JAN 2012

MOLECULAR BIOLOGY NEWSLETTER

Georg-August-Universität Göttingen · International Max Planck Research School

Welcome message

The year 2011 was defined by the university-wide preparations for the renewal proposals of the German Excellence Initiative in all three funding lines: the institutional strategy of the university, the cluster of excellence, and our graduate school GGNB. The proposals were submitted in August 2011 and defended in December/January.

The group presenting the GGNB renewal proposal in Berlin

Characteristic of the Göttingen Spirit, fostering creativity in research and teaching, is the close cooperation of university and non-university scientists on the Göttingen Research Campus. The successful development of the MSc/PhD program and International Max Planck Research School Molecular Biology can certainly be considered one of the driving forces for the *Science without Boundaries* concept, for the major reforms towards structured doctoral education at the university, and for the successful start of GGNB. In accordance with the institutional strategy of the university, future measures taken by the graduate school and its programs will include reforms towards a seamless educational path from BSc to PhD, and a qualification program for postdoctoral scientists.

The Faculty of Biology launched a new Bachelor's program in Biochemistry last fall. Furthermore, the Master's programs "Microbiology and Biochemistry" and "Developmental, Neural and Behavioral Biology" were closely connected to GGNB through facilitated admission procedures and a fast-track option, following the model of the Molecular Biology and Neuroscience programs.

We would like to thank Ivo Feußner for nine years of dedicated work as director of the Molecular Biology program. The program highly appreciates his tireless commitment and contribution. Congratulations to Jörg Stülke for the election as new program director and Stefanie Pöggeler as a new member of the program committee.

Many thanks also to the PhD student organizers of the 2011 Horizons meeting and the Career Fair. Once again, our students managed to invite outstanding scientists. In a modified concept, the scientific sessions were grouped along the increasing complexity from the molecular to the systems level, and "Connectomics" - a new speed-dating session to promote communication between PhD students and senior scientists was integrated into the meeting.

The Horizons organizers 2011

CONTENT

Ivo Feußner, Jörg Stülke, Stefanie Pöggeler

Beyond these topics, this newsletter reports on the latest scientific discoveries by both alumni of the first Molbio student generation and PhD related research projects. A new section on academic careers is introduced, illustrating the different career paths of our PhD graduates in science. As in previous newsletters, our current and former students also report about their personal experience outside academia and the daily challenges of combining family and science.

Jörg Stülke, Reinhard Jahn, Steffen Burkhardt

How many letters are there in the genome?

It was the year 1953 when Watson and Crick wrote these famously modest words in their Nobel-prize winning article on the structure of the DNA "This structure has novel features which are of considerable biological interest". Including the experimental work of Wilkins and Franklin they deciphered the arrangement of the four basic letters in the genome and laid a strong foundation for the future biomedical sciences.

One of the less abundant letters in DNA, 5-methylcytosine (5mC), was found as early as 1925 but its biological relevance in humans was uncovered only in the 1970s. 5mC accounts for ~1% of all the bases and affects almost 80% of CpG dinucleotides. Exceptions are the so-called CpG islands or CGIs (CpG-rich regions that are present in 60% of all gene promoters), which are mostly unmethylated. A significant number of CGIs can be subjected to progressive aberrant methylation in certain cell types in cancer and ageing. Global DNA demethylation is observed in primordial germ cells and in fertilized eggs and is necessary for the erasure of the genomic imprints and return of the embryonic genome to totipotency and thus for correct embryonic development. Methylation reprogramming is deficient in iPS (induced pluripotent stem) cells and cloned embryos. Therefore, understanding the mechanism of DNA demethylation is key to regenerative medicine.

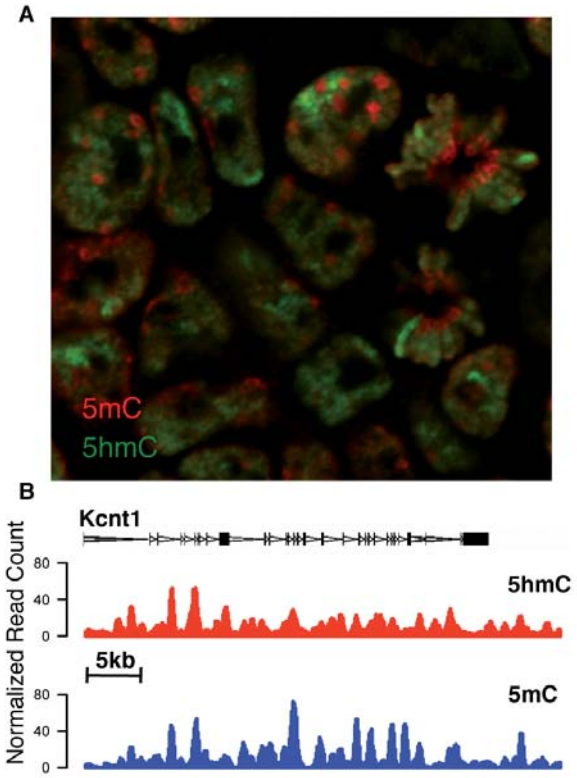


Fig. 1: Distribution of 5-hydroxymethylcytosine in the mouse genome. (A) Immunofluorescence co-staining of mouse embryonic stem cells with antibodies against 5hmC (green) and 5mC (red). (B) Examples of enrichment of 5mC and 5hmC at a genomic region on Chromosome 2.

The enzymes responsible for generating 5mC are known but it has been a longstanding unsolved question as

PhD-related Publications 2011 (PhD students of the Molecular Biology program in bold type)

Aggarwal S, **Yurlova L**, Simons M (2011) Central nervous system myelin: structure, synthesis and assembly. Trends Cell Biol 21(10):585-93

Aggarwal S, **Yurlova L**, Snaidero N, Reetz C, Frey S, Zimmermann J, Paehler G, Janshoff A, Friedrichs J, Mueller D, Goebel C, Simons M (2011) A size barrier limits protein diffusion at the cell surface to generate lipid-rich myelin-membrane sheets. Dev Cell 21(3):445-456

Alkhaja AK, Jans DC, **Nikolov M**, Vukotic M, **Lytovchenko O**, Ludewig F, Schliebs W, Riedel D, Urlaub H, Jakobs S, Deckers M (2012) MINOS1 is a conserved component of mitofilin complexes and required for mitochondrial function and cristae organization. Mol Biol Cell 23(2):247-257; Epub 2011, Nov 23

Balija M, Griesinger C, Herzig A, Zweckstetter M, Jaeckle H (2011) Pre-fibrillar alpha-synuclein mutants cause Parkinson's disease-like non-motor symptoms in *Drosophila*. PLoS One 6(9)

to what removes this epigenetic mark. After a number of reports where experiments could not be reproduced in other labs and lack of a generally accepted mechanism, the enzyme Tet1 (ten-eleven translocation 1) was found in 2009 to oxidize 5mC to 5-hydroxymethylcytosine (5hmC) leading to a potential mechanism of DNA demethylation.

5hmC was also identified in DNA more than 30 years ago, but for many years it was thought to be a product of oxidative damage. It was only in 2009 that 5hmC was accurately quantified in the human brain and mouse embryonic stem (ES) cells. 5hmC accounts for ~0. 1% of all the bases, being more abundant in ES cells and brain compared to other cell types.

We wanted to dissect the role of this new base and its potential epigenetic function and started by mapping 5hmC in the mouse genome using high throughput sequencing methods. We were one of the first to map 5hmC in mouse ES cells and during differentiation of ES cells into embryoid bodies (structures that differentiate *in vitro* and resemble the tissues in the developing mouse embryo). Even though it is a lowly abundant letter, it is spread throughout the genome and, using functional studies in ES cells, we found a number of pluripotency related genes that are downregulated upon loss of 5hmC by lack of oxidation of 5mC.

Research on 5hmC has increased rapidly since and recently other authors have identified further oxidation species like 5-formylcytosine (5fC) and 5-carboxycytosine (5caC), adding another two letters to the genome. These are thought to be intermediates in the demethylation of 5mC but were nonetheless found to be stable modifications in the zygote, albeit at very low levels. It is unknown whether 5fC and 5caC have epigenetic roles.

The challenge for the future will be to sequence genomic DNA at single nucleotide resolution using upcoming technologies (Nanopore and SMRT sequencing) that should allow direct sequencing of virtually every possible letter in the genome.

Gabriella Ficz did her PhD with Donna Arndt-Jovin at the MPI for Biophysical Chemistry. She graduated from the Molecular Biology program in July 2005. Presently, she is a postdoctoral research fellow at the Babraham Institute, Cambridge, UK.

These results were published in Nature, 2011, 473: 398-402.

Boldajipour B, Doitsidou M, **Tarbashevich K**, Laguri C, Yu S, Ries J, Dumstrei K, Thelen S, Doerries J, Messerschmidt E, Thelen M, Schwille P, Brand M, Lortat-Jacob H, Raz E (2011) Cxcl12 evolution - subfunctionalization of a ligand through altered interaction with the chemokine receptor. Development 138(14):2909-2914

Bug M, Dobbelstein M (2011) Anthracyclines induce the accumulation of mutant p53 through E2F1-dependent and -independent mechanisms. Oncogene 30(33):3612-3624

Burkhardt P, **Stegmann C**, Cooper B, Kloepper T, Imig C, Varoqueaux F, Wahl M, Fasshauer D (2011) Primordial neurosecretory apparatus identified in the choanoflagellate *Monosiga brevicollis*. Proc Natl Acad Sci USA 108(37):15264-15269

Denker A, Bethani I, Kröhnert K, Körber C, Horstmann H, Wilhelm B, **Barysch S**, Kuner T, Neher E, Rizzoli S (2011) A small pool of vesicles maintains synaptic activity *in vivo*. Proc Natl Acad Sci USA 108(41):17177-17182

Treating neurodegeneration: a novel approach

Enzyme block in immune cells benefits mouse models of Alzheimer's and Huntington's diseases

Treating neurodegeneration has been a frustrating enterprise. No drugs stop the progression of the diseases, and diseases, such as Alzheimer's disease (AD) or Huntington's disease (HD) have proven to be extraordinarily complicated. Paul Muchowski's lab decided to take a different approach to HD that subsequently had significant implications for AD. Paul used an unbiased genetic yeast screen to identify genes that modify the toxicity of mutant huntingtin (mHtt). mHtt results from an autosomal dominant mutation and causes HD in humans. They found kynurenine 3-monooxygenase (KMO, an enzyme of the kynurenine pathway or KP), as a putative hit. Essentially, KMO deletion suppresses mHtt toxicity.

The KP, the main tryptophan degradation pathway, had previously been linked to Alzheimer's and Huntington's diseases. It is activated in immune cells

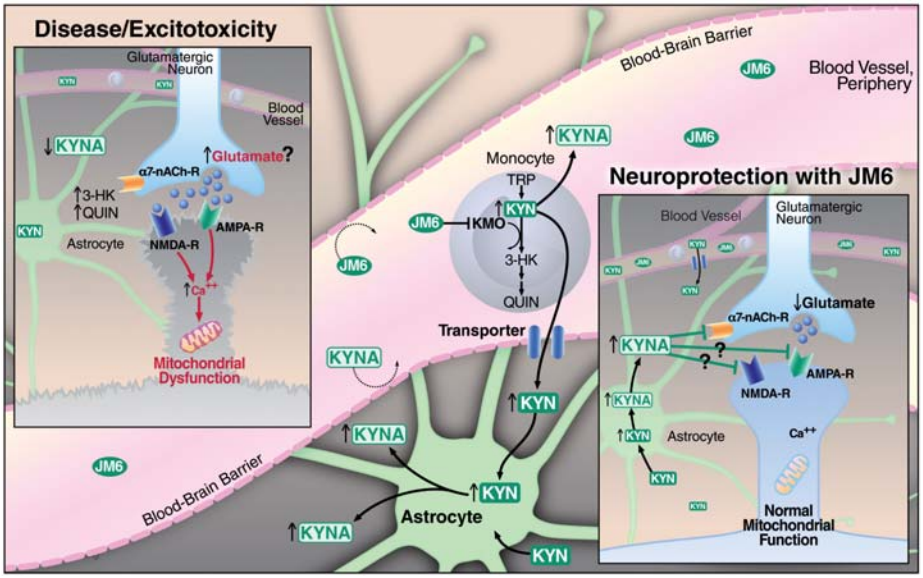


Fig. 1: A model illustrating the mechanism by which KMO inhibition in blood cells leads to elevated brain KYNA levels and neuroprotection. In neurodegenerative diseases like HD and AD, increased levels of the toxic kynurenine pathway metabolites 3-HK and QUIN and decreased levels of the neuroprotective KYNA might contribute to increased glutamatergic neurotransmission, elevation of intracellular calcium levels, mitochondrial dysfunction, and ultimately neuronal dysfunction/cell death. We hypothesize that the biotransformation of JM6 to Ro 61-8048 in the gut (not shown) results in KMO inhibition in peripheral monocytes, causing the accumulation of kynurenine (KYN) in blood. KYN is then actively transported into the brain, where it is converted by astrocytes to KYNA. KYNA released from astrocytes mediates neuroprotection, at least in part, by decreasing glutamate levels via antagonism of presynaptic $\alpha 7$ nicotinic acetylcholine receptors (inset "Neuroprotection with JM6"). At high local concentrations KYNA might also directly block glutamate receptors.

Denker A, Kröhnert K, Bückers J, Neher E, Rizzoli S (2011) The reserve pool of synaptic vesicles acts as a buffer for proteins involved in synaptic vesicle recycling. Proc Natl Acad Sci USA 108(41):17183-17188

Flórez LA, Gunka K, Polanía R, Tholen S, Stülke J (2011) SPABBATS: A pathway-discovery method based on Boolean satisfiability that facilitates the characterization of suppressor mutants. BMC Syst Biol 5:5

Gailite I, Egger-Adam D, Wodarz A (2012) The phosphoinositide-associated protein Rush hour regulates endosomal trafficking in *Drosophila*. Mol Biol Cell 23(3):433-47; Epub 2011, Dec 7

Griesel G, Krug C, **Yurlova L**, Diaconu M, Mansouri A (2011) Generation of knockout mice expressing a GFP-reporter under the control of the Lmx1a locu. Gene Expr Patterns 11(5-6):345-8

Halbsgut N, **Linnemannstöns K**, Zimmermann LI, Wodarz A (2011) Apical-basal polarity in *Drosophila* neuroblasts is independent of vesicular trafficking. Mol Biol Cell 22(22):4373-9

(e.g., macrophages, monocytes and microglia) upon stress or inflammation. Two of its metabolites are elevated in HD patients: quinolinic acid (QUIN) is associated with NMDA receptor excitotoxicity and 3-hydroxykynurenine (3-HK) is a free radical generator. In contrast, a side arm of the KP produces the neuroprotective kynurenic acid (KYNA), an NMDA- and α7-nicotinic acetylcholine-receptor antagonist, which is decreased in AD and HD patients.

Our approach was to block KMO which sits at a key position in the KP. KMO catalyzes the conversion of kynurenine to the cytotoxic 3-HK (which is converted further down to the excitotoxic QUIN). However, blocking KMO leads to an increased production of the neuroprotective KYNA.

To pharmacologically block KMO we used our novel compound JM6, as a prodrug for a previously characterized KMO inhibitor (Ro 61-8048). Using JM6 helps to overcome limitations of Ro 61-8048 such as metabolic instability and other adverse effects.

JM6 treatment resulted in rescue of memory and anxiety-related behavior in a mouse model of AD. JM6 also improved motor scores and dramatically extended the lifespan in a mouse model of HD. Synapse loss – neuroanatomical hallmark of both diseases – was prevented in both mouse models.

Most interestingly, neither JM6 nor Ro 61-8048 enter the brain! The drug works by blocking KMO in blood cells which send a neuroprotective signal to the brain. Blocking KMO causes an increase of kynurenine (the precursor of 3-HK and KYNA). Kynurenine gets actively transported from the blood into the brain and is then preferentially converted to the neuroprotective KYNA in astrocytes.

More importantly, our findings suggest that there is a pathological mechanism underlying at least two completely different neurological diseases. Targeting the KP may turn out to be a new avenue for a multitude of brain diseases. While there is considerably more work to be done to render JM6 or its derivatives for clinical testing, proof-of-concept has been achieved.

Finally, to our knowledge this is the first example of a drug that prevents neurodegeneration without crossing the blood brain barrier, but by solely acting on peripheral immune cells.

Daniel Zwilling did his PhD with Reinhard Jahn at the MPI for Biophysical Chemistry. He graduated from the Molecular Biology program in 2005. Presently, he is a postdoctoral research fellow at the Gladstone Institute of Neurological Disease, UCSF, USA.

These results were published in Cell, 2011, 145(6): 863-874

Helmstaedt K, Schwier E, Christmann M, **Nahlik K**, Westermann M, Harting R, Grond S, Busch S, Braus G (2011) Recruitment of the inhibitor Cand1 to the cullin substrate adaptor site mediates interaction to the neddylation site. Mol Biol Cell 22(1):153-164

Herzog E, Nadrigny F, Silm K, **Biesemann C**, Helling I, Bersot T, Steffen H, Schwartzmann R, Naegerl UV, El Mestikawy S, Rhee JS, Kirchhoff F, Brose N (2011) *In vivo* imaging of intersynaptic vesicle exchange using VGLUT1Venus knock-in mice. J Neurosci 10(31):15544-59

Hoon M, **Soykan T**, Falkenburger B, Hammer M, Patrizi A, Schmidt K, Sassoe-Pognetto M, Loewel S, Moser T, Taschenberger H, Brose N, Varoqueaux F (2011) Neuroligin-4 is localized to glycinergic postsynapses and regulates inhibition in the retina. Proc Natl Acad Sci USA 108(7):3053-3058

Hoopmann P, Rizzoli SO, Betz WJ (2012) Imaging synaptic vesicle recycling by staining and destaining vesicles with FM dyes. Cold Spring Harb Protoc 2012(1):77-83

Hoopmann P, Rizzoli SO, Betz WJ (2012) FM dye photoconversion for visualizing synaptic vesicles by electron microscopy. Cold Spring Harb Protoc 2012(1):84-6

Synaptic vesicle recycling *in vivo*

Investigation of vesicle use in ten different living animal models

Have you ever observed how fast a zebrafish flaps its fin or how often a frog jumps? You will probably say a few times per second. Nevertheless, when performing *in vitro* studies on dissected muscle preparations to investigate synaptic transmission, neuroscientists often use much higher stimulation frequencies, such as 30 Hz or more.

Many important aspects of synaptic function have been elucidated by such experiments, but it is not always evident whether these results reflect the *in vivo* situation. For instance, whereas virtually all synaptic vesicles can be forced to participate in transmission by fusing with the plasma membrane, releasing their neurotransmitter content into the synaptic cleft and then being retrieved from the membrane under such strong stimulation conditions in most preparations, it is unknown how many vesicles are used by a behaving animal.

In my PhD project, I therefore investigated vesicle use *in vivo* in ten different model organisms (ranging from insects and nematodes over fish, amphibians and birds to mammals) by injection of a fluorescent marker of vesicle recycling. The injected animals were then allowed to behave freely for a defined

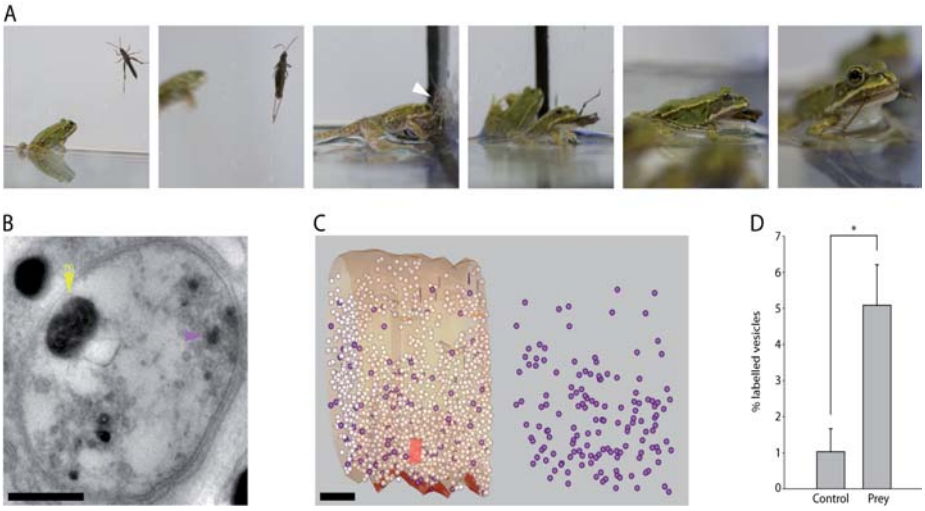


Fig. 1 (from Denker et al., PNAS, 2011): (A) Hunted locust experiment. Locusts injected with a vesicle recycling marker were placed into a terrarium occupied by three or four frogs. After several failed capture attempts (white arrowhead in panel three; the head of the frog is behind the locust), each locust was eventually caught and ingested. (B) Exemplary electron micrograph from a muscle synapse of the third pair of legs of a hunted locust. Purple arrowhead indicates example labeled vesicle, yellow arrowhead indicates mitochondrium. Scale bar: 400 nm. (C) 3D reconstruction of muscle synapse. Scale bar: 300 nm. (D) Percentage of labeled vesicles (four to eight preparations, means ± SEM; $P < 0.05$, t test).

Jessen D, Olbrich A, Knüfer J, Krüger A, Hoppert M, Polle A, Fulda M (2011) Combined activity of LACS1 and LACS4 is required for proper pollen coat formation in *Arabidopsis*. Plant J; Epub 2008 May 21

Kari V, **Shchebet A**, Neumann H, Johnsen SA (2011) The H2B ubiquitin ligase RNF40 cooperates with SUPT16H to induce dynamic changes in chromatin structure during DNA double-strand break repair. Cell Cycle 10(20):3495-504

Knoell R, Linke W, Zou P, Miocic S, Kostin S, Buyandelger B, Ku C, Neef S, **Bug M**, Schaefer K, Knoell G, Felkin L, Wessels J, Toischer K, Hagn F, Kessler H, Didie M, Quentin T, Maier L, Teucher N, Unsoeld B, Schmidt A, Birks E, Gunkel S, Lang P, Granzier H, Zimmermann W, Field L, Faulkner G, Dobbelstein M, Barton P, Sattler M, Wilmanns M, Chien K (2011) Telethonin deficiency is associated with maladaptation to biomechanical stress in the mammalian heart. Circ Res 109(7):758

Krumova P, Meulmeester E, Garrido M, Tirard M, Hsiao H, Bossis G, Urlaub H, Zweckstetter M, Kuegler S, Melchior F, Baehr M, Weishaupt J (2011) Sumoylation inhibits alpha-synuclein aggregation and toxicity. J Cell Biol 194(1):49-60

time interval. At different times after injection (ranging from 10 minutes to 4 hours), the organs of interest were dissected, fixed and photo-oxidized, a technique that allowed me to determine the number of vesicles used by electron microscopy (EM).

Photo-oxidation takes advantage of the production of reactive oxygen species by excited fluorescent dyes and the subsequent oxidation of the membrane-permeant substrate 3,3'-diaminobenzidine to transform the fluorescent signal into an electron-dense precipitate. I found that for all preparations and animal models investigated, only a handful (~1-5%) of vesicles were used over several hours.

Of course, one might argue that the animals we studied were quite relaxed and that the remaining vesicle population would form a "reserve", which would be used if an animal was exposed to maximal stress. We therefore wanted to reproduce a physiologically relevant situation that would result in maximal stress.

We took advantage of the fact that one of the muscles we had studied before, located in the third pair of legs of the locust, coordinates the animal's escape mechanism – jumping away. Therefore, we injected locusts as before, and two hours after injection, we placed them individually into a terrarium occupied by three or four frogs (Figure 1). The locusts tried to escape from their predators, but were all eventually (after on average ~5-10 minutes) caught and ingested. We then retrieved the locusts from the stomachs of the frogs and fixed and photo-oxidized the muscle of interest to learn how many vesicles had been used under the stress of predation.

Surprisingly, the locusts had still used only ~5% of their vesicles. 95% of the vesicles had therefore not been used even under such extreme stress.

I conclude that only a small active subpopulation of vesicles undergoes recycling *in vivo*. The question whether these vesicles differ in their molecular composition from the resting vesicle population remains to be elucidated.

Annette Denker did her PhD with Silvio Rizzoli at the European Neuroscience Institute Göttingen. She graduated from the Molecular Biology program in November 2011 and will assume a postdoctoral position at the Salk Institute, La Jolla, USA in summer 2012.

These results were published in PNAS, 2011, 108:17177-17182.

Liu S, **Ghalei H**, Luehrmann R, Wahl M (2011) Structural basis for the dual U4 and U4atac snRNA-binding specificity of spliceosomal protein hPrp31. RNA 17(9):1655-1663

Luo L, **Hannemann M**, Koenig S, Hegermann J, Ailion M, Cho M, Sasidharan N, Zweckstetter M, Rensing S, Eimer S (2011) The *Caenorhabditis elegans* GARP complex contains the conserved Vps51 subunit and is required to maintain lysosomal morphology. Mol Biol Cell 22(14):2564-2578

Moutty M, **Sakin V**, Melchior F (2011) Importin alpha/beta mediates nuclear import of individual SUMO E1 subunits and of the holoenzyme. Mol Biol Cell 22(5):652-660

Nikolov M, Stützer A, Mosch K, Krasauskas A, Soeroes S, Stark H, Urlaub H, Fischle W (2011) Chromatin affinity purification and quantitative mass spectrometry defining the interactome of histone modification patterns. Mol Cell Proteomics 10:M110.005371

Papadopoulos T, Soykan T (2011) The role of collybistin in gephyrin clustering at inhibitory synapses: facts and open questions. Front Cell Neurosci 5:11

A molecular sieve generating the lipid-rich insulator

Oligodendrocytes employ a physical barrier to generate lipid-rich myelin

Myelin is a membrane of vital importance for the central nervous system. It is formed by oligodendrocytes that spirally wrap their plasma membrane several times around an axon (Fig. 1A). This lipid-rich (more than 70% of the dry weight) and highly condensed membrane can act as an insulator for efficient impulse conduction. The insulation is broken periodically at regular intervals to give rise to the so-called nodes of Ranvier (Fig. 1A). Electrical impulses jump from one node to the other, thereby speeding up the nerve conduction by several folds.

Although the unique composition of myelin has been a subject of study for decades, the mechanisms that generate this lipid-rich membrane are not known. Bulk of myelin is composed of compacted myelin (Fig. 1A, membrane in green color) where the two bilayers are closely opposed to each other, separated from non-compacted regions that contain more cytosol (Fig. 1A, membrane in red color). *In vivo*, when myelin is wrapped around an axon,

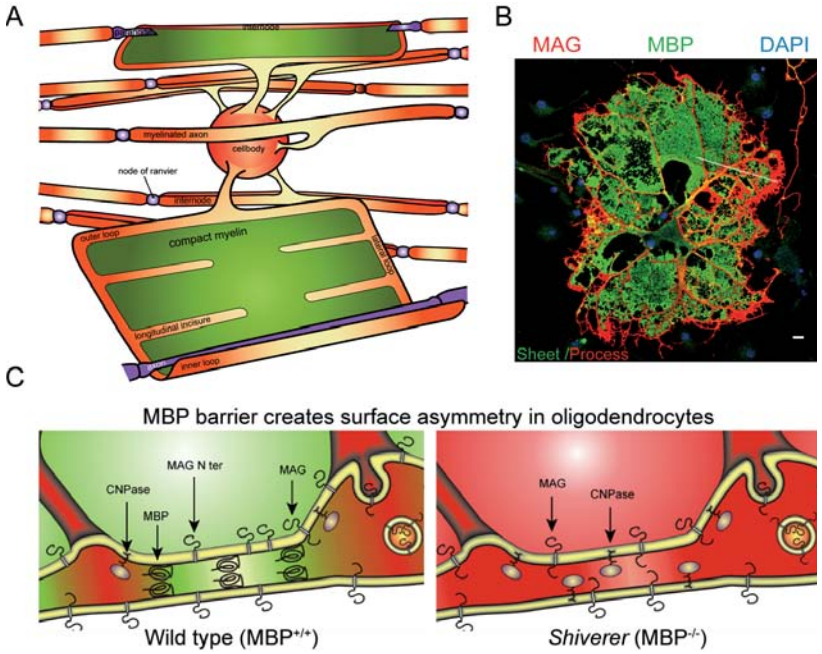


Fig. 1: (A) Myelin membrane is shown in its unwrapped stage. The membrane is polarized into compact (green) and non-compact myelin (red) membrane domains. (B) A cellular model of cultured oligodendrocytes that polarize their membrane during differentiation and extend flat, MBP positive, myelin-membrane sheets from which non-compact myelin proteins like MAG are excluded. (C) MBP associates with the two bilayers in the sheets and forms a diffusion barrier, restricting the entry of membrane proteins with bulky cytosolic domains. This polarity is lost in MBP deficient Shiverer cultures where membrane proteins can enter into the sheets without any size restriction.

Peradziryi H, Kaplan N, Podleschny M, Liu X, Wehner P, Borchers A, Tolwinski N (2011) PTK7/Otk interacts with Wnts and inhibits canonical Wnt signalling. EMBO J 30(18):3729-3740

Peradziryi H, Tolwinski NS, Borchers A (2012) The many roles of PTK7: A versatile regulator of cell-cell communication. Arch Biochem Biophys, Jan 3; Epub ahead of print

Ribic A, Fluegge G, Schlumbohm C, Maetz-Rensing K, Walter L, Fuchs E (2011) Activity-dependent regulation of MHC class I expression in the developing primary visual cortex of the common marmoset monkey. Behav Brain Funct 7:1

Rosberg-Cody E, **Liavonchanka A**, Goebel C, Ross R, O'Sullivan O, Fitzgerald G, Feussner I, Stanton C (2011) Myosin-cross-reactive antigen (MCRA) protein from *Bifidobacterium breve* is a FAD-dependent fatty acid hydratase which has a function in stress protection. BMC Biochem 12:9

Schulz C, **Lytovchenko O**, **Melin J**, Chacinska A, Guiard B, Neumann P, Ficner R, Jahn O, Schmidt B, Rehling P (2011) Tim50's presequence receptor domain is essential for signal driven transport across the TIM23 complex. J Cell Biol 195(4):643-56

these polarized domains can only be resolved by electron microscopy.

To visualize the compact and non-compact myelin sub-domains by light microscopy, we took advantage of the fact that oligodendrocytes are able to expand flat membrane sheets, when cultured in the absence of neurons (Fig. 1B). We confirmed that composition of these membrane sheets resembles the compacted myelin *in vivo*. The sheets contain little cytosol that was mainly restricted to the processes. Similarly, compact myelin proteins like myelin basic protein (MBP) localized to the sheets, while the non-compact myelin proteins like myelin associated glycoprotein (MAG) were found in the processes.

MBP is an intrinsically unstructured protein that gains secondary structure upon electrostatic interaction with negatively charged lipids, namely phosphatidylserine (PS) and phosphatidylinositol-4,5-bisphosphate (PIP2) that are normally present in the inner leaflet of the two bilayers. Using the model system of cultured oligodendrocytes, we show that MBP forms a molecular sieve that controls the diffusion of proteins into the compact myelin. Our results show that MBP creates a physical barrier through which proteins can cross, only based upon the size of their cytosolic domains. We could demonstrate that a non-compact membrane protein like MAG can enter into the sheets, if we reduce the length of its cytosolic domain to less than 30 amino acids. Consistent with MBP forming a size barrier, we observe that in oligodendrocyte culture from MBP deficient (Shiverer) mice, any membrane protein gains access into the sheets. Thus, by restricting the entry of most proteins into the sheets, MBP defines a pre-condition for the formation of a lipid-rich membrane. This finding also establishes a new mechanism of how a cell is able to regulate the lipid to protein ratio in its membrane. Our study shows that basic questions in myelin biogenesis can be studied with this simplified model system which is easy to manipulate.

Shweta Aggarwal

Shweta Aggarwal is a PhD student of the Molecular Biology program in the group of Mikael Simons, University of Göttingen Medical School and MPI for Experimental Medicine.

Larisa Yurlova also did her PhD with Mikael Simons. She graduated from the Molecular Biology program in July 2010. Presently she is working as an R & D scientist at ChromoTek GmbH, Martinsried, Germany.

These results were published in Dev Cell, 2011, 21:445-56 and in Trends Cell Biol, 2011, 21:585-93.

Tarbashevich K, **Dzementsei A**, Pieler T (2011) A novel function for KIF13B in germ cell migration. Dev Biol 349(2):169-178

Wehner P, **Shnitsar I**, Urlaub H, Borchers A (2011) RACK1 is a novel interaction partner of PTK7 that is required for neural tube closure. Development 138(7):1321-1327

Yee N, **Ribic A**, de Roo C, Fuchs E (2011) Differential effects of maternal immune activation and juvenile stress on anxiety-like behaviour and physiology in adult rats: No evidence for the „double-hit hypothesis". Behav Brain Res 224(1):180-188

Yurlova L, Kahya N, **Aggarwal S**, Kaiser HJ, Chiantia S, Bakhti M, Pewzner-Jung Y, Ben-David O, Futerman AH, Brügger B, Simons M (2011) Self-segregation of myelin membrane lipids in model membranes. Biophys J 101(11):2713-20

New Students

Master‘s class 2011/12

Gurneet Braich, Canada
BSc from University of Calgary

Kolja Eckermann, Germany
BSc from Georg-August-Universität Göttingen

Muna Ayesha Khan, India
BSc from Sri Venkateswara College, University of Delhi

Mahdokht Kohansal Nodehi, Iran
MSc from Tarbiat Modares University, Tehran

Dragomir Milovanovic, Serbia
BSc from University of Belgrade

Lena Musiol, Germany
BSc from Leibniz University Hannover

Sabin Prajapati, Nepal
BSc from Universal Science College / Pokhara University

Emmanuel Reyna González, Mexico
BSc from Universidad Nacional Autónoma de México (UNAM), Mexico City

Katja Rust, Germany
BSc from Georg-August-Universität Göttingen

Evgeniia Samoiliuk, Russian Federation
BSc from St. Petersburg State Polytechnical University

Katharina Seitz, Germany
BSc from University of Würzburg

Heena Sharma, India
MSc from University of Delhi

Sumana Sharma, Nepal
BSc from Jacobs University Bremen

Anita Smarandache, Romania
BSc from Jacobs University Bremen

Sven Truckenbrodt, Germany
BSc from University of Würzburg

Kanika Vanshylla, India
BSc from Sri Venkateswara College, University of Delhi

Arturo Vera Rodríguez, Mexico
BSc from Instituto Politécnico Nacional, Unidad Profesional Interdisciplinaria de Biotecnología (UPIBI-IPN), Mexico City

Laura Winters, Germany
BSc from University of Bremen

Agata Witkowska, Poland
BSc from Warsaw University of Life Sciences

Olena Zaitseva, Ukraine
MSc from “Kyiv-Mohyla Academy” National University, Kiev

Applications 2011

In the year 2011, the Molecular Biology program received 522 applications from 62 countries.

Germany 31
other Western Europe 23
Eastern Europe 48
North America 18
Central/South America 33
Africa 78
Asia 291

PhD projects started in 2011

Metin Aksu
Anchorage of N/Q rich nucleoporins into NPC.
D. Görlich, P. Rehling, R. Lührmann

Marta Gião Carneiro
Molecular recognition kinetics using NMR spectroscopy.
C. Griesinger, J. Enderlein, T. Grüne

Ibrahim Ömer Çiçek
Role of micro RNA in germ cell development.
H. Shcherbata, A. Wodarz, R. Dosch

Akanksha Goyal
Translation initiation in eukaryotes.
M. Rodnina, H. Krebber, H. Neumann

Veena Jagannathan
Stress signaling pathways in the cellular response to nucleoside analogues.
M. Dobbelstein, W. Kramer, H. Reichardt

Maria Levchenko
Mitophagy - Mechanisms and components at the organelle.
P. Rehling, B. Schwappach, S. Jakobs

Ewa Maj
Analyzing canonical *versus* non-canonical Wnt signaling in neural crest migration and differentiation.
A. Borchers, A. Wodarz, H. Hahn

Simone Mayer
Molecular mechanisms of collybistin-dependent gephyrin clustering at inhibitory synapses.
N. Brose, R. Jahn, B. Schwappach

Jonathan Melin
Import of presequence-containing precursor proteins into mitochondria.
P. Rehling, I. Feußner, C. Griesinger

Momchil Ninov
Purification and characterization of proteins in active zones and vesicle docking.
R. Jahn, H. Urlaub, S. Rizzoli

Sona Pirkuliyeva
Structural and functional elucidation of the primary transducing module of the B cell antigen receptor.
J. Wienands, S. Johnsen, H. Urlaub

Kundan Sharma
Quantitative MS-on immune defense system of prokaryotes and MS monitoring of protein-RNA and protein-protein interaction within CRISP-cas system.
H. Urlaub, J. Stülke, P. Rehling

Upadhyayula Sai Srinivas
The phosphatase regulator NIPP1 in the response to replicative stress.
M. Dobbelstein, W. Kramer, H. Reichardt

Ingrid-Cristiana Vreja
Investigation of protein number and function relationship in the secretory pathway.
S. Rizzoli, R. Jahn, B. Schwappach

External MSc projects

Victor Bustos Parra
supervised by Linda Partridge, MPI for Biology of Ageing, Cologne, Germany

Paola Kuri
supervised by Francesca Peri, EMBL, Heidelberg, Germany

Ines Rudolf
supervised by Angelika Eggert, Universitätskinderklinik, Essen, Germany

Students
Graduated

The Masters of 2011

Ahmed AbdElSamad (A. Mansouri)
MicroRNA role in the regenerating pancreas of the mouse.

Maximilian Fünfgeld (J. Stülke)
The development of a web based platform to visualize the protein-protein interaction network in *Bacillus subtilis*.

Kevser Gencalp (D. Görlich)
Biochemical analysis of the actin nuclear export complex.

Akanksha Goyal (M. Rodnina)
Intragenic suppressor mutation helps bypassing the requirement for GTP hydrolysis by IF2 during translation initiation.

Christian Hoffmann (H. Neumann)
New methods to elucidate chromatin assembly.

Lena Hyatt (W. Fischle)
Functional and molecular analysis of *C. elegans* LIN-61/ H3K9me3 interaction.

Veena Jagannathan (M. Dobbelstein)
The kinase MK2 in the response of leukemic cells to Ara-C-treatment.

Seol-hee Joo (M. Göpfert)
The role of trpml in hearing of *Drosophila melanogaster.*

Simone Mayer (N. Sestan, Yale University, New Haven, CT, USA)
Linking the expression pattern of ANKRD32 to the evolution and development of the neocortex.

Jonathan Melin (P. Rehling)
Transport of presequence-containing precursor proteins into mitochondria.

Danesh Moradi Garavand (M. Kessel)
Molecular control of cell cycle regulators by Mad2l2.

Rafik Tarek Neme Garrido (D. Tautz, MPI for Evolutionary Genetics, Plön)
Phylostratigraphic analyses of mouse tissue transcriptomes and comparative genomics of orphan genes.

Momchil Ninov (Y. Yarden, Weizmann Institute of Science, Rehovot, Israel)
Studying mechanisms of EGF-induced microRNA turnover.

Reejuana Parveen (M. Rodnina)
Active role of tRNA in decoding.

Paula Perin (S. Pöhlmann, Hannover Medical School)
Proteolytic activation of influenza A virus by type II transmembrane serine proteases.

Jennifer Seefeldt (D. Görlich)
Towards the reconstruction of recombinant eukaryotic translation initiation factor 3 (eIF3) from *Triticum aestivum*.

Upadhyayula Sai Srinivas (M. Dobbelstein)
NIPP1 and Wip1 - two regulators of protein phosphorylation and their impact on the DNA damage response.

Congwei Wang (A. Spang, Biocenter Basel, Switzerland)
Are mRNAs targeted for destruction to PBs under various stresses?

Miriam Weiss (M. Dobbelstein)
Interaction of the p53 ubiquitin ligase Mdm2 and the epigenetic repressor EZH2.

Halenur Yavuz (R. Jahn)
In vitro investigation of the effect of NSF/alpha SNAP and Munc18-1 on SNARE complex assembly pathway intermediates.

The Doctors of 2011

Katharina Ahmann (née Hoppe)
The production of VLCPUFAs in plants.
Ivo Feußner, Michael Thumm, Henning Urlaub

Christoph Bredack
Genetic targeting and analysis of parvalbumin and VGLUT3 expressing inhibitory neurons.
Sonja Wojcik, Erwin Neher, Ahmed Mansouri

Fatma Esra Demircioglu
Comparative studies on regulation of SNARE complex formation by the SM protein Sly1p.
Dirk Fasshauer, Markus Wahl, Stefan Eimer

Annette Denker
Synaptic vesicle recycling *in vivo*.
Silvio Rizzoli, Reinhard Jahn, Klaus-Armin Nave

Dirk Jessen
Impact of specific long chain acyl CoA synthetases on plant development.
Ivo Feußner, Dieter Klopfenstein, Henning Urlaub

Birgit Manno
Molecular mechanism of B cell antigen receptor-induced SHIP activation.
Jürgen Wienands, Andreas Wodarz, Lutz Walter
thesis submitted: Nov 2011
thesis defended: Jan 2012

Hanna Peradziryi
Identification and functional characterization of PTK7-ligands in *Xenopus laevis*.
Annette Borchers, Andreas Wodarz, Reinhard Schuh

Amanda Schalk
Structural and functional characterization of the autophagy proteins Atg5 and Atg16L1 and their interaction partners.
Karin Kühnel, Michael Thumm, Markus Wahl

Andrei Shchebet
Investigations into the regulation of histone H2B monoubiquitination.
Steven Johnsen, Heidi Hahn, Markus Wahl

Tolga Soykan
Neuroligin 2 induced allosteric transition of collybistin underlies inhibitory postynaptic differentiation.
Nils Brose, Andreas Wodarz, Dieter Klopfenstein

Switzerland - PhD studies at ETH

Ex-Molbio adventures in Zurich

A 23-year old Molbio graduate arrived in Zurich for a PhD from the headquarters of Swiss super-nerds, ETH Zurich. It turned out that working at ETH was the least stressful part of my day. Without Steffen and with horrific housing in Zurich, I had one long year ahead of me.

Super-nerds in action. Stoffel lab, ETH.

After migrating between shady WGs for one year (Switzerland has no student housing and no Steffen), I finally ended up in a pleasant central neighborhood. My flatmate, like the rest of Zurich, works for a bank. Off-science: this week we turned our common room into a British-style bar, to the great joy of my flatmate's colleagues. Now I have a question. Are they the mature individuals, who, with great expertise in investment and profound respect take care of our money in the banks? These guys? Seriously?? Have to withdraw my 10 CHF (9 EUR) of savings, cannot trust these people! It is indeed better to avoid social contacts to your doctor, your lawyer and your banker.

Now, Zurich. With high density of finance, re-insurance and consulting institutions, Zurich is populated by creatures of high finance. That allows either plenty of networking opportunities or inspirational encounters with slightly intoxicated financiers. The country's fascination with finance is reflected in numerous business schools, offering evening classes. Into one of them I am looking with particular interest. Oh, I forgot to mention: The alps are in 50-min driving distance and the city is on the lake with sailing or speed-boats for rent. That is if you are sporty (unlike me) or too mature for Zurich's high-glam crowd (unlike me).

But I really got carried away! Now, science!

Obscene surplus of Swiss franc is financing two big ETH campuses, one of which reminds me of Fassberg flooded with Swiss cash from offshore banking. With true Swiss efficiency, the universities of Zurich have joined their forces, creating an excellent infrastructure and numerous opportunities to network with fellow PhDs or students from other fields, such as architecture, art and law. On the campuses, students have access to facilities sufficiently equipped to fully satisfy their nerdy nature. ETH employees receive help from well-trained and overpaid staff whose only daily pleasure is to assist new PhD students at the live-cell imaging station.

ETH offers many post-degree career opportunities through numerous workshops and wide alumni network. Companies like Novartis, Roche and Boston Consulting periodically appear on the campus, give away chocolate cookies and brag about their job opportunities to ETH students.

ETH, fueled by Swiss wealth and ambitions of us, super-nerds, regularly invites Nobel laureates, treats itself to retreats in Davos and "strictly business" dinners in central restaurants of Zurich. Now, these boys surely push horizons of human knowledge with style!

Nadia Kondratiuk graduated from the Molecular Biology Master's Program in April 2010. She did her Master's thesis in the lab of Ahmed Masouri at the MPI for Biophysical Chemistry. Shortly after she started her PhD thesis at ETH Zurich in the group of Markus Stoffel.

Beyond the mountains, the lakes and the cows

"*Grüezi wohl*!" people greet in Switzerland. While I finally learned in Göttingen that I should say "*Moin*" for salutation, I had to wash that away and try to pick up more words like "*En Guete*" (*bon appétit*) or "*Merci vielmal*" (many thanks) – Swiss German lesson one.

After my PhD study on exosome formation in cell biology, I decided to change my research field completely to investigate the evolution of feedbacks in a regulatory network – a topic in systems/synthetic biology. I joined Prof. Becskei's group as a postdoctoral fellow in University of Zürich in 2010. I stayed in Zürich for slightly more than one year and moved again with the whole group to Biozentrum, University of Basel in 2011.

I've almost forgotten how complex it had been for me to move from Taiwan to Germany. The challenges came back again, although this time the distance wasn't that far. My first shock began before I was in Zürich. Not only is the rent high, but it is also extremely difficult to find an apartment. Some people spend several months to get a place to stay. Most of the objects will only open the door for visit for one or two days and there will be tens of people on the spot. Therefore the apartment application is even more serious than the job application – people send all their private information to get the chance. In Zürich, it is the apartments who choose. I was very lucky at the end to get one which was urgently to let from a friend's friend's friend, literally.

The second shock was, as one can imagine, the price. In addition to the deposit and the first rent for my flat, which emptied my bank account, I brought around 200 Swiss francs on my first day in Zürich and they were gone in two days! The food, the transport and the administrative fees are all very expensive. However, considering the salary-to-living-expense ratio, Switzerland has nice conditions for scientists.

One might think people in Germany and in the German speaking regions in Switzerland are similar, since they speak the same language. The argument is already wrong: they do speak differently. The words, the numbers, the pronunciation and even the grammar, all have "local specialties." The differences don't only lie in the language. Some said, "Swiss people are more German than the Germans," describing their demand on exactness. People start to complain when a train is late for two or three minutes and the train conductor will apologize for the delay. On the other hand, Swiss people tend to be more indirect than the Germans. It can be rude if the expression is too straightforward.

Chieh and the Aletsch Glacier at Jungfraujoch

The two cities where I stayed in Switzerland, Basel and Zürich, always compete with each other: the football teams, the banks, the airports, etc. As a "fair" foreigner, I was asked several times to compare them. In my opinion, people are more friendly and talkative when they meet the first time in Basel and the atmosphere is more international and intercultural in Zürich. Both cities have their charms and I have a lot of fun to live in the "tale of two cities." The only slight disturbance was that each city has its own policy, including the immigration rules, which led to some extra administrative works when I moved.

Of course, apart from being an observer, I also travel in the country and enjoy it very much. Switzerland has wonderful landscapes to be explored. The mountains are beautiful in all seasons, surrounding the clean and peaceful waters: lakes, rivers and the glaciers. At work, it is tough yet exciting for me to acquire new abilities to do research in an unfamiliar field. Luckily, I have supportive international colleagues in the group and the Biozentrum, similar to the MPIs, is a very compact and well equipped research unit. However, I believe that the tiny details in everyday life deepen my thought and broaden my mind. The ones in Göttingen did, and the ones in Switzerland will also do.

Chieh Hsu did his PhD with Mikael Simons at the MPI for Experimental Medicine. He graduated in February 2010 and moved to the University of Zurich to join the group of Attila Becskei. In 2011, the entire group moved to Biozentrum Basel. In the same year, he received a postdoctoral Long-Term Fellowship by the Human Frontier Science Program.

Lingfei's career started in Göttingen

Developmental Biology at Southwest University in Chongqing, China

After I received my PhD degree from the Molecular Biology program and International Max Planck Research School in October 2004 and kissed the Gänseliesel, I first continued my research as a postdoctoral research fellow in the developmental biology research group of Michael Kessel at the Max Planck Institute for Biophysical Chemistry. Subsequently, I moved to the University of California, San Francisco for a second postdoctoral period to study pancreas development in zebrafish.

Lingfei Luo in his lab at Southwest University, Chongqing

In early 2008, I took advantage of the opportunity that the School of Life Sciences at the Southwest University in China was attracting faculty members in order to establish a new department of developmental biology and became an associate professor. Since then, I successfully organized a 973 Grant in 2008 and became the chief scientist of this grant (similar to the chief scientist of an SFB grant in Germany). Furthermore, I obtained the National Science Fund for Distinguished Young Scholars in 2009.

In the beginning of 2010, I was appointed as the Director of the Department of Developmental Biology on a full and permanent professor's position. By now, there are four young faculty members working in my department. The department currently possesses the largest zebrafish facility in West China and a number of core facilities including a two-photon microscope, a confocal microscope, a cell sorter, a mass spectrometer, etc.

Lingfei Luo receiving the Gruss-Jäckle prize

Using zebrafish as the model system, my research interests are genetics and epigenetics of organogenesis and regeneration. Currently I am focusing on vasculature as well as endodermal organs, in particular liver and pancreas.

When I am asked how my time in Göttingen helped me to pursue my academic career, I remember that I felt always very lucky that I had joined the Molecular Biology program in Göttingen. It is also a great honor for me to belong to the first generation of Molbio students, to be the first Molbio student who published in Nature, and to be the first Molbio student who received his PhD degree from this program. A particular highlight was the award of the Gruss-Jäckle Prize in 2004 for innovative scientific ideas and distinguished scientific publications.

In Göttingen I had received the best scientific as well as technical training. What I have learned in Göttingen is indispensable to my whole career. I would say, and I am proud of saying it, that my entire scientific career started in Göttingen, in "our program"

Lingfei Luo was the first PhD student who graduated from the Molecular Biology program in October 2004. He is a developmental biologist and currently holds a permanent professor's position at Southwest University in Chongqing, China.

Nutritional research in Aberdeen

Aberdeen is more than just the oil capital of Europe

Since January 2009 I have worked at the Rowett Institute of Nutrition and Health (RINH), which is part of the University of Aberdeen in Scotland. Aberdeen lies on the East coast of Scotland and the city and Shire have the best of both worlds: the sea on one side, and mountains of the Grampian region with the Cairngorms National Park on the other side. This location allows unlimited (almost) opportunities for outdoor activities with amazing views! However, for any outdoor activity, waterproofing is essential!

The RINH is a Scottish Research Institute specialising in nutrition research. Topics including gut health, obesity and metabolic health as well as lifelong health are being addressed. Part of the research here and most positions, including mine are funded by the Scottish Government. Therefore the main research topics are discussed with and agreed by the Scottish Government's Rural and Environment Science and Analytical Services Division. External funding supplements research that cannot be funded by the core funding. So writing grant applications is important.

The group that I am working in has an interest in micronutrients. My research mainly revolves around the effects of iron-deficiency, one of the most common nutritional deficiencies worldwide, frequent even in developed countries. Iron deficiency is most prevalent in pregnant women and the consequences can affect both the mother and her child. Therefore, part of our studies focuses on the effect of iron deficiency in the context of pregnancy and the consequences for lifelong health of the offspring. We also aim to find ways to improve the iron status of the general population by trying to understand how the uptake of iron from the gut is influenced by the presence of other nutrients (micro- and macronutrients) in the context of meal composition and which foodstuffs are most likely to improve a person's iron status.

Christine Kennedy

I am involved in the practical part of work in the current projects, as well as the supervision of undergraduate and PhD students. However, the emphasis of my work is slowly but steadily moving away from practical work, and I seem to be more and more busy working at my desk. I was really excited to get this position, as the research is not only interesting, but the post is permanent and gives me the opportunity to develop my own research area within the group.

The topic I am working on now is quite a change from what I did during my PhD in Göttingen (how *Toxoplasma gondii* infection alters the hosts immune response), or from my postdoc position in Dundee at the MRC Protein Phosphorylation Unit (Nod2 signalling in the context of Crohn's disease). It requires knowledge in physiology, developmental biology, nutrition, and metabolism.

The broad background knowledge I gained during my participation in the Molecular Biology Program in Göttingen, both the theory and the practical aspects, were very useful during the transitions between different research topics.

Christine Kennedy (née Lang) belonged to the first cohort of students in the Molecular Biology program. She did her PhD with Uwe Groß at the University of Göttingen Medical School and graduated from the Molecular Biology program in May 2005. After a first postdoctoral fellowship in Dundee, Christine now holds a permanent staff position at the Rowett Institute of Nutrition and Health at the University of Aberdeen in Scotland.

From science to business consulting

Moving from the inner workings of cells to the inner workings of corporations

„What did you like most about science?" That's what I call an easy interview question: list the benefits of the MolBio program and summarize my PhD time at the lab of Jörg Stülke. But in this way, the interviewer cleverly managed to catch me off-guard for his follow-up question: „So, why do you want to work for the Boston Consulting Group?"

Lope Andrés Flórez Weidinger

It's a start from scratch, at least at first glance. My new job is about helping managers of big corporations decide the best course of action for the years to come. I moved from reading Nature papers to financial reports. I ditched protein-protein interactions for compounded annual growth rates and distribution channels. I switched from sitting in front of the computer all day long doing models of bacterial metabolism to… sitting in front of the computer all day long doing a financial model in an Excel sheet, which calculates the profit margin of the company depending on different scenarios.

It almost feels like nine years of scientific education served nothing. But make no mistake. A training as a scientist is a great asset when working in a business setting. There is probably little use for the MAP-kinase pathway or a Ramachandran plot. But the acquired skills are directly transferable: working in a structured and systematic way, splitting a complex problem into manageable tasks, finding motivation under difficult situations, wanting to understand the reason behind things, asking clever questions and debating based on facts.

As long as you bring the curiosity, the business knowledge can be acquired relatively fast. This is especially the case when you work closely in a team of highly motivated people from very different backgrounds and years of cumulative experience. Sooner than I would have expected I was already interviewing global experts or key employees and condensing information from many different sources into a coherent PowerPoint story: the knowledge needed to make an informed strategic decision.

There is certainly a change in life style. It sometimes feels like someone has pushed a hidden „fast-forward" button and now everything happens twice as fast. Projects are relatively short and filled with interim deadlines. Flexibility is the name of the game: lots of travel, every day new tasks and challenges, constantly having to get up-to-speed in new topics faster than you do a PCR.

But it is an exciting pace and an unmatched opportunity to glimpse into an intriguing complex system – the business world.

Why quit science to move to business consulting? There is no standard answer, there are only individual wishes. My wish is to discover every day something I didn't know existed. Grow further in skills that will be critical in the future. And eventually find the best company… where I can start again from scratch.

Lope Flórez Weidinger
did his PhD in the lab of Jörg Stülke in the Department for General Microbiology on systems biology in *Bacillus subtilis*. He graduated from the Molecular Biology program in 2010. Currently, he is a consultant at the Stuttgart office of the Boston Consulting Group.

Seeking refuge from the ivory tower

The first steps into a pharmaceutical start-up company in Denmark

Don't work on Sundays. One day you'll come to the lab to see all doors broken and all the stuff gone. And they always take good stuff. Like your laptop. Well, that only means I'm getting a new one next week. Here in biotech money is spent a bit easier.

EpiTherapeutics ApS, Copenhagen

Some half year ago I was sitting in the lab with a defended thesis and no clue what to do further. Applications need to be prepared. The standard "blah-blah-blah" from motivation letters suddenly had to be put into practice, no matter what. The boss of my lab was a nice guy (and hopefully still is - hi Steve!) and offered me a half-year position. But at this point you clearly feel that your salary becomes a favor. So, when he tells you that there is a position god knows where to work on god knows what you don't ask for time to think about it. You just go there to figure it out yourself.

And then a little miracle happens. You suddenly realize that all the words you used to hear about high-level education, elite program, international environment, outstanding research groups and excellent scientists are actually somewhat true. And that biotech bosses from a different country are impressed by what the Molbio program has made of you. Sufficiently impressed to hire you.

That's how one day I found myself in Copenhagen working for EpiTherapeutics ApS. 15 employees, little lab, big ambitions and a clear understanding that in 2-3 years I am going to need a new job (small companies don't live long). No cultural shock whatsoever, another language, a bit weird money, nice people. More or less like Germany (if you are Danish, forgive me, I know you hate to hear that but it's true).

After converting the salary into Euros don't start jumping around picturing yourself in a black Porsche. Learn about their tax system first. Get used to not being able to tell anyone about your research. One sentence in your contract guarantees you a two year sentence in jail.

Don't try to save money doing the experiments. Never. Ever. The time always costs more. Be ready to present your progress to big bosses every two weeks. Yes, there has to be some progress every two weeks. At least you've been trained to give good presentations in Göttingen, right? Don't relax and don't panic. You are not losing your time... anymore. There is a break now to really plan the future. It's not so frightening. It's getting real.

Tomorrow I'll have to talk to the police officer explaining how I found all this mess and what exactly was stolen. Little fun. Don't work on Sundays. You're not paid for that.

Andrei Shchebet did his PhD in the Molecular Oncology group of Steve Johnsen. He graduated from the Molecular Biology program in April 2011. Currently, he works at EpiTherapeutics ApS in Copenhagen, Denmark.

PhD and Paula

I started my PhD in the group of Andreas Wodarz in June 2008, so I was in my second year when I found out in March 2010 that we will have a child. My partner Nils was in the same lab at that time finishing his thesis, which he defended in June. We didn't really

Paula and Karen

plan this case and I couldn't imagine how life as a PhD student with a child will be like.

The first person in the lab I informed was of course my boss and he was really happy about this news. He didn't put any pressure on me at all, e.g. how long I can be on maternity leave, but simply encouraged me to enjoy this time. I cannot imagine anyone being more supportive and I am really grateful about this.

During a dinner in April 2010 I told my colleagues that we will get a lab baby and the first reaction was by my colleague Gang saying "Who?!" because he couldn't believe that I was just trying to tell them that I was pregnant – having a child during the PhD is still rather exotic in Germany.

Fortunately, my work was not too much influenced by the fact that I was pregnant. There were a couple of things that I was not allowed to do anymore due to safety reasons (SDS PAGE, formaldehyde/methanol fixation techniques), but most of my colleagues were very helpful and took over those parts. Concluding, I can say that my scientific output did not suffer too much from being pregnant thanks to a supportive boss and a great team of lab mates. The MolBio program supported me in that way that the deadline for submission of my thesis got extended for the time of parental leave and Steffen kindly provided us his old pram. ☺

In Germany, maternity leave officially starts 6 weeks before the predicted day of delivery. I tried to work less, but in the end I still did quite a bit during this time, because I felt absolutely fine. So I realized a while ago that the last entry in my lab book is from the day before I actually went to the hospital.

On November 8th 2010 our daughter Paula was born and this changed of course everything! I took off six months after birth and during this time I did not do much for my project because taking care of a small child consumes more time, sleep and energy than one can imagine.

For us, it was clear that both parents share the responsibility and take some time off. In April 2011, Nils started his parental leave and during his first month I was also still at home to get a smooth transition. This was a great time for the three of us - we went on vacation to Italy with another family and could do many other activities together. I resumed my work in May 2011 and due to the fact that Nils managed everything at home this was quite easy. My project was not continued during the time I was gone, so I could continue where I stopped working half a year ago.

We were lucky to get a place in the Kinderkrippe from the Studentenwerk and Paula goes there since September 2011. It took about six weeks until she was completely used to it and would spend the full day there. I remember this "acclimatization phase" as being quite tough because Paula was confused and slept extremely badly and this was exhausting for everyone.

To Bremen by bike

Nils started as a PostDoc at the MPI for Experimental Medicine in December and as we don't have any grandparents or other relatives nearby, we need to organize the daily family life according to the opening times of the daycare from 8 am to 4 pm. Usually, Nils takes Paula to the daycare in the morning and I try to be in the lab not later than 7 am and leave at about 3:30 in the afternoon to pick her up.

Of course, I do spend less time in the lab than before I had a child and compared to my colleagues, but I think this

Karen Linnemannstöns
is a PhD student in the Stem Cell Biology Group of Andreas Wordarz at the GZMB, University of Göttingen Medical School.

Dual career with two kids

is easily compensated by self-organization and working efficiently. And it is definitely an advantage that Göttingen is rather small since we don't have to spend much time travelling from work/home to daycare.

It is certainly a challenge to arrange both family and science when both partners work full-time. There is almost no time to relax and I am looking forward to a day when I don't feel tired… However, I never regretted this step because it is incredibly fascinating to watch Paula grow up and develop. Plus, I realized that as a scientist there is probably never a good time to have children as later on in my a career I will most likely have more obligations and responsibilities - so one might as well get them right away!

Another positive aspect of managing both family and a PhD project is that I am not frustrated anymore about failed experiments and unexpected results since I know that there are many more important things in life. I am in the final phase of my PhD now and the fact that I have other things to take care of apart from my work prevents me from turning into a crazy workaholic like many other PhD students at this point do.

For the future there will be many more challenges to deal with, as for example finding positions at the same place and assuring full-day care for Paula and potential future children. But I am positive that we will find solutions for these issues and that we can make the best out of it!

After I defended my thesis in March 2006, I took on a postdoctoral position in plant epigenetics at the University of Nebraska, Lincoln, to work with Dr. Zoya Avramova. My wife Louisa and I moved at the time to Lincoln. It was

Ivan, Louisa, Zoey and Praise

challenging for her as a medical student because she was in the process of doing her clinical rotations, and they were set-up in such a way that she had to fly out for a stretch of 4-6 weeks sometimes to do some rotations out of state.

In spite of the hectic schedule, I had the unique opportunity to have great scientific interactions, learn lots of new things and do some ground-breaking research which has been reported to the scientific community.

By the time my wife got done with the stretch of clinical rotations, we had our first baby, Zoey. She was taken into a residency (specialization) program at the East Carolina University Brody School of Medicine. I was also offered a postdoctoral scholar position at the school of medicine 6 months later, and had an appointment as a research instructor of the Department of Microbiology and Immunology.

We had our second baby, Praise, in October 2011. One of the things I have learned to accept and be willing to do over the last five years, is to have the flexibility to move in order to accommodate the career of my spouse. I know we will certainly move again in a few months to another location in East Carolina, where Louisa has been offered a position to serve as a physician, but the good thing is that, this time, at the cost of driving a few extra miles daily, I get to keep my job at East Carolina University, do more research and make more exciting contributions to the scientific community.

I am ever grateful to the Max Plank Research School Molecular biology program at the University of Goettingen for priming my career in science as a molecular biologist.

Ivan Ndamukong did his PhD with Christiane Gatz in the Department of Plant Molecular Biology and Physiology. He graduated from the Molecular Biology program in April 2006. Currently, he is a postdoctoral research fellow in the Department of Microbiology and Immunology at East Carolina University, Brody School of Medicine.

Science vs art: PhD vs stage

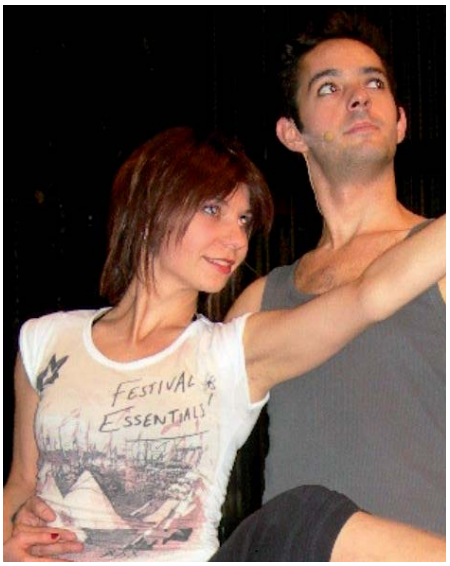
Hi. I am Lena. I am a PhD student in the Simons lab at the MPI-em, and I am a dancer.

... I mount the last coverslip and swiftly leave my lab. There are only 15 minutes left to get to the theater and the ladies in the make-up room hate when you are not on time. Late in the night, after the play, I come back for the imaging session on the confocal ...

The famous musical ‚West Side Story' is performed at the Deutsches Theater Göttingen from September 2011 the whole year long. Around 30 professional dancers and actors are involved, among them 9 semi-profis from Göttingen. Casting was tough: 4 rounds with up to 60 people. It was a challenge for my ego, a test to discover whether I am good enough, whether 12 years of hobby-dancing were any good for me. They were, indeed.

Warm-up to avoid injuries

The rehearsal time was a mess. Art-people have their own feeling of time. For two months, we never were informed before 2 pm whether we had a rehearsal the next day, at what time, and for how long. I suffered a lot, trying to squeeze my completely unpredictable schedule between confocal slots, antibody incubation time, etc. The last two weeks before the first performance were easier: rehearsals every working day from 5 pm to 11 pm.



Repeating moves

Theater life is a lot of fun, after you got used to take it easy and know how to manage your time. Sometimes you just hang around, waiting for your scene: a perfect time to drink a coffee and to read a paper, or to analyze pictures with ImageJ. Often scenes were good one day and completely changed or discarded the day after: directors are moody. There were no protocols for us, no strict rules how to act, but a choreography and people next to you. You learn to feel them,

Repeating moves

behave according to their actions. Of course, professional actors and dancers helped us semi-profis a lot. My colleagues are great, some of them work constantly at Deutsches Theater, many are from Kassel, some even from Berlin, so they need to shuttle for each play.

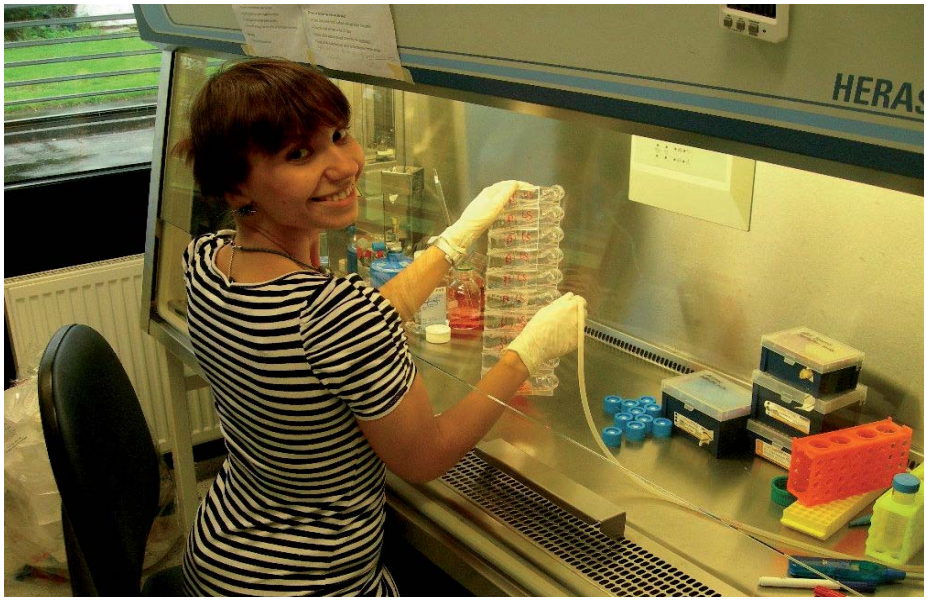
Behind the stage: Jet girls

Theater & Dance

Being on the stage feels incredibly good. Some scenes do evolve from play to play, leaving a space for improvisation, so it is never boring. You are outraging, hating, flirting, laughing according to scenario, but all the senses are real!

I must say, it is not much fun to go to the confocal around midnight, but I am addicted to dance, thus I don‘t want to quit!

First act is over: dancers and actors also need to eat and relax



Daily lab work

After the performance

P.S. Now, after the play has started, we spend only several evenings per month in the theater. In the meanwhile, I am devoting my free time in the evenings to my other passion: Latin-American dancing. The competition season is about to begin, and our team spends up to 10 hours per week practicing. How do I manage to combine science and dancing? I have deep feelings in my heart for both things, and love always finds its way.

Making an ad-trailer - work continues even if the choreographer is injured

Olena Steshenko joined the Molecular Biology program in October 2008. After the first year of courses, she joined the *Drosophila* Neuronal Cell Biology lab of Cahir O‘Kane for an external Master‘s thesis at the University of Cambridge. In May 2010, she started her PhD thesis in the Celllular Neuroscience group of Mikael Simons, University of Göttingen Medical School and Max Planck Institute for Experimental Medicine.

Science keeps the way beyond open

Report about the 61st Nobel Laureate Meeting in Lindau (dedicated to physiology or medicine)

In 1951 the MDs Gustav Parade and Karl Heinz Hein initiated the first Nobel Laureate Meeting in Lindau at Lake Constance in Germany, in order to overcome the isolation of German scientists after World War II. The idea was supported by Count Lennart Bernadotte of Wisborg who, as a member of the Royal Swedish family, had excellent contacts to the Nobel Prize Committee.

Harald zur Hausen

Since then, the small town and its about 25,000 inhabitants welcome Nobel Laureates and young researchers from the fields of medicine or physiology, physics, chemistry, or economics every year to give them a platform for exchange, education and inspiration. By now, even alumni of previous meetings have returned to Lindau as Nobel Laureates themselves.

Last year we had the opportunity to take part in the 61st meeting dedicated to medicine or physiology. 23 Nobel Laureates and 566 young scientists from 78 countries gathered to discuss scientific challenges concerning global health. During the meeting, we had the chance to listen to lectures of the laureates in the morning, meet with other young scientists during the lunch break, and discuss more details with the laureates in small rounds in the afternoon.

Hans Rosling gave one of the most inspiring talks on global health. He discussed correlations between education, population, disease, income, family structure and health. Using the tools provided by www.gapminder.org (certainly worth a visit), he visualized data from the UN, demonstrating that the common classification into developed, newly industrialized and developing countries does not hold true anymore. He classified the world into high (e.g. Germany, Kuwait), middle (e.g. China, Brazil) and low-income countries (e.g. Haiti, Congo) and, not very surprising, life expectancy was found to directly correlate with the income. However, when this data was put into the historic context, it became clear that for instance in 2010 Vietnam had an income comparable to that of the United States in 1870, however they were dealing with the diseases of the US in 1975. Rosling pointed out that all these countries had the methods and education to fight the respective diseases, but just could not afford them. Hence, one of his main messages was that research in the high-income countries should also focus on making health care more affordable for the less privileged.

Another highly inspiring lecture was given by Sir Harold Kroto, who shared the Nobel Prize in 1996 for the discovery of fullerenes. He gave a kaleidoscopic overview of his life, but also of his thoughts on science, religion, education and sustainability. For instance, he elaborated on the question of whether parents should be allowed to bring up their children in the religious belief they consider to be right, while a few minutes later he discussed the meaning of us sharing 70% of our genetic information with pumpkins.

Sir Kroto also presented a very inspiring quote by Walt Whitman, stating that science "keeps the way beyond open" by its "willingness to surrender ideas, when evidence is against them". From such thoughts, Sir Kroto has developed his "4 out of 5 rule", stating that if 4 out of 5 observations fit to your hypothesis, it will ALMOST certainly be right.

Ei-ichi Negishi, Oliver Smithies, Adam Smith, Thomas A. Steitz, and Harald W. Kroto

One of the formats which were newly introduced to the meeting this year was the so-called "Science Masterclass". Here, young scientists had the chance to present their own research to the audience and to a Nobel Laureate. One of the sessions was hosted by Aaron Ciechanover, who shared the Nobel Prize in 2004 for the discovery of the ubiquitin-proteasome system. The talks given by the young researchers focused on Parkinson's disease, diabetes and tuberculosis. In the discussion, Aaron Ciechanover involved the audience by asking about solutions for the problems raised in the talks (e.g., how can one deliver drugs specifically to the target cell and prevent off-target effects). The energetic discussion was very much appreciated by the speakers and the audience, rendering this new format a clear success.

In another format termed "Turning the Tables", the Nobel Laureates were given the opportunity to ask a group of young scientists about their experiences as a young researcher in today's scientific environment. Questions focused for instance on lab atmosphere, working hours, space for creativity and the role of women in science. Once again, it was especially exciting to learn about the different experiences and opinions from young researchers from all over the world.

Besides all those scientific events, there was of course also enough time and place for socializing, e.g. in the Grill and Chill session. For this occasion, the organizers set up a huge barbecue right at Lake Constance. In this very relaxed atmosphere, we could meet other young scientists, the laureates, journalists and also the citizens of Lindau. While the sun was setting, people were engaging in discussions about the latest research and about the meaning of the meeting for the city of Lindau.

On the last day of the meeting, we experienced a special highlight when embarking on a boat trip to the Isle of Mainau. On this trip, our group was joined by the Minister-President of Baden-Württemberg, Winfried Kretschmann. We then convened for a penal discussion on global health at the Castle Meadow on the isle. After a farewell ceremony in front of the castle, the young researchers boarded the boat again to celebrate the extraordinary experience of the Lindau Meeting with a goodbye party.

Annette Denker; Christian Schulz

Annette Denker did her PhD with Silvio Rizzoli at the European Neuroscience Institute and graduated from the Molecular Biology program in Nov 2011 (see also Science Spotlight, p. 7).

Christian Schulz is a PhD student in the group of Peter Rehling, Department of Biochemistry II, University of Göttingen Medical School.

Horizons – Informative. Inspiring. Interactive.

The 8th "Horizons in Molecular Biology" International PhD student symposium, that took place on 14-17th September 2011, was truly a highly communicative meeting that broke down barriers and opened up new horizons for the nearly 200 participants, as well as for the 20 speakers that presented their cutting-edge science.

The organizers of the Horizons 2011 meeting

For the fifth time, a career fair preceded the meeting and offered the possibility for intensive one-on-one contact between participants and companies such as "Bayer Healthcare Pharmaceutical" or "McKinsey&Company". Fascinating insights into alternative career paths were given for example by a forensic scientist, a science photographer and an EMBO reports editor. A panel discussion on "How to start your own research group" set a successful end to a stimulating career fair

The senior scientists who followed the invitation to Göttingen covered a broad range of research areas, as has become customary for Horizons. For instance Ben Hankamer presented his latest work on high-efficiency biofuel systems, Jonathan Weissman shared the extensive opportunities offered by the technique called ribosome profiling and Mikhail Lebedev reported the construction of brain-machine interfaces.

Career fair with PhD alumnus Christian Stegmann, now lab head at Bayer Pharmaceuticals Berlin, and colleagues

As the idea of Horizons is to promote communication between PhD students and senior scientists, a new speed dating session called "Connectomics" was integrated into the meeting. During this session participants had the chance to talk to their favorite speakers in small groups and exchange ideas in a very relaxed atmosphere. Textbook author Harvey Lodish was engaging in even deeper discussions with PhD students during separate lunch meetings with small groups of participants.

Career fair lecture by Jon Yewdell on "How to succeed in science without really trying"

Besides science, "Horizons in Molecular Biology" is also about networking. Therefore many enjoyable social events provide an informal setting for discussions. As this year's pub-crawl coincided with the birthday of the speaker Scott Blanchard, everyone joined in singing "Happy Birthday".

Particularly the "Wine & Cheese" poster session turned into an unforgettable event when the American immunologist Jonathan Yewdell unpacked his saxophone and together with students started a jamming session. The dinner in the auditorium of "Junges Theater"

Connectomics

Closing ranks for Horizons – speakers and participants united

and the subsequent conference party in "JT Keller" completed a row of fantastic social events that made "Horizons" 2011 special.

The upcoming 9th "Horizons in Molecular Biology" symposium will take place 8-11th October 2012 and we, the organizers, are looking forward to welcoming you for this meeting in Göttingen.

Tino Pleiner

see: www.horizons.uni-goettingen.de for further details

Horizons speakers 2011

Molecular level
Scott Blanchard, Matthias Rief, Carol Robinson, Sriram Subramaniam

Cellular level
Jan Ellenberg, Achilleas Frangakis, Jan-Michael Peters, Petra Schwille, Maria Vartiainen, Yosef Yarden

Organismal level
Ana P. Costa-Pereira, Alexander Gottschalk, Mikhail Lebedev, Harvey Lodish, Jon Yewdell

Systems level
Andrew Berry, Ben Hankamer, Bernhard Küster, Kristala Prather, Jonathan Weissman

Molbio, GGNB, courses and networks

When alumni of the Molbio program return to Göttingen, for research collaborations, for the Horizons symposium, or just for visiting friends, they are often amazed at the recent development of their program and its close ties with the other GGNB doctoral programs.

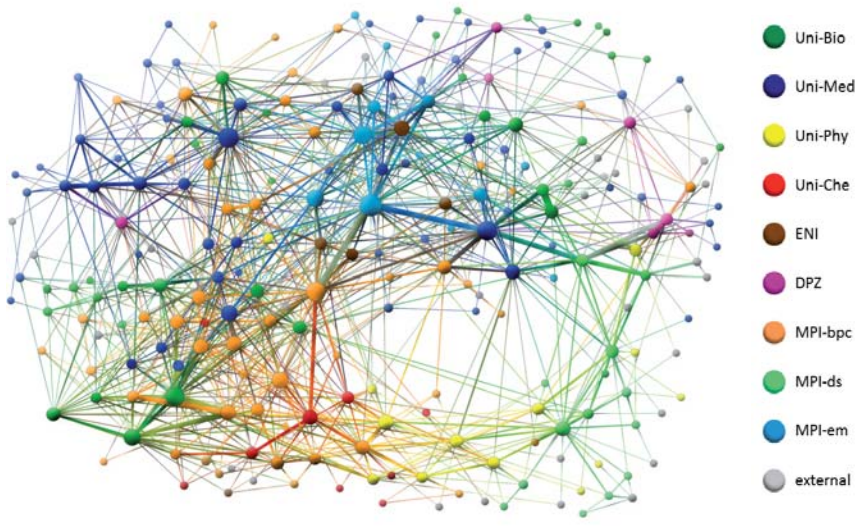
Of course, the Molbio students still appreciate the characteristic features of their program such as the close social network that builds during the Master's year, regular PhD retreats, monthly culture nights, annual Horizons meetings and Career Fairs, or the collaboration with the Weizmann Institute. Unlike ten years ago, however, when the Molbio program was pioneering structured PhD education and tried its novel concepts on a small, international bunch of "guinea pigs", the Molbio students are now part of a much larger scientific network on the Göttingen Research Campus.

The Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences (the careful reader will note that GGNB was renamed to include "biophysics" without changing the acronym) forms a common roof for presently 11 PhD programs, over 400 PhD students, and more than 180 faculty members. 40 percent of the doctoral students of GGNB belong to one of its three International Max Planck Research Schools. By now, GGNB is one of the largest graduate schools in the excellence program of the DFG.

According to the integrated training concept of GGNB, all of its students have free access to the broad spectrum of courses and other activities offered by the school. In the year 2011, GGNB offered 149 short methods courses, 3 extended methods courses, 31 professional skills courses, 19 language courses, and 6 industry excursions. The students can freely select their courses to design the curriculum according to their individual interests and needs.

Besides acquiring new techniques and skills, the PhD students appreciate most that they meet their colleagues in these courses, at the biennial GGNB Science Day and during joint events like the GGNB Summer Games.

However, not only the students benefit from these newly established networks. The GGNB faculty also does. As indicated in the figure below, joint supervision of PhD students in thesis advisory committees connects junior and senior scientists across all participating institutions. It may not come as a big surprise that three of the new DFG collaborative research centers are coordinated by present or former directors of one of the GGNB doctoral programs, reflecting the catalyzing effect of the graduate school on the scientific interaction across the Göttingen Research Campus. StB



Networking in thesis advisory committees. The bullets represent GGNB faculty members (see color code for institutional affiliation) and how they are connected through joint supervision of PhD students (bullet size reflects number of thesis advisory committees).

(Figure by A. Sorge, H. Gutch, C. Menzfeld)

Honors and Awards

Annette Denker was awarded prizes for the best talk at the ScieTalk student congress in Göttingen, and the best poster at the Neurizons 2011 meeting.

Akanksha Goyal was awarded a GGNB Excellence Stipend.

Women‘s careers and networks

The Women’s Careers and Networks Symposium was, for the first time, held in November 2011 - yet another example for a career-related event organized by Molbio and GGNB students. The idea of organizing this meeting was brought up by Annette Denker and H. Broder Schmidt who felt the need to have a career-related event dedicated to female career paths within and outside academia, to build a network beyond the borders of Göttingen, and to increase the visibility of female role models.

A team of GGNB organizing students was quickly found which invested much time, effort and enthusiasm in the realization of the meeting the same year.

The organizers of the WoCaNet Symposium

The idea was supported by the president of the University of Göttingen, Prof. Ulrike Beisiegel, by Prof. Mary Osborn, by the managing director of the MPI-bpc, Prof. Gregor Eichele, and by GGNB (not only through funding but also the committed help by the GGNB coordinator Kirsten Pöhlker).

Participants in the WoCaNet Symposium

The Women’s Careers and Networks Symposium aims at bringing doctoral researchers into contact with women who pursued a successful career in fields such as research, industry, journalism, or science administration. The personal experience of the speakers, how they advanced in their professions, and diversity in life and career concepts are discussed.

After opening lectures by the president of the university and Prof. Osborn, the meeting continued with sessions led by prominent female scientists and managers including Prof. Elisabeth Knust (director at the MPI-cbg Dresden and DFG vice president), Prof. Silvie Klein-Franke (consultant and coach for human resource development and diversity management, Innsbruck), or Dr. Stella Hurtley (senior editor at Science magazine, London). The symposium concluded with an interactive “Networking Dinner”.

The participants consider the first meeting of this kind a great success and hope that it prepared the ground for establishing a lively network. The organization of the next Women’s Careers and Networks Symposium has already started new members to the organizing team are always welcome!

StB

Mandy Hannemann was awarded a poster prize at the 18th International *C. elegans* meeting 2011 in Los Angeles, USA.

Chieh Hsu received a postdoctoral Long-Term Fellowship by the Human Frontier Science Program.

Veena Jagannathan was awarded a poster prize at the Horizons 2011 meeting.

Simone Mayer was awarded a GGNB Excellence Stipend.

Sinem Saka was awarded a Boehringer Ingelheim Fonds PhD stipend.

Avani Shukla was awarded a GGNB Excellence Stipend.

Hanno Sjuts was awarded a poster prize at the Horizons 2011 meeting.

Halenur Yavuz was awarded a GGNB Excellence Stipend.

Daniel Zwilling received the Alzheimer‘s Association award for excellence in Alzheimer‘s research.

New Faculty

Joining the program in 2011

Holger Bastians was appointed as Heisenberg-Professor of Cellular Oncology at the University Medical Center Göttingen (UMG) in 2011. He did his doctoral thesis project at the German Cancer Research Center (DKFZ) in Heidelberg, followed by a postdoctoral fellowship with Joan Ruderman at Harvard Medical School in Boston, USA. From 2000 to 2010, he was group leader at the Institute for Molecular Biology and Tumor Research (IMT) at the University of Marburg, since 2008 as a Heisenberg fellow. His current research focuses on the molecular mechanisms of chromosome segregation during mitosis, the molecular mechanisms of mitosis-associated cell death after chemotherapeutic treatment, and the identification of novel mitotic drug targets in order to improve current therapies and to develop novel therapeutic concepts.

www.uni-goettingen.de/en/216801.html

Boris Goerke is group leader in the Department of General Microbiology at the University of Göttingen, Institute for Microbiology and Genetics. He received his doctoral degree from the University of Freiburg. From 20002 to 2004 he worked as a postdoctoral fellow at the Laboratoire de Chimie Bacteriénne at the Centre National de la Recherche Scientifique (CNRS), Marseille, France. He joined the Department of Microbiology in 2004 and completed his habilitation in microbiology and genetics in 2009. His current research aims to understand the regulatory principles that control and adjust carbohydrate metabolism in bacteria, focusing on post-transcriptional control of gene expression by small regulatory RNAs, and the role of reversible protein phosphorylation in controlling protein activities.

www.uni-goettingen.de/en/164534.html

Tim Grüne is a postdoctoral research fellow with George Sheldrick at the University of Göttingen, Institute of Inorganic Chemistry. He was awarded a joint PhD degree by the European Molecular Biology Laboratory (EMBL) and the Universite Josef-Fourier Grenoble on the „Structural studies on ISWI, an ATP-dependent nucleosome remodeling factor“ in 2003. From 2003 to 2006, he received an EMBO long-term fellowship on „automated building of nucleic acid structures“, followed by a 3-month sabbatical at the Australian Synchrotron. His current research focuses on methods in X-ray and neutron crystallography, automation of model building for nucleic acids, and low resolution model building and refinement. He has participated in the training of Master's and doctoral students of the Molecular Biology program for several years and became an associate member of the program in 2011.

www.uni-goettingen.de/en/264496.html

Till Marquardt leads the Developmental Neurobiology Group at the European Neuroscience Institute Göttingen (ENI-G) since 2007. He did his doctoral thesis project with Peter Gruss at the Max Planck Institute for Biophysical Chemistry in Göttingen. From 2001 to 2006 he was postdoctoral research associate and staff scientist with Samuel L. Pfaff at the Salk Institute for Biological Studies in La Jolla, California, USA. His current research aims at understanding the molecular mechanisms driving the assembly of functional neuromuscular circuitries during embryonic and postnatal development including the study of cell surface-based signaling molecules that control motor and sensory axon connectivity in mice. Another research focus of the lab aims at identifying and characterizing novel mechanisms driving the functional specification of motor neurons within the context of operative neuromuscular circuitry.

www.uni-goettingen.de/en/58005.html

Tobias Moser is research director of the Department of Otolaryngology at the University of Göttingen Medical School since 2007. He received his M.D. from the University of Jena. From 1994 to 1997 he worked as a postdoctoral research fellow with Erwin Neher in the Department of Membrane Biophysics at the Max Planck Institute for Biophysical Chemistry. In 2001 he established the InnerEarLab in the Department of Otolaryngology at the University of Göttingen Medical School. He

is the coordinator of the DFG collaborative research center SFB 889, member of the GGNB managing board, member of the Bernstein Center for Computational Neuroscience managing board and director of the GGNB doctoral program *Sensory and Motor Neuroscience*. His current research focuses on the molecular physiology and pathology of sound encoding at the hair cell ribbon synapse.

www.uni-goettingen.de/en/58009.html

Moritz Roßner leads the Gene Expression Group at the Max Planck Institute for Experimental Medicine since 2003. He did his doctoral thesis project at the Center of Molecular Biology Heidelberg (ZMBH). From 1999 to 2002, he was postdoctoral research associate and project leader at Axaron Bioscience AG, Heidelberg, heading the project group "Novel Technologies". In 2010, he completed his habilitation in developmental and behavioral neuroscience at the University of Göttingen. His research investigates the generation and analysis of transgenic mouse mutants in order to understand individual gene functions in the adult brain, employing mouse genetics, molecular/biochemical and behavioral techniques. His current interest focuses on basic-helix-loop-helix (bHLH) transcription factors and aims at combining mouse models and genetic sensors to better understand the molecular adaptations of gene-environment interactions relevant for psychiatric and neurological diseases.

www.uni-goettingen.de/en/215200.html

Program committee and student representatives

The Molecular Biology program thanks **Ivo Feußner** for his continuous commitment and dedicated work as the director of the Molecular Biology program from 2002 to 2011. He became the director of the newly established Biochemistry Bachelor's program and remains Molbio faculty member.

Congratulations to **Jörg Stülke** for his election as the director of the Molecular Biology program, and to **Stefanie Pöggeler** for being elected as a new member of the Molecular Biology program committee.

We thank **Annette Denker**, **David Haselbach** and **Lena Hyatt**, whose terms as PhD or MSc student representatives ended in 2011.

Welcome to our new student representatives **Kevser Gencalp**, **Simone Mayer** (both PhD students) and **Agata Witkowska** (MSc student)**. H. Broder Schmidt** was recenly elected (together with the *Biomolecules* student Cindy Wechsel) as PhD student representative in the GGNB Managing Board.

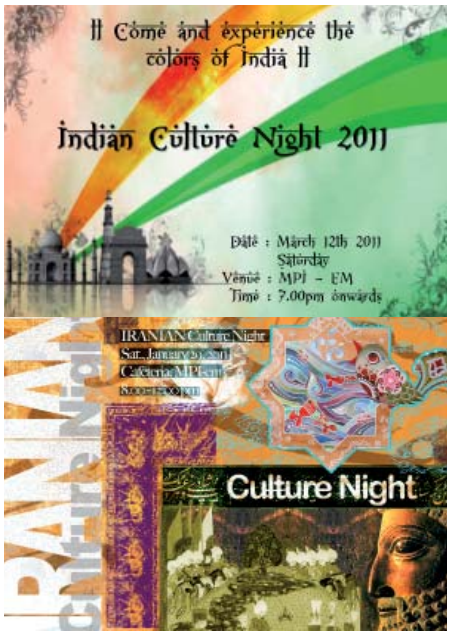
Current faculty members

Mathias Bähr, Holger Bastians, Gerhard H. Braus, Bertram Brenig, Nils Brose, Matthias Dobbelstein,Roland Dosch, Stefan Eimer, Wolfgang Engel, Ivo Feußner, Ralf Ficner, Wolfgang Fischle, Christiane Gatz, Boris Görke, Dirk Görlich, Christian Griesinger, Uwe Groß, Jörg Großhans,Tim Grüne, Heidi Hahn, Claudia Höbartner, Herbert Jäckle, Reinhard Jahn, Steven Johnsen, Michael Kessel, Dieter Klopfenstein, Wilfried Kramer, Heike Krebber, Volker Lipka, Reinhard Lührmann, Ahmed Mansouri,Till Marquardt, Burkhard Morgenstern, Tobias Moser, Klaus-Armin Nave, Erwin Neher, Heinz Neumann, Tomas Pieler, Stefanie Pöggeler, Peter Rehling, Silvio Rizzoli, Marina Rodnina, Moritz Roßner, Reinhard Schuh, Blanche Schwappach, Halyna Shcherbata,George Michael Sheldrick, Mikael Simons, Holger Stark,Jörg Stülke, Michael Thumm, Kai Tittmann, Henning Urlaub,Lutz Walter, Jürgen Wienands, Ernst Wimmer, Andreas Wodarz.

For details regarding the research of all faculty members, see www.gpmolbio.uni-goettingen.de/content/c_faculty.php

Culture nights

We are in Nepal – at least it feels a little bit like this. It took bus number 5, exit at Fassberg, to get there – or a bike, adding to the Nepal feeling considering the steep slope. Sumana and Anita somehow managed to reserve



the Manfred Eigen Lecture Hall, the foyer, and the adjacent seminar room of the MPI-bpc for the first Nepali culture night. As always, the culture night is organized by the students of the Molecular Biology and Neuroscience programs, an eight-year old tradition by now. And it is still possible to surprise the audience with new ideas. This time, we watch a 90 minute play, in which the actors travel via Delhi airport by bus to Kathmandu and even to Mount Everest. We enjoy Sabin, the travel guide, taking Anita and Heena on a sightseeing tour and smile at the love story between Anita and Sabin which comes to a happy ending because they both get admitted to the Molbio program. We see colorful costumes and beautiful dances. If you take a closer look, the Nepali dance group includes students from Germany, India, Mexico, Romania, Russia and Serbia. They were trained by Sumana and their performance looks very professional.

The culture night series 2011 started with the poetry, literature and music night in January. Everyone was excited to see how many talents and artists study in our programs. We were then taken on a fascinating (monthly) journey from Iran to Taiwan, India, Turkey and the Balkan to Latin America. Live music and dance performances, slide shows and games, and not to forget the delicious meals! Carnival, Halloween, Christmas nights, quizes and Casino nights – all these events can be quite exciting in an international setting.

Dance at the Nepali Night, preparations for the Indian Night

The students who joined the Molecular Biology and Neuroscience programs during the past 11 years come from 61 different countries. This treasure of cultural variety is truly reflected in the culture night series, thanks to the enthusiastic commitment of the student organizers. Congratulations, you do a great job! StB

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