newly established International Max Planck Research Schools. Both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

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

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

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

Letter from the Max Planck Society



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

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

The goals of the International Max Planck Research Schools are

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

By now, 43 International Max Planck Research Schools have been established involving 54 Max Planck Institutes, 55 German universities and 15 universities abroad. More than 1700 (mostly PhD-) students from 86 countries are presently enrolled. Approximately 350 PhD students have graduated to date from an International Max Planck Research School.

The success of the Göttingen International Max Planck Research Schools in Molecular Biology and Neurosciences is evident from the high quality of the students and from the hundreds of applications the programs receive each year. The Schools have also re-shaped the local scientific community, strengthened the ties between the participating institutions, and initiated new scientific collaborations that augment the international reputation of Göttingen as a center for scientific excellence. We hope that in the years to come the students of the International Max Planck Research Schools will be successful in their professional careers. We also hope that they will remember their training period in Göttingen as an exciting and stimulating phase in their lives.

Peter Gruss
President
Max Planck Society
for the Advancement
of Science

Erwin Neher
Dean of the IMPRS
Neurosciences

Overview

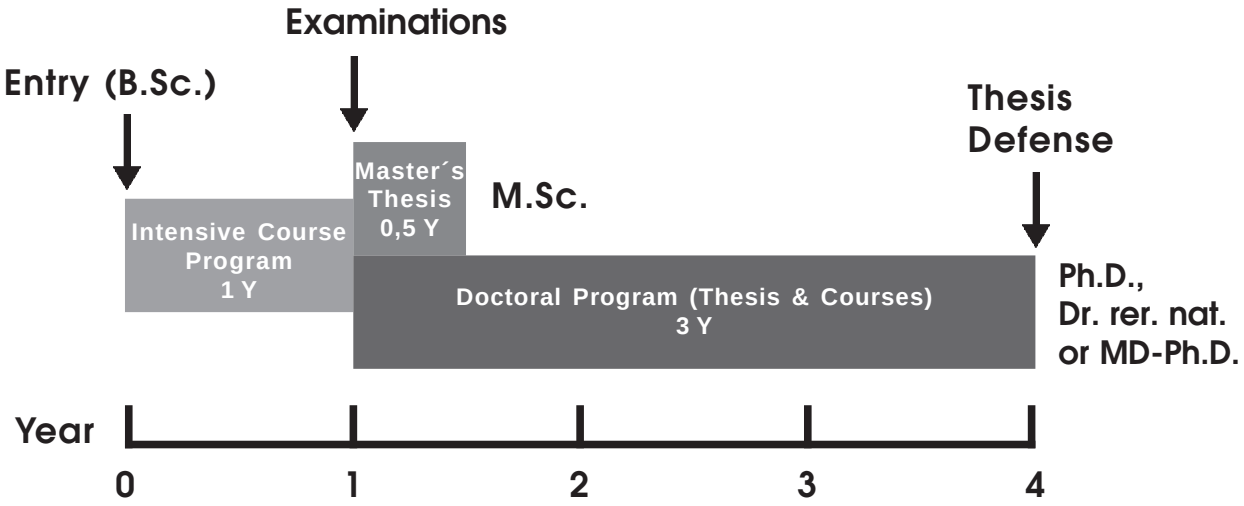
This yearbook is intended to provide information on the International MSc/PhD/MD-PhD Neuroscience Program in Göttingen, Germany, which was established in 2000. In addition to general information on the program, the yearbook introduces the current year's students, the faculty members, the program committee,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

The program is jointly conducted by the University of Göttingen, the Max Planck Institute for Biophysical Chemistry (MPIbpc), the Max Planck Institute for Experimental Medicine (MPIem), the Max Planck Institute for Dynamics and Self-Organization (MPIds), the German Primate Center (DPZ), and the European Neuroscience Institute (ENI). Further to their active participation in the Neuroscience Program, the above-mentioned partners closely cooperate in the DFG Research Center for Molecular Physiology of the Brain (CMPB), the Göttingen Center for Molecular Biosciences (GZMB), the Center for Systems Neuroscience (ZNV), in several collaborative research centers (Sonderforschungsbereiche, SFB) and in interdisciplinary doctoral programs (Graduiertenkollegs, GK).

The International MSc/PhD/MD-PhD Neuroscience Program qualifies students for professional work in the neurosciences. The program is open to students from Germany and from abroad, who hold a Bachelor's degree (or equivalent) in the biosciences, medicine, psychology, physics, or related fields. All courses are held in English. Scholarships are available. The academic year starts in October and is preceded by a three week orientation program. Applications may be submitted until January 31 of the year of enrollment. To ensure a high standard of individual training, the number of participants is limited to 20 students per year.

All students initially participate in one year of intensive course work. This first segment of the program comprises lectures, tutorials, seminars, methods courses, and independent, individually supervised research projects (laboratory rotations). The traditional German structure of academic semesters is not followed. The condensed schedule allows students to accumulate 90 credits (ECTS) within one year, which would normally require 3 semesters. Subsequently, two separate segments are offered:

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



Funding of the Program

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

DAAD

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

International Degree Programs - Auslandsorientierte Studiengänge (AS)

IPP made in Germany

International Postgraduate Programs – Internationale Promotionsprogramme (IPP)

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

International Max Planck Research Schools

Niedersächsisches Ministerium für Wissenschaft und Kultur

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

Innovationsoffensive

Doctoral Programs - Promotionsprogramme

Stifterverband für die Deutsche Wissenschaft

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

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

Bayer AG, Leverkusen, Germany

Carl Zeiss Lichtmikroskopie, Göttingen, Germany

Degussa AG, Düsseldorf, Germany

DeveloGen AG, Göttingen, Germany

Heka Elektronik GmbH, Lambrecht / Pfalz, Germany

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

KWS Saat AG, Einbeck, Germany

Leica Microsystems GmbH, Bensheim, Germany

Luigs & Neumann, Ratingen, Germany

Olympus Deutschland GmbH, Hamburg, Germany

Roche Diagnostics GmbH, Penzberg, Germany

Sartorius AG, Göttingen, Germany

Solvay Pharmaceuticals, Hannover, Germany

Springer Verlag, Heidelberg, Germany

Vossius & Partner, München, Germany

Intensive Course Program (First Year)

Throughout the first year, current topics in the neurosciences are covered by

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

Lectures and Tutorials

A comprehensive lecture series is organized into a sequence of 4-6 week units. The following topics are taught on an advanced level throughout the first year (36 weeks, 4 hours per week):

A. Neuroanatomy

B. Physiology and Basic Statistics

C. Methods in the Neurosciences

D. Molecular Biology, Development and Neurogenetics

E. Sensory and Motor Systems

F. Clinical Neurosciences and Higher Brain Functions

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

Methods Courses

During the first months of the Neuroscience Program, students participate in a series of methods courses to introduce them to principles and practical aspects of basic scientific techniques and the handling of model organisms. The methods courses comprise the following topics:

I Neuroanatomy

- histology and development of the brain
- cytology of the cortex (EM)
- human brain
- spinal cord/cerebellum
- basal ganglia
- sensory systems
- hippocampus
- immunocytochemistry
- invertebrate model systems (insects, leech, *C. elegans*)

II Membrane Physiology and Neurophysiology

- membrane physiology
- sensory physiology
- FLIM
- Ca-imaging
- FCS
- electrophysiological techniques
- neural basis of acoustic communication
- arthropod muscle system
- visual sense of arthropods
- the biology of electric fish

III Methods in the Neurosciences

- neuronal modelling
- cell culture methods
- patch clamp data analysis
- optical imaging
- behavioral analysis

Laboratory Rotations

Starting in January, every student carries out three independent research projects (laboratory rotations) in participating laboratories. Each project is individually supervised and involves seven to eight weeks of experimental work, followed by one week for data analysis and presentation. For each project, a report must be completed in the format of a scientific publication. The laboratory rotations must cover at least two different subjects.

Seminars

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

Examinations

After the first year of intensive training, all students take one written and two oral Master's examinations. The Master's examinations explore the students' theoretical background in topics covered by lectures and tutorials. Furthermore, topics covered by the laboratory rotations will be examined.

PhD Program

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

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

At the end of the PhD training program, a doctoral thesis is submitted either in the traditional format, or as a collection of scientific publications in internationally recognized journals along with a general introduction and a discussion of the results. The degree PhD or, alternatively, Dr. rer. nat. will be awarded after the successful defense of the doctoral thesis. Having fullfilled all PhD degree requirements, medical students may apply for the degree of an MD-PhD at the Medical Faculty.

Master's Program

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

Orientation, Language Courses, Social Activities

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

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

Application, Selection and Admission 2006

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

In the year 2006, the coordination office received 238 applications from 46 countries.

Continent	Applications	Admissions
Europe (total)	**51**	**7**
Germany	25	6
other West Europe	5	0
East Europe	21	1
America (total)	**14**	**2**
North America	5	1
Central/South America	9	1
Africa (total)	**15**	**0**
North Africa	4	0
Central/South Africa	11	0
Asia (total)	**158**	**6**
Near East	37	1
Central Asia/ Far East	121	5
Australia	**0**	**0**

Students 2006/2007

Name		Home Country
Christoph	Anacker	Germany
Dario	Arcos-Díaz	Colombia
Anne	Hammerstein	Germany
David	Hermann	Germany
Wen	Hu	P.R. China
Chao-Hua	Huang	Taiwan
Ramya	Nair	India
Pinar	Öz	Turkey
Shahaf	Peleg	Israel
Kirsten	Reuter	Germany
Sebastian	Richter	Germany
Nikhil	Sasidharan	India
Raunak	Sinha	India
Jessica	Wittnam	United States of America

Christoph Anacker

First Name
Christoph

Last Name
Anacker

Date of Birth
3 May 1984

Country
Germany

EDUCATION

College / University
Georg August University, Göttingen
Highest Degree:
Vordiplom
Major Subjects:
Zoology, Biochemistry, Psychology
Lab Experience:
Basic techniques in biochemistry, microbiology, microscopy, immunhistochemistry, cell culture, SDS- PAGE, practical training at the departement of neurobiology, psychological and behavioural experiments
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2006 - 2007: Stipend Studienstiftung des deutschen Volkes

SCIENTIFIC INTERESTS AND GOALS

To me, the brain is the most exciting part of the human body, although or even because it is still little understood. I am especially interested in synaptic transmission and the various ways in which it can be influenced by drugs or medicine. The underlying mechanisms of neurotransmitters controlling the state of mind and cognitive processes like learning, intelligence or emotion are one theme in the great field of neuroscience which interests me the most. Thus, I would like to acquire more knowledge about the neuronal basis of higher brain functions and behaviour. In addition, I consider psychiatric disorders as serious diseases which can affect everyone's life so hard and I would like to contribute to the pharmaceutical research trying to cure and prevent neurodegenerative processes leading to a serious loss of cognitive abilities.

Dario Arcos-Díaz

First Name
Dario

Last Name
Arcos-Díaz

Date of Birth
6 August 1986

Country
Colombia

EDUCATION

College / University
2002 - 2006: Universidad Nacional de Colombia
Highest Degree:
B.Sc. (Biology)
Major Subjects:
Biology, Neurobiology
Lab Experience:
Practical training in behavioral neurobiology. Basic techniques in cell biology, animal physiology, histology, biochemistry, population genetics.
Projects / Research:
March-June 2006: "Extinction facilitates the new acquisition of spatial memory in rats in the Barnes maze", Universidad Nacional de Colombia, Behavioral Neurophysiology Department, Medicine Faculty, Prof. A. Múnera.
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2003 - 2005: Honor matriculation and tuition fee exemption for the best Grade Point Average, Universidad Nacional de Colombia
Honors / Awards:
2006: Best score in the Colombian national examinations for undergraduates in Biology
2001: "Andrés Bello" distinction by the Colombian Government in the national category in Biology to the six best results in the examinations for university entrance

SCIENTIFIC INTERESTS AND GOALS

I feel deeply fascinated by memory and the higher brain functions. An understanding of their complexity can only be envisaged by looking at it from different points of view. I want to investigate the processes underlying behavior using diverse approaches from the molecular to the behavioral level. Furthermore, I think the comprehension of these mysterious phenomena is not only interesting but will also help improve the quality of life of people all over the world.

Anne Hammerstein

First Name
Anne Friederike

Last Name
Hammerstein

Date of Birth
20 November 1983

Country
Germany

EDUCATION

College / University
University of Oxford, UK
Highest Degree:
M.Chem.
Major Subjects:
Chemistry
Lab Experience:
Molecular biology (DNA cloning techniques, protein expression, purification and analysis), single channel electrophysiology, organ bath contraction studies, organic synthesis, analytical chemistry
Projects / Research:
2005 - 2006: Part II Thesis: Engineering of an a-hemolysin pore, Prof. Hagan Bayley, Chemistry Research Laboratory, University of Oxford
2005: Characterisation of muscarinic ACh receptors in the mouse vas deferens, Dr. Tom Cunnane, Department of Pharmacology, University of Oxford
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany

SCIENTIFIC INTERESTS AND GOALS

My interest lies in understanding the structure-function relationship of receptors in the nervous system.

David Hermann

First Name
David

Last Name
Hermann

Date of Birth
19 April 1984

Country
Germany

EDUCATION

College / University
2005 - 2006: University of Umeå, Sweden
2003 - 2005: University of Würzburg, Germany
Highest Degree:
Vordiplom
Major Subjects:
Physics
Lab Experience:
Axonal guidance study during neuronal circuit formation in drosophila (immunohistochemical method), olfactory system in mice (histochemical staining)
Projects / Research:
Measurement analysis of mechanical properties on macromolecules expressed by uropathic bacteria Escherichia (P Pili protein filament subunits PapA)
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2005 - 2006: Twin town stipend of Würzburg, Germany and Umeå, Sweden

SCIENTIFIC INTERESTS AND GOALS

Emergence of neuronal systems like the human brain is remarkable and fascinating. Ideally, I would like to connect processes from the molecular level to behaviour/responses of small subunits of the brain or even to higher brain functions through modelling, for example. Brain imaging techniques like NMR are also of great interest for me. Neuroplasticity after neuronal circuit formation is not only essential for higher brain functions or recovery from brain damage, but it might also include development of new neuronal cells. Investigating underlying mechanisms could give us much better understanding of our brain. In addition, improving ways for actively influencing neuroplasticity could have many applications as in medical treatment and prevention of brain illnesses.

Wen Hu

First Name
Wen

Last Name
Hu

Date of birth
11 April 1984

Country
P.R. China

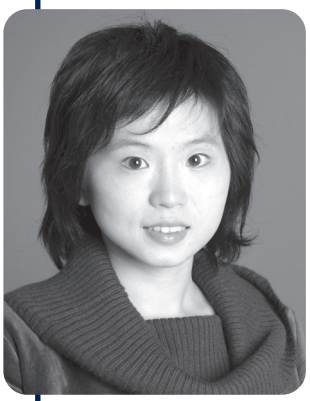
EDUCATION

College / University
2002 - 2006: University of Science and Technology of China, P.R.China
Highest Degree:
B.Sc.
Major Subjects:
Biological Science
Lab Experience:
The relationship between chromosomal bridge and chromosomal instability
Projects / Research:
Feb 05 - Jun 06: Investigate the formation and destination of the Anaphase Bridge in mitosis on the basis of time lapse observation and its crucial role in chromosomal instability
Scholarships:
2006 - 2007: Stipend International Max Planck Research School , Germany
2002: Freshman Scholarship, University of Science and Technology of China (USTC)
2003: Outstanding Student Scholarship, USTC, 3rd class
2004: Outstanding Student Scholarship, USTC, 2 rd class

SCIENTIFIC INTERESTS AND GOALS

How does the neuron network produce complex behavior? Which parts of the brain are responsible for what kind of computation? What does the information transferring from one neuron to another mean? All these questions are fascinating. I hope I can do something to solve them.

Chao-Hua Huang



First Name
Chao-Hua

Last Name
Huang

Date of birth
2 October 1983

Country
Taiwan (R.O.C.)

EDUCATION

College / University
National Taiwan University
Highest Degree:
B.Sc.
Major Subjects:
Biology
Lab Experience:
Lab of cellular neuroscience, Institute of Zoology , NTU
Projects / Research:
Pan C.Y., Huang C.H., Lee C.H. (2006) Calcium Elevation Elicited by Reverse Mode Na^+/Ca^{2+} Exchange Activity Is Facilitated by Intracellular Calcium Stores in Bovine Chromaffin Cells. *Biochem Biophys Res Commun*. 342(2):589-95
Scholarships:
2006- 2007 Stipend International Max Planck Research School, Germany
Dr. Hseih De-Kwei and Dr. Feng Song-Yen Memorial Scholarship (Scientific Student Poster Award)

SCIENTIFIC INTERESTS AND GOALS

I am interested in the signal transduction between synapses – especially in the mechanisms of activating the ion channels, and how some specific chemical molecules function together to perform a great symphony. In addition, the interaction between glial cell and neuronal cell also attracts my attention.

Ramya Nair

First Name
Ramya

Last Name
Nair

Date of Birth
19 September 1985

Country
India

EDUCATION

College / University
St.Stephen's College, Delhi University, India
Highest Degree:
B.Sc. (Honours)
Major Subjects:
Chemistry
Lab Experience:
Volumetric and qualitative analysis, organic compound detection and preparation, calorimetric and kinetically controlled experiments based on different conditions, Spot Assay, MIC_{80}, Alkali lysis and DNA isolation by boiling method
Projects / Research:
May 04 - July 04: Dr. Rajendra Prasad, School of Life Sciences, Jawaharlal Nehru University, Delhi: To check the activity of a drug (azoles) on *Candida albicans* and also studied the protocols for DNA isolation
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany

SCIENTIFIC INTERESTS AND GOALS

My area of interest lies in neuropsychological and cognitive science. I would like to work on how the brain processes information and how this leads to difference in behavioral pattern. I am also interested in the study of the various neurodegenerative diseases.

Pinar Öz

First Name
Pinar

Last Name
Öz

Date of Birth
8 August 1983

Country
Turkey

EDUCATION

College / University
2001 - 2006: Bogazici University, Turkey
Highest Degree:
B.Sc. in Molecular Biology and Genetics
Major Subjects:
Neurobiology, Experimental Psychology, Molecular/Cell Biology, Genetics, Neurophysiology
Lab Experience:
Techniques for molecular biology and biochemistry; FISH; chromatography; cloning and transformation of bacteria; basic techniques for microbiology; immunohistochemistry; radioimmune assay; electrolytic lesions; vibratome and cryostats; bioinformatics
Projects / Research:
Sep '05 - Jan '06: identification of oak species; comparative analysis of molecular markers
Feb '05 - Jun '05: identification and investigation of thermophilic bacteria in Turkey for biotechnological purposes
Feb '03 - Jun '05: investigation of Alzheimer's Disease, biological clock and circadian rhythmicity, roles and structures of certain brain regions like SCN and PVT
Jun '04 - Sep '04: investigation of the central effects of nicotine, its interaction with stress; investigation of roles and interactions of NOS and CART in stress response
Scholarships:
2006 - 2007: International Max Planck Research School, Germany
Apr 2004: Scholarship to attend 3rd National Neuroscience Congress (Denizli, Turkey)

SCIENTIFIC INTERESTS AND GOALS

The brain is the most fascinating machine in the world and my desire is to learn the mechanism of understanding and producing thoughts from a neuron as a single unit to brain as a whole. More specifically, I wish to deal with synaptic mechanisms and development of the brain for this purpose.

Shahaf Peleg

First Name
Shahaf

Last Name
Peleg

Date of Birth
28 November 1980

Country
Israel

EDUCATION

College / University
2003 - 2006: Ben Gurion University, Israel
Highest Degree:
B.Sc.
Major Subjects:
Biology
Lab Experience:
Immunofluorescence, explant culture, microscopy, agarose gel electrophoresis, basic techniques in microbiology and molecular biology
Projects / Research:
July 2005 - May 2006: Investigated the effect of olfactory epithelial proliferation of new neurons in the olfactory bulb. Department of Morphology, Ben Gurion University, Israel
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2005: The Amos De-Shalit Summer program for select students in Life Science, Weizmann Institute of Science, Israel

SCIENTIFIC INTERESTS AND GOALS

As time goes by, aging begins to take its toll on us. Currently, medical technology allows us to replace lost limbs with artificial ones and failing organs with healthy transplants; however, the brain itself has no possible replacement. Therefore, my main interest is the aging process of the brain, the decline of its functions and the appearance of neurodegenerative diseases. My goal is to gain a broad perspective from different areas of the aging processes within the brain and find ways to preserve its vitality, delay aging and in essence, cure its damage. In accomplishing these goals, I hope to create and implement major improvements for each person's quality of life.

Kirsten Reuter

First Name
Kirsten

Last Name
Reuter

Date of Birth
8 August 1983

Country
Germany

EDUCATION

College / University
Mannheim University of Applied Sciences
Highest Degree:
B.Sc. in Biotechnology
Major Subjects:
Biochemistry, Cell- and Microbiology, Bioreactors
Lab Experience:
Cell culture (mammalian, bacterial), DNA and protein molecular techniques, confocal microscopy, basic techniques in biochemistry, cell- and molecular biology and biotechnology
Projects / Research:
2004: The Children's Hospital at Westmead, Sydney: Localization of large deletions in MECP2 gene of Rett Syndrom patients
2005 - 2006: Max Planck Institute for Medical Research, Heidelberg: Selective Labeling of Presynaptic Protein in the Calyx of Held Mediated by the Genetically Encoded AGT-tag.
Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany

SCIENTIFIC INTERESTS AND GOALS

I am interested in studying molecular mechanisms and effects of genetic alterations on given protein reaction pathways. It is exciting to find the contribution of single reactions and reaction cascades to cellular life. My specific interest in Neuroscience is based on the fact that disorders in neurons cause severe diseases. However, brain function is insufficiently known to develop drugs for the treatment of many diseases all too often it is not even possible to lessen symptoms or slow down disease progression. I hope I will be able to contribute to the knowledge of effects of disorders on specific reaction pathways on the molecular and cellular level to assist the development of improved treatments.

Sebastian Richter

First Name
Johann Sebastian

Last Name
Richter

Date of Birth
20 August 1982

Country
Germany

EDUCATION

College / University
2002 - 2005: University of Göttingen
2005 - 2006: Université Victor Ségalen 2 de Bordeaux, France

Highest Degree:
Physikum

Major Subjects:
Medicine

Lab Experience:
Basic biochemical and microbiological methods, immunofluorescency microscopy

Scholarships:
2006 - 2007 Stipend International Max Planck Research School, Germany
2005 - 2006: Erasmus Bordeaux

SCIENTIFIC INTERESTS AND GOALS

My scientific interests lie in understanding pathological processes in degenerative diseases of the nervous system and the underlying molecular mechanisms. In this respect I am particularly interested in doing research on biochemical alterations, plaque formation and subsequent functional losses in diverse forms of disorders associated with dementia, foremost Alzheimer´s disease. By attaining a neuroscientific education I hope to gain the ability to work in both a clinical and a research setting, to serve as some sort of a translative joint between the two and to be able to contribute to advances in preventive, therapeutic, and curative approaches in neurodegenerative diseases.

Nikhil Sasidharan

First Name
Nikhil

Last Name
Sasidharan

Date of Birth
14 October 1984

Country
India

EDUCATION

College / University
2003 - 2006: International University Bremen, Germany

Highest Degree:
B.Sc.

Major Subjects:
Biochemistry and Cell Biology

Lab Experience:
Mammalian cell culture, immunocytochemistry, epifluorescence and laser scanning microscopy, SDS-PAGE, Western Blotting, realtime PCR, gene cloning

Projects / Research:
02/2006 - 07/2006: Lab rotation project focused on the molecular enzymology of the DNA methyltransferase, DNMT 1 (Intl. University Bremen, Dept. of Biochemistry)
09/2005 - 01/2006: Lab rotation project focused on studying the effects of LPS and IGF-1 on oligodendrocyte survival (Intl. University Bremen, Dept. of Cell Biology)
06/2005 - 08/2005: Internship project to determine the effects of the extracellular glycoprotein, Reelin, on neuronal differentiation (Albert Ludwigs University Freiburg, Dept. of Neuroscience)

Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2003 - 2006: Merit Scholarship for studies at International University Bremen, Germany

SCIENTIFIC INTERESTS AND GOALS

What prevents the brain from working as it should? My curiosity lies in the understanding of the molecular mechanisms behind neurological diseases such as multiple sclerosis, morbus Parkinson and morbus Alzheimer. Through a stronger understanding of these disease processes, I hope to be able to work towards potential therapies and treatments.

Raunak Sinha

First Name
Raunak

Last Name
Sinha

Date of Birth
12 February 1985

Country
India

EDUCATION

College / University
2005 - 2006: Tata Institute of Fundamental Research, India
2002 - 2005: Presidency College / University of Calcutta, India

Highest Degree:
B.Sc. (Honours) in Physiology

Major Subjects:
Physiology, Molecular Biology

Lab Experience:
Experimental physiology, work physiology, molecular biology techniques, immunoprecipitation, immunohistochemistry, protein expression studies

Projects / Research:
Jul 05 - Jun 06: TIFR, India : Identifying the role of 'Translin' in mRNA processing, subcellular localization and translational regulation in *Drosophila melanogaster*
Jun - Jul 05: Studying the pharmacological properties of Analgesic drugs at Glaxosmithkline
Nov 04: Evaluating physiological parameters in a field survey of tribal inhabitants in the northeastern part of India

Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
Jul 05 - Jun 06: Stipend Junior Research Scholar, TIFR, India
Jun - Jul 05: Stipend Research trainee, GlaxoSmithkline, India

SCIENTIFIC INTERESTS AND GOALS

My scientific goal is to understand neuronal plasticity at the molecular level. Long-lasting forms of synaptic plasticity in mammalian brain require local protein synthesis from pre-existing mRNA at the synapse. I am interested to understand how the local repertoire of translational factors enable the synapse to control its strength independent of the cell soma and whether there lies any difference in the biochemical mechanisms governing translation at the synapse.

Jessica Wittnam

First Name
Jessica

Last Name
Wittnam

Date of Birth
30 October 1983

Country
USA

EDUCATION

College / University
2002 - 2006: Yale University, USA

Highest Degree:
B.Sc. in Molecular, Cellular, and Developmental Biology

Major Subjects:
Cell Biology, Genetics, Immunology, Neurobiology, Organic Chemistry, Biochemistry

Lab Experience:
Light microscopy, immunohistochemistry, molecular biology, tissue culture, and *Drosophila* genetics

Projects / Research:
2005 - 2006: Temporal analysis of TGF-Beta signaling during the development of the *Drosophila* neuromuscular junction, Department of Molecular, Cellular, and Developmental Biology, Yale University, USA
2005: Investigation of inversion polymorphisms in the human genome, Department of Genetics and Genomic Biology, Hospital for Sick Children, Canada
2005: Synergy between neuronal activity and retrograde TGF-Beta signaling at the *Drosophila* neuromuscular junction, Department of Molecular, Cellular, and Developmental Biology, Yale University, USA

Scholarships:
2006 - 2007: Stipend International Max Planck Research School, Germany
2005: Alan S. Tetelman '58 Summer Traveling Fellowship
2002- 2003: National Merit Scholarship, Amsco-Lowry Scholarship

SCIENTIFIC INTERESTS AND GOALS

I am interested in studying the mechanisms that govern synaptogenesis and synaptic plasticity, with a specific emphasis on how these phenomena allow an organism to adapt to external stimuli. In addition, I would like to gain a greater understanding of neurodegenerative diseases and the body's response to neurological injury.

Faculty

(Senior Faculty, Group Leaders, Lecturers)

Mathias	Bähr	Neurology	U Göttingen
Nils	Brose	Molecular Neurobiology	MPI em
Wolfgang	Brück	Neuropathology	U Göttingen
Edgar	Brunner	Medical Statistics	U Göttingen
Stefan	Eimer	Molecular Neurogenetics	ENI
Norbert	Elsner	Neurobiology	U Göttingen
Wolfgang	Engel	Human Genetics	U Göttingen
Gabriele	Flügge	Neurobiology	DPZ
Jens	Frahm	Biomedical NMR Research / Physical Chemistry	MPI bpc
Eberhard	Fuchs	Animal Physiology / Neurobiology	DPZ
Theo	Geisel	Nonlinear Dynamics	MPI ds
Ralf	Heinrich	Neurobiology	U Göttingen
Michael	Hörner	Cell Biology	U Göttingen
Swen	Hülsmann	Neuro- and Sensory Physiology	U Göttingen
Reinhard	Jahn	Neurobiology	MPI bpc
Hubertus	Jarry	Clinical and Experimental Endocrinology	U Göttingen
Jürgen	Klingauf	Membrane Biophysics	MPI bpc
Willhart	Knepel	Molecular Pharmacology	U Göttingen
Kerstin	Krieglstein	Neuroanatomy	U Göttingen
Tobias	Moser	Otolaryngology	U Göttingen
Klaus-Armin	Nave	Neurogenetics	MPI em
Erwin	Neher	Membrane Biophysics	MPI bpc
Walter	Paulus	Clinical Neurophysiology	U Göttingen
Evgeni	Ponimaskin	Neuro- and Sensory Physiology	U Göttingen
Thomas	Rammsayer	Psychology	U Göttingen
Diethelm W.	Richter	Neuro and Sensory Physiology	U Göttingen
Michael	Rickmann	Neuroanatomy	U Göttingen
Eleni	Roussa	Neuroanatomy	U Göttingen
Detlev	Schild	Molecular Neurophysiology	U Göttingen
Jörg B.	Schulz	Neurodegeneration	U Göttingen
Stephan	Sigrist	Neuroplasticity	ENI
Jakob	Sørensen	Molecular Mechanisms of Exocytosis	MPI bpc
Anastassia	Stoykova	Molecular Cell Biology	MPI bpc
Walter	Stühmer	Molecular Biology of Neuronal Signals	MPI em
Andreas	Stumpner	Neurobiology	U Göttingen
Victor	Tarabykin	Molecular Biology of Neuronal Signals	MPI em
Stefan	Treue	Cognitive Neuroscience and Biological Psychology	DPZ
Andreas	Wodarz	Stem Cell Biology	U Göttingen
Fred	Wolf	Nonlinear Dynamics	MPI ds
Fred	Wouters	Cellular Biophysics	ENI
Weiqi	Zhang	Neuro- and Sensory Physiology	U Göttingen

U Göttingen = Georg August University, MPI bpc = Max Planck Institute for Biophysical Chemistry, MPI em = Max Planck Institute for Experimental Medicine, MPI ds= Max Planck Institute for Dynamics and Self-Organization, DPZ = German Primate Center, ENI = European Neuroscience Institute

Mathias Bähr

Professor of Neurology

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

Major Research Interests

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

Up to now, only little is known about the mechanisms that support survival of a postmitotic cell like a human neuron for eventually more than 100 years under physiological conditions. However, by examining the molecular regulation of cell survival and cell death during development and in the lesioned adult CNS, one may get some clues to answer this question.

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

Address

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

37075 Göttingen
Germany

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

Further Information

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

Selected Recent Publications

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

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

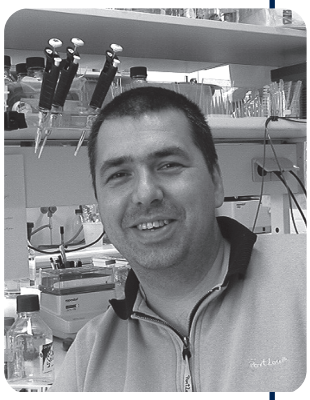
Diem R, Hobom M, Maier K, Weissert R, Storch MK, Meyer R, Bähr M (2003) Methyprednisolone increases neuronal apoptosis during autoimmune CNS inflammation by inhibition of an endogenous neuroprotective pathway. J Neurosci 23(18): 6993-7000

Dietz GPH and Bähr M (2004) Delivery of Bioactive Molecules into the Cell: The Trojan Horse Approach. Mol Cell Neurosci 27(2): 85-131

Diem R, Sättler MB, Merkler D, Demmer I, Maier K, Stadelmann C, Ehrenreich H and Bähr M (2005) Combined therapy with methylprednisolone and erythropoietin in a model of multiple sclerosis. Brain 128: 375-85

Lingor P, Koeberle P, Kügler S and Bähr M (2005) Downregulation of apoptosis mediators by RNA interference inhibits axotomy-induced retinal ganglion cell death *in vivo*. Brain 128: 550-558

Nils Brose



Professor, Director at the Max Planck Institute for Experimental Medicine

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

Address

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

37075 Göttingen
Germany

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

Further Information

http://www.em.mpg.de/User/Brose/index.html

Major Research Interests

Research in the Department of Molecular Neurobiology focuses on the molecular mechanisms of synapse formation and function in the vertebrate central nervous system. Typically, synapses are formed between cellular processes of a sending and a receiving nerve cell. They are the central information processing units in the vertebrate brain where some 10^{12} nerve cells are connected by 10^{15} synapses to form an elaborate and highly structured neuronal network that is the basis for all forms of behaviour. Signal transmission at synapses is mediated by the regulated release of signal molecules (neurotransmitters) which then diffuse to the receiving nerve cell and change its physiological state. In the Department of Molecular Neurobiology, we combine biochemical, morphological, mouse genetic, behavioural, and physiological methods to elucidate the molecular basis of synapse formation and transmitter release processes. Our synaptogenesis research concentrates on synaptic cell adhesion proteins and their role in synapse formation. Studies on the molecular mechanisms of neurotransmitter release focus on components of the presynaptic active zone and their regulatory function in synaptic vesicle fusion.

Selected Recent Publications

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

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

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

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

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

Wolfgang Brück

Professor of Neuropathology

- 1986 MD Johannes Gutenberg University in Mainz, 1994 national boards in neuropathology
- 1996-2002 Associate professorships for neuropathology at the University of Göttingen and the Charité in Berlin
- Since 2002 full professor and director of the Department of Neuropathology, University of Göttingen

Address

Department of
Neuropathology
University of Göttingen
Robert-Koch-Str. 40

37075 Göttingen
Germany

phone: + 49-551-39 2700
fax: + 49-551-39 8472
e-mail: wbrueck@med.uni-goettingen.de

Major Research Interests

- Immunpathology of multiple sclerosis
- Brain-specific mechanisms of immune response in multiple sclerosis
- Axonal damage in inflammatory demyelination and mechanisms of remyelination
- Mechanisms and consequences of microglial activation

Selected Recent Publications

Merkler D, Ernsting T, Kerschensteiner M et al (2006) A new focal EAE model of cortical demyelination: multiple sclerosis-like lesions with rapid resolution of inflammation and extensive remyelination. BRAIN 129: 1972-198

Merkler D, Boscke R, Schmelting B et al. (2006) Differential Macrophage/Microglia Activation in Neocortical EAE Lesions in the Marmoset Monkey. BRAIN PATHOL 16: 117-123

Brück W (2005) The pathology of multiple sclerosis is the result of focal inflammatory demyelination with axonal damage. J NEUROL 252 Suppl 5: v3-v9

Brück W (2005) Clinical implications of neuropathological findings in multiple sclerosis. J NEUROL 252 Suppl 3: iii10-iii14

Brück W (2005) Inflammatory demyelination is not central to the pathogenesis of multiple sclerosis. J NEUROL 252 Suppl 5: v10-v15

Brück W, Stadelmann C (2005) The spectrum of multiple sclerosis: new lessons from pathology. CURR OPIN NEUROL 18(3): 221-4

Stadelmann C, Ludwin S, Tabira T, Guseo A, Lucchinetti CF, Leel-Ossy L, Ordinario AT, Brück W, Lassmann H (2005) Tissue preconditioning may explain concentric lesions in Baló's type of multiple sclerosis. BRAIN 128(Pt 5): 979-87

Höftberger R, Aboul-Enein F, Brueck W, Lucchinetti C, Rodriguez M, Schmidbauer M, Jellinger K, Lassmann H (2004) Expression of major histocompatibility complex class I molecules on the different cell types in multiple sclerosis lesions. BRAIN PATHOL 14(1): 43-50

Edgar Brunner

Address

Dept. Medical Statistics
University of Göttingen
Humboldtallee 32

37073 Göttingen
Germany

phone: +49-551-39 4991
fax: +49-551-39 4995
e-mail: edgar.brunner@ams.med.uni-goettingen.de

Further Information

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

Professor of Medical Statistics

- Student: WS 64/65 - SS 69, Technical University of Aachen
- Diploma: April 1969, Mathematics
- Promotion: 12. May 1971, (Dr. rer. nat.), Technical University of Aachen
  Title: Eine Beziehung zwischen dem Holm-Test und dem Kolmogorov-Smirnov-Test (A Relation between Holm's Test and the Kolmogorov-Smirnov-Test)
- Habilitation: 11.11.1973, Medical Statistics
- Professor: 01.01.1976 University of Göttingen, Dept. of Medical Statistics, 01.03.1976 Head of the Department

Major Research Interests

Nonparametric Statistics

- Asymptotic distribution of rank statistics
- Multi-factor designs
- Adjustment for covariates

Longitudinal data

Ordered categorical data

Design and analysis of diagnostic trials

Statistical methods for the analysis of microarray data

Selected Recent Publications

Brunner E, Domhof S, Langer F (2002) Nonparametric Analysis of Longitudinal Data in Factorial Designs. Wiley: New York

Brunner E, Munzel U (2002) Nichtparametrische Datenanalyse. Springer. Heidelberg

Kaufmann J, Werner C, Brunner E (2005) Nonparametric methods for analyzing the accuracy of diagnostic tests with multiple readers. Statistical Methods in Medical Research 14: 129-146

Bretz F, Landgrebe J, Brunner E (2006) Efficient Design and Analysis of Two Color Factorial Microarray Experiments. Computational Statistics and Data Analysis 50: 499 - 517

Thangavelu K, Brunner E (2006) Wilcoxon Mann-Whitney Test for Stratified Samples and Efron's Paradox Dice. Journal of Statistical Planning and Inference (in press)

Werner C, Brunner E (2006) Rank methods for the analysis of clustered data in diagnostic trials. Computational Statistics and Data Analysis (in press)

Chen T-W, Lin B-J, Brunner E, Schild D (2006) *In Situ* Background Estimation in Quantitative Fluorescence Imaging. Biophysical Journal 90: 2534 –2547

Stefan Eimer

Group Leader Molecular Neurogenetics/ Neurodegeneration

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

Major Research Interests

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

Address

Molecular Neurogenetics/
Neurodegeneration
European Neuroscience
Institute
Grisebachstr. 5

37077 Göttingen
Germany

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

Further Information

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

Selected Recent Publications

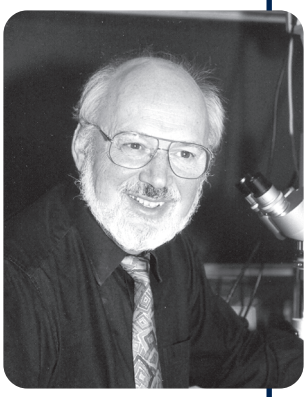
Eimer S, Lakowski B, Donhauser R, and Baumeister R (2002) Loss of spr-5 bypasses the requirement for the presenilin *sel-12* by stage-specific derepression of *hop-1*. EMBO Journal 21: 5787-5796

Lakowski B, Eimer S, Göbel C, Bottcher A, Wagler B, Baumeister R (2003) Two suppressors of *sel-12* encode C2H2 zinc finger proteins that regulate presenilin transcription in *Caenorhabditis elegans*. Development 130: 2117-2128

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

Yamasaki A, Eimer S, Okochi M, Smialowska A, Kaether C, Baumeister R, Haass C, Steiner H (2006) The GxGD motif of presenilin contributes to catalytic function and substrate identification of gamma-secretase. J Neurosci 26(14):3821-8

Norbert Elsner



Professor of Zoology

- Dr. rer. nat. University of Cologne 1967
- PostDoc: Makerere University College, Kampala (Uganda) 1968
- Department of Zoology, University of Copenhagen (Denmark) 1971
- Department of Biology, University of Oregon (USA) 1972
- Habilitation (Zoology) University of Cologne 1974
- Professor of Zoology, University of Göttingen 1978
- Head of the Department of Neurobiology

Address

J.-F. Blumenbach Institute
for Zoology and
Anthropology
Dept. Neurobiology
University of Göttingen
Berliner Strasse 28

37073 Göttingen
Germany

phone: +49-551-39 5401
fax: +49-551-39 2262
e-mail: nelsner@gwdg.de

Further Information

http://www.znv.de/
mem_elsner.shtml

Major Research Interests

The common research topic of the department is Neuroethology of acoustic communication in singing insects. This involves as main fields of interest neuronal basis of song production and song recognition, neuropharmacology of motor actions, interdependence of singing and hearing, evolution of acoustic communication, bioacoustic and sensory ecology in the lab and in the field, and development and regeneration of components of the auditory system.
The songs of insects are produced as fixed action patterns. Single cell recordings, behaviour following lesions and electric or pharmacologic stimulation of the brain help to identify single elements and networks in the CNS producing the innate song patterns. Application of neuroactive substances to the brain aim to identify mechanisms like second messenger cascades involved in production of these motor programs (Heinrich).
A song only makes sense when it is heard by a potential partner. Song parameters and song recognition behaviour are studied with a focus on bushcrickets (Stumpner). The function of sensory cells and auditory interneurones in various insects is investigated by means of extra- and intracellular recordings, neuroanatomy and immunohistochemistry. The relevant questions are: to what degree are hearing systems specialized to species-specific needs, how is song recognition realized on the level of single interneurones, or: what are the potential predecessor structures or systems in the evolution of audition? For the latter, various sensory organs are in the focus of research - neuroanatomically, functionally and their ontogenesis (Lakes-Harlan, Stumpner).
Singing and hearing, of course, are highly interdependent, on the one hand by interference of movements with the ability to hear (studied e.g. by laser-vibrometry), on the other hand by biophysical constraints limitating the detection of parameters in the field (studied e.g. by sound analysis and behavioural tests) (Elsner).
Very helpful and sometimes surprising data are gained from developmental studies. This involves regeneration of behaviour and neuronal structures, molecular mechanisms in early development and regeneration as well as cell cultures with neurones identified as parts of the auditory system (Lakes-Harlan).

Selected Recent Publications

Heinrich R, Elsner N (1997) Central nervous control of hindleg coordination in stridulating grasshoppers. J Comp Physiol A 180: 257-269

Heinrich R, Jacobs K, Lakes-Harlan R (1998) Tracing of a neuronal network in the locust by pressure injection of markers into a synaptic neuropile. J Neurosci Meth 80: 81-89

Heinrich R, Rozwod K, Elsner N (1998) Neuropharmacological evidence for inhibitory cephalic control mechanisms of stridulatory behaviour in grasshoppers. J Comp Pysiol A 183: 389-399

Lakes-Harlan R & Pfahlert C (1995) Regeneration of axotomized tympanal nerve fibres in the adult grasshopper *Chorthippus biguttulus* (L.)(Orthoptera: Acrididae) correlates with regaining the localization ability. J Comp Physiol A 176: 797-807

Jacobs K & Lakes-Harlan R (1997) Lectin histochemistry of the metathoracic ganglion of the locust, *Schistocerca gregaria*, before and after deafferentation. J Comp Neurol 387: 255-265

Lakes-Harlan R, Stölting H & Stumpner A (1999) Convergent evolution of an insect ear from a preadaptive structure. Proc R Soc Lond B 266: 1161-1167

Stölting H, Stumpner A (1998) Tonotopic organization of auditory receptorcells in the bushcricket *Pholidoptera griseoaptera* (Tettigoniidae, Decticini). Cell Tissue Res 294: 377-386

Stumpner A (1998) Picrotoxin eliminates frequency selectivity of an auditory interneuron in a bushcricket. J Neurophysiol 79: 2408-2415

Stumpner A (1999) An interneurone of unusual morphology is tuned to the female song in the bushcricket *Ancistrura nigrovittata* (Orthoptera: Phaneropteridae). J Exp Biol 202: 2071-2081

Wolfgang Engel

Professor of Human Genetics

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

Address

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

37077 Göttingen
Germany

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

Further Information

http://www. humangenetik. gwdg.de

Major Research Interests

Our research is focussed on the molecular analysis of normal human variability and genetic disturbances of development and differentiation. Isolated genes are being analyzed in detail with respect to their functional properties by animal models (transgenic and knock-out-mice). For suitable genetic diseases therapeutic strategies (substitution; gene therapy) are being developed and initial evaluation of such strategies is done in the mouse. - We are working on the genotype - phenotype correlations in neurological and cardiovascular diseases (e. g. Spastic paraplegia, Rett syndrome, mental retardation by subtelomeric microdeletions, molybdenum cofactor deficiency; cardiomypathies, Noonan syndrome) and several genetically determined malformation syndromes (e. g. Townes-Brocks syndrome, Okihiro syndrome, Morbus Osler).We are also engagend in the molecular and cellular basis of initiation events of cancer, specifically in prostate cancer, medulloblastoma and rhabdomyosarcoma. - One main interest in our institute is the analysis of structure, expression and function of genes involved in differentiation of male gametes. The knowledge of the function of those genes can help us to clarify the genetic causes of male infertility.

We have isolated spermatogonial stem cells (SSCs) from adult mouse testis and demonstrated that these cells are as pluripotent as embryonic stem cells (ESCs). Our main interest is now to isolate and proliferate SSCs from adult human testis. These cells would be of great interest for regenerative medicine.

Selected Recent Publications

Nayernia K, Li M, Jaroszynski L, Khusainov R, Wulf G, Schwandt I, Korabiowska M, Michelmann HW, Meinhardt A Engel W (2004) Stem cell based therapeutical approach of male infertility by teratocarcinoma derived germ cells. Human Molecular Genetics 14: 1451-1460

Lee H-J, Göring W, Ochs M, Mühlfeld C, Steding G, Paprotta I, Engel W, Adham IM (2004) Sox15 is required for skeletal muscle regeneration. Molecular and Celluar Biology 19: 8428-8436

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

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

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

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

Gabriele Flügge

Apl. Professor, Experimental Neuroscience

- Dr. rer. nat., University of Munich, 1979
- Senior Scientist, Clinical Neurobiology Laboratory at the German Primate Center

Address

Clinical Neurobiology Laboratory
German Primate Center
Dept. Neurobiology
Kellnerweg 4

37077 Göttingen
Germany

phone: +49-551-3851 133
fax: +49-551-3851 137
e-mail: gfluegg@gwdg.de

Further Information

http://www.cnl-dpz.de/start.htm

Major Research Interests

In humans, stressful or traumatic life events such as death of a close relative often represent a chronic psychological load that can lead to psychopathologies such as depression. Because the central nervous mechanisms that lead to such diseases are still not elucidated we are investigating processes that occur in the course of chronic psychosocial stress in the brains of animals that show similar symptoms as depressed patients. Using molecular techniques, we identify genes in the brain that are regulated by stress. *In situ* hybridization and immunocytochemistry serve to localize changes in neurotransmitter systems, receptors, transporters and other molecules in distinct neurons of the brain. Similar tools are used to clarify the mechanisms that underlie the beneficial effects of antidepressant drugs. In conjunction with behavioral studies we are able to find neuromolecular factors that contribute to emotionality.

Selected Recent Publications

Abumaria N, Rygula R, Hiemke C, Fuchs E, Havemann-Reinecke U, Rüther E, Flügge G (2006) Effect of chronic citalopram on serotonin-related and stress-upregulated genes in the dorsal raphe nucleus of the rat. Eur Neuropsychopharm, in press

Abumaria N, Rygula R, Havemann-Reinecke U, Rüther E, Bodemer W, Roos C, Flügge G (2006) Identification of genes regulated by chronic social stress in the rat dorsal raphe nucleus. Cell Mol Neurobiol 26: 145-162

Rygula R, Abumaria N, Flügge G, Hiemke C, Fuchs E, Rüther E, Havemann-Reinecke U (2006) Citalopram counteracts depressive symptoms evoked by chronic social stress in rats. Behav Pharm 17: 19-29

Alfonso J, Fernandez M, Cooper B, Flügge G, Frasch AC (2005) The stress-regulated protein M6a is a key modulator for neurite outgrowth and filopodium/spine formation. Proc Natl Acad Sci USA 102: 17196-17201

Palchaudhuri M, Flügge G (2005) $5HT_{1A}$-receptor expression in pyramidal neurons of cortical and limbic brain regions. Cell Tiss Res 321: 159-172

Heilbronner U, van Kampen M, Flügge G (2004). The alpha-2B adrenoceptor in the paraventricular thalamic nucleus is persistently upregulated by chronic psychosocial stress. Cell Mol Neurobiol 24: 815-831

Fuchs E, Czeh B, Flügge G (2004) Examining novel concepts of the pathophysiology of depression in the chronic psychosocial stress paradigm in tree shrews. Behav Pharmacol 15: 315-325

Alfonso J, Pollevick GD, Van Der Hart MG, Flügge G, Fuchs E, Frasch AC (2004) Identification of genes regulated by chronic psychosocial stress and antidepressant treatment in the hippocampus. Eur J Neurosci 19: 659-666

Flügge G, van Kampen M, Meyer H, Fuchs E (2003) Alpha2A and alpha2C-adrenoceptor regulation in the brain: alpha2A changes persist after chronic stress. Eur J Neurosci 17: 917-28

Jens Frahm

Professor of Physical Chemistry

- Director of 'Biomedizinische NMR Forschungs GmbH'
  - Biomedical Nuclear Magnetic Resonance -

Address

Biomedizinische NMR
Forschungs GmbH am
Max-Planck-Institut für
Biophysikalische Chemie
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1721
fax: +49-551-201 1307
e-mail: jfrahm@gwdg.de

Further Information

http://www.biomednmr.mpg.de

Major Research Interests

General

- development and application of magnetic resonance imaging (MRI) techniques for noninvasive studies of the central nervous system of humans and animals

Methodology

- functional neuroimaging
- localized neurospectroscopy
- diffusion tensor imaging

Brain Research

- non-invasive neurobiology, human neuroscience
- structural, metabolic, and functional studies of the central nervous system
- functional mapping of neuronal activation, cognitive information processing in humans
- MRI of animal models (nonhuman primates, rats, transgenic mice, insects)

Selected Recent Publications

Merboldt KD, Baudewig J, Treue S, Frahm J (2002) Functional MRI of Self-Controlled Stereoscopic Depth Perception. Neuroreport 13: 1721-1725

Dechent P, Frahm J (2003) Functional Somatotopy of Finger Representations in Human Primary Motor Cortex. Hum Brain Mapp 18: 272-283

Frahm J, Baudewig J, Dechent P, Merboldt KD (2004) Advances in Functional MRI of the Human Brain. Progr NMR Spectr 44: 1-32

Watanabe T, Frahm J, Michaelis T (2004) Functional Mapping of Neural Pathways in Rodent Brain *In Vivo* Using Manganese-Enhanced Three-Dimensional Magnetic Resonance Imaging. NMR Biomed 17: 554-568

Hofer S, Frahm J (2006) Topography of the Human Corpus Callosum Revisited - Comprehensive Fiber Tractography Using Magnetic Resonance Diffusion Tensor Imaging. NeuroImage 32: 989-994

Eberhard Fuchs

Professor of Animal Physiology

- 1977: Dr. rer. nat., University of Munich
- 1996 - 2000: Professor (Animal Physiology), University of Karlsruhe
- 2000 - 2003: Professor for Animal Physiology, University of Göttingen
- since 2003: Professor for Neurobiology, Department of Neurology, Medical School, University of Göttingen

Address

German Primate Center
Clinical Neurobiology
Laboratory
Kellnerweg 4

37077 Göttingen
Germany

phone: +49-551-3851 130
fax: +49-551-3851 307
e-mail: efuchs@gwdg.de

Further Information

http://www.cnl-dpz.de/start.htm

Major Research Interests

The Clinical Neurobiology Laboratory (CNL) at the German Primate Center is an interdisciplinary research laboratory using neuroanatomical, neuropharmacological, behavioral and molecular techniques to investigate functioning of the brain in animal models of psychiatric and neurodegenerative diseases. The aim of our work is to elucidate brain structures, circuits, pathways and mechanisms that underlie normal and pathological behavior. This work integrates inputs from other research fields with the ultimate aim of developing new therapeutic strategies for psychiatric and neurodegenerative diseases.

The laboratory specializes in the development, validation and investigation of animal models to detect abnormal cognitive, motor and emotional expressions of brain pathology. Currently, we are engaged in the investigation of central nervous and behavioral phenomena associated with stress and depression. In addition, we provide service platforms to study Parkinson's disease and multiple sclerosis..

Selected Recent Publications

Czéh B, Simon M, Schmelting B, Hiemke C, Fuchs E (2006) Astroglial plasticity in the hippocampus after chronic psychosocial stress and concomitant fluoxetine treatment. Neuropsychopharmacology 31:1616-26

Fuchs E, Flügge G, Czéh B (2006) Remodeling of neuronal networks by stress. Front Biosci 11: 2746-2758

Boretius S, Schmelting B, Watanabe T, Tammer R, Czéh B, Michaelis T, Frahm J, Fuchs E (2006) Monitoring of EAE onset and progression in the common marmoset monkey by sequential high-resolution 3D MRI. NMR Biomed., 19:41-42, 2006.

Fuchs E, Czéh B, Kole MHP, Michaelis T, Lucassen PJ (2004) Alterations of neuroplasticity in depression: The hippocampus and beyond. Europ Neuropharmacol 14: 481-490

Lucassen PJ, Fuchs E, Czéh B (2004) Antidepressant treatment with tianeptine prevents apoptosis in the hippocampal dentate gyrus and temporal cortex. Biol Psychiatry 55: 789-796

Coe CL, Kramer M, Czéh B, Gould E, Reeves AJ, Kirschbaum C, Fuchs E (2003) Prenatal stress diminishes neurogenesis in the dentate gyrus of juvenile rhesus monkeys. Biol Psychiat 54: 1025-1034

Czéh B, Michaelis T, Watanabe T, Frahm J, de Biurrun G, van Kampen M, Bartolomucci A, Fuchs E (2001) Stress-induced changes in cerebral metabolites, hippocampal volume and cell proliferation are prevented by antidepressant treatment with tianeptine. Proc Natl Acad Sci USA 98: 12796-12801

Professor of Theoretical Physics
Director, Max Planck Institute for Dynamics and Self-Organization
Coordinator, Bernstein Center for Computational Neuroscience

- Dr. rer.nat., University of Regensburg (1975)
- Heisenberg fellow (1983 - 1987)
- Professor of Theoretical Physics, Universities of Würzburg (1988 - 1989), Frankfurt (1989 - 1996), and Göttingen (since 1996)
- Director, Max Planck Institute for Dynamics and Self-Organization, Göttingen (since 1996)

Major Research Interests

How do the myriads of neurons in our cortex cooperate when we perceive an object or perform another task? How do they self-organize in the preceding learning process? Questions like these address the complex dynamics of spatially extended and multi-component nonlinear systems, which still reserve many surprises. In networks of sufficiently many spiking neurons e.g. we find unstable attractors, a phenomenon which would neither have been guessed nor understood without mathematical modelling and which many physicists consider an oxymoron. They can provide a neuronal network with a high degree of flexibility to adapt to permanently changing tasks. The tools and mathematical methods developed in studies of chaotic behaviour in the past can now help us clarify the dynamics and function of complex networks and spatially extended systems and reveal the biological role of dynamical phenomena like unstable attractors.

These methods lend themselves to applications in neuroscience from the level of single cells to the level of cell assemblies and large cortical networks, from the time scales of action potentials (milliseconds) to the time scales of learning and long-term memory (up to years). My work in the past has dealt among others with studies of stochastic resonance of single neurons under periodic and endogenous stimulation, detailed investigations of the properties, functions, and conditions of neuronal synchronization, and the development of neuronal maps in the visual cortex. We have elucidated the influence of the network topology on synchronization and other dynamical properties and demonstrated the existence of speed limits to network synchronization due to disordered connectivity. Besides, I am also focusing on other applications of nonlinear dynamics, e.g. in mathematical models for the description and forecast of the spread of epidemics. Basins of attraction of synchronized states in a network of spiking neurons.

Address

Dept. of Nonlinear Dynamics
MPI for Dynamics and Self-Organization
Bunsenstr. 10

37073 Göttingen
Germany

phone: +49-551-5176 400
fax: +49-551-5176 402
e-mail: Geisel@NLD.DS.MPG.de

Further Information

http://www.chaos.gwdg.de

Selected Recent Publications

Brockmann D, Hufnagel L, Geisel T (2006) The Scaling Laws of Human Travel. Nature 439: 462-465

Hufnagel L, Brockmann D, Geisel T (2004) Forecast and Control of Epidemics in a Globalized World. PNAS 101: 15124

Wolf F, Timme M, Geisel T (2004) Topological speed limits to network synchronization. Phys Rev Lett 92: 074101

Denker M, Timme M, Diesmann M, Wolf F, Geisel T (2004) Breaking Synchrony by Heterogeneity in Complex Networks. Phys Rev Lett 92: 974193

Wolf F Geisel T (2003) Universality in visual cortical pattern formation. Journal of Physiology - Paris 97: 253-264

Timme M, Wolf F, Geisel T (2002) Prevalence of unstable attractors in networks of pulse-coupled oscillators. Phys Rev Lett 89(15): 154105

Wolf F, Geisel T (1998) Spontaneous pinwheel annihilation during visual development. Nature 395: 73-78

Ralf Heinrich

Address

J.-F. Blumenbach Institute
for Zoology and
Anthropology
Dept. Neurobiology
University of Göttingen
Berliner Strasse 28

37073 Göttingen
Germany

phone: +49-551-39 91183
fax: +49-551-39 54 38
e-mail: rheinri1@gwdg.de

Further Information

http://wwwuser.gwdg.de/~neuro/ag_heinrich/index.html

Juniorprofessor of Molecular Neuropharmacology of Behavior

- Dr. rer. nat., University of Göttingen, 1995
- Postdoctoral fellow, Harvard Medical School, Boston, USA, 1997 - 1999

Major Research Interests

Behavior results from integration of sensory information with internal physiological states involving complex interactions between various types of neurons. In order to study cellular and molecular mechanisms that contribute to the selection and control of situation-specific behavior, invertebrate preparations can offer unique advantages over more complex nervous systems of vertebrates, especially mammals. The nervous systems of invertebrates contain smaller numbers of neurons, many of which can be individually identified, and their behavioral repertoires are rather limited to combinations of genetically determined stereotyped components.

Studies are conducted with intact or partially dissected behaving animals (insects, crustaceans, annelids) and with isolated nervous systems or cultured organs and cells. Projects for experimental theses usually combine two or more of the following methods: neuroethology, pharmacology, electrophysiology, histology and immunocytochemistry, cell culture and molecular biology. Examples of current research projects are

- Acoustic communication in grasshoppers: control of sound production by con verging signaling pathways (transmitters and second messengers) in the cen tral complex neuropil of the brain.

- Physiological characterization of neurosceretory neurons that mediate general physiological states e.g. serotonin-releasing neurons of leeches and crustaceans.

- Control of agonistic behavior and the formation of hierarchies in crustaceans, crickets and fruitflies.

- Presence and function of erythropoietin in invertebrate nervous systems: devel opment, regeneration and hypoxia-related functions.

Selected Recent Publications

Heinrich R, Cromarty SI, Hörner M, Edwards DH, Kravitz EA (1999) Autoinhibition of serotonin cells: an intrinsic regulatory mechanism sensitive to the pattern of usage of the cellls. Proc Nat Acad Sci USA 96: 2473-2478

Heinrich R, Bräunig P, Walter I, Schneider H, Kravitz EA (2000) Aminergic neuron systems of lobsters: Morphology and electrophysiology of octopamine-containing neurosecretory cells. J Comp Physiol A 186: 617-629

Heinrich R, Wenzel B, Elsner N (2001) A role for muscarinic excitation: Control of specific singing behavior by activation of the adenylate cyclase pathway in the brain of grasshoppers. Proc Nat Acad Sci USA 98: 9919-9923

Wenzel B, Elsner N, Heinrich R (2002) mAChRs in the grasshopper brain mediate excitation by activation of the AC/PKA and the PLC second-messenger pathways. J Neurophysiol 87: 876-888

Heinrich R (2002) Impact of descending brain neurons on the control of stridulation, walking and flight in orthoptera. Microscopy Research and Technique 56: 292-301

Wenzel B, Kunst M, Günther C, Ganter GK, Lakes-Harlan R, Elsner N, Heinrich R (2005) Nitric oxide/cyclic GMP-signaling in the central complex of the grasshopper brain inhibits singing behavior. J Comp Neurol 488: 129-139

Michael Hörner

Apl. Professor of Cellular Neurobiology

- Dr. rer. nat., University of Göttingen, 1989
- Postdoctoral Fellow, Medical University of Kiel, Dept. Physiology, 1989 - 1990
- Assistant Professor, Institute for Zoology and Anthropology, Göttingen, 1990 - 1997
- Habilitation (Zoology), 1997
- Associate Professor, Institute for Zoology and Anthropology, Göttingen, 1997 - 2002
- Guest Professor, University of Science & Technology, Hongkong, 2002 - 2004
- Apl. Professor, Inst. for Zoology, Anthropol. and Develop. Biol., Göttingen, since 2004

- Research Assistant, MPI for Ethology, Seewiesen, 1985/1986
- Research Fellow, Arizona Research Labs, Tucson, USA, 1993/1996
- Feodor-Lynen/Humboldt Fellow, Harvard Medical School, Boston, USA, 1994 - 1995
- Research Fellow Marine Biological Labs, Woods Hole, USA, 1992/1997

Address

J.-F. Blumenbach Institute
for Zoology and
Anthropology
Dept. Neurobiology
University of Göttingen
Berliner Strasse 28

37073 Göttingen
Germany

phone: +49-551-39 12307
fax: +49-551-39 12308
e-mail: mhoerne@gwdg.de

Further Information:

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

Major Research Interests:

Molecular Mechanisms Of Synaptic And Non-Synaptic Modulation

Biogenic amines such as serotonin, dopamine, histamine or octopamine (OA), the pendant of norepinephrine in invertebrates, are widely distributed within the animal kingdom. These evolutionary conserved neuroactive substances are involved in the control of vital functions in both vertebrates and invertebrates. Biogenic amines often initiate long-lasting neuro-modulatory effects in their targets, which is due to diffusion following non-synaptic release activating G-protein coupled to intracellular pathways. My work is focussed on the investigation of cellular and molecular mechanisms underlying the modulation of neuronal signaling in identified networks in invertebrate model systems. Using electrophysiological, pharmacological and immunocytochemical techniques in combination with behavioral measurements, I am investigating mechanisms of aminergic modulation in identified neurons of defined networks in insects and crustacea. To address both mechanistic and functional questions, a parallel approach has been developed, which allows to investigate single identified neurons both *in-vivo* with intact synaptic connections and *in-vitro* in primary “identified” cell culture, where neurons are separated from connections to other neurons. The functional meaning of aminergic modulation on the cellular level in behaviorally-relevant circuits is assessed by quantitative behavioral measurements. The investigations show that OA enhances the responsiveness of a neuronal network in insects (“giant fiber pathway”) which triggers a fast escape reaction. The reaction to sensory stimuli in the postsynaptic giant interneurons, which are monosynaptically coupled to sensory neurons via excitatory cholinergic synapses, is significantly enhanced by OA application. Characteristic changes of the action potentials *in-vivo* (“spike broadening”) and patch-clamp recordings *in-vitro* suggest, that OA selectively affects slow K^+-conductances in postsynaptic giant interneurons.

Selected Recent Publications:

Kloppenburg P, Hörner M (1998) Voltage-activated currents in identified giant interneurons isolated from adult crickets, *Gryllus bimaculatus*. J Exp Biol 201(17): 2529-2541

Heinrich R, Cromarty SI, Hörner M, Edwards DH, Kravitz EA (1999) Autoinhibition of serotonin cells: An intrinsic regulatory mechanism sensitive to the pattern of usage of the cells. Proc Natl Acad Sci USA 96: 2473-2478

Ferber M, Hörner M, Cepok S, Gnatzy W (2001) Digger wasp versus cricket: Mechanisms underlying the total paralysis caused by the predators venom. J Neurobiol 47: 207-2222

Hörner M, Heinrich R, Cromarty SI, Kravitz EA (2002) Synaptic connectivity of amine-containing neurosecretory cells of lobsters: inputs to 5HT- and OCT- containing neurons. in: The Crustacean Nervous System. (ed. K. Wiese) Springer Verlag, Berlin, Heidelberg, New York, pp156-172

Rose T, Gras H, Hörner M (2006) Activity-dependent suppression of spontaneous spike generation in the Retzius neurons of the leech, *Hirudo medicinalis* L. Invertebrate Neuroscience 6: 19-176 (DOI 10.1007/s10158-006-0030-2)

Swen Hülsmann

Address

Center for Physiology and Pathophysiology
Dept. Neuro- and Sensory Physiology
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 9592
fax: +49-551-39 9676
e-mail: shuelsm2@uni-goettingen.de

Further Information

http://wwwuser.gwdg.de/~shuelsm2/de/home/index.php

Privatdozent, Department of Neurophysiology

- Dr. med., University of Münster, 1995
- Postdoctoral fellow, University of Münster Dept. of Neurosurgery, 1995 - 1996
- Postdoctoral fellow, University of Göttingen, Dept. of Neurophysiology, 1996 - 2001
- Group leader (Wissenschaftlicher Assistent) Neurophysiology, since 2001
- Principle Investigator at the DFG Research Center for Molecular Physiology of the Brain (CMPB) since 2002
- Habilitation, University of Göttingen, 2005

Major Research Interests

The majority of cells in the human brain are glial cells, outranging the number of neurons by a factor of 10. However, most behavioral aspects of life are attributed to neurons, leaving a rather white spot of knowledge about the function of the different types of glial cells.
Our group aims to identify and clarify the mechanisms that allow glial cells, e.g. astrocytes to modulate and stabilize the most vital behavior of breathing.

Selected Recent Publications

Hülsmann S, Oku Y, Zhang W, Richter DW (2000) Metabotropic glutamate receptors and blockade of glial Krebs cycle depress glycinergic synaptic currents of mouse hypoglossal motoneurons. Eur J Neurosci 12(1): 239-46

Hülsmann S, Oku Y, Zhang W, Richter DW (2000) Metabolic coupling between glia and neurons is necessary for maintaining respiratory activity in transverse medullary slices of neonatal mouse. Eur J Neurosci 12(3): 856-62

Gomeza J, Hülsmann S, Ohno K, Eulenburg V, Szöke K, Richter D, Betz H (2003) Inactivation of the glycine transporter 1 gene discloses vital role of glial glycine uptake in glycinergic inhibition. Neuron 40(4): 785-96

Gomeza J, Ohno K, Hülsmann S, Armsen W, Eulenburg V, Richter DW, Laube B, Betz H (2003) Deletion of the mouse glycine transporter 2 results in a hyperekplexia phenotype and postnatal lethality. Neuron 40(4): 797-806

Grass D, Pawlowski PG, Hirrlinger J, Papadopoulos N, Richter DW, Kirchhoff F, Hülsmann S (2004) Diversity of functional astroglial properties in the respiratory network. J Neurosci 24(6): 1358-65

Reinhard Jahn

Professor, Director at the Max Planck Institute for Biophysical Chemistry

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

Address

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

37077 Göttingen
Germany

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

Further Information

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

Major Research Interests

Our group is interested in the mechanisms of membrane fusion, with the main emphasis on regulated exocytosis in neurons. Since recent years it is known that intracellular membrane fusion events are mediated by a set of conserved membrane proteins, termed SNAREs. For fusion to occur, complementary sets of SNAREs need to be present on both of the fusing membranes. The neuronal SNAREs are among the best characterized. They are the targets of the toxins responsible for botulism and tetanus. To understand how these proteins make membranes fuse, we studied their properties in detail using biochemical and biophysical approaches. We found that they assemble into a tight complex which ties the membrane closely together and thus probably initiates bilayer mixing.

In our current approaches, we study membrane fusion at the level of isolated proteins as well as in semi-intact and intact cells. Thus, we are investigating conformational changes of the SNARE proteins before and during fusion. Furthermore, we use reconstitution of membrane fusion in cell-free assays and in proteoliposomes. Other projects of the group include the study of neurotransmitter uptake by synaptic vesicles and the function of Rab-GTPases in neuronal exocytosis.

Selected Recent Publications

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

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

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

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

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

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

Jahn R (2006) A neuronal receptor for Botulinum toxin (Perspective). Science 312: 540-541

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

Hubertus Jarry

Address

Clinical and Experimental Endocrinology
Gynecological University Hospital
Robert-Koch-Str. 40

37075 Göttingen
Germany

phone: +49-551-39 6522
fax: +49-551-39 6518
e-mail: hubjarry@med.uni-goettingen.de

Further Information

http://www.mi.med.uni-goettingen.de/KEE/index.htm

Professor of Clinical and Experimental Endocrinology

- 1976 - 1980 University of Göttingen, study of biology, diploma degree in bio chemistry, microbiology, organic chemistry
- 1980 - 1983 PhD thesis, Department of Biochemistry, University of Göttingen, PhD degree in biochemistry, microbiology, organic chemistry (summa cum laude)
- Until February 1985 German Primate Center Göttingen, Dept. Reproductive Biology
- March 1985 until March 1986 Michigan State University, Dept. Pharmacology and Toxicology
- Since April 1986 Research Associate Dept. Clinical and Experimental Endocrinology University of Göttingen
- Januar 1991 Habilitation
- Dezember 1995 Promotion to Professor

Major Research Interests

The proper function of the GnRH pulse generator ist essential for reproduction of all mammals studied so far. GnRH pulses are a prerequisite for proper pituitary gonadotropin release. The neurochemical mechanisms leading to pulsatile GnRH release involve norepinephrine and gamma amino butyric acid (GABA) as most important neurotransmitters. In addition, other catecholamines, amino acid neurotransmitters and neuropeptides play a modulatory role in the function of the GnRH pulse generator. Many of the GABAergic neurons in the hypothalamus are estrogen-receptive. The mechanisms by which the estrogen receptors of the alpha and beta subtype regulate gene and protein expression of neurotransmitter-producing enzymes are at present a prime focus of interest. Induction of puberty is not a gonadal but a hypothalamic maturational process. The initiation of proper GnRH pulse generator function is the ultimate trigger signal for puberty which is currently investigated. Ageing involves also neuroendocrine mechanisms. The GnRH pulse generator function deteriorates in aged rats, mechanisms which involve a variety of catecholamines and amino acid neurotransmitters which are currently investigated. Steroidal feedback signals (of estradiol, progesterone, and glucocorticoids) are crucial for the development and proper function of the adult hypothalamus of which the molecular and neurochemical mechanisms are studied with cell biological and animal experimental tools. Proper function of the GnRH pulse generator is also of crucial importance for initiation of puberty and maintenance of normal menstrual cycles in women. Many of hitherto unexplained infertilities can be explained of malfunctioning GnRH pulse generators which are studied in a series of clinical experiments.

Selected Recent Publications

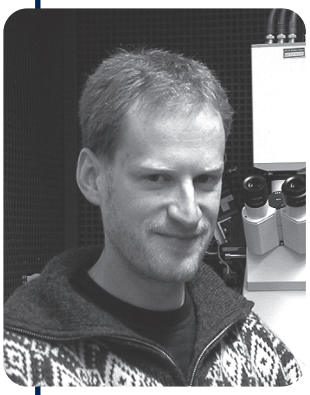
Kretz O, Fester L, Wehrenberg U, Zhou L, Brauckmann S, Zhao S, Prange-Kiel J, Naumann T, Jarry H, Frotscher M, Rune GM (2004) Hippocampal synapses depend on hippocampal estrogen synthesis. J Neurosci. 24: 5913-5921.

Roth C, Hegemann F, Hildebrandt J, Balzer I, Witt A, Wuttke W, Jarry H (2004) Pituitary and gonadal effects of GnRH (gonadotropin releasing hormone) analogues in two peripubertal female rat models. Pediatr Res. 55: 126-133

Prange-Kiel J, Wehrenberg U, Jarry H, Rune GM (2003) Para/autocrine regulation of estrogen receptors in hippocampal neurons. Hippocampus 13: 226-234.

Seong JY, Han J, Park S, Wuttke W, Jarry H, Kim K (2002) Exonic splicing enhancer-dependent splicing of the gonadotropin-releasing hormone premessenger ribonucleic acid is mediated by tra2alpha, a 40-kilodalton serine/arginine-rich protein. Mol Endocrinol. 16: 2426-2438.

Jürgen Klingauf



Research Group Leader at the Max Planck Institute for Biophysical Chemistry

- Research fellow, Dept. of Molecular & Cellular Physiology, Stanford University, Ca, 1996 - 1998
- Dr. rer. nat. (Ph.D.) 1999, University of Göttingen
- Since 2000 junior group leader at the Max Planck Institute for Biophysical Chemistry

Major Research Interests

The focus of our research is the study of synaptic transmission, with the emphasis on presynaptic mechanisms. At the synapse, neurotransmitter is rapidly released from small vesicles which are triggered to fuse with the plasma membrane by the entry of Ca^{2+} ions. The maintenance of synaptic transmission requires that these vesicles be retrieved by a reverse process, i.e. endocytosis. How is this endocytic activity and subsequent formation of fusion-competent vesicles coupled to exocytosis? To delineate the mechanisms by which synaptic vesicles can be retrieved we employ high-resolution imaging techniques, like two-photon laser scanning and total internal reflection microscopy, electrophysiology, as well as biochemical approaches. By transfection of neurons in primary cell culture or the usage of knock-out models we can target or modulate specific proteins thought to be pivotal in synaptic vesicle endocytosis. Currently, we are mainly studying synapses of rodent hippocampus, down to the level of single fluorescently labeled vesicles in cultured or freshly isolated synaptic boutons. By making use of fluorescent styryl dyes with different kinetic properties we found that in central nervous synapses at least two kinetically distinct modes of endocytosis coexist. We are now trying to characterize the respective molecular events underlying those different mechanisms using genetically encoded fluorescent probes.

Address

AG Microscopy of Synaptic Transmission
Dept. Membrane Biophysics
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1629
fax: +49-551-201 1688
e-mail: jklinga@gwdg.de

Further Information

http://www. mpibpc.gwdg.de/abteilungen/140/groups/index.html

Selected Recent Publications

Mueller VJ, Wienisch M, Nehring RB, Klingauf J (2004) Monitoring clathrin-mediated endocytosis during synaptic activity. J Neurosci 24(8): 2004-12

Jordan R, Lemke EL, Klingauf J (2005) Visualization of synaptic vesicle movement in intact synaptic boutons using fluorescence fluctuation spectroscopy. Biophys J 89(3): 2091-102

Lemke EL, Klingauf J (2005) Single synaptic vesicle tracking in individual hippocampal boutons at rest and during synaptic activity. J Neurosci 25(47): 11034-44

Vanden Berghe P, Klingauf J (2006). Synaptic vesicles in hippocampal boutons recycle to different pools in a use-dependent fashion. J Physiol London 572(Pt 3): 707-20

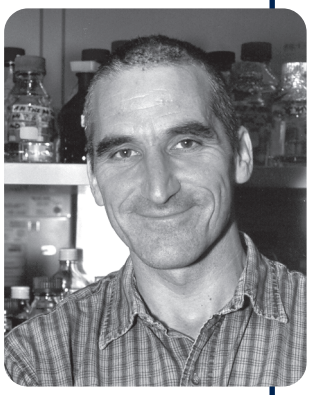
Diril MK, Wienisch M, Jung N, Klingauf J, Haucke V (2006) Stonin 2 is an AP-2-dependent endocytic sorting adaptor for synaptotagmin internalization and Recycling. Dev Cell 10(2): 233-44

Wienisch M, Klingauf J (2006) Vesicular proteins exocytosed and subsequently retrieved by compensatory endocytosis are non-identical. Nature Neurosci 9(8): 1019-27

Toonen RF, Kochubey O, de Wit H, Gulyas-Kovacs A, Konijnenburg B, Sørensen JB, Klingauf J, Verhage M (2006) Dissecting docking and tethering of secretory vesicles at the target membrane. EMBO J 25(16): 3725-37

Kochubey O, Majumdar A, Klingauf J (2006) Imaging clathrin dynamics in D. melanogaster hemocytes reveals a role for actin in vesicle fission. Traffic Oct 2, Epub ahead of print

Willhart Knepel



Professor of Molecular Pharmacology

- Dr. rer. nat., University of Freiburg i. Br., Germany, 1980
- Habilitation, University of Freiburg i. Br., Germany, 1985
- Research Fellow, Laboratory of Molecular Endocrinology, Harvard Medical School, Boston, MA, USA, 1987 - 1990
- Joined Medical Faculty of the University of Göttingen 1991

Address

Dept. Molecular Pharmacology
University of Göttingen
Robert-Koch-Str. 40

37075 Göttingen
Germany

phone: +49-551-39 5787
fax: +49-551-39 9652
e-mail: wknepel@med.uni-goettingen.de

Further Information

http://regulus.pharbp.med.uni-goettingen.de/molpham/molpham.htm

Major Research Interests

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

Selected Recent Publications

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

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

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

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

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

Kerstin Krieglstein

Professor of Anatomy/Neuroanatomy

- Dr. rer. nat., University of Gießen, Germany, 1990
- Postdoctoral fellow, University of California, Irvine, 1990 - 1992
- Professor of Anatomy, University of Saarland, 1999 - 2001
- Appointed 2001 as head of the Department of Anatomy/Neuroanatomy, University of Göttingen

Major Research Interests

The nervous system is a complex network of billions of neurons building appropriate connections and transmitting the information required. Although the nervous system has a lifelong synaptic plasticity, it is essentially built just once with very little regenerative capacity, meaning that neurons have to survive and function for lifetime. Loss of neurons will eventually lead to functional impairments such as those found in Alzheimer's, Parkinson's or ALS patients.

We are interested in the understanding of the regulation of neuronal survival and death. Recent advancements in the field have provided clear evidence that neuronal survival is caused by synergistic actions of neurotrophic factors along with other cytokines most prominently from the TGF-ß superfamily. Synergisms of TGF-ß in combination with neurotrophic factors, like GDNF or NGF, will be studied to establish their role in nervous system development and their therapeutic potential in brain repair. Specifically, we shall investigate such synergisms by utilising mouse mutants to understand the developmental role and by emplying genomic screens to identify new target genes for the establishment of new therapeutic strategies for human neurodegenerative disorders. Furthermore, as growth factors function not only in the decision of neuron survival or death, we shall explore their morphogenetic and differentiation capacities employing the powerful potential of embryonic (ES) and CNS stem cells.

Address

Center for Anatomy
Dept. Anatomy with main focus on Neuroanatomy
University of Göttingen
Kreuzbergring 36

37075 Göttingen
Germany

phone: +49-551-39 7051/
39 7052
fax: +49-551-39 14016
email: kkriegl@gwdg.de

Further Information

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

Selected Recent Publications

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

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

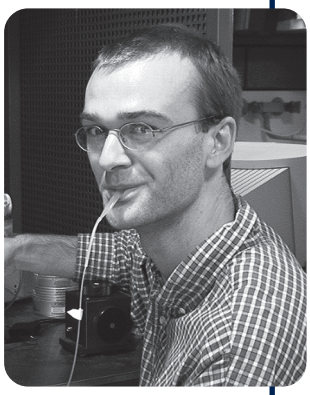
Krieglstein K, Richter S, Farkas L, Schuster N, Dünker N, Oppenheim R W, Unsicker K (2000) Reduction of endogenous transforming growth factor beta prevents ontogenetic neuron death. Nature Neuroscience 3: 1085-1091

Peterziel H, Unsicker K, Krieglstein K (2002) TGFbeta induces GDNF responsiveness in neurons by recruitment of GFRalpha1 to the plasma membrane, J Cell Biol 159: 157-167

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

v Bohlen und Halbach O, Schober A, Krieglstein K (2004) Genes, proteins, and neurotoxins involved in Parkinson's disease. Prog Neurobiol 73: 151-177

Tobias Moser



Professor of Experimental and Clinical Audiology

- Dr. med. (M.D.) 1995, University of Jena
- Postdoctoral fellow with E. Neher at the MPI for Biophysical Chemistry, 1994 - 1997
- Group leader at the Department of Otolaryngology, University of Göttingen since 1997

Address

InnerEarLab
Dept. of Otolaryngology
University of Göttingen
Robert-Koch-Strasse 40

37075 Göttingen
Germany

phone: +49-551-39 8968
fax: +49-551-39 12950
e-mail: tmoser@gwdg.de

Further Information

http://
wwwuser.innerearlab.uni-goettingen.de

Major Research Interests

Our group focuses on the physiology and pathology of the hair cell ribbon synapse. Molecular dissection and detailed physiological characterization of ribbon synapse function have only recently become possible using novel molecular and biophysical techniques. We combine single cell RT-PCR, immunohistochemistry of hair cells with auditory physiology (recordings of otoacoustic emissions, compound action potentials and auditory brainstem responses) and in-depth biophysical analysis of the hair cell ribbon synapse in normal and mutant mice (Moser and Beutner, 2000; Beutner et al., 2001; Khimich et al., 2005). The biophysical approach includes patch-clamp, optical methods (epifluorescence and evanescent wave imaging as well as flash photolysis of caged compounds) to investigate membrane currents, synaptic membrane turnover (membrane capacitance and membrane dyes) and stimulus-secretion coupling in hair cells from the mouse.

The group has contributed to understanding normal hair cell ribbon synapse function (review in Nouvian et al., 2006). In our previous work we have physiologically and in part morphologically characterized mutant mice with defects in hair cell synaptic coding (Brandt et al., 2003; Khimich et al., 2005, Roux et al., 2006) and auditory nerve function (Lacas-Gervais et al., 2004). The results demonstrated that defects of hair cell synaptic sound coding cause sensorineural hearing loss in animal models – auditory synaptopathy and confirmed impaired hearing in case of nerve disorders - auditory neuropathy.

Selected Recent Publications

Moser T, Beutner D, (2000) Kinetics of exocytosis and endocytosis at the cochlear inner hair cell afferent synapse of the mouse. Proc Natl Acad Sci USA 97: 883-888

Beutner D, Voets T, Neher E, Moser T (2001) Calcium dependence of exocytosis and endocytosis at the cochlear inner hair cell afferent synapse. Neuron 29: 681-90

Fuchs P, Glowatzki E, Moser T (2003) The afferent synapse of cochlear hair cells. Curr Opin Neurobiol 13: 453-58

Khimich D, Nouvian R, Pujol R, tom Dieck S, Egner A, Gundelfinger ED, Moser T (2005) Hair Cell Synaptic Ribbons are Essential for Synchronous Auditory Signaling. Nature 434: 889-94

Brandt A, Khimich D, Moser T (2005) Few Ca_V 1.3 channels regulate a synaptic vesicle's exocytosis at the hair cell ribbon synapse. J Neurosci 25: 11577-11585

Nouvian R, Beutner D, Parsons TD , Moser T (2006) Structure and function of the hair cell ribbon synapse. J Membr Biol 209: 153-65

Roux I, Safieddine S, Nouvian R, Grati M, Simmler MC, Perfettini I, Le Gall M, Rostaing P, Hamard G,Triller A, Avan P, Moser T, Petit C (2006) Otoferlin, defective in DFNB9 deafness, is essential for the Ca^{2+} -triggered synaptic exocytosis at the auditory hair cell ribbon synapse (Cell, in press).

Klaus-Armin Nave

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

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

Address

Max Planck Institute for
Experimental Medicine
Hermann-Rein-Strasse 3

37075 Göttingen
Germany

phone: +49-551-3899 757
fax: +49-551-3899 758
email: nave@em.mpg.de

Further Information

http://nave.em.mpg.de/

Major Research Interests

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

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

Selected Recent Publications

Schwab M H, Bartholomä A, Heimrich B, Feldmeyer D, Druffel-Augustin S, Goebbels S, Naya F J, Frotscher M, Tsai M-J, Nave K-A (2000) Neuronal bHLH proteins (NEX and BETA2/NeuroD) regulate terminal granule cell differentiation in the hippocampus. J Neurosci 20: 3714-3724

Niemann S, Sereda MW, Suter U, Griffiths IR, Nave K-A (2000) Uncoupling of myelin assembly and Schwann cell differentiation by transgenic overexpression of PMP22. J Neurosci 20: 4120-4128

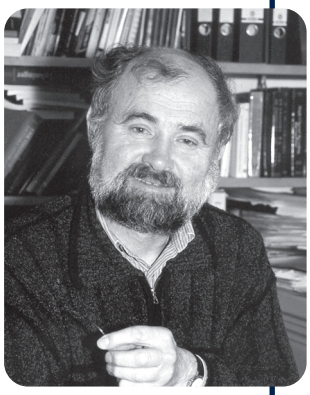
Lappe-Siefke C, Göbbels S, Gravel M, Nicksch E, Lee J, Braun P E, Griffiths I, Nave K-A (2003) Disruption of Cnp1 uncouples oligodendroglial functions in axonal support and myelination. Nature Genetics 33: 366-374

Sereda MW, Meyer zur Hörste G, Suter U, Uzma N, Nave K-A (2003) Therapeutic administration of anti-progesterone in a PMP22-transgenic model of Charcot-Marie-Tooth disease (CMT1A). Nature Medicine 9: 1533-1537

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

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

Erwin Neher



Address

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

37077 Göttingen
Germany

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

Further Information

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

Professor, Director at the Max Planck Institute for Biophysical Chemistry

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

Major Research Interests

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

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

Selected Recent Publications

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

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

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

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

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

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

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

Walter Paulus

Professor of Clinical Neurophysiology

- Dr. med., University of Düsseldorf, 1978
- Training in Neurology at the Universities of Düsseldorf, UCL London and Munich
- Habilitation (Neurology and Clinical Neurophysiology) in Munich
- Prof. and Head of the Department of Clinical Neurophysiology 1992

Address

Dept. Clinical Neurophysiology
University of Göttingen
Robert Koch Str. 40

37075 Göttingen Germany

phone: +49-551-39 6650
fax: +49-551-39 8126
e-mail: wpaulus@med.uni-goettingen.de

Further Information

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

Major Research Interests

Our main research goal is to development new neurophysiologically based therapies for neurological diseases incorporating excitability changes of the brain. For this we use repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (TDCS). TMS induces a short electric current in the human brain. Both rTMS and TDCS offer the prospect of inducing LTD and LTP like effects in the human brain. Diseases in our focus are Parkinson's disease, epilepsy, migraine, stroke and dystonia.

Both methods may also be used to measure excitability changes in the motor cortex or alterations in visual perception thresholds. We also evaluate rTMS and TDCS induced changes in motor cortex excitability by functional MR imaging.

Selected Recent Publications

Paulus W (2005) Toward Establishing a Therapeutic Window for rTMS by Theta Burst Stimulation. Neuron 45: 181-183

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

von Spiczak S, Whone A L, Hammers A, Asselin MC, Turkheimer F, Tings T, Happe S, Paulus W, Trenkwalder C and Brooks DJ (2005) The role of opioids in restless legs syndrome: an [11C]diprenorphine PET study. Brain 128: 906-917

Evgeni Ponimaskin

Privatdozent, Group Leader at the Centre for Molecular Physiology of the Brain

- 1994 Dr. rer. nat., Free University of Berlin, Germany
- 1994 - 2000 Postdoctoral training within the special research unit (Sonderforschungsbereich) "Cellular signal recognition and signal transduction"
- 2000 - 2002 Faculty member and group leader at the Departments of Neuro and Sensory Physiology, Medical School at the University of Göttingen
- Since October 2002 Tenure Track position within the Centre for Molecular Physiology of the Brain (ZMPG)

Address

Dept. Neuro- and Sensory Physiology
University of Göttingen
Humboldtallee 23

37073 Göttingen, Germany

phone: +49-551-39 5939
fax: +49-551-39 6031
e-mail: eponima@gwdg.de

Further Information

http://www.neuro-physiol.med.uni-goettingen.de/

Major Research Interests

Our scientific activities are centered on the understanding of the time- and space-dependent interactions between different signalling proteins (in particular G-Protein Coupled Receptors and their downstream effectors), leading to the specific actions within the cell. As model system we use the serotonergic signaling, which is critically involved in regulation of different neuronal processes. This project addresses following aspects:

- Dynamic distribution and clustering of defined serotonin receptors (5-HTR) in different cell types. To study the activation-dependent changes in receptor distribution, individual receptor are coupled with fluorescence proteins (GFP, CFP, YFP) and analysed by confocal as well as 2-photon microscopy. We also analyse oligomerization state of different receptors by biochemical methods as well as by molecular imaging (i.e. FRET, single-cell FRET)
- Determination of G-proteins as well as downstream effectors specifically interacting with individual serotonin receptors. Cross-talk between GPCRs and specific effectors. To identify specific downstream effectors we apply biochemical, biophysical and electrophysiological methods. To get dynamic biochemical information we are establishing molecular imaging of high spatial and temporal resolution (single-cell FRET, fluorescence lifetime imaging microscopy (FLIM)). Combination of this nanotomographic fluorescence imaging with various forms of "patch clamping" will also be used for the parallel on-line measurement of physiological parameters in whole cell function. Using "patch-clamp" method will also allow the quantitative analysis of the transcription level for individual signalling molecules by using single-cell RT-PCR and TaqMan techniques, which are presently established in our lab.
- Functional role of post-translational protein modifications on G protein-coupled 5-HTR. Differential expression of receptors during development und after chronic application of drugs.

Selected Recent Publications

Ponimaskin E, Heine M, Joubert L, Sebben M, Bickmeyer U, Richter DW, Dumuis A (2002) The 5-hydroxytryptamine(4a) receptor is palmitoylated at two different sites and acylation is critically involved in regulation of receptor constitutive activity. Journal of Biological Chemistry 277: 2534-2546

Ponimaskin E, Profirovic J, Vaiskunaite R, Richter DW, Voyno-Yasenetskaya T (2002) 5-hydroxytryptamine(4a) receptor is coupled to Galpha subunit of heterotrimeric G13 protein. Journal of Biological Chemistry 277: 20812-20819

Manzke T, Guenther U, Ponimaskin E, Haller M, Dutschmann M, Schwarzachwer S, Richter DW (2003) 5-HT4(a) receptors avert opioid-induced breathing depression without loss of analgesia. Science 301: 226-229

Richter DW, Manzke T, Wilken B, Ponimaskin EG (2003) Serotonin Receptors: Guardians for a Stable Breathing. Trends in Molecular Medicine 9: 542-548

Papoucheva K, Dumuis A, Sebben M, Richter D, Ponimaskin EG (2004) The 5-HT1A receptor is stably palmitoylated and acylation is critical for the receptor communication with Gi-protein. Journal of Biological Chemistry 279: 3280-3291

Professor of Psychology

- 1988 - 1989 Postdoctoral Fellow, Department of Pharmacology, Thomas Jefferson University, Philadelphia, Pa.
- 1989 - 1995 Assistant Professor, Department of Psychology, University of Giessen
- 1995 - 1997 Associate Professor, Institute for Psychology, University of Jena
- since 1997 Professor of Psychology, Georg Elias Müller Institute for Psychology, University of Göttingen

Address

Georg Elias Müller Institute
for Psychology
University of Göttingen
Goßlerstr. 14

37073 Göttingen
Germany

phone: +49-551-39 3611
fax: +49-551-39 3662
e-mail: trammsa@uni-goettingen.de

Further Information

http://www.psych.uni-goettingen.de/home/rammsayer/

Major Research Interests

Biological and experimental personality research:

Biological basis of extraversion
Neuropharmacology of individual differences
Pharmacopsychological approaches to personality
Elementary cognitive tasks and mental ability
Behavioral sex differences

Temporal information processing in humans:

Neurobiological approaches to timing systems in humans
Perceptual and cognitive mechanisms in human timing and time perception
Time psychophysics

Cognitive neuroscience:

Neurochemistry of declarative and procedural memory functions
Cognitive inhibition in humans

Selected Recent Publications

Rammsayer TH (2004) Extraversion and the dopamine hypothesis. In RM Stelmack (Ed), On the psychobiology of personality (pp. 411-429). Amsterdam: Elsevier.

Rammsayer TH, Brandler S (2004) Aspects of temporal information processing: A dimensional analysis. Psychological Research 69: 115-123

Rammsayer TH, Stahl J (2004) Extraversion-related differences in response organization: Evidence from lateralized readiness potentials. Biological Psychology 66: 35-49

Rammsayer T (2003) Sensory and cognitive mechanisms in temporal processing elucidated by a model systems approach. In H. Helfrich (Ed.), Time and mind II: Information processing perspectives (pp. 97-113). Göttingen, Germany: Hogrefe & Huber Publishers.

Rammsayer TH (2003) NMDA receptor activity and the transmission of sensory input into motor output in introverts and extraverts. Quarterly Journal of Experimental Psychology, Section B: Comparative and Physiological Psychology 56B: 207-221

Diethelm Richter

Professor of Physiology
Chairman of the II. Department of Physiology, University of Göttingen
Speaker of the European Neuroscience Institute Göttingen

- Wiss. Angestellter, I. Physiol. Inst., University of Saarland, 1969 - 1970
- Wiss. Assistent, I. Physiol. Inst., University of Saarland, 1970 - 1972
- Wiss. Assistent, I. Physiol. Inst., University of Munich, 1972 - 1974
- Universitätsdozent, I. Physiol. Inst., University of Munich, 1974
- Universitätsdozent, I. Physiol. Inst., University of Heidelberg, 1975 - 1976
- C-3 Professor, I. Physiol. Inst., University of Heidelberg, 1976 - 1988
- C-4 Professor, II. Physiol. Inst., University of Göttingen, 1988

Address

Center for Physiology and Pathophysiology
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 59112
fax: +49-551-39 6031
e-mail: d.richter@gwdg.de

Further Information

http://www.neuro-physiol.med.uni-goettingen.de/groups/richter/start.htm

Major Research Interests

Neurotransmitters, neuromodulators, and peptide hormones are known to activate metabotropic receptor proteins that control ion channels or second messenger cascades. These receptors regulate an intracellular network of interacting signal transduction pathways by means of G-proteins. Thus, receptors transmit extracellular signals to intracellular proteins and other chemical factors. These signals are normally not transduced in a stereotype manner, but they are integrated in a space- and time-dependent manner, resulting in highly dynamic and variable cellular responses. The specific nature of the cellular response depends on individual cell types that may differ in the expression pattern of receptor subtypes or of intracellular signaling factors.
Our research group concentrates on the spatial organization of various subtypes of serotonin receptors and targets an understanding of the highly localized regulation of molecular interactions occurring simultaneously at many sites of a neuron. The goal is to achieve a refined understanding of the parallel signal processing within networks of chemical signal pathways and to clarify their effects on the properties of the neuron as a whole.

Selected Recent Publications

Manzke T, Günther U, Ponimaskin EG, Haller M, Dütschmann M, Schwarzacher S, Richter DW (2003) 5-HT_{4ca1} Receptors avert opioid-induced breathing depression without loss of analgesia. Science 301: 226-229

Gomeza J, Hülsmann S, Ohno K, Eulenburg V, Szöke K, Richter D and Betz H (2003) Inactivation of the Glycine Transporter 1 Gene Discloses Vital Role of Glial Glycine Uptake in Glycinergic Inhibition. Neuron Vol 40: 785-796

Gomeza J, Ohno K, Hülsmann S, Armsen W, Eulenburg V, Richter DW, Laube B and Betz H (2003) Deletion of the Mouse Glycine Transporter 2 Results in a Hyperekplexia Phenotype and Postnatal Lethality. Neuron Vol 40: 797-806

Papoucheva E, Dumuis A, Sebben M, Richter DW and Ponimaskin EG (2004) The 5-Hydroxytryptamine(1A) Receptor is Stably Palmitoylated, and Acylation is Critical for Communication of Receptor with Gi-Protein. J Biol Chem 279: 3280-3291

Ponimaskin E G, Heine M, Dumuis A, Richter DW, Glebov K, Oppermann M (2005) Palmitoylation of the 5-Hydroxytryptamine(4a) Receptor Regulates Receptor Phosphorylation, Desensitization and ß-Arrestin mediated Endocytosis. Mol Pharmacol 67(5): 1434-1443

Eleni Roussa

Privatdozentin, Neuroanatomy

- 1988 Dr. med. dent. University of Saarland, Germany
- Training in Periodontology, Dental School, University of Saarland
- Postdoctoral fellow, Department of Anatomy, Medical School, University of Saarland
- Temporary Lecturer for Anatomy, School of Biological Sciences, University of Manchester, UK
- since 2001 Senior scientist, Center for Anatomy, Department of Neuroanatomy, University of Göttingen, Germany
- 2002 Habilitation, University of Göttingen

Address

Center for Anatomy,
Dept. Neuroanatomy
University of Göttingen
Kreuzbergring 40

37075 Göttingen
Germany

phone: +49-551-39 7068
fax: +49-551-39 14016
e-mail: eroussa@gwdg.de

Further Information

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

Major Research Interests

Dopaminergic and serotonergic neurons play important roles in the regulation of motor performances, behavior and cognition. Neuron loss or functional impairment of dopaminergic or serotonergic neurons are associated with a wide range of human disease states, including Parkinson's disease, depression and anxiety.
We are interested in the understanding of the early determination and differentiation of mesencephalic dopaminergic neurons and hindbrain serotonergic neurons. We specifically focus on the identification of intrinsic and extrinsic regional determinants that dictate differentiation of progenitor cells towards particular types of neurons, as well as on new genes representing the intracellular mediators of development towards dopaminergic and serotonergic neurons.

Selected Recent Publications

Farkas LM, Dünker N, Roussa E, Unsicker K, Krieglstein K (2003) TGF-βs are essential for the development of midbrain dopaminergic neurons *in vitro* and *in vivo*. The Journal of Neuroscience 23: 5178-5186

Roussa E, Nastainczyk W, Thévenod F (2004) Differential expression of electrogenic NBC1 (SLC4A4) variants in rat kidney and pancreas. Biochemical Biophysical Research Communications 314: 382-389

Roussa E, Krieglstein K (2004) GDNF promotes neuronal differentiation and dopaminergic development of mouse mesencephalic neurospheres. Neuroscience Letters 361: 52-55

Roussa E, Farkas L, Krieglstein K (2004) TGF-beta promotes survival on mesencephalic dopaminergic neurons in cooperation with Shh and FGF-8. Neurobiology of Disease 16: 300-310

Roussa E, Krieglstein K, (2004) Induction and specification of dopaminergic cells development: focus on TGF-β, Shh and FGF8. Cell and Tissue Research (in press)

Detlev Schild

Professor of Physiology

- 1979 Diplom in Physics, University of Göttingen
- 1982 M.D., University of Göttingen
- 1985 Dr. rer.nat., University of Göttingen
- 1987 Dr. med., University of Göttingen
- 1997 Appointed head of the Department of Molecular Neurophysiology in the Center of Physiology and Pathophysiology, Medical School, University of Göttingen

Address

Dept. Neurophysiology and
Cellular Biophysics
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 5915
fax: +49-551-39 8399
e-mail: dschild@gwdg.de

Further Information

http://www.ukmn.gwdg.de

Major Research Interests

The olfactory system is able to detect and distinguish thousands of molecules in our environment. Receptor neurons are endowed with hundreds of different receptors to bind odorants and transduce the chemical signal into an electrical one. The receptor neurons convey their information onto the olfactory bulb where a neuronal image of odorants is generated. Using a combination of electrophysiological and high resolution imaging techiques, we are studying

- the biophysical details of the primary transduction processes,
- the synaptic transmission in the olfactory bulb,
- the generation of the neuronal chemotopic map and
- the mechanism of odor learning,
- single molecule behaviour in cells.

Selected Recent Publications

Chen T-W, Lin B-J, Brunner E, Schild D (2006) (CMPB, BCCN) *In-situ* background estimation in quantitative fluorescence imaging. Biophys J 90: 2534 - 2547

Nezlin LP, Schild D (2005) Individual olfactory sensory neurons project into more than one glomerulus in *Xenopus laevis* tadpole olfactory bulb. J Comp Neurol 481: 233-9

Gennerich A, Schild D (2005) Sizing-up finite fluorescent particles with nanometer-scale precision by convolution and correlation image analysis. Eur Biophys J 34: 181-99

Manzini I, Schild D (2004) Classes and narrowing selectivity of olfactory receptor neurons of *Xenopus laevis* tadpoles. J. Gen Physiol 123: 99 - 107

Manzini I, Schild D (2003) cAMP-independent olfactory transduction of amino acids in *Xenopus laevis* tadpoles. J Physiol 551: 115-123

Czesnik D, Rössler W, Kirchner F, Gennerich A, Schild D (2003) Neuronal representation of odorants in the olfactory bulb of *Xenopus laevis* tadpoles. Eur J Neurosci 17: 113-118

Gennerich A, Schild D (2002) Anisotropic diffusion in mitral cell dendrites of *Xenopus laevis* tadpoles Biophys J 83: 510-522

Jörg B. Schulz

Professor of Restorative Neurobiology, Director of the Department of Neurodegeneration and Restorative Research

- MD, University of Cologne Medical School, 1991
- Training in Neurology and Neuroscience at the Department of Neurology in Tübingen
- DFG Research Fellow at the Massachusetts General Hospital and Harvard Medical School, Boston
- Head of Neurodegeneration Laboratory, Hertie Institute for Clinical Brain Research and University of Tübingen, 1998 - 2004
- Habilitation, University of Tübingen, 1999
- Director of the Department of Neurodegeneration and Restorative Research, CMPB, University of Göttingen, since 2004

Major Research Interests

Our Department studies the mechanisms of degeneration in neurodegenerative disorders, including Parkinson's disease, Alzheimer's disease and cerebral ataxias. Because increased age is the major risk factor for developing a neurodegenerative disorder, we are highly interested in the mechanisms of neuronal aging. To study these mechanisms we use immortalized cell line models, primary neuronal culture models, Drosophila models, toxin-induced and transgenic mammalian (mice, rats, primates) models of Parkinson's disease. Once important pathogenetic steps have been identified we investigate their functional significance my using pharmacological or molecular tools including different transfection methods and viral gene transfer. The ultimate goal is to translate these findings into treatments that are applicable to patients. Therefore, the Department is enrolled in the outpatient clinics for Movemenet Disorders and Dementias and has a leading role in the German Network for Hereditary Movement Disorders (GeNeMove).

Address

Dept. of Neurodegeneration and Restorative Research
Center of Neurological Medicine
DFG Research Center "Molecular Physiology of the Brain"
University of Göttingen
Waldweg 33

37073 Göttingen
Germany

phone: +49-551-39 13540
fax: +49-551-39 13541
e-mail: jschulz4@gwdg.de

Further Information

http://www.neuro degeneration. uni-goettingen.de/

Selected Recent Publications

Xia XG, Harding T, Weller M, Uney JB, Schulz JB (2001) Gene transfer of the JNK interacting protein-1 protects dopaminergic neurons in the MPTP model of Parkinson's disease. Proc Natl Acad Sci USA 98: 10433-10438

Wick A, Wick W, Waltenberger J, Weller M, Dichgans J, Schulz JB (2002) Neuroprotection by hypoxic preconditioning requires sequential activation of vascular endothelial growth factor receptor and Akt. J Neurosci 22: 6401-6407

Simons M, Krämer E-M, Macchi P, Rathke-Hartlieb S, Trotter J, Nave K-A, Schulz JB (2002) Overexpression of the Myelin Proteolipid Protein leads to accumulation of cholesterol and Proteolipid Protein in endosomes/lysosomes: implications for Pelizaeus-Merzbacher disease. J Cell Biol 157: 327-336

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

Luft AR, Buitrago MM, Ringer T, Dichgans J, Schulz JB (2004) Motor skill learning depends on protein synthesis in motor cortex after training. J. Neurosci. 2004, 24: 6515-6520.

Beier CP, Wischhusen J, Gleichmann M, Gerhardt E, Pekanovic A, Krueger A, Taylor V, Suter U, Krammer PH, Endres M, Weller M, Schulz JB (2005) FasL (CD95L/APO-1L) resistance of neurons mediated by phosphatidylinositol 3-kinase-Akt/protein kinase B-dependent expression of lifeguard/neuronal membrane protein 35. J Neurosci 25: 6765-6774

Strauss K, Martins LM, Plun-Favreau H, Marx F, Kautzmann S, Berg D, Gasser T, Wszolek Z, Müller T, Bornemann A, Wolburg H, Downward J, Riess O, Schulz JB, Krüger R (2005) Loss of function mutations in the gene encoding Omi/HtrA2 in Parkinson's disease. Hum Mol Genet 14: 2099-2111

Stephan J. Sigrist

Address

European Neuroscience
Institute Göttingen
Grisebachstrasse 5

37077 Göttingen
Germany

phone: +49-551-39 12350
fax: +49-551-39 12346
e-mail: ssigris@gwdg.de

further information

http://www.eni.gwdg.de/plastioverview.htm

Research Group Leader at the European Neuroscience Institute Göttingen

- Dr. rer. nat (PhD) 1997, University of Tübingen
- Since 2001 Independent group leader position at the European Neuroscience Institute Göttingen (ENI-G)
- 1997 - 2001 Postdoc with Christoph Schuster at Friedrich Miescher Laboratory in Tübingen (Germany), Max Planck Society
- 1993 - 1997 Ph.D. with Christian F. Lehner at Friedrich Miescher Laboratory in Tübingen (Germany), Max Planck Society

Major Research Interests

Synaptic strengths change as neuronal circuits develop and are modified by experience, providing a cellular basis for the correct development of neuronal systems as for higher brain functions (e.g. learning and memory). Model system for our studies is the developing larval neuromuscular junction (NMJ) of Drosophila, offering access for physiological, ultrastructural and biochemical methods as well as for the powerful molecular-genetic and genetic approaches typical for Drosophila. Moreover, the optical transparence of the larva opens the way for the *in vivo* imaging of plasticity relevant processes using genetically encoded GFP-sensors.

At the NMJ, we have recently demonstrated the existence of large aggregates of translation factors very close to the synaptic sites. Increasing this subsynaptic translation stimulated synaptogenesis, neurotransmission as well as morphological outgrowth of the developing NMJ. Postsynaptic translation we found to provoke this substantial long-term strengthening by increasing the synaptic levels of a particular glutamate receptor subunit, DGluR-IIA.

In our ongoing work, mechanisms underlying synapse formation and growth at the Drosophila NMJ are characterized further. On one hand, newly designed genetic screens and a molecular analysis of the translational control mechanisms throughout plasticity will be the basis to identify molecules that regulate synaptic growth and function. Moreover, synaptic protein synthesis, glutamate receptor dynamics and synaptic growth are visualized live in developing larvae, using lines transgenic for GFP-tagged marker proteins in combination with confocal and 2-photon microscopy. Moreover, the fact that learning and memory paradigms are well established for adult Drosophila flies offers the possibility to assess the relevance of junctional plasticity-mechanisms for central synapses and brain functions in general.

Selected Recent Publications

Sigrist SJ, Ried G, Lehner CF (1995a) *Dmcdc2* kinase is required for both meiotic divisions during *Drosophila* spermatogenesis and is activated by the twine/cdc25 phosphatase. Mech of Dev 53: 247-260

Sigrist SJ, Jacobs H, Stratmann R, Lehner CF (1995b) Exit from mitosis is regulated by *Drosophila* fizzy and the sequential destruction of cyclins A, B and B3. EMBO J 14(19): 4827-38

Sauer K, Weigmann K, Sigrist SJ, Lehner CF (1996) Novel members of the *cdc2*-related kinase family in *Drosophila*: cdk4/6, cdk5, PFTAIRE, and PITSLRE kinase. Mol Biol Cell: 1759-69

Sigrist SJ, Lehner CF (1997) *Drosophila* fizzy-related down-regulates mitotic cyclins and is required for cell proliferation arrest and entry into endocycles. Cell 1997 (4): 671-81

Sigrist SJ, Thiel PR, Reiff D, Lachance PE, Lasko P, Schuster CM (2000) Postsynaptic translation affects the morphology and efficacy of neuromuscular junctions. Nature 405 (6790): 1062-1065

Jakob Sørensen

Research Group Leader at the Max Planck Institute for Biophysical Chemistry

- MSc 1996 in Biology, Copenhagen University, Denmark
- PhD 1999, Copenhagen University, Denmark
- 2000 - 2005 scientific assistant (postdoc) at the Max Planck Institute for Biophysical Chemistry, Göttingen
- since 2005 research group leader at the Max Planck Institute for Biophysical Chemistry

Major Research Interests

The release of neurotransmitter happens by exocytosis of transmitter-filled vesicles. Both the high speed of this release process and the tight coupling to the intracellular calcium concentration is critical for normal synaptic transmission in the brain. We are interested in unraveling the molecular specializations behind both properties. Our model systems are adrenal chromaffin cells and cultured hippocampal neurons, where secretion can be monitored using fast electrophysiological (patch clamp) and electrochemical (amperometry) techniques. In order to manipulate presynaptic proteins we take advantage of cells isolated from knock-out mice, where a specific protein is removed, combined with overexpression using viral vectors (Semliki Forest Virus, Adenovirus and Lentivirus). The expression of different protein isoforms, or mutated protein, in knock-out cells is used to assay the involvement of proteins in neurotransmitter release.

The major focus of our interest is the SNARE complex, the synaptotagmins and Munc18 proteins. The SNARE complex consists of SNAP-25, syntaxin and synaptobrevin, which is formed between the vesicle and plasma membrane during fusion. The synaptotagmins are C2-domain containing proteins, that can bind to calcium, phospholipids and SNAREs. They are usually assumed to be calcium-sensors for release. The Munc18 proteins bind to syntaxin and is necessary for docking vesicles to the plasma membrane.

Address

Dept. Membrane Biophysics
AG Molecular Mechanism of Exocytosis
Max Planck Institute for Biophysical Chemistry
Am Fassberg 11

37077 Göttingen
Germany

phone: +49-551-201 1297
fax: +49-551-201 1688
e-mail: jsoeren@gwdg.de

Further Information

http://www.mpibpc.mpg.de/groups/neher/groups/mme/

Selected Recent Publications

Sørensen JB, Wiederhold K, Müller EM, Milosevic I, Nagy G, de Groot BL, Grubmüller H, Fasshauer D (2006) Sequential N- to C-terminal SNARE complex assembly drives priming and fusion of secretory vesicles. EMBO J 25: 955-966

Nagy G, Kim JH, Pang ZP, Matti U, Rettig J, Sudhof TC, Sørensen JB (2006) Different effects on fast exocytosis induced by synaptotagmin 1 and 2 isoforms and abundance but not by phosphorylation. J Neurosci 26: 632-643

Nagy G, Milosevic I, Fasshauer D, Muller EM, de Groot BL, Lang T, Wilson MC, Sørensen JB (2005) Alternative Splicing of SNAP-25 Regulates Secretion through Nonconservative Substitutions in the SNARE Domain. Mol Biol Cell 16: 5675-5685

Milosevic I, Sørensen JB, Lang T, Krauss M, Nagy G, Haucke V, Jahn R, Neher E (2005) Plasmalemmal PI(4,5)P_2 level regulates the releasable vesicle pool size in chromaffin cells. J Neurosci 25: 2557-2565

Nagy G, Reim K, Matti U, Brose N, Binz T, Rettig J, Neher E, Sørensen JB (2004) Regulation of releasable vesicle pool sizes by protein kinase A-dependent phosphorylation of SNAP-25. Neuron 41: 351-365

Sørensen JB, Fernandez-Chacon R, Südhof TC, Neher E (2003) Examining synaptotagmin I function in dense core vesicle exocytosis under direct control of Ca^{2+}. J Gen Physiol 122: 265-276

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

Anastassia Stoykova

Address

Max Planck Institute for
Biophysical Chemistry
Am Faßberg 11

37077 Göttingen
Germany

phone: +49-551-201 1710
fax: +49-551-201 1504
e-mail: astoyko@gwdg.de

Further Information

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

Privatdozent, Developmental Biology

- 1972 M.D. degree, Bulgarian Medical Academy
- 1973 - 1988 Research Associate in Neurochemistry; Regeneration Research Laboratory, Bulgarian Academy of Sciences, Sofia
- 1985 PhD; Bulgarian Academy of Sciences, Sofia
- 1989 Habilitation (Neurobiology) and Assistant Research Professor at the Institute of Molecular Biology, Bulgarian Academy of Sciences
- 1980 - 1981 and 1988 - 1989 Guest investigator as Alexander von Humboldt grant holder at theMax Planck Institute for Experimental Medicine and Max Planck Institute for Biophysical Chemistry, Göttingen
- 1991 - 2002 Staff Research Scientist at the Max Planck Institute for Biophysical Chemistry; Department Molecular Cell Biology, Göttingen
- 2002 Habilitation (Developmental Biology); Faculty of Human Medicine, University of Göttingen
- since 2002 Research Group Leader at the Max Planck Institute for Biophysical Chemistry; Department Molecular Cell Biology, Göttingen Lecturer at the Interna tional Max Planck Research School, Program Neurosciences

Major Research Interests

Our main research interest is the genetic mechanisms involved in the brain morphogenesis of vertebrates recently focusing on the corticogenesis. In the mammalian cortex billions of neurons are organized in six layers and in many functional domains with distinct morphology, connections and physiology. We identified sets of known and novel genes by Affymetrix microarray assays, that are differentially expressed between distinct domains and layers of the developing mouse cortex. The function of selected genes is studied through targeted gene inactivation in transgenic mice using conventional and conditional knock-out strategies, ectopic expression through electroporation techniques in brain slices *in vitro*, in embryo brains in utero, morphological expression and behavioral analysis.

Another research focus of our group is the role of the transcription factor *Pax6* in the mammalian forebrain patterning and in corticogenesis. We found that *Pax6* acts as an intrinsic determinant of the cortical pluripotent progenitors, the radial glial cells, that lacking *Pax6* produce less neurons, particularly for the upper cortical layers. Current projects investigate the function of *Pax6* in the corticogenesis after conditional *in vivo* inactivation and overexpression of Pax6 in the cortical progenitors. We are attempting to identify genes that act in a *Pax6* dependent pathway during cortical neurogenesis. Another project includes the identification and analysis of epigenetic factors that may control the neurogenic function of *Pax6* in the developing and adult brain.

Selected Recent Publications

Götz M, Stoykova A, Gruss P (1998) *Pax6* controls radial glia differentiation in the cerebral cortex. Neuron 21: 1031-1044

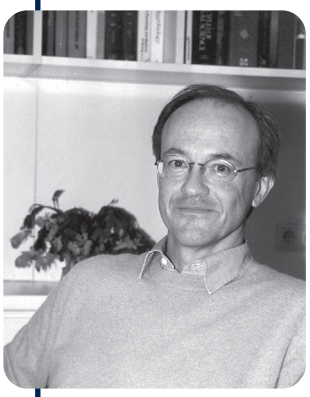
Stoykova A, Treichel D, Hallonet M, Gruss P (2000) *Pax6* modulates the patterning of the mammalian telencephalon. J Neuroscience 20 (21): 8042-8050

Muzio L, DiBenedetto B, Stoykova A, Boncinelli E, Gruss P, Mallamaci A (2002) Conversion of cerebral cortex into basal ganglia in *Emx2-/- Pax6*$^{sey/sey}$ double-mutant mice. Nature Neuroscience 5: 737-745

Muhlfriedel S, Kirsch F, Gruss P, Stoykova A and Chowdhury K (2005) A roof plate-dependent enhancer controls the expression of Homeodomain only protein in the developing cerebral cortex. Dev Biol 283(2): 522-534

Tole S, Remedios R, B Saha and Stoykova A (2005) Selective requirement of Pax6, but not Emx2, in the specification and development of several nuclei of the amygdaloid complex. J Neurosci 25: 2753-2760

Walter Stühmer



Professor of Neurophysiology, Director at the Max Planck Institute for Experimental Medicine

- 1978 - 1980 PhD with Dr. F. Conti in Camogli, Italy
- 1980 - 1983 Post Doc in the Department of Physiology and Biophysics in Seattle, USA, with Dr. W. Almers
- 1983 - 1992 group leader at the Max Planck Institute for Biophysical Chemistry in Göttingen with Dr. E. Neher
- 1992 - present Director of the Department Molecular Biology of Neuronal Signals at the Max Planck Institute for Experimental Medicine in Göttingen

Address

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

37075 Göttingen
Germany

phone: +49-551-3899 646
fax: +49-551-3899 644
e-mail: wstuehm@gwdg.de

Further Information

http://www.mpiem.gwdg.de/

Major Research Interests

The principal aim of the department "Molecular Biology of Neuronal Signals" is the study of signaling within cells and between cells. To this end, molecular biology, genetics and electrophysiology are used to elucidate structure-function relationships of membrane-bound proteins, expecially ion channels and receptors. Specific tools such as antibodies and toxins are developed and used to interfere with signaling pathways relevant for cell cycle control, ion selectivity and the secretion of cells in culture and in primary cells.

Selected Recent Publications

Jenke M, Sánchez A, Monje F, Stühmer W, Weseloh RM, Pardo LA (2003) C-terminal domains implicated in the functional surface expression of potassium channels. EMBO J 22: 395-403

Becherer U, Moser T, Stühmer W, Oheim M (2003) Calcium regulates exocytosis at the level of single vesicles. Nature Neurosci 6: 846-853

García-Ferreiro RE, Kerschensteiner D, Major F, Monje F, Stühmer W, Pardo LA (2004) Mechanism of block of hEag1 K^+ channels by imipramine and astemizole. J Gen Physiol 124: 301-317

Pardo LA, Contreras-Jurado C, Zientkowska M, Alves F, Stühmer W (2005) Role of voltage-gated potassium channels in cancer. J Membr Biol 205: 115-124

Weber C, Mello de Queiroz F, Downie F, Suckow A, Stühmer W, Pardo LA (2006) Silencing the activity and proliferative properties of the human Eag1 potassium channel by RNA interference. J Biol Chem 281: 13030-13037

Stühmer W, Alves F, Hartung F, Zientkowska M, Pardo LA (2006) Potassium channels as tumour markers. FEBS Letters 580: 2850-2852

Andreas Stumpner

Professor of Neuroethology

- Dr. rer. nat., University of Erlangen, Germany, 1988
- Postdoctoral fellow, Andrews University, Berrien Springs, USA, 1990 - 1991
- Habilitation, University of Göttingen, 1997
- Guest professor, University of Zurich, Switzerland, 2002 - 2003
- Since April 2003 Professor of Zoology at the University of Göttingen

Address

Institute for Zoology,
Anthropology and
Develop. Biology
Dept. Neurobiology
University of Göttingen
Berliner Str. 28

37073 Göttingen
Germany

phone: +49-551-39 5574
fax: +49-551-39 5438
e-mail: astumpn@gwdg.de

Further Information

http://wwwuser.gwdg.de/~neuro/ag_stumpner/AndreasTitel.htm

Major Research Interests

My research focuses on how a small nervous system recognises specific frequencies and temporal patterns (in the context of acoustic communication in insects, mainly in Orthoptera). Understanding these processes bears implications also for understanding function and evolution of the same performances of the vertebrate brain. I see the strength of the acoustic and invertebrate system *a)* in the precise temporal and spectral stimuli one can deliver and the clear (innate) responses on the behavioural and neuronal level, *b)* in the comparative potential (song recognition in groups of related species and differences in neuronal layout to related non-singing or non-hearing groups) allowing to understand what mechanisms might have played a role in evolution and how evolution of songs and recognition systems depend on each other, *c)* in the identified neurone-approach allowing to find homologous neurones in related species and indicating evolutionary changes on the cellular level and *d)* the potential to directly test hypotheses in behavioural experiments.

Recent findings from intracellular studies in bushcrickets are: Central neurons receive lateral frequency-dependent inhibitions. After blocking such inhibitions the frequency tuning broadens considerably. Species-specificity of a neuron in related species depends on specific inhibitions, not on specific excitations. And homologous neurons in more distantly related species may differ considerably in their properties.

Selected Recent Publications

Stumpner A (1998) Picrotoxin eliminates frequency selectivity of an auditory interneuron in a bushcricket. J Neurophysiol 79: 2408-2415

Rust J, Stumpner A, Gottwald J (1999) Singing and hearing in an ancient bushcricket. Nature 399: 650

Stumpner A (1999) Comparison of morphology and physiology of two plurisegmental sound-activated interneurones in a bushcricket. J Comp Physiol A 185: 199-205

Stumpner A (2002) A species-specific frequency filter through specific inhibition, not specific excitation. J comp Physiol A 188: 239-248

Hennig M, Franz A, Stumpner A (2004) Processing of auditory information in insect. Microsc Res Tech 63: 351-374

Molina J, Stumpner A (2005) Effects of pharmacological treatment and photoinactivation on the directional responses of an insect neuron. J Exp Zool 303A: 1085-1103

Victor Tarabykin

Group Leader at the Max Planck Institute for Experimental Medicine

- MD, Russian State Medical University, Moscow 1993
- PhD in Molecular Biology with S.Lukyanov, Russian Academy of Sciences, Moscow 1996
- Postdoctoral fellow with P.Gruss at the Max Planck Institute for Biophysical Chemistry, 1996 - 2001
- since 2002 Research Group Leader at the Max Planck Institute for Experimental Medicine, Dept. Molecular Biology of Neuronal Signals

Address

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

37075 Göttingen
Germany

phone: +49-551-3899 656
or -3899 606
fax: +49-551-38 99644
e-mail: tarabykin@
em.mpg.de

Further Information

http://www.mpiem.gwdg.de/

Major Research Interests

During development, several populations of progenitor cells in the dorsal telencephalon generate a large variety of neurons. These neurons acquire distinct morphologies and physiological properties and serve distinct functions in the mammalian cerebral cortex.

We are interested in the cellular and molecular mechanisms underlying cell fate specification in the mouse cerebral cortex. We focus on the mechanisms controlling the generation of neurons of different cortical layers. We apply a combination of genetic, molecular and cell biological approaches. We have identified several genes that control cortical development. One of them, Sip1 is a transcription factor implicated in Mowat-Wilson syndrome (MWS) in humans. MWS patients suffer from intellectual disability, microcephaly and seizures. Another gene we identified, Satb2 is a transcription factor of a novel type that interacts with special chromosomal regulatory elements, Matrix Attachment Regions. Satb2 is an important determinant of neurons of superficial cortical layers. There are several other genes that have been identified in the lab whose function in the cortical development remains to be revealed.

Selected Recent Publications

Britanova O, Depew MJ, Schwark M, Thomas BL, Miletich I, Sharpe P, Tarabykin V (2006) Satb2 haploinsufficiency phenocopies 2q32-q33 deletions while loss suggests a fundamental role in the coordination of jaw development. Am J Hum Genet 79(4): 668-78

Britanova O, Alifragis P, Johnes K, Gruss P, Tarabykin V (2006) Tangential migration of cortical projection neurons: a novel mode of migration. Dev Biol 298(1): 299-311

Guillemot F, Molnar Z, Tarabykin V, Stoykova A (2006) Molecular mechanisms of cortical differentiation. Eur J Neurosci 23(4): 857-68

Molnar Z, Metin C, Stoykova A, Tarabykin V, Price D, Frances F, Meyer G, Dehay C, Kennedy K (2006) Comparative aspects of cerebral cortical development. Eur J Neurosci 23(4): 921-34

Britanova O, Akopov S, Lukyanov S, Gruss P, Tarabykin V (2005) Novel transcription factor Satb2 interacts with matrix attachment region DNA elements in a tissue-specific manner and demonstrates cell-type-dependent expression in the developing mouse CNS. Eur J Neurosci 21: 658-68

Tarabykin V, Stoykova A, Usman N, Gruss P (2001) Cortical upper layer neurons derive from the subventricular zone as indicated by *Svet1* gene expression. Development 128: 1983-1993

Stefan Treue

Professor, Director of the German Primate Center

- Head of the Cognitive Neuroscience Laboratory
- Ph.D. 1992, Massachusetts Institute of Technology
- Postdoctoral Fellow, MIT, 1992 - 1993
- Postdoctoral Fellow, Baylor College of Medicine, Houston, Texas, 1993 - 1995
- Work Group Leader, Laboratory of Cognitive Neuroscience, University of Tübingen, 1995 - 2001
- Professor of Animal Physiology, University of Tübingen, 2000 - 2001
- Professor of Cognitive Neuroscience and Biological Psychology, University of Göttingen, 2001

Address

German Primate Center
Kellnerweg 4

37077 Göttingen
Germany

phone: +49-551-3851 115
fax: +49-551-3851 452
e-mail: treue@gwdg.de

Further information:

http://www.dpz.gwdg.de/akn/en/index.html

Major Research Interests

Research at the Cognitive Neuroscience Laboratory is aimed at understanding the neural basis of visual perception. Vision is an active process that is far more than a passive registration of our environment. Rather, on its way from the eyes to and through the cortex, visual information is modulated by numerous processes that enhance some aspects while diminishing others. One of these processes is attention, i.e. the ability to filter out unwanted information and concentrate the brain´s processing abilities on relevant information.

The accurate representation of visual motion in the environment is one of the most important tasks of the visual system. Correspondingly, research in the laboratory concentrates on this ability as a model for sensory information processing in general.

We use various techniques. While our emphasis is on electrophysiology, i.e. the recording of the activity of neurons in the visual cortex of macaque monkeys and measuring human perceptual abilities with psychophysical methods, we also use theoretical approaches and functional brain imaging.

Using these techniques, we have been able to elucidate how motion information is represented in primate cortical area MT and how attention changes that representation and correspondingly the percept of the visual environment.

Selected Recent Publications

Treue S, Maunsell JHR (1996) Attentional modulation of visual motion processing in cortical areas MT and MST. Nature 382 (6591): 539-541

Treue S, Martinez Trujillo JC (1999) Feature-based attention influences motion processing gain in macaque visual cortex. Nature 399 (6736): 575-579

Treue S, Hol K, Rauber HJ (2000) Seeing multiple directions of motion - Physiology and psychophysics. Nature Neuroscience 3 (3): 270-276

Martinez-Trujillo JC, Treue S (2002) Attentional modulation strength in cortical area MT depends on stimulus contrast. Neuron 35: 365-370

Treue S (2001) Neural correlates of attention in primate visual cortex. Trends in Neurosciences 24 (5): 295-300

Martinez-Trujillo JC, Treue S (2004) Feature-based attention increases the selectivity of population responses in primate visual cortex. Current Biology 14: 744-751

Womelsdorf T, Fries P, Mitra PP, Desimone R (2006) Gamma-band synchronization in visual cortex predicts speed of change detection. Nature 439: 733-736

Andreas Wodarz

Professor of Stem Cell Biology

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

Address

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

37077 Göttingen
Germany

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

Major Research Interests

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

Selected Recent Publications

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

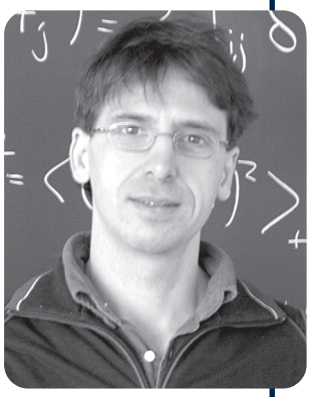
Wodarz A (2005) Molecular control of cell polarity and asymmetric cell division in *Drosophila* neuroblasts. Curr Opin Cell Biol 17: 475-481

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

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

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

Fred Wolf



Address

Department of Nonlinear Dynamics
Max Planck Institute for Dynamics and Self-Organization
Bunsenstr. 10

37073 Göttingen
Germany

phone: +49-551-5176 423
fax: +49-551-5176 409
e-mail: Fred-WL@NLD.DS.MPG.de

Further Information

http://www.chaos.gwdg.de

Research Group Leader at the Max Planck Institute for Dynamics and Self-Organization

- Head of the Research Group „Theoretical Neurophysics“, Department of Nonlinear Dynamics, Max-Planck-Institut für Strömungsforschung, Göttingen, since 2004.
- Visiting Scholar, Kavli Institute for Theoretical Physics, UC Santa Barbara (USA), Fall 2001, 2003, 2004
- Research Associate, Max-Planck-Institut für Strömungsforschung, Göttingen, 2001 - 2004
- Amos de Shalit Fellow, Racah Institute of Physics and Interdisciplinary Center for Neural Computation, Hebrew Univ., Jerusalem (Israel), 2000
- Dr. phil. nat., J.W. Goethe Universität, Frankfurt , 1999

Major Research Interests

- Theoretical neuroscience and nonlinear dynamics
- Dynamics and synchronization in cortical neural networks
- Function and development of the visual cortex
- Sensory processing in the auditory system

The brains of humans and animals arguably are among the most complex systems in nature. Over the past decade, theoretical neuroscience - the use of quantitative theories, mathematical modelling and advanced quantitative data analysis methods for the study of brain function - has started to provide powerfull new approaches for understanding the neuronal basis of preception, learning, memory, and other higher brain functions. This is because, even during the neuronal processing of the most elementary sensory stimulus large ensembles of interacting nerve cells distributed throughout the brain are activated, the collective operations of which are often hard to understand by means of purely qualitative reasoning.
The primary focus of our research in theoretical neuroscience is self-organisation in the dynamics of cortical networks. In particular, we have developed novel approches to model and predict the dynamics and and neuronal plasticity of the visual cortex. To quantitatively connect theory and experiment in this system, we recently also designed methods that enable to quantify the organization of visual cortical functional architecture with high precision. Another important focus of our work is the mathematical analysis of the dynamics of large and complex networks of pulse-coupled neuron models. The concepts and tools for the representation of the dynamics of cortical circuits developed enable a rational and transparent design of models of higher cortical functions such as the processes underlying perceptual learning phenomena.

Selected Recent Publications

Wolf F, Naundorf B, Volgushev M (2006) Unique features of action potential initiation in cortical neurons. Nature 440(7087)

Wolf F (2005) Symmetry, Multistability, and Long-Range Interactions in Brain Development. Phys. Rev. Lett., 95: 208701

Naundorf B, Geisel T, Wolf F (2005) Action potential onset dynamics and the response speed of neuronal populations. Journal of Computational Neuroscience, 18(3): 297-309

Wolf F (2005) Symmetry Breaking and Pattern Selection in Visual Cortical Development. Methods and Models in Neurophysics, Les Houches, Session LXXX, 2003, p. 575-639, Chow CC, Gutkin B, Hansel D, Meunier C, Dalibard J (eds.), Elsevier

Zumdieck A, Timme M, Geisel T, Wolf F (2004) Long chaotic transients in complex networks. Phys. Rev. Lett., 93: 244103

Timme M, Wolf F, Geisel T (2004) Topological speed limits to network synchronization. Phys. Rev. Lett., 92: 074101

Denker M, Timme M, Diesmann M, Wolf F, Geisel T (2004) Breaking synchrony by heterogeneity in complex networks. Phys. Rev. Lett., 92: 074103

Privatdozent, Group Leader Cell Biophysics Group at the European Neuroscience Institute

- Dr. (Ph. D.) 1997, Faculty of Chemistry, University of Utrecht, The Netherlands
- Postdoctoral fellow, Imperial Cancer Research Fund (ICRF), London UK, 1997 - 2000
- Postdoctoral fellow, European Molecular Biology laboratory (EMBL), Heidelberg, 2000 - 2001
- Appointed as group leader at the European Neuroscience Institute, Göttingen 2001
- PD (habilitation) 2006, Physiology, Göttingen University

Major Research Interests

The focus of our research is the regulation and role of the neuronal cytoskeleton in the modulation of neuronal shape and motility during chemotactic processes. The growing neuronal growth cone probes its environment for the chemical composition of its substrate and the presence of neighbouring cells. The former information is sampled by cell adhesion receptors in focal adhesion structures that, next to their sensing function also perform a structural function in that they provide the cell with a means to exert force on its substrate. We are primarily interested in the signal transduction processes that regulate these effects and the cross-talk between the different motility systems.
The main interest areas in this question are; 1. The role and molecular mechanism of lipid raft-resident cell adhesion molecules in the remodelling of the membrane cytoskeleton, 2. Dynamic control of growth cone protein content by local proteolysis and chaperone function during chemotactic responses, 3. Role and mechanism of the neuronal exocyst complex as critical landmarks for dendritic/axonal neuritogenesis.
Our group has a related interest in the pathophysiological mechanism of neurodegeneration by intracellular aggregation of the tau protein, as occurs in Alzheimer's disease. As tau is an intrinsically unstructured protein that can undergo remarkable conformational changes upon binding to microtubules and in the Alzheimer-related aggregation condition, it presents an ideal model system for the biophysical analysis of protein conformational change and protein interactions.
Our research depends on the development and application of advanced microscopy techniques, primarily; fluorescence lifetime imaging microscopy (FLIM), and Förster resonance energy transfer (FRET) microscopy, in combination with a range of GFP-based optical biosensors and novel bioconjugation approaches for organic dyes, and protein biochemical/molecular biological techniques to resolve and quantify biochemical reactions and conditions in living cells.

Address

Cell Biophysics Group
European Neuroscience Institute
Waldweg 33

37073 Göttingen
Germany

phone: +49-551-39 12368
fax: +49-551-39 12266
e-mail: fred.wouters@gwdg.de

Further Information

http://www.eni.gwdg.de/index.php?id=103

Selected Recent Publications

Liman J, Ganesan S, Dohm CP, Krajewski S, Reed JC, Bähr M, Wouters FS, Kermer P (2005) Interaction of BAG1 and HSP70 mediates neuroprotectivity and increases chaperone activity. Mol Cell Biol 25: 3715-3725

Esposito A, Gerritsen HC, Wouters FS (2005) Fluorescence lifetime heterogeneity resolution in the frequency domain by Lifetime Moments Analysis (LiMA). Biophysical Journal 89: 4286-4299

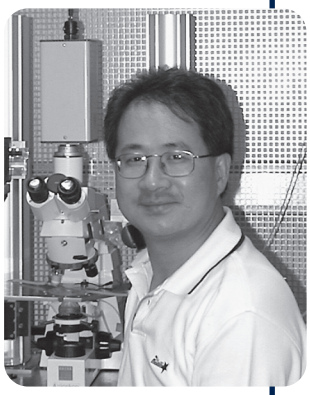
Ganesan S, Ameer-beg SM, Ng T, Vojnovic B, Wouters FS (2006) A dark yellow fluorescent protein (YFP)-based Resonance Energy Accepting Chromoprotein (REACh) for efficient FRET with GFP. Proc Natl Acad Sci USA 130(11): 4089-4094

Esposito A, Gerritsen, HC, Oggier T, Lustenberger F, Wouters FS (2006) Innovating lifetime microscopy: a compact and simple tool for the life sciences, screening and diagnostics. J Biomed Optics 11(3): 34016

Iliev AI, Ganesan S, Bunt G, Wouters FS (2006) Removal of small pattern-breaking stretches in microtubule-binding repeats produces instantaneous Tau aggregation and toxicity. J Biol Chem in press

Iliev A & Wouters FS (2006) Application of simple photobleaching microscopy techniques for the determination of the balance between anterograde and retrograde axonal transport. J Neurosci Methods in press

Weiqi Zhang



Address

Center of Physiology
and Pathophysiology
University of Göttingen
Humboldtallee 23

37073 Göttingen
Germany

phone: +49-551-39 3767
fax: +49-551-39 4178
e-mail: wzhang1@gwdg.de

Further Information

http://www.gwdg.de/~wzhang1/

Privatdozent, Neurophysiology

- Dr. med. (M. D.) University of Bonn, 1987
- Internship, Department of Neurology, University of Bern, Switzerland, 1988
- Postdoctoral fellow, Department of Physiology, University of Bern, Switzerland, 1989 - 1994
- Postdoctoral fellow, Department of Physiology, University of Oxford, UK, 1993
- Postdoctoral fellow, The Nobel Institute of Neurophysiology, Karolinska Institute, Stockholm, Sweden, 1994 - 1996
- Research Group Leader, Center of Physiology and Pathophysiology, University of Göttingen, since 1997
- Habilitation, University of Göttingen, 2003

Major Research Interests

The neuronal developmental disorders associated with Rett syndrome, the classic autism and other autistic spectrum diseases (ASD) are correlated with a disruption of functional synaptic maturation during postnatal development. Such developmental dysregulation causes cognitive, social and motor retardations. Most ASD patients achieve normal developmental milestones until 6-18 months of age when they enter a period of regression with loss of acquired cognitive, social and motor skills. The main interest of our research group is to analyze disease-related changes of the expression of receptor subunits, the properties of ion-channels and dysfunction synaptic transmission within intakt neuronal network in mutant mice models, such as MECP2, neuroligin, neurexin and neurobeachin mutants. Using an integrative approach, we aim to clarify the functional consequences of identified molecular disturbances in functional synaptic maturation and identify the changes in neuromodulation. In addition, we elucidate the potency of various strategies of protection and restoration including pharmacotherapies using the mutant mice models for ASD.

Selected Recent Publications

Ritter B, Zhang W (2000) The $GABA_A$-mediated inhibition matures during first postnatal week in brain stem of mouse. European Journal of Neuroscience 12: 2975-2984

Zhang W, Barnbrock A, Gajic S, Pfeiffer A, Ritter B (2002) Differential ontogeny of $GABA_B$ receptor-mediated pre- and postsynaptic modulation of GABA and Glycine transmission in respiratory rhythm-generating network of mouse. The Journal of Physiology 540(2): 435-446

Missler M, Zhang W, Rohlmann A, Kattenstroth G, Hammer R, Gottmann K, Südhof TC (2003) α-Neurexins are Required for Coupling Ca^{2+}-Channels to Synaptic Vesicle Exocytosis. Nature 423: 939-948

Zhang W, Rohlmann A, Sargsyan V, Aramuni G, Hammer R, Südhof TC, Missler M (2005) Extracellular domains of α-neurexin are important for regulating synaptic transmission by selectively affecting N- and P/Q-type Ca^{2+}-channels. Journal of Neuroscience. 25(17): 4330-4342

Varoqueaux F, Aramuni G, Rawson R, Mohrmann R, Gottmann K, Zhang W, Südhof TC, Brose N (2006) Neuroligins control synaptic function and network activity but not synaptogenesis. Neuron 51: 741-754

Graduate Program Committee

Prof. Dr. Nils Brose
PD Dr. Gabriele Flügge
Prof. Dr. Ralf Heinrich
PD Dr. Swen Hülsmann
PD Dr. E. Ponimaskin
Prof. Dr. Tobias Moser
Prof. Dr. Dr. Detlev Schild
Dr. Fred Wouters
Dr. Jürgen Klingauf
Christoph Anacker
Stephan Junek

Program Coordination

Neuroscience Program

Prof. Dr. Michael Hörner
(Program Coordinator)

Sandra Drube
(Program Assistant)

Coordination Office
Neurociences
European Neuroscience Institute
Georg-August-Universität
Grisebachstraße 5

37077 Göttingen
Germany

phone:
+49 – 551 – 39 12307 / 91244
fax:
+49 – 551 – 39 12308
e-mail:
gpneuro@gwdg.de

Further Information:
http://www.gpneuro. uni-goettingen.de

Molecular Biology Program

Dr. Steffen Burkhardt
(Program Coordinator)

Ivana Bacakova
(Program Assistant)

Index

Notes

Coordination Office
Neurociences
European Neuroscience Institute
Georg-August-Universität
Grisebachstraße 5

37077 Göttingen
Germany

phone:
+49 – 551 – 39 12307 / 91244
fax:
+49 – 551 – 39 12308
e-mail:
gpneuro@gwdg.de

Further Information:

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