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# How to become an accomplished lab leader

Third EMBO Laboratory Management Course for Female Leaders in Science



## Some take-home messages:

- Awareness is the first step toward change
- Know your values and strengths and be clear in what you want
- Understand what you can influence (and what not) – either personally or at work
- Be aware of hidden biases
- Personality often explains behaviour better than gender does
- Be confident in your communication and decision-making
- There are different leadership styles – develop your own

EMBO has offered more than 100 Laboratory Management Courses since their launch in 2005. The courses are designed for post-doctoral researchers and group leaders. The one that took place in mid-October near Heidelberg addressed a more specific audience. Only female scientists were targeted this time. It was the third Laboratory Management Course for Female Leaders in Science since 2013. 16 participants

confident way, how to deal with superiors and how to reach the people in the lab,” comments co-trainer Damjana Kastelic, who is also a scientist at the German Cancer Research Center.

The course started with exercises on dismantling stereotypes and contrasting them with reality. This module was followed by a discussion about the existence of hidden biases, to which both men and women are likely to succumb. “Such topics could and should also be discussed in a mixed gender group. It is a different experience though to discuss them with women only,” outlines Janssens.

A session on strengthening self-confidence followed on the second day. Dealing with guilt, with rejection or with a negative behaviour were on the agenda. One of the exercises involved a role-play on active listening, which aims at understanding the different layers of a conflict. “Scientists are used to focus on solutions,” says Janssens who worked as a researcher for 19 years. Yet in a conflict situation, a lab leader needs to take a step back and give some thought to what is really being said. The examples discussed during that exercise were actual situations taken from day-to-day lab life.

The morning session on day three of the course focused on developing an individual leadership style. A lot of attention was put on body language, confident voice and positive language. The trainers encouraged the participants for example to rephrase answers so that they sounded confident and convincing. At the end of the exercise, attendees were asked to present themselves. The emphasis on non-verbal communication was new to this course and specifically requested. “It was not such a burning topic in previous courses,” recalls Janssens.

*“One of the things I implemented immediately after coming back from the course was that I started to prepare myself better for group and one-on-one meetings with individual team members,” says Jacqueline Jacobs, group leader at the Netherlands Cancer Institute, who attended the very first course in 2013. “I am now better at making clear what I expect from people in such meetings.”*

came to Heidelberg for this three-day-session from all over Europe – with various expectations.

“Self-confidence, conflict management and communication in general were the central topics,” says Hilde Janssens, who ran the course for the third time now. “The most frequently asked questions were how to get your message across in a

Women remain under-represented in positions of scientific leadership – even though they make up a majority of PhD graduates in scientific disciplines – for a variety of reasons. Lack of self-confidence and the fear of not being able to combine family with a career in academia are the main hurdles. “There are still big inequalities when it comes to gender in career progression. We all know that. Providing secure and quality childcare and proper mentoring is crucial to change this,” says course participant Renata Basto who is also a member of the EMBO Young Investigator network. The Portuguese scientist leads a laboratory of eight young researchers at the Institute Curie in Paris, France. Her goal was to learn more about improving work-life balance, dealing with guilt, time management and different leadership techniques. “I wish I had done this course earlier,” she says.

# Exploring quotas in academia

Gender quotas are one tool that could improve gender balance at the highest levels of academia. Their use is controversial.

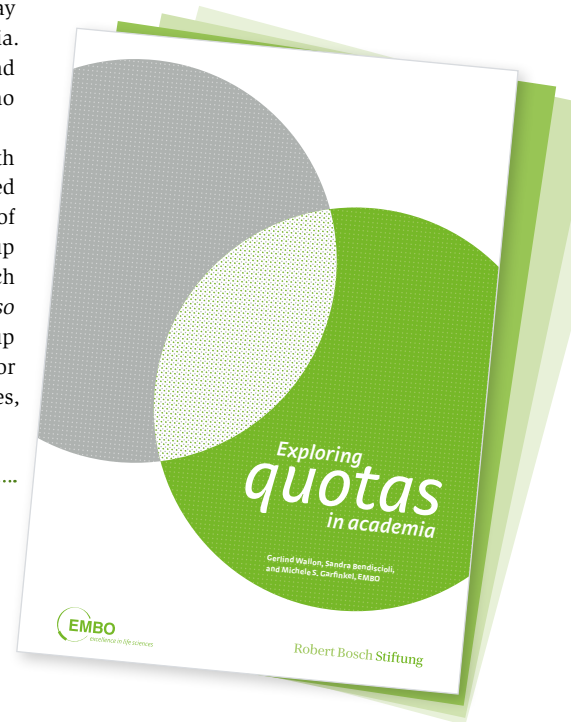
**B**e it on scientific boards, on hiring committees, or at the top of hierarchies in universities and other research organizations: women are still under-represented. The overall numbers and ratios of women to men in senior academic positions are much smaller than would be expected given the number of female university graduates in the last decades.

One tool that could diminish disparities in the number of women and men in academia is the use of gender quotas. *Exploring quotas in academia* is the report of a study conducted by EMBO in collaboration with and funded by the Robert Bosch Stiftung. Sandra Bendiscioli, Michele Garfinkel and Gerlind Wallon from EMBO are the authors of the final report.

The report, published in September, looks at the potential benefits and challenges that could arise from the use of quotas as one way to achieve better gender balance in academia. It describes options for introducing quotas and provides information for decision makers who might consider implementing them.

The year-long study involved interviews with a wide range of stakeholders followed by a closed workshop in Berlin, where options for the use of gender quotas were analyzed. The working group included gender researchers, heads of research institutes, funders and scientists (*see also interview with Detlef Weigel below*). The group discussed measures such as cascade models for hiring, quotas for the composition of committees, and equal success rates in funding schemes.

The full report is available at [www.embo.org/documents/science\\_policy/exploring\\_quotas.pdf](http://www.embo.org/documents/science_policy/exploring_quotas.pdf)



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## The numbers speak for themselves

Interview with **DETLEF WEIGEL**, Chair of EMBO Council for 2013 – 2015 and Director at the Max Planck Institute for Developmental Biology in Tübingen, on the representation of women in academia and his role in the EMBO-led study.

**You were one of the motivators of the gender quota study. Where did the idea come from?**

Like many others, I was initially sceptical about quotas, not least because of the concern that women would be branded as “quota candidates”, whose success was not merely due to their scientific achievements. However, it was clear that the Max Planck Institute and other organizations were increasing the number of women in leadership positions too slowly, and that new measures were required to change this situation. While it is rare these days to encounter blatant discrimination, the numbers speak for themselves. I had already come to the conclusion that formal rules can be a powerful tool to redress the current imbalances. For example, I have been organizing

quite a few conferences over the years, and I had noticed that male names surfaced much quicker than female names when my colleagues and I started to think of potential speakers. Once I had identified this as a problem and made it a personal rule not to be satisfied with an unbalanced list of speakers, I was surprised how easy it was to come up with lists where half or more were women, without any compromise in quality.

**What did you think about the process and the methodology used in the project?**

I was very impressed by the systematic approach that Michele, Sandra and Gerlind took. They started with a literature meta-analysis, and updated the conclusions with lessons learned from

interviewing a wide range of people in executive positions who had direct experience with quotas. I particularly appreciated the workshop that they organized together with Ingrid Wüning Tschol from the Bosch Foundation, to help identify best practices in implementing quotas. One of the greatest challenges is that hiring or funding decisions are generally made at such a fine-grained level that bias, be it conscious or not, is difficult to detect. The report describes a series of possible solutions to this issue.

**In your various leadership roles as scientist, director at the Max Planck Institute and Chair of EMBO Council, what do you think about using quotas?**

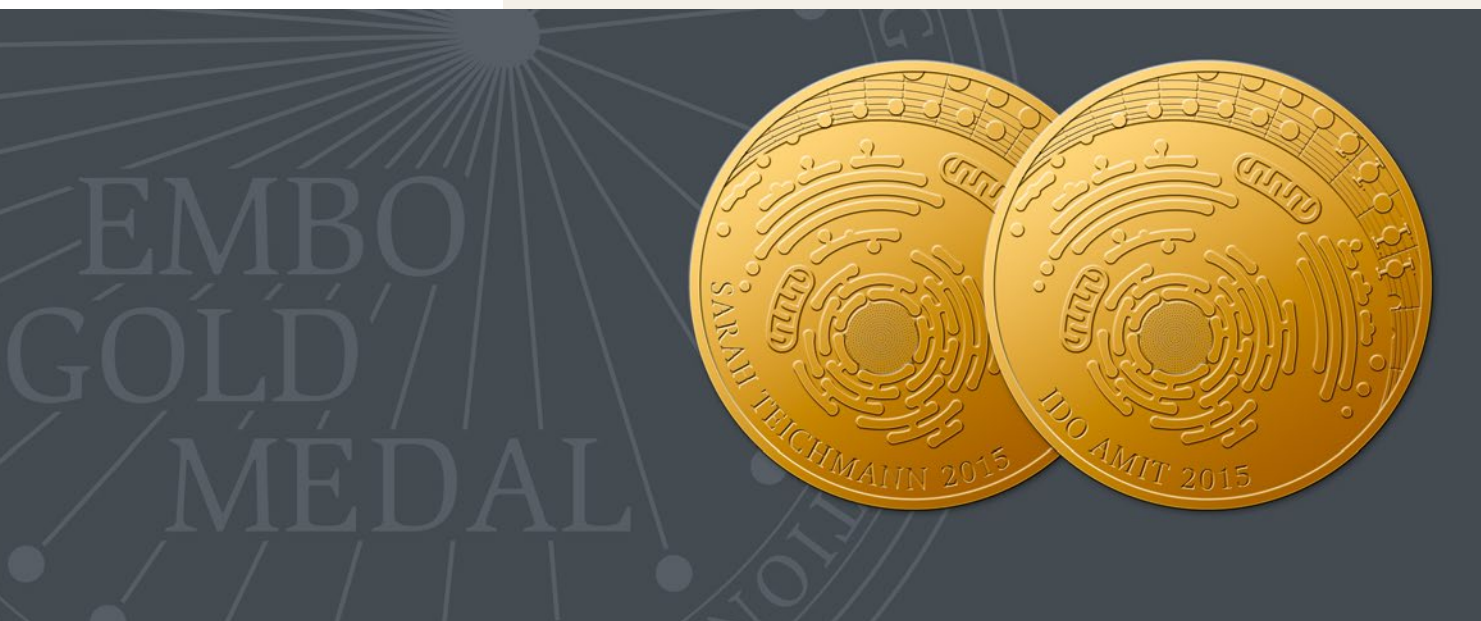
Although I thought that I was already quite well informed, the workshop drove home the point that quotas are not only an appropriate, but also in my view essential tool to accelerate the pace with which women are hired in academic leadership positions. That progress has been too modest so far has many reasons, one being that performance criteria are often skewed and do not take the entire breadth of academic work, such as departmental responsibilities, teaching, mentoring and supervision, properly into account. Finally, I do not accept the excuse that “academia is simply different” and that quotas are therefore not workable. Large corporations and parliaments can do it, and we should be up to the task as well. After all, as scientists we often pride ourselves in being in the avant-garde. This is certainly one area where we have not always shown such leadership. And as it turns out, I learned from the workshop that the concerns about the “quota” perception are largely unjustified.



Geneviève Almouzni of the Institute Curie gave a plenary lecture in the session on nuclear architecture. She commented: “Speaking at The EMBO Meeting is a fantastic opportunity to present research to the wider scientific community.”



Joan Steitz of Yale University School of Medicine and the Howard Hughes Medical Institute gave an opening lecture on the molecular events involved in the formation of messenger RNA



Sarah Teichmann and Ido Amit received the EMBO Gold Medal at the opening session of the meeting. “Informatics has always been at the heart of my research, using statistics and computer science to tease out meaning from the ‘wet-lab’ experiments we carry out,” said Teichmann. Ido Amit has received the award for his work to reveal the function of the immune system. He commented: “It is a wonderful feeling that prominent scientists believe we are on the right way, but also a huge responsibility to continue and make progress towards our research vision.”





# On excellence, serendipity and Rosetta's comet rendezvous

Highlights from *The EMBO Meeting 2015*

Hosted in Birmingham this time, *The EMBO Meeting* featured talks from more than 80 life scientists speaking at 20 concurrent sessions and three sets of plenary lectures. Conference chairs Gillian Griffiths, Geneviève Almouzni and Jürgen Knoblich structured the themes of the concurrent sessions into five groups: cytoplasm, medicine, membrane, nucleus, and signalling.

Joan Steitz' talk on *Nuclear non-coding RNAs of viral and cellular origin* inaugurated the four-day conference full of high-quality scientific presentations, networking events and career development sessions. "She is a fantastic role model and she inspired me by showing that you can have a family and do great science," said Gillian Griffiths in her introduction to Joan Steitz' keynote lecture on the opening evening.

Keynote lecturer Peter Walter from the University of California, San Francisco, talked on Monday morning about *The serendipitous path of discovery: from protein folding to cognition* on Monday morning. He explained how a small drug-like compound called ISRIB renders cells insensitive to translational inhibition. The properties of this compound are truly remarkable: ISRIB proved to be a cognitive enhancer in rodents, significantly improving their long-term memory. "Looking back at my career I can say that the path of discovery is neither linear nor predictable," said Walter. His work on the unfolded protein response (UPR) provides a wonderful example of how serendipity can shape scientific discovery: The molecular machines that transmit information about defective protein folding and regulate appropriate gene expression programmes function in unusual, unprecedented ways.

The challenge of being an explorer was also in the centre of Matt Taylor's special lecture on *The ESA Rosetta mission*. Taylor, project scientist at the European Space Agency (ESA), gave an enthusiastic talk summarising the journey of Philae to comet 67P/Churyumov-Gerasimenko. Launched in 2004, the mission has been coordinated by hundreds of people. "I am a small, very tiny piece of the machine," said the British physicist. In November 2014, Rosetta successfully deployed Philae to the surface of the comet: "From 23 km away from the comet, we dropped the lander." The awareness of the mission amongst the general public reached a spectacular 80 per cent in some European countries at that time.

Both Louis-Jeantet Prize lectures took place on Monday, day three of the conference. Emmanuelle Charpentier gave a glimpse into the origins, mechanisms and applications of the CRISPR-Cas9 technology. Rudolf Zechner explained the mechanisms governing the metabolism of lipids. He showed in his lecture that the recently discovered

enzyme adipose triglyceride lipase (ATGL) and its protein co-activator CGI-58 facilitate lipid catabolism in both mice and humans. He also spoke about lipolysis in cancer and cancer-associated cachexia – an uncontrolled and irreversible loss of weight in cancer patients.

In the Science Policy session on *Excellence and inclusion in evaluating research* Jack Stilgoe of University College London and Claudio Sunkel, professor at the University of Porto, discussed what scientific excellence really means, what type of science could be funded by governments and how investments into Research & Development translate into the economic success of a country.



Matt Taylor



© Images: Marilyn Hicks

# Izmir Biomedicine and Genome Center – a model for the region

Largest public research investment in the history of Turkey – with strong EMBO ties

Turkey is an emerging country that has accelerated its investment in science and technology over the last decades. Between 1980 and 2015 the number of Turkish universities increased almost tenfold, reaching 180. Life science research in Turkey is conducted mainly at state universities. An important alternative to the public higher education institutions are foundation universities, typically set up by wealthy businessmen. Large basic research institutes are on the rise – yet at a slow pace. In relation to its gross domestic product, Turkey still spends less than half as much on research as the EU average. The dream of creating a large-scale, internationally competitive life science institute in Turkey was born many years ago, but only realized when the Izmir Biomedicine and Genome Center (iBG-izmir) was created.

Located on the campus of Dokuz Eylül University in Izmir – Turkey’s third largest city – the iBG-izmir was launched in September. The institute is the largest public research investment in the history of the Republic of Turkey. The opening ceremony was attended by the Turkish Minister of Science and other government representatives. It also featured a series of scientific presentations including a talk from Nobel Laureate Tim Hunt. In his speech he said that the creation of the institute is a “fantastic opportunity” for talented Turkish scientists to return to their country.

“Both EMBO and EMBL played important roles in shaping the path to the creation of the institute,” said Mehmet Öztürk, founding director and its driving force. Maria Leptin, EMBO Director, and Iain Mattai, EMBL Director General, currently serve on the Scientific Advisory Committee of iBG-izmir. Öztürk, who was elected EMBO Member in 1994, consulted EMBO and EMBL directors over the years, seeking advice on how to plan and structure the emerging institute. “EMBO has been following the development of science in Turkey since 1993, when the country joined the EMBC, the funding body of EMBO,” said Deputy Director Gerlind Wallon in her speech at the opening ceremony. To date, twenty scientists in Turkey have been supported by EMBO Installation Grants, created to attract scientists to set up their independent laboratories in participating member states.

iBG-izmir, designed as a multidisciplinary cluster, is striving to become a national and regional

hub for biomedical research, innovation, service and education in the Eastern Mediterranean Region. Located between the Middle East, Western Asia and Europe, it is predestined to function as a cultural bridge, where scientists can meet and cooperate. “We designed the institute as a model for the entire region,” says Öztürk.



With a size of more than 20,000 square meters, the centre is designed to host 32 research groups and educate 150 graduate students

“Time will tell whether our idea gains ground.”

The director’s close association with EMBO and INSERM in France allowed him to establish strong ties with European institutes and life science researchers and to facilitate the institute’s European integration. His association with The World Academy of Sciences (TWAS), an academy working for the advancement of science in developing countries, offered him insights into the specific problems of emerging countries.

Currently, the major funding of iBG-izmir comes from Dokuz Eylül University, the Ministry of Development and TÜBİTAK, the Scientific and Technological Research Council of Turkey. The iBG-izmir is candidate for a centre of excellence, recognized by the Ministry of Development of Turkey – a status that will secure funding. In the next few months, the government will make a decision on which centres to fund; the iBG is considered a strong candidate. The institute is expected to strongly focus on innovation,

high-tech product development, and high quality services for both public and private sectors.

The centre has already attracted a number of young talents from around the world. Nearly twenty of the planned 32 independent basic and translational research groups have been formed and are already working in the institute. Two of them are headed by EMBO Installation Grantees, Günes Özhan and Gerhard Wingender. The groups are organized as multidisciplinary clusters connecting researchers and clinicians – a structure that is unique for the Turkish research landscape. They cover focus areas such as targeted molecular therapy, stem cell and gene therapy, immunotherapy, and genomics of rare diseases. Their research is supported by state-of-the-art

core facilities for biobanking, *in vivo* and *in vitro* imaging, genomics and bioinformatics, and a vivarium for rodent, zebra fish, and fly animal models, to name just a few.

Turkey is now trying to lure its talented natives back home – as well as to attract foreign scientists. TÜBİTAK has developed several programmes to increase the mobility of researchers within the Horizon 2020 framework. The EMBO Installation Grants are also financed by TÜBİTAK – in collaboration with EMBO. The iBG-izmir has already attracted a number of young scientists through these programmes. Now, the centre is looking to recruit specialists in genomics and bioinformatics.

[www.ibgizmir.deu.edu.tr](http://www.ibgizmir.deu.edu.tr)



## Making the killer mosquitoes kill themselves

Parasitic diseases have been the centre of attention of this year's Nobel Committee: William Campbell and Satoshi Ōmura

have been recognized for their discovery of the drug avermectin and its derivative ivermectin. Youyou Tu from China received the Nobel Prize for her discovery that artemisinin is highly effective against the malaria parasite. Next to the traditional, drug-based therapies to combat parasitic disease, promising biotechnologies have recently been launched – an emerging one was on the agenda of the 2015 EMBO | EMBL Science and Society Conference. One of the conference speakers was **SIMON WARNER**, Chief Scientific Officer of Oxitec, a British biotechnology company. Oxitec produces genetically engineered *Aedes aegypti* mosquitoes to fight Dengue and Chikungunya – viral diseases that have no cure and are spreading around the world. In an interview, Warner explains Oxitec's approach and speaks about the reaction of the residents to local field trials.

**You are planning to release several millions of genetically altered *Aedes aegypti* mosquitoes in the Florida Keys. What is the status quo?**

Pesticides can only reduce this mosquito by up to fifty percent at best. That leaves too many mosquitoes to pick up and spread painful diseases like Dengue, Chikungunya and Zika virus. We have been working with the Florida Keys Mosquito Control District (FKMCD) for several

years now, and if and when FDA says this project can go ahead, FKMCD will run the trial – with technical support from Oxitec.

**What is the Oxitec approach?**

We develop male mosquitoes with a self-limiting gene so after they mate with the pest female *Aedes aegypti* mosquitoes, their offspring die before reaching adulthood. This way the offspring die

before they can reproduce and before they can become transmitters of disease, reducing the population in successive generations. There is currently no vaccine available or any specific medication for Dengue. So the only effective way to control the disease is to control the mosquito that spreads it. The Oxitec solution is far and away the most environmentally sustainable way to control *Aedes aegypti* since it affects only the target species and the insects and their genes do not persist in the environment.

**Dengue fever is common in more than a hundred countries. Why did you choose the US for field trials?**

It is true that the infection is found predominantly in the tropics and subtropics, but this is an invasive mosquito that keeps spreading, and it has become even more prevalent in the US. The last outbreak of Dengue in Florida was around 2009. That mosquito is still there. After that outbreak, the Florida authorities asked Oxitec if they could trial our mosquito.

**How successful were the trials you ran in Panama, Cayman and Brazil?**

In every trial, the dengue mosquito, *Aedes aegypti*, was reduced by more than 90% – this is an unprecedented level of control by any method. Results have been independently peer-reviewed and published in the scientific literature, including most recently studies in Brazil and Panama. The national biosafety group in Brazil has now approved our mosquito for release throughout the entire country.

**Were you surprised by the opposition of the locals in Key West and now in the Florida Keys?**

Not really. Advancements in science and technology generate some debate, especially when they are first being implemented. There are a lot of questions about risks and benefits. So it is important to engage communities directly and also look to the data on diversity of opinions to better understand people's views. There have been a series of independent surveys that show that the local population is in fact neutral or supportive of genetically engineered mosquito control. We have arranged a number of town-hall meetings and public engagement sessions so people can come to voice their opinions and meet our scientists face to face to get their questions answered. This dialogue is an important part of the process.

[www.oxitec.com](http://www.oxitec.com)

**The EMBO Science Policy Programme** is involved in European discussions about responsible research and innovation to ensure that research, for example in biotechnology applications, is conducted responsibly and for the benefit of society and of the scientific community. See [www.embo.org/science-policy/biotechnology-and-genomic-technologies](http://www.embo.org/science-policy/biotechnology-and-genomic-technologies)

# New biobank for brain tumour research

EMBO Member **BENGT WESTERMARK** and colleagues at Uppsala University have developed a biobank with cell lines that can be used as a model of the incurable brain tumour type glioblastoma.

The purpose of the biobank is to become a public resource that enables accurate cell-based modelling of glioblastoma diversity using stem cell conditions,” says Bengt Westermark, who has worked on the resource for the past five years. The biobank, called HGCC (for Human Glioblastoma Cell Culture), is publicly available for researchers and all information about the cell lines can be retrieved from a database linked to the biobank. The new tool has been described in a paper published in the journal *EBioMedicine* in August 2015.

Human cancer cell lines – such as the famous HeLa cells – are used for a wide variety of research projects, both in academia and in the pharmaceutical industry. The development of new cancer drugs and therapies requires experimental models that are representative of the cancer type that is studied. Currently, many

established cancer cell lines exist, including brain tumour cell lines, but for various reasons they are less valuable as models for the incurable brain tumour type glioblastoma: Some of the present collections have remained to a large extent private and have limited distribution. The culture conditions of other established cell lines do not allow the properties of the original cancer cell to be maintained. Serum-cultured cell lines do not copy the phenotype of the tumour *in vivo*. The major advantage of the HGCC biobank is, that its 48 human glioblastoma cell lines are cultured under neural stem cell conditions.

The HGCC panel has several advantages. The cells are clinically annotated and unambiguously identifiable by a unique STR profile. The researchers have applied genomic- and computational analysis to assign a molecular subclass, according to the widely used classification from

the Cancer Genome Atlas (TCGA). They have also shown that the cell lines essentially retain the same features as the cells in the original tumour. The associated database is searchable and contains all available information about the cells, e.g. genetic alterations, subtype and clinical data on the patients.

EMBO Member René Bernards of the Netherlands Cancer Institute is one of the early users of the biobank: “The HGCC biobank is a great resource because it reflects the molecular heterogeneity of the human glioblastoma tumour types and offers an advantage over the classical serum-cultured lines. For instance, in terms of gene expression, the new cell lines cluster with the major subtypes identified in human glioblastoma much better than the serum cultured lines. Also, they seem to model well certain aspects of what we know about clinical glioblastoma progression.”

The researchers behind the study hope that HGCC will become a well-used resource that will accelerate the development of more efficient therapies for patients with glioblastoma. “The value of this resource will increase proportionally with its usage,” says Westermark.

[www.hgcc.se](http://www.hgcc.se)

## EMBO Press Poster Prize Winners

### THE EMBO JOURNAL

#### Iwo Kucinski

Gurdon Institute, University of Cambridge, United Kingdom

#### Cell competition: the molecular signature of loser cells

*The EMBO Meeting 2015*

### EMBO REPORTS

#### Guillaume Rey

University of Cambridge, United Kingdom

#### Central carbon metabolism regulates circadian oscillations

*The EMBO Meeting 2015*

### EMBO MOLECULAR MEDICINE

#### Myra Chavez

Dept. of Plastic Surgery, TU München, Germany & FONDAP-GGR, Universidad de Chile, Santiago, Chile

#### Towards autotrophic tissue engineering: photosynthetic biomaterials for tissue regeneration

*The EMBO Meeting 2015*

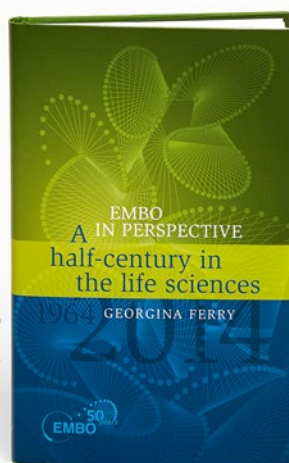
### MOLECULAR SYSTEMS BIOLOGY

#### Angelika Feldmann

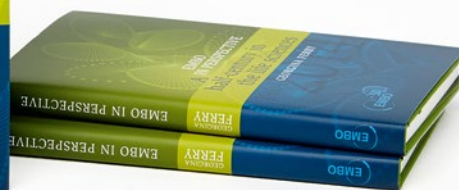
Dept. of Biochemistry, Oxford University, United Kingdom

#### Quantitative analysis of DNA methylation turnover reveals its preferential target sites and potential mechanisms

*The EMBO Meeting 2015*



## EMBO in perspective: A half century in the life sciences *now free to read online*



Now, anyone with interest in the story of the creation of EMBO, its growth and expansion can enjoy reading *EMBO in perspective: A half-century in the life sciences* online. The book is based on personal interviews with Sydney Brenner, Luca Cavalli-Sforza, Georges Cohen, James Watson and the directors of EMBO. Its six chapters are available at [www.embo.org/anniversary/book](http://www.embo.org/anniversary/book) | For more information on how to obtain a hard copy of the book please contact [anniversary-embo@embo.org](mailto:anniversary-embo@embo.org)

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# Short History of the EMBO Workshops in Arolla

A “happening” rather than a meeting – an EMBO workshop with a long tradition. Personal memories by early participant, EMBO Member Klaus Scherrer

The “Arolla Workshops” are a series of EMBO workshops devoted to eukaryotic molecular biology and genetics. The most recent workshop took place in August 2015 and was organized by Susan Gasser of the Friedrich Miescher Institute in Basel. The focus of this essay is on the history of the Arolla Workshops and the ideas behind them.



© Klaus Scherrer

The series was established in 1972 with the help of US friends Sheldon Penman and Robert Perry. The workshops had – and continue to have – a distinct flavour due to the original concept of the founders. Former EMBO Director John Tooze once praised the series as “one of the best that EMBO organizes”. By 1982, however, his focus on Heidelberg as the centre of EMBO activities led him to suggest it should be discontinued, despite a petition signed by more than 100 participants. Max Birnstiel, then Chair of EMBO Council, saved most of the concept by initiating a new series, which still lives on to be held in Arolla, Switzerland, every third year and is chaired by outstanding Swiss scientists.

John Paul, one of the first molecular haematologists, who worked in Glasgow, once described an early workshop as a “happening”, rather than a meeting. Its concept was special indeed, not least the location. The Arolla village is placed in scenic woodland in front of three towering mountains and glaciers. Just below the Alps and the tree-line stands the cosy Grand Hotel Kurhaus, which was built in the 1870s. The hotel is run by the Weatherill-Selz family, who installed a proper

lecture hall (and modern bathrooms) after the first meeting.

The main point of the series was (and remains) to focus discussion – down to hard-core chemistry and physics – on results and concepts that have proven to stand the test of time, although being largely forgotten for a while. Indeed, the value and validity of much of what we discussed in those early days has only recently been confirmed by ENCODE data: for instance pervasive transcription, the prevalence of post-transcriptional regulation, the size of primary transcripts and 3D genome structure, etc. How did it all begin?

The initial idea for the series was sparked by a 1970 Cold Spring Harbor (CSH) symposium: a meeting with five-minute talks transmitted to secondary rooms by video. However, this set-up meant no real discussion was possible, so such type of meetings became a source of what we termed “consensus truth” or, even worse, “consensus methods”: the acceptance of superficial scientific notions because of the reputation of speakers and their epigones. We wanted a meeting that would deliberately avoid “consensus

truth”, so the emphasis at Arolla was on discussing results in all details. Each session began with a 40-minute review of the current knowledge in the field to be addressed, followed by 20-minute talks describing the recent advances. Most importantly, the chairperson held a regular pre-meeting with the speakers, who would pass on the latest information.

An important feature of the meeting was that ample time was given outside the sessions for the discussion of science. The six-day-meeting kept afternoons free for this purpose. “Let people feel good” was the maxim – a relief from stress and tense scientific battles. There were also wild parties, often after wine tastings down in the valley, and moments of real grace, such as when Charly Thomas played ragtime on a 19th century piano, or Mark Ptashne’s violin sounded in the hotel. Hospitality was high on the agenda.

Passionate discussions took place with Francis Crick about “junk DNA” and alternative explanations, leading to the first ideas about 3D genome architecture by 1980. Mark Ptashne and Kurt Wüthrich argued about the stability of hydrogen bonds in DNA-protein interaction. On the practical side, many later biotech pioneers from companies such as Biogen, Chiron, Progen and Intercell attended Arolla. For Steven McKnight, the founder of the US biotech-company Tularik, it was “the best meeting I ever attended”.

Over the years, the workshop changed with the times. At some point Arolla became a real “jet-set” meeting: participants were flown in from Japan, the US and Europe to speak about the same transcription factor. Walter Schaffner restored much of the Arolla spirit by returning to a more modest, but still high-calibre meeting. Later, some excellent meetings were devoted exclusively to development. The original idea, however, was to avoid specialisation and to break routine; indeed, the best ideas spring up at crossroads of science. In 2015, the workshop returned to broader topics thanks to Susan Gasser.

Arolla is not a “happening” any more; the attempt we undertook to enforce real discussion was possibly more than could be asked for in time and effort. But it has remained a particular spot for scientific exchange for more than forty years. The fact that data and concepts first discussed at Arolla between 1972–1985 have come back to the surface today seems to legitimise the idea and style of the meetings. Rigorousness is the duty of the scientist – one that is unfortunately not always respected. Sadly, the pressure of the “science business” today can lead to stress and competition that sometimes results in corner cutting. To avoid this, we need to take the time for real reflection and discussion in peaceful surroundings – just like in Arolla.

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# Quality control system and QC database for functional genomics

A free tool to improve data quality and the value of results obtained from data mining and integration

Recent technological advances and cost reductions of massive parallel sequencing, in combination with a variety of molecular biology methods, has greatly facilitated the functional genomics. Exponentially increasing amounts of data are generated from the analysis of protein-chromatin interactions and epigenome modification, global transcription profiling, chromatin accessibility and its three-dimensional organisation. Collecting all this information in databases like GEO involves complementing 'classical' molecular biology with data-driven science. The challenge of this data-driven science is to integrate large amounts of datasets in such a way that we can extract and model regulatory systems (signalling, transcription regulation, epigenome, chromatin architecture) and circuits (gene-regulatory networks) and identify key players, which altogether account for the functional complexity of a living system (cell, organ) and its physiological and pathological fate transitions (cell lineage generation, pathogenesis like tumorigenic transformations) in the context of the global system.

Large collaborative efforts like ENCODE, modENCODE, the NIH Roadmap Epigenome project, the European BLUEPRINT consortium, but also independent laboratories all over the

world continue to generate functional genomics data. All these efforts generate impressive amounts of data filling up public repositories enabling the scientific community – in principle – to perform further exploratory and integrative studies. However, while public repositories represent an extremely rich source of information, there are two major drawbacks: firstly, the absence of quality information that is associated to the various datasets; and secondly, the limitations of existing computational tools for exploration and data integration. As a result these important reservoirs of knowledge are largely unexplored and underexploited.

To address the first issue, a quality control (QC) system was developed, applicable to any type of datasets generated by massive parallel DNA sequencing that involved a sample-enrichment procedure (ChIP-seq and enrichment-related assays). Importantly, in contrast to other described quality metrics<sup>1</sup>, it does not require prior peak calling strategies, nor does it involve inter-datasets comparisons (IP versus input; inter-replicate comparison), such that the computed QC metrics reflect the quality of the concerned dataset directly. Briefly, the QC algorithm evaluates the distortion of the enrichment patterns as a consequence of their reconstitution

with a lower number of sequenced DNA reads selected by random sub-sampling<sup>2</sup>. For simplicity, our QC system provides global QC indicators in the form of a 3-letter grade scale that ranges from AAA (highest quality datasets relative to the total datasets in the QC database) to DDD (lowest quality datasets).

As this procedure is universal and can be applied to every type of Next-Generation Sequencing (NGS)-derived profile, it has been used to assess the quality of datasets available in the public domain. Currently, the NGS-QC database hosts the quality descriptors for more than 26,000 public datasets, covering a great variety of model organisms and data types. Within short, the database will be complemented with a quality assessment of datasets on long-range interactions, such as those used to establish chromatin interactomes.

The QC database is available to the scientific community via a dedicated web portal ([www.ngs-qc.org](http://www.ngs-qc.org)). This portal also provides users with the possibility to compute quality grades for their own unpublished datasets and retrieve a detailed QC report. Such reports can be also obtained for each of the datasets present of the QC database.

The aim is to provide extensive quality information about public datasets, such that the scientific community is able to add quality as a parameter in their data exploitation and integration efforts. If widely used, the resource will improve data quality and the value of results obtained from data mining and integration.

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**Marco A. Mendoza Parra & Hinrich Gronemeyer**

## REFERENCES

- Landt, S. G. et al. *Genome Res* 22, 1813–1831, (2012).
- Mendoza-Parra, M. A., Van Gool, W., Mohamed Saleem, M. A., Ceschin, D. G. & Gronemeyer, H. *Nucleic Acids Res* 41, e196, (2013).



## On the move

**MARIA-ELENA TORRES-PADILLA**, recently elected EMBO Member, will become the director of the newly founded Institute of Epigenetics and Stem Cells at the Helmholtz Centre Munich, Germany.

Torres-Padilla is a leading expert in the field of chromatin research and developmental epigenetics. Her research activities as institute director will focus on how epigenetic information influences cellular plasticity during early mammalian development. EMBO has played a vital role in her scientific career.

Originally from Mexico, she was an EMBO Fellow during her postdoctoral research in the group of Magdalena Zernicka-Goetz at the University of Cambridge. Later on, she was elected as a member of the EMBO Young Investigator

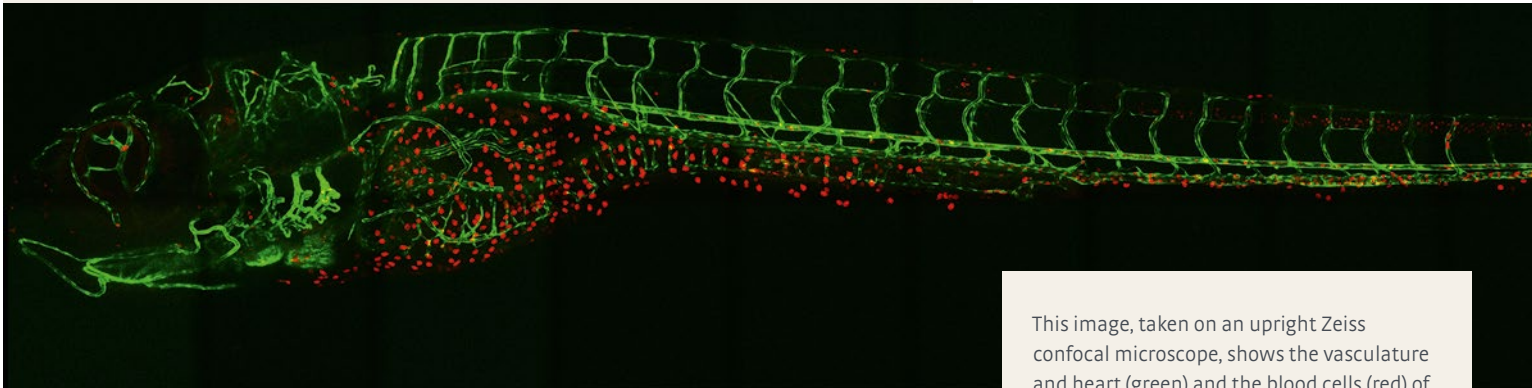
network. In 2012, she was awarded an ERC Grant. "We want to understand exactly how early mammalian embryonic development is regulated and how chromatin and nuclear organization direct changes in gene expression and cellular plasticity," said Torres-Padilla, explaining the core objective of her work. She is planning to recruit top junior group leaders in the areas of epigenetics and stem cells to the new Institute.

Prior to taking up the new position, she worked with her team of scientists at the Institut de Génétique et de Biologie Moléculaire et Cellulaire (IGBMC) in Strasbourg, France. Her new appointment should also help forge new scientific partnerships between France and Germany.

The Mexican scientist is optimistic, but recognizes the future challenges: "We want to use this fresh impetus to advance our scientific knowledge on the molecular mechanisms underlying totipotency and epigenetic reprogramming." These topics, largely inspired by hypothesis-driven methodologies, should remain at the heart of basic research in Europe, she thinks.

# 25 years of molecular medicine

Headed by EMBO Member **DOUGLAS HIGGS**, the MRC Weatherall Institute of Molecular Medicine (WIMM) at the University of Oxford celebrates an anniversary this year



This image, taken on an upright Zeiss confocal microscope, shows the vasculature and heart (green) and the blood cells (red) of a live 10 day old transgenic zebrafish larvae. Image credit: Jana Koth/Patient Lab/WIMM/Wolfson Imaging Centre Oxford.

Just over 25 years ago, the MRC Weatherall Institute of Molecular Medicine (WIMM) at the University of Oxford first opened its doors. Led by Sir David Weatherall, one of the most prominent clinicians of the 20th century, the institute pioneered the concept of applying newly developed techniques in molecular and cellular biology to understanding and treating human diseases. Today, the WIMM hosts 45 research groups and approximately 500 researchers and support staff who to this day continue to push forward the boundaries in translational medical research.

When the WIMM was established in 1989, the concept of molecular medicine was still very novel, but the institute has led the way in advancing the field ever since its inception. Early accomplishments include the diagnosis and treatment of the world's most common inherited anaemias; understanding how T cells are activated during an immune response; and developing vaccines to protect against meningitis.

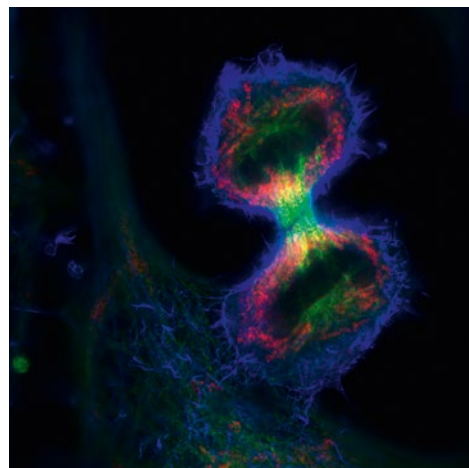
In 2012, when EMBO Member Douglas Higgs was appointed as the new Director of the WIMM, the expansion of molecular medicine had produced many new biomedical institutes. Consequently, the WIMM concentrated its interests on specific research areas. Today, research at the WIMM focuses on haematopoiesis, immunology and inflammation, stem cell biology, cancer biology and a range of associated genetic diseases. At present, about one third of senior investigators are clinically trained, allowing critically important access to patient samples.

As research at the WIMM has been consolidated in recent years, the infrastructure at the institute has been developed in parallel. Over the past few years the WIMM has established one of the largest and most versatile FACS facilities in Europe allowing researchers to isolate rare populations of cells accurately and in abundance. More recently this has been supplemented by a joint venture between the WIMM and the nearby Wellcome Trust Centre of Human Genetics

(WTCHG) to create a collaborative facility for analyzing the biology of single cells.

## Open to genome engineering

Over the past few years there has been some debate over whether model organisms are appropriate for studying human genetic diseases. Many aspects of research ongoing at the institute are explored using model organisms, but increasingly researchers are also studying human diseases using human resources. Genome editing techniques are used to manipulate these models and recently a facility for genome engineering has been established which uses both conventional



The emergence of a variety of super-resolution microscopy techniques are enabling the much improved visualization of biomolecular structures in cells and tissue down to a resolution of <100 nm. Shown in this example is a 3-color STED image of mitochondria (TOM2; red), tubulin (green), and F-actin (blue) in HeLa cells acquired on a commercial Leica SP8 STED 3X microscope. Image credit: Christoffer Lagerholm/WIMM/Wolfson Imaging Centre Oxford.

approaches and cutting-edge techniques. The ultimate goal is to harness these technologies to engineer primary human stem cells to ameliorate or cure human genetic diseases.

## New Bioinformatic Centre

In recent years, the ability to extract huge amounts of information about the genetic make-up of patients suffering from different diseases has ushered in a new era of molecular medicine, but analyzing these vast and complex datasets requires an enormous amount of skill, expertise and computing power. The WIMM and the WTCHG have joined forces to recruit computational scientists to work in the institute's new MRC CRI Bioinformatic Centre, which will open in Spring 2016 thanks to a £2.6m investment from the Medical Research Council and the University of Oxford.

Recent investment from the Wolfson Foundation and the MRC enabled the institute to build the Wolfson Imaging Centre, which includes facilities that enable super resolution imaging. This in turn has enabled the WIMM to collaborate with other imaging groups in Oxford such as Micron and Nano to build one of the most extensive imaging programmes in Europe.

The emphasis on translational medical research is reflected in the institute's strong support of students pursuing both clinical and non-clinical postgraduate training. The institute currently houses approximately 140 doctoral students supported by a range of funding bodies, including the Wellcome Trust and the MRC.

## Awards of Excellence

### EMBO MEMBERS

#### 2015 Nobel Prize in Chemistry

EMBO Member **Tomas Lindahl** of the Francis Crick Institute and Clare Hall Laboratory in UK is one of the recipients of the 2015 Nobel Prize in Chemistry for mechanistic studies of DNA repair. He received this prize jointly with **Paul Modrich**, also of the Francis Crick Institute, and **Aziz Sanchar** of University of North Carolina in the US. The three scientists, from Sweden, the USA and Turkey respectively, received an equal share of the 855,000 Euros award. According to the Nobel Foundation, their work has provided fundamental knowledge of how a living cell functions and is, for instance, used for the development of new cancer treatments.

#### Fellows of the Royal Society for 2015

EMBO Members who joined the ranks of the Royal Society this year: **Stephen Brown**, **Jane Clarke**, **Stephen Cusack**, **Michael Häusser**, **Laurence Hurst**, **Jane Langdale**, **Gero Miesenböck**, **Ketan Patel**, **Bryan M. Turner** and **Frank Uhlmann**.

**Li Jiayang** and **Susan Lindquist** have been announced Foreign Members of the Royal Society.



Susan Lindquist's admission into the Royal Society

#### Dame Commander of the Order of the British Empire

**Frances Ashcroft** of University of Oxford has been made a Dame Commander of the Order of the British Empire for "services to medical science and the public understanding of science" in the Queen's Birthday Honours List. Her groundbreaking research into a rare genetic form of diabetes has enabled many patients born with the disease to switch from insulin injections to tablet therapy.

#### L'Oreal-UNESCO Women in Science Award

**Emmanuelle Charpentier** is one of the five recipients of the 2016

Women in Science Award from L'Oreal-UNESCO. Charpentier, the laureate from Europe, was joined by **Jennifer Doudna** (North America), **Quarraisha Abdo** (Africa), **Hualan Chen** (Asia) and **Andrea Gamarnik** (South America). The French microbiologist's work on the CRISPR-Cas9 technology also earned her the Carus-Medal by the German National Academy of Science Leopoldina and the Otto Warburg Medal 2016. Charpentier has started a new position as a Scientific Member and Director at the Max Planck Institute for Infection Biology in Berlin in July.

#### Academicians of Science – Academy of Finland

**Sirpa Jalkanen** from the University of Turku and **Ilkka Hanski** from the University of Helsinki have been awarded the honorary title of Academician of Science by the Academy of Finland. The title can be held by a maximum of sixteen Finnish scientists and scholars at a time.

#### 2016 Croonian Medal and Lecture

**Enrico Coen** of the John Innes Centre has been awarded the Royal Society's prestigious Croonian Medal for his work to understand how the shapes of biological structures, such as flowers and leaves, arise through development and evolution.

#### René & Andrée Duquesne Prize

**Hinrich Gronemeyer** of the Institute of Genetics and Molecular and Cellular Biology (IGBMC) in Illkirch, France, received the René & Andrée Duquesne prize of the French La Ligue Contre le Cancer worth 75,000 Euros.

#### IBRO-Kemali Prize for Research

**Casper Hoogenraad** has been awarded the 2016 IBRO-Kemali International Prize for Research in the Field of Basic and Clinical Neuroscience for his "outstanding work on cytoskeleton dynamics and intracellular transport in neural development and synaptic plasticity." The prize, amounting to 25,000 Euros, is awarded every two years to a researcher under the age of 45, who has made important contributions in the field of basic and clinical neuroscience.

#### IPSEN Prize for Neuronal Plasticity

The 2015 award for Genes, Synapses and Psychiatric Disorders was shared by EMBO Members **Thomas Bourgeron** of the Institute Pasteur, France, and **David Porteous** of the Institute of Genetics and Molecular Medicine, UK. They received it jointly with **Mark Bear** of the Massachusetts Institute of Technology, US. Past laureates of this award include fourteen EMBO Members.

#### Ivano Bertini Award

**Stephen Cusack**, Head of EMBL Outstation in Grenoble, France, is the first recipient of the Ivano Bertini Award from the company Bruker BioSpin. The award recognises a significant achievement in research that utilises an integrative structural biology approach.

#### Academy of Medical Sciences

**Sarah Teichmann** and **Ewan Birney** have been elected to the Fellowship of the Academy of Medical Sciences in recognition of their excellence in research and innovative application of scientific knowledge.

#### Portugal's Medal of Merit

**Henrique Veiga-Fernandes** of the Institute of Molecular Medicine in Lisbon, Portugal, was distinguished with the honour of Commander of the Ordem Militar de Sant'Iago de Espada by the President of Portugal for his contributions to science and internationalization.

#### Australian Academy of Health and Medical Sciences

**Frank Gannon** of the QIMR Berghofer Medical Research Institute, Australia, has been elected member of the newly established Australian Academy of Health and Medical Sciences.

#### Umeå University Medal of Honour

**Bernt Eric Uhlén**, director of The Laboratory for Molecular Infection Medicine Sweden, receives the Medal of Honour from Umeå University. Bernt Eric Uhlén has been honoured for his contributions to the university and the development of the strong research environment in infection biology and molecular infection medicine.

## A Good Read – Publications from the EMBO Community

#### Antioxidant role for lipid droplets in a stem cell niche of *Drosophila*

Alex P. Gould (EMBO Member) and colleagues  
*Cell Press* | 8 October 2015  
doi:10.1016/j.cell.2015.09.020

#### Control of REM sleep by ventral medulla GABAergic neurons

Franz Weber (EMBO Fellow) and colleagues  
*Nature* | 7 October 2015  
doi:10.1038/nature14979

#### Integrin endosomal signalling suppresses anoiakis

Johanna Ivaska (EMBO Member), Guillaume Jacquemet (EMBO Fellow) and colleagues  
*Nature Cell Biology* | 5 October 2015  
doi:10.1038/ncb3250

#### Intensity of a pulse of RSL4 transcription factor synthesis determines *Arabidopsis* root hair cell size

Liam Dolan (EMBO Member), Sourav Datta (EMBO Fellow) and colleagues  
*Nature Plants* | 28 September 2015  
doi:10.1038/nplants.2015.138

#### Complementary activities of TPX2 and chTOG constitute an efficient importin-regulated microtubule nucleation module

Thomas Surrey (EMBO Member), Johanna Roostalu (EMBO Fellow) and colleagues  
*Nature Cell Biology* | 28 September 2015  
doi:10.1038/ncb3241

#### Transcriptional plasticity promotes primary and acquired resistance to BET inhibition

Johannes Zuber (EMBO Member), Felix Muedter (EMBO Fellow) and colleagues  
*Nature* | 14 September 2015  
doi:10.1038/nature14898

#### Translational arrest by a prokaryotic signal recognition particle is mediated by RNA interactions

Roland Beckmann, Irmgard Sinning (EMBO Members), Daniel Wilson (EMBO Young Investigator), Bertrand Beckert (EMBO Fellow) and colleagues  
*Nature Structural & Molecular Biology* | 7 September 2015  
doi:10.1038/nsmb.3086

#### Small RNA-based feed-forward loop with AND-gate logic regulates extrachromosomal DNA transfer in *Salmonella*

Jörg Vogel (EMBO Member) and colleagues  
*Proceedings of the National Academy of Sciences* | 11 August 2015  
doi:10.1073/pnas.1507825112

#### Mistargeted mitochondrial proteins activate a proteostatic response in the cytosol

Agnieszka Chacinska (EMBO Installation Grantee) and colleagues  
*Nature* | 5 August 2015  
doi:10.1038/nature14951

#### Endothelial depletion of murine SRF/MRTF provokes intracerebral hemorrhagic stroke

Alfred Nordheim (EMBO Member) and colleagues  
*Proceedings of the National Academy of Sciences* | 27 Juli 2015  
doi:10.1073/pnas.1509047112

#### Parent-progeny sequencing indicates higher mutation rates in heterozygotes

Laurence D. Hurst (EMBO Member) and colleagues  
*Nature* | 15 July 2015  
doi:10.1038/nature14649

#### Targeting melanoma with NT157 by blocking Stat3 and IGF1R signaling

Alexander Levitzki (EMBO Member) and colleagues  
*Oncogene* | 29 June 2015  
doi:10.1038/onc.2015.229

#### Primate-specific endogenous retrovirus driven transcription defines naïve-like stem cells

Laurence D. Hurst (EMBO Member) and colleagues  
*Nature* | 15 October 2014  
doi:10.1038/nature13804

## Appointments

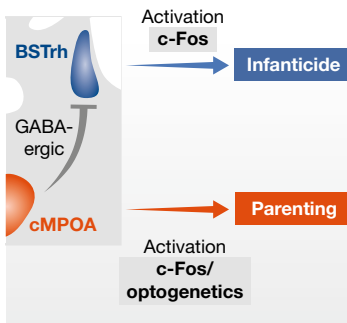
### EMBO YOUNG INVESTIGATORS

EMBO Young Investigator **Panayiota Poirazi** of the Institute for Molecular Biology and Biotechnology in Heraklion, Crete, has been elected as chair of the FENS-Kavli Network of Excellence. The network – founded in May 2014 – is a joint endeavour of the Federation of European Neuroscience Societies and the KAVLI Foundation.

### EMBO FELLOWS

Former EMBO Fellow **Andrea Puhar** has become a new group leader at the Laboratory for Molecular Infection Medicine Sweden.

Former EMBO Fellow **Santiago Zelenay** has recently joined the Cancer Research UK Manchester Institute to establish the Cancer Inflammation and Immunity Group.



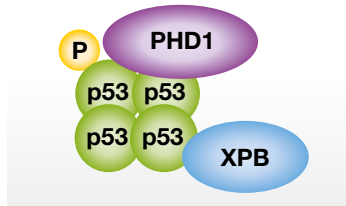
## RESEARCH ARTICLE

## Switching on paternal behaviour

Male mice dramatically change their social behaviour towards newborn pups after mating and cohabitation with pregnant females. Japanese neurobiologists now report in *The EMBO Journal* that activation of defined small regions of the mouse brain determine whether a male mouse will show infanticidal or paternal behaviour. A team led by Kumi Kuroda of the RIKEN Brain Science Institute in Japan monitored the trace of neuronal activation of nine histologically defined areas in the mouse forebrain. Two of these areas showed strikingly distinct activation patterns depending on whether the male mouse had displayed parental care or aggression towards pups a few hours earlier. Selective inactivation of these brain areas confirmed that they were indeed responsible for controlling paternal versus infanticidal behaviour. Moreover, the scientists could trigger development of sustained infanticide suppression even in previously aggressive virgin males. “The most striking finding in our studies was that the observed activation patterns did not depend on whether the male mouse had actually performed infanticide or parenting, or had only intended to do so upon being indirectly presented with a protected pup”, remarked Kuroda.

## Distinct preoptic–BST nuclei dissociate paternal and infanticidal behavior in mice

Yousuke Tsuneoka, Kenichi Tokita, Chihiro Yoshihara, Taiju Amano, Gianluca Esposito, Arthur J Huang, Lily MY Yu, Yuri Odaka, Kazutaka Shinozuka, Thomas J McHugh, Kumi O Kuroda  
Read the paper:  
<http://dx.doi.org/10.15252/embo.201591942>



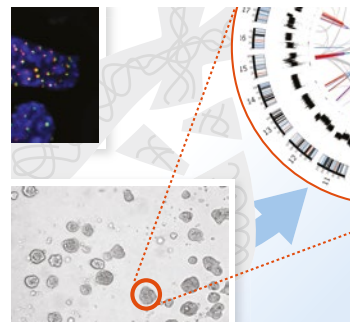
## RESEARCH ARTICLE

## Reducing resistance to chemotherapy by inhibition of PHD1

Chemotherapy remains the most widely used cancer treatment, and much attention has been paid to the mechanisms underlying chemotherapy resistance. Sofie Deschoemaeker and a research team led by Massimiliano Mazzone have shown that blocking the PHD1 oxygen sensor hinders the activation of p53, a transcription factor that aids colorectal cancer (CRC) cells in repairing themselves and thus resisting chemotherapy. These findings indicate that PHD1 inhibition may have valuable therapeutic potential. “We demonstrated that PHD1 can affect the way colorectal cancer responds to the three most common chemotherapeutic drugs used to treat CRC today. By blocking PHD1, we rob CRC cells of their ability to harness p53 to the cell-repair yoke, even when this protein is mutated (as often occurs in CRC). That means the CRC cells are exposed to the full DNA damage caused by these genotoxic drugs, resulting in greater cell death and thus a better response to the chemotherapy and, ultimately, an improved outcome,” Deschoemaeker explained. The research opens the door to the design and validation of PHD1-specific inhibitors in colorectal cancer patients, with the aim of increasing their sensitivity to currently used chemotherapeutic treatments.

## PHD1 regulates p53-mediated colorectal cancer chemoresistance

Sofie Deschoemaeker, Giusy Di Conza, Sergio Lilla, Rosa Martín-Pérez, Daniela Mennerich, Lise Boon, Stefanie Hendrikx, Oliver DK Maddocks, Christian Marx, Praveen Radhakrishnan, Hans Prenen, Martin Schneider, Johanna Myllyharju, Thomas Kietzmann, Karen H Vousden, Sara Zanivan, Massimiliano Mazzone  
Read the paper:  
<http://dx.doi.org/10.15252/emmm.201505492>  
Source: <http://www.vib.be>



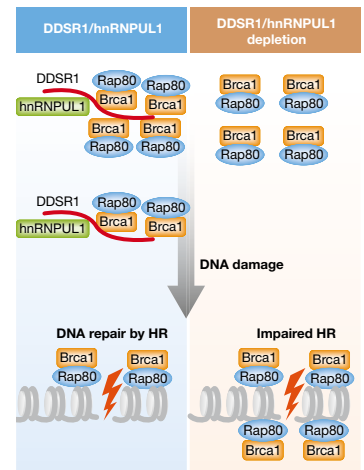
## RESEARCH ARTICLE

## A cell-based model system links chromothripsis with hyperploidy

A remarkable observation emerging from recent cancer genome analyses is the identification of chromothripsis as a one-off genomic catastrophe, resulting in massive somatic DNA structural rearrangements (SRs). Largely due to lack of suitable model systems, the mechanistic basis of chromothripsis has remained elusive. We developed an integrative method termed “complex alterations after selection and transformation (CAST),” enabling efficient *in vitro* generation of complex DNA rearrangements including chromothripsis, using cell perturbations coupled with a strong selection barrier followed by massively parallel sequencing. We employed this methodology to characterize catastrophic SR formation processes, their temporal sequence, and their impact on gene expression and cell division. Our *in vitro* system uncovered a propensity of chromothripsis to occur in cells with damaged telomeres, and in particular in hyperploid cells. Analysis of primary medulloblastoma cancer genomes verified the link between hyperploidy and chromothripsis *in vivo*. CAST provides the foundation for mechanistic dissection of complex DNA rearrangement processes.

## A cell-based model system links chromothripsis with hyperploidy

Balca R Mardin, Alexandros P Drinas, Sebastian M Waszak, Joachim Weischenfeldt, Mayumi Isokane, Adrian M Stütz, Benjamin Raeder, Theocharis Efthymiopoulos, Christopher Buccitelli, Maia Segura-Wang, Paul Northcott, Stefan M Pfister, Peter Lichter, Jan Ellenberg, Jan O Korbel  
Read the paper:  
<http://dx.doi.org/10.15252/msb.20156505>



## RESEARCH ARTICLE

## lncRNA DDSR1 maintains genome stability

Long non-coding RNAs (lncRNAs) are important players in diverse biological processes. Upon DNA damage, cells activate a complex signaling cascade referred to as the DNA damage response (DDR). Using a microarray screen, we identify here a novel lncRNA, DDSR1 (DNA damage-sensitive RNA1), which is induced upon DNA damage. DDSR1 induction is triggered in an ATM-NF-κB pathway-dependent manner by several DNA double-strand break (DSB) agents. Loss of DDSR1 impairs cell proliferation and DDR signaling and reduces DNA repair capacity by homologous recombination (HR). The HR defect in the absence of DDSR1 is marked by aberrant accumulation of BRCA1 and RAP80 at DSB sites. In line with a role in regulating HR, DDSR1 interacts with BRCA1 and hnRNPUL1, an RNA-binding protein involved in DNA end resection. Our results suggest a role for the lncRNA DDSR1 in modulating DNA repair by HR.

## A BRCA1-interacting lncRNA regulates homologous recombination

Vivek Sharma, Simran Khurana, Nard Kubben, Kotb Abdelmohsen, Philipp Oberdoerffer, Myriam Gorospe, Tom Misteli  
Read the paper:  
<http://dx.doi.org/10.15252/embr.201540437>

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FR-Paris, 14–17 June 2016

**Molecular and developmental biology of *Drosophila***  
GR-Chania, Crete, 19–25 June 2016

**Ribosome structure and function 2016**  
FR-Strasbourg, 6–10 July 2016

**Chemical biology 2016**  
DE-Heidelberg, 31 August–3 September 2016

**Lymphocyte antigen receptor signalling**  
IT-Pontignano, 3–7 September 2016

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DE-Potsdam, 2–7 October 2016

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*For a complete and up-to-date list of EMBO events please go to*  
**[events.embo.org](http://events.embo.org)**

## Upcoming deadlines

ERS-EMBO Fellowships  
31 January

EMBO keynote lectures  
1 February

EMBO Long-Term Fellowships  
12 February

EMBO Courses & Workshops  
1 March

**Innate immunity in host-pathogen interactions**  
DE-Heidelberg, 26–29 June 2016

**Actin in action: From molecules to cellular functions**  
DE-Heidelberg, 7–10 September 2016

**The complex life of mRNA**  
DE-Heidelberg, 5–8 October 2016

**Organoids: Modelling organ development and disease in 3D culture**  
DE-Heidelberg, 12–15 October 2016

## Other EMBO events

**EMBO Laboratory Management Courses**  
DE-Leimen, Various dates



## Next issue

*EMBOencounters*

The next *EMBOencounters* issue – **Winter 2015 | 2016** – will be dispatched in **February 2016**. Please send you suggestions, contributions and news to [communications@embo.org](mailto:communications@embo.org) by **11 January 2016**

## Editorial

**Editor, E-Newsletter**  
Yvonne Kaul

**Print & Web layout**  
Sandra Krahl

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Meryl Schneider

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Aditya Jati

EMBO | FEBS Lecture Courses  
1 March

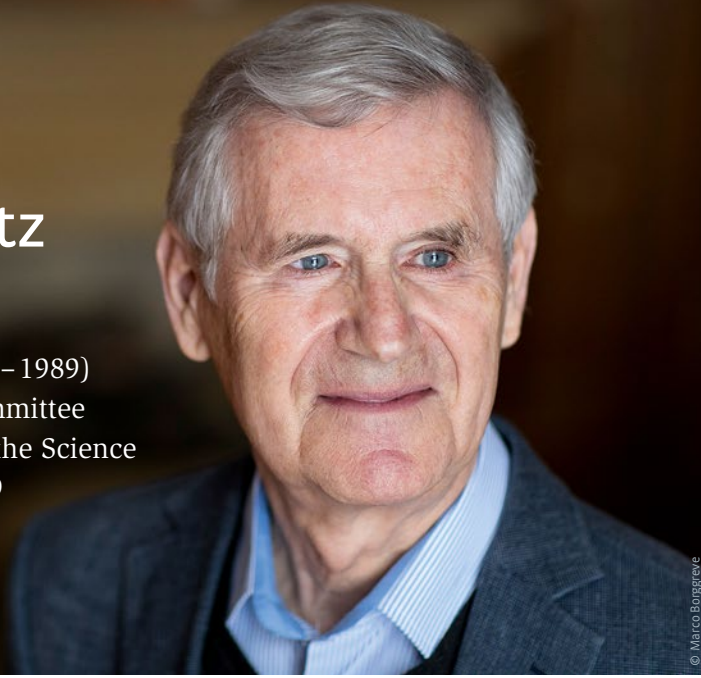
EMBO Young Investigators  
1 April

EMBO Installation Grants  
15 April

ERS-EMBO Short-Term Fellowships  
15 April

# A tribute to Gottfried Schatz 1936–2015

EMBO secretary General (1985–1989)  
Member of the Fellowship Committee  
(1979–1982), and Member of the Science  
and Society Committee in 1999



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Gottfried “Jeff” Schatz was proud of having been trained as a chemist – in the classic physical chemistry sense – where the taste and smell of chemicals were as important as precision measurements for guiding one’s scientific insight. But Jeff Schatz’ brilliant scientific career was actually as a biochemist who embraced and dissected two fundamental questions of cell biology: “Where does the energy-producing engine of our cells come from?” and “How are these mitochondria made?”

During 35 years the concept of “mitochondrial biogenesis” became synonymous with Schatz’ name. Two words that seemed to hide an infinite complexity of details were made simple by his razor-sharp intuition and gifted explanations. Jeff Schatz studied mitochondria in budding yeast partly because yeast is one of the few organisms that can live with non-functional mitochondria, in a form that was dubbed by French geneticists *petite*. Inspired by the implications of such genetic studies, Schatz used biochemical approaches to decipher the interplay of two genomes – the mitochondrial and the nuclear – and the machinery that assembles the proteins they encode into the elegant electron transport chain. This cascade of enzymes which extracts energy from the oxidation of sugars and fats to generate the high-energy intermediate ATP, was for Schatz one of nature’s great miracles.

Rarely has a field been so overwhelmingly shaped by one person. Results from the Schatz laboratory became embodied in textbooks shortly after they were published – so compelling were the elegance and logic of his work. Of course he was not alone in the field of mitochondrial biogenesis. The discoveries arising from the Schatz laboratory ricocheted off those of Walter Neupert, a highly successful, Munich-based biochemist, who studied a similar phenomenon in the mold *Neurospora*. But even Walter Neupert must have

been impressed by the elegance of Schatz’ experiments, the simplicity of his explanations, and the accessible way, in which complex phenomena were explained.

## Fundamental discoveries

What were Jeff Schatz’ discoveries? First, he and his first PhD student, Ellen Haslbrunner, showed by biochemical fractionation that mitochondria contain DNA, i.e. their own genome buried within the membrane-bound organelle. He showed that mitochondria did not arise *de novo*, but were self-reproducing: even anaerobically grown yeast that appeared to lack mitochondria contained pro-mitochondrial particles within which their genome was preserved. Proteins encoded and synthesized within mitochondria would then assemble with others that were nuclear-encoded and synthesized in the cytoplasm to form one of nature’s most elegant organelles.

Again using biochemical approaches, Schatz showed that only 13 proteins were encoded by the mitochondrial genome. The rest of the protein machinery that carries out fatty acid and sugar catabolism, electron transport and oxidative phosphorylation had to be specifically imported from the cytoplasm, processed and then assembled with the mitochondrial-encoded counterparts. His approach was classically biochemical, relying on fractionation and reconstitution. It was quantitative and molecular, yet with it he could explain many fundamental principles of cell biology. Piece by piece his laboratory made sense of sequences that target proteins to the mitochondria, of membrane channels that regulate translocation, and the processing and re-folding machinery that assembles the electron transport chain, requiring two membranes, two compartments, and an asymmetric spatial organization of enzymes. I remember how carefully he taught me the principles of enzymology and Christian de

Duve’s quantitative cell fractionation, for out of such basic principles, with each student and postdoc he trained, Jeff Schatz was helping spawn the new field of molecular cell biology.

## Exquisite gentleman and mentor

Jeff Schatz was extremely gifted. He was gifted in the sense of an artist, and possibly the insight that made him a great musical talent was the same that enabled him to render biological complexity elegantly simple. Above all, Jeff was passionate and caring, he was an exquisite gentleman of the sort that harkens back to a lost age, and he never stopped believing that great minds like his should share whatever insight they have about the richness of life with as many people as possible. Beyond those trained in his laboratory, Jeff Schatz schooled countless young scientists in the art of giving scientific talks. He wrote and lectured elegantly about science and nature to the general public, and he attempted to enlighten our leaders – in politics, industry and in academia – about the true nature of the scientific enterprise. He played a major role in European society at large by fostering awareness of the importance of scientific knowledge in our modern life.

For Jeff, culture and science were one; creativity he saw as a human gift that one must always foster and encourage, and his ability to write critically yet insightfully about scientific research and academic training set him apart from any other scientist alive. The entire world of science – not merely Swiss science – has lost one its greatest spokesmen.

.....  
Susan M. Gasser, Director  
Friedrich Miescher Institute for Biomedical Research

8 June

Early registration &  
abstract submission

2 September

Late registration

Save the date

the 7<sup>th</sup>  
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advancing the life sciences

2016

**Mannheim**  
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Conference  
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Brian **Charlesworth**  
Jan **Ellenberg**

Speakers  
include

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Patrick **Cramer**  
Caroline **Dean**  
Peter **Donnelly**  
Ronald N. **Germain**  
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20

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