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EMBO encounters

EMBO-India Partnership

EMBO expands its global reach

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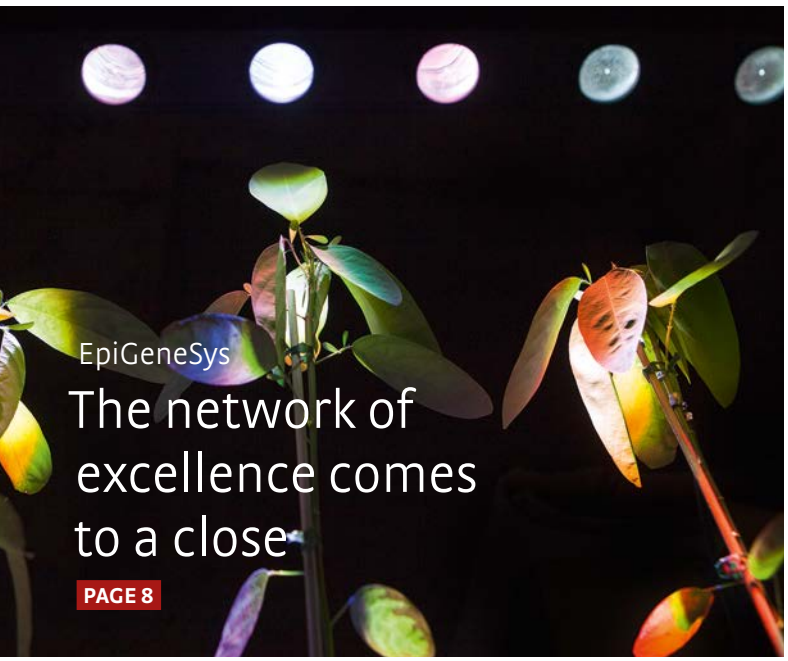

EpiGeneSys

The network of excellence comes to a close

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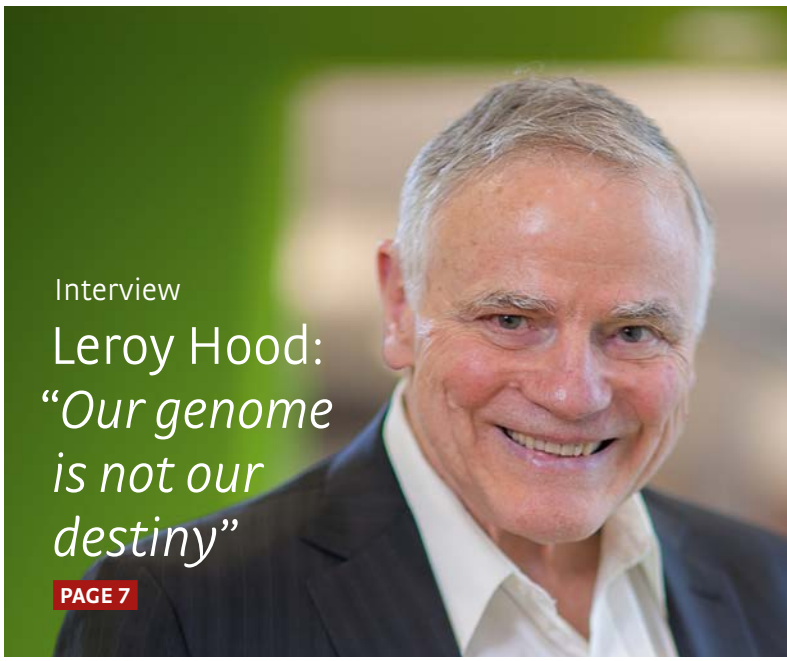

Interview

Leroy Hood: *"Our genome is not our destiny"*

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EMBO expands its global reach

EMBC, EMBO and Government of India's Department of Biotechnology sign cooperation agreement

Under the new agreement, India, as an associate member state, financially contributes to EMBC. In return, researchers working in India will be eligible for the full range of EMBO's programmes supporting talented researchers and stimulating scientific exchange. The eligibility of these researchers will be evaluated against the same criteria as those from other states, allowing international exchange.

"India can only succeed if we partner with the best everywhere to bring the best here."

VijayRaghavan,
State Secretary, Government of India

EMBO has been steadily increasing interactions outside of Europe during the past two decades. This cooperation is the latest accomplishment of EMBO's Global Activities strategy, which works to foster collaboration with scientists in non-European countries that show strength in life science research.

"We have been promoting international interactions beyond Europe, and India is one of our prime partners. I am extremely pleased that India now is an Associate Member and I look forward to India being able to access EMBO activities. Many European researchers already have established scientific connections in India. No doubt these will be strengthened further once more tools and formal opportunities for interactions are available," commented Maria Leptin, Director of EMBO.

An official launch ceremony took place in Delhi on 4 February 2016, and the Nobel Laureates and EMBO Members Christiane Nüsslein-Volhard and Ada E. Yonath joined a high-profile panel discussion. An EMBO-led delegation of ten researchers is visiting various institutes across the country and meeting with Indian scientists and government representatives. The visit started in Mumbai on 1 February and finished in Mohali on 8 February.

Maria Leptin and VijayRaghavan exchanging the signed agreement at the launching ceremony in New Delhi

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Maria Leptin, EMBO Director

Life sciences in India are developing fast, supported by governmental and academic initiatives to attract bright young people to science from inside and outside India. VijayRaghavan, Secretary of the Department of Biotechnology for the Government of India, who signed the agreement, said at the launch ceremony: "India is rapidly growing into a position where we are making extraordinary demands on ourselves. India can only succeed if we partner with the best everywhere to bring the best here."

The newly forged cooperation will build upon already existing links between Indian and European scientists. In 2015, ten Indian postdoctoral researchers received an EMBO Long-Term Fellowship to work in Europe, and eight India-based scientists received the EMBO Short-Term Fellowship. A satellite symposium focusing on research in India has been a part of the annual conference, *The EMBO Meeting*.

EMBO delegation arriving at the National Institute of Immunology in New Delhi

Scientific lecture at the Global Biotechnology Summit following the launching event

Panel discussion with Matthew Freeman, Christiane Nüsslein-Volhard, Satyajit Mayor, Ada Yonath, VijayRaghavan and Maria Leptin

Though the EMBC was founded by its member states as an intergovernmental organization to provide for cooperation among European States for life science research, EMBO as EMBC's execution body may expand its engagement with further states outside Europe. After Singapore, which signed a similar agreement in July 2015, India is the second country to acquire the status of EMBC Associate Member State. Four young scientists from Singapore have already joined the Young Investigator Programme. "In addition, EMBO has cooperation agreements with South Africa and with the Taiwanese Ministry of Science and Technology. Discussions are underway with other potential partner countries, particularly elsewhere in Asia and in South America," said Anne-Marie Glynn, Manager in charge of EMBO's Global Activities.

Further reading:
Official India-EMBO Partnership Symposium webpage: india.embo.org
Website of the Department of Biotechnology / Government of India (including recordings of the scientific presentations and talks): indiabioscience.org
Personal impressions and thoughts from EMBO Member James Briscoe: [thenode.biologists.com/far-india-europe/discussion/]

Indo-French connections

EMBO Member Carsten Janke initiates a cytoskeleton seminar in Pune

EMBO engagement in India has gone a long way and builds upon many already existing links between Indian and European researchers. One example is a conference on cytoskeleton research that took place in Pune last October co-organized by EMBO Member Carsten Janke of the Institut Curie in France.

"Frontiers in cytoskeleton research: coordination, adaptation, fine-tuning" was the title of the three-day seminar. The meeting brought together leading experts with different perspectives on cytoskeletal functions – *in vitro* as well as in cells. The workshop turned out to be a high-level platform for intense and focused discussions, which "will certainly result in active research collaborations and joint grant proposals in the future," Janke is convinced. The 20 participating group leaders talked about novel frontiers to be addressed in future and how these challenges can be mastered by combining complementary expertise and knowledge in interdisciplinary research.

The idea for the workshop was born in 2013, during an EMBO-India Bioscience meeting that was held in Bangalore and organized by the EMBO Young Investigators Programme. "It was my first visit to India. I was thrilled by the great institutes and the high-level science I saw there," recalls Janke. On this occasion, he visited various research institutes in Bangalore, Pune and Mumbai and established contacts to local researchers. Together they decided to set up a platform of exchange between French and Indian group leaders and students. One year later, Roop Mallik of the Tata Institute of Fundamental Research in Mumbai and Aurnab Ghose of the IISER Pune teamed up with Janke to submit a workshop proposal to the French-Indian exchange program CEFIPRA, which promptly selected it for funding.

"France has never been closer to India," tweeted EMBO Young Investigator and speaker Manuel Thèry on the second day of the cytoskeleton seminar. There are already plans for a follow-up conference – this time on French territory.

www.iiserpune.ac.in/events/Indo-French+Conference+on+Cytoskeleton+Research

The conference *Emerging Biotechnologies: Hype, Hope and Hard Reality* focussed on the social impact of innovative biotechnologies, particularly in the fields of human health and the environment. An interdisciplinary and international group of 17 speakers and about 200 participants from Europe and beyond gathered for two days in the auditorium of the Advanced Training Centre in Heidelberg last November. The discussion topics included the roles and responsibilities of stakeholders in realising the potential economic and societal benefits of these technologies; issues such as governance, ownership, and innovation were also discussed.

Modern medical biotechnology is the most widely applied area of biotechnology and a number of talks were dedicated to it. The speakers on this topic illustrated the potential benefits of these applications for patients as compared to existing therapies, and highlighted their limitations and the challenges of bringing them to the market. The range of applications presented was very broad, ranging from CRISPR-Cas9 (Dirk Heckl), to stem cell and gene therapy (Luigi Naldini), tissue engineering (Paolo de Coppi), and genetic modification of mosquitoes to fight dengue fever (Simon Warner).

Another session, dedicated to biotechnologies and the environment, included talks on synthetic biology (Sven Panke), bioremediation (Victor de Lorenzo), the production of plant natural products and new-to-nature chemicals (Anne Osbourn), and the use of genetic markers to monitor and possibly restore animal species (Carsten Nowak).

Some highlights from the conference

The recently developed CRISPR-Cas9 technology for gene editing was a focus of the conference. Dirk Heckl from the Hannover Medical School in Germany presented and discussed the many potential applications of what has been defined as the game changer in genome editing. Due to its simplicity, efficiency and low cost, the CRISPR-Cas9 system can be used in all fields of biomedicine, from basic research to clinical applications. Moreover, in agriculture, CRISPR-Cas9 can be used to modify crops without combining DNA from different species, potentially putting an end to public concerns that mixing DNA of different species will have undesirable consequences.

Along with the enthusiasm about its potential, CRISPR-Cas9 genome editing has also raised concerns both inside and outside the scientific community. These concerns relate in particular to its potential use in editing the human germline, resulting in changes being passed on to future generations. More research is needed to prove that the technology is safe and that genome edits occur in the desired position. Moreover, the possible application of CRISPR-Cas9 to germ-line editing has revived international ethical and policy discussions about whether research involving the human germ-line should be allowed at all, and about the roles and responsibilities not only of scientists, but of many other social groups, in taking decisions on the use of this technology.

Luigi Naldini, Director of the San Raffaele Telethon Institute for Gene Therapy in Milan, presented his work which uses a novel combination of old technologies, stem cell therapy and gene therapy: the development and application of HIV-based vectors to deliver blood stem cell gene therapies. Gene-transfer efficacy and safety have long been the major problems for gene therapy, but Naldini's team has developed new techniques that seem to have overcome these problems and recently produced results in two clinical trials for the treatment of rare diseases in children, raising hopes and expectations of cures for devastating genetic diseases. In this area there is often a tension between patients, their families, scientists and doctors, who are eager to test research advances in the clinic as soon as possible to treat some otherwise lethal diseases, and regulators, who, in order to protect patients, take a cautious approach and often impose controls that are thought to delay progress.

In the session about biotechnologies and the environment, Anne Osbourn, project leader at the John Innes Centre in the UK, talked about the fantastic contribution of plants to important pharmaceutical and industrial products. Biotechnology has opened many alternative routes in the production of plant products. A well-known example is artemisinin, an antimalarial drug that is naturally produced by sweet wormwood. Using synthetic biology techniques, scientists have succeeded in producing synthetic artemisinin from yeast in much higher quantities and at lower prices than that derived from traditional cultivation.

The talks and slides from the conference are available at: http://events.embo.org/science-society-conference/online-talks.html

Biotechnology work by the EMBO Science Policy Programme

There are many concerns that arise from biotechnology applications. Some of them are old, like the ethical issues related to modifying the human germ-line or the potential environmental impacts of introducing new plant varieties. But the continuous advances in scientific knowledge and the ever more refined technologies available have opened new possibilities for a growing number of scientists to develop new products with more ease. EMBO, among other organizations, is monitoring these developments, and aims at ensuring that science is carried out for the benefit of society.

As an example of EMBO's interest in developments in biotechnology, the Science Policy programme organized in December 2014 an exploratory workshop, supported by the European Science Foundation, on *The use of non-anonymized human genome sequence in research: Science and policy*. The interdisciplinary group of participants evaluated current knowledge and revealed scientific and governance gaps in the use of human genome data intentionally made identifiable for research purposes. Main questions were: 1) How much phenotypic and medical information do researchers need in order to extract useful data from genomes? 2) What does the consent process look like for making genome sequence publicly available? 3) How much interpretation of data do researchers owe to research participants? 4) How would "misuse" of genetic information be identified and punished?

The report is available at: www.embo.org/science-policy/biotechnology-and-genomic-technologies

Recent activities:

- Brocher Foundation-supported workshop on *The genomics of human cognition and psychiatric disease*, 7–10 December 2015
- ESF-supported Workshop on the *Use of non-anonymized human genome sequence in research*, 10–11 December 2014.

Leader in stem cells and outstanding role model

FIONA WATT wins the 2016 FEBS | EMBO Women in Science Award

© Centre for Stem Cells and Regenerative Medicine London

Ever since she was a child she knew that she wanted to be a scientist: dressed in a child's lab coat she used to play with a chemistry set and keep pet newts. "Like many scientists I could not conceive of being anything else," she says. Today, Fiona Watt is Director of the Centre for Stem Cells and Regenerative Medicine at King's College London and looks back at a successful career that spans more than 35 years. In February, she was announced winner of the 2016 FEBS | EMBO Women in Science Award for her achievements in epidermal cell biology and epidermal stem cells.

Much of Fiona Watt's work has focused on the stem cells of mammalian skin and the molecular and genetic pathways that work together to control epidermal stem cell proliferation and differentiation. She has made numerous fundamental discoveries, most recently about how the epidermis interacts with different classes of dermal fibroblasts, and how these normal signalling mechanisms go awry in cancer and skin disease.

Over the past few years, the British biologist has focused on using new technologies to understand what controls the fate of human epidermal stem cells. She was one of the first to discover that processes such as inflammation, physical forces and epigenetics influence skin stem cell behaviour.

The award winner was also recognized for her commitment to gender issues, her leadership qualities and her active mentorship of junior scientists. In a series of interviews she held with 24 female scientists she exposed the barriers and challenges that women who pursue a career in science face. The interviews were published in the *Journal of Cell Science*, for which she served as Editor-in-Chief for almost a decade, until 2011. The stem cells expert also played a key role in promoting the British government's investment in stem cell research.

"Her research continues to be at the cutting edge," said Brigid Hogan of the Duke University Medical Center in Durham, United States. "She has boundless energy and enthusiasm, and in her leadership positions she has worked tirelessly to build interactive and collaborative research communities."

The 2016 FEBS | EMBO Women in Science Award of 10,000 Euros will be presented to Fiona Watt on 6 September at the *FEBS Congress* in Ephesos/Kusadasi, Turkey, where she will give a special lecture.

To find out more about the award and Fiona Watt's career steps see press release at: http://embo.org/news/press-releases/press-releases-2016/2016-febs-embo-women-in-science-award

Unravelling synthetic biology

"Synthetic Biology Course", managed by iBiology in collaboration with EMBO, is a series of online talks launched last January (see also *EMBOencounters Summer 2015*). It covers general principles, technical challenges, current research and ethical issues in synthetic biology research. The series was linked to the EMBO Practical Course "Synthetic Biology in Action" that took place in Heidelberg last June.

The very first lecture was given by Victor de Lorenzo of the Spanish National Centre for Biotechnology. He answered basic questions about what is synthetic biology and how it relates to other areas of biology. So far, eighteen lectures have been recorded with more than 5,000 downloads. De Lorenzo's talk – next to Timothy Lu and Jan van der Meer – are the most popular ones. The lectures were recorded at EMBL in Heidelberg.

Victor de Lorenzo speaking about synthetic biology on iBiology.org

© EMBO/iBiology

To watch all lectures go to: www.ibiology.org/ibioeducation/taking-courses/synthetic-biology-course.html

Life Science Alliance between EMBL and Stanford

Inspired by his dual affiliation, EMBO Member LARS STEINMETZ initiates a new transcontinental collaboration kicked off at the Personalised Health Conference at EMBL.

"You can't list your iPhone as your primary-care physician," reads the caption to a recent *New Yorker* cartoon. Yet this is not such a distant vision as we might think. Today a smartphone can measure sleep patterns. Many people carry external sensors to measure pulse and physical activity. "In the future we will probably have thousands of biosensors on our body that register information about various molecular parameters to deliver better, more personalised care," predicts Lars Steinmetz.

Steinmetz is Professor of Genetics at Stanford University School of Medicine, Co-Director of the Stanford Genome Technology Centre and Associate Head of the Genome Biology Unit at EMBL. He was the initiator of the first *EMBL | Stanford Joint Conference* that took place at EMBL in November 2015 and focused on personalised health. The meeting brought together scientists, clinicians, patient advocates, funders and ethicists discussing the progress and promise of personalised health.

"We had a meeting on -omics and precision health three years ago. The field has moved a long way since then. Personalised health has become more of a reality today," says Steinmetz. He defines personalised or precision health as a systematic, proactive approach to medicine that emphasises maintaining wellness as well as treating disease. Through comprehensive data analysis, personalised health will enable more targeted treatments and the prevention of disease before it arises.

Conference co-organizer Lars Steinmetz: "Personalised health has become more of a reality today".

Gathering genome sequence information for a growing number of individuals is only the beginning. Today there are several hundred actionable variants that can be obtained from genome sequencing – depending on how actionable is defined. Even more important will be personal molecular profiling to analyse disease and manage health – the collection of additional information including epigenome, transcriptome, proteome, metabolome and microbiome data. The integration of these interdisciplinary datasets is necessary to tackle the challenges in precision health.

A collaboration between Stanford University School of Medicine and EMBL was launched at the conference and is poised to help realize these efforts. The *Life Science Alliance* will foster interaction between both institutions across several domains enabling scientific cooperation, staff and postdoc exchange, joint symposia and workshops, mutual access to leading facilities and training.

"I have had a laboratory between EMBL and Stanford for twelve years now and I want to bring the benefits that I experienced from having this double affiliation to other people," says Steinmetz who coordinates this transcontinental Alliance. He and his colleagues envision a partnership that enables high-risk, high-gain projects, strengthens links between Europe and the US and leverages complementary strengths. "This alliance is a win-win situation for both partners," he is convinced. It will also open up new funding opportunities, as funding bodies and private donors might be interested in supporting research efforts that span the Atlantic.

"This is a wonderful collaboration that has arisen from the faculty, from the scientists enjoying the synergies. I am eager to see it going to the next levels," said Lloyd Minor, the Carl and Elizabeth Naumann Dean of Stanford University School of Medicine, in his talk at the official kick-off ceremony on day four of the conference.

Particularly in the area of genome biology, Stanford and EMBL complement each other very well as Steinmetz explains. EMBL is a leader in the integration of laboratory expertise with computational know-how. Its strength in basic sciences meshes very well with clinical applications developed at Stanford. In addition to a strong expertise in basic science, Stanford is a leader in clinical applications and engineering technologies. These could be brought to the EMBL system and disseminated through the core facilities to the European audience via EMBL's infrastructure.

The *Personalised Health Conference* will be repeated in Stanford in two years. In parallel, there will be conferences in structural biology and biological imaging.

"We hope we can impact healthcare in the next 10–15 years," said Lloyd Minor. He has made precision health a focus of the Stanford School of Medicine. "What we hope to do in precision health is to create a delivery system and pathways of care that are predictive and preventive." The transition will not happen over night though. There have been changes with more precise treatment, in cancer for example, but those are still the exception rather than the rule.

Yet the field has already come a long way. Today even governments have ushered in a change: in the United Kingdom, *Genomics England* launched the 100,000 genomes project last year. In the United States, President Obama and the White House have announced a precision medicine initiative, which involves a cohort of one million individuals. Keynote lecturer Lee Hood of the US-based Institute for Systems Biology explained the concept of *Transforming Healthcare through Wellness* in his talk (see also interview next page). Major governments are coming on board. Even funding agencies are changing their approach: The National Institutes of Health in the United States have made precision medicine a major priority.

The use of mobile devices is just one tiny part in the mosaic of new methods needed to drive the change. As Minor remarked in his talk, by 2020 eighty per cent of the adult population will own a smartphone. The devices might be used to monitor people's blood pressure, glucose levels and heart rhythm and to alert the doctors when risk factors start to show for a particular person. "If today we can monitor billions of credit card transactions in real-time, surely we can monitor physiological parameters too," said Minor. "We have not gotten there yet but it is coming." So even if the smartphone in your pocket will never entirely replace a doctor, it might in future do a lot more than just connect to the internet – it may one day provide a window into your health.

www.embl.de/training/events/2015/PEH15-01/
http://med.stanford.edu/
www.genomicsengland.co.uk/the-100000-genomes-project/

Our genome is not our destiny

EMBO Associate Member LEROY HOOD is president of the Institute for Systems Biology (ISB) in Seattle, United States, and senior editor of EMBO's open access journal *Molecular Systems Biology*. At the first joint EMBL | Stanford Personalised Health Conference he presented his vision for P4 Medicine – predictive, preventive, personalized, and participatory. In a keynote speech, he described the 100K Wellness Project he launched last year as president of the Institute for Systems Biology. The study aims to track the biometrics of 100,000 participants over 20 years. The pilot study involving 108 participants was concluded in 2014. In an interview with Thomas Lemberger, chief editor of *Molecular Systems Biology*, Hood talks about how he defines wellness and his objective to provide actionable information to the participants of the study.

Why do you focus on wellness?

In classic healthcare, physicians wait until the patient exhibits visible symptoms of a disease. This however generally happens only long after the initial transition from a healthy state to disease. And after this long period following the intitial transition the disease often becomes irreversibly altered. I think that wellness is the fundamental key to health in the future. The reason for this is really twofold. Firstly, one needs to optimize the wellness of the individual to maximize their human potential – feeling well both mentally and physically. Secondly, we need to be able to follow the wellness to disease progression to identify the very earliest point of change. Analyzing this critical earliest disease phase will allow one to develop diagnostic and therapeutic approaches that can revert back to wellness immediately. In a sense, this is "preventive" medicine: We want to take all the common diseases, figure out what the earliest transitions are and develop approaches to revert them back to wellness immediately.

What is the Hundred Person Wellness Project?

Two years ago we invited 108 volunteers to be intensely monitored for a ten-month-study. The aim of the study was to identify actionable possibilities that could improve their wellness or assist them avoiding disease. The study collected data at daily and three-month intervals. Each participant had their whole genome sequenced at the beginning and every three months provided samples of blood, saliva, urine, and stool for clinical parameters analyses, metabolite, proteomics measurements and microbiome profiling. We also used wearable devices to gather quantitative longitudinal data on physical activity, pulse and quality of sleep.

What did this pilot study reveal?

It turned out that every single one of the 108 individuals had multiple actionable possibilities during the course of the study. For example, we found that 53 of them were pre-diabetic and five per cent of them actually had chronic diseases without being aware of it.

One participant was a poster-child example of having an unknown chronic disease. He displayed a gradually increasing degree of arthritis that prevented him from hiking with his wife. His genome sequence revealed that he was homozygous for the genetic defect of hemochromatosis. Only about 30 per cent of these homozygous individuals go on to get the actual disease. Two observations suggested this individual had active hemochromatosis. First, blood tests revealed that his iron levels were very high. Second, arthritis can be one early finding of this disease. Moreover, hemochromatosis can progress to a serious chronic disease as it can attack the pancreas (diabetes), the liver (fibrosis) and the heart (decompensation). Thus, his health coach advised him to go to a doctor. Hemachromatosis is actionable and can be managed by bringing down the blood iron levels by removing a unit of blood every month until normal iron levels are achieved. After these treatments, his arthritis disappeared and his hemochromatosis was under control. He is one of a number of examples we achieved in reversing disease transitions.

What was the participants' feedback?

Most individuals felt that this was a really transforming experience because they understood that their genome is not their destiny. Indeed, many learned that changes in lifestyle could control the consequences of many genetic defects. They realize with enough information that they could take control of their own health. I feel that this is an important step in bringing down the costs of healthcare. They also began to realize that the journey of scientific wellness is probably going to be life-long journey and not just for a month or a year. Indeed, as more and more data are accumulated, new kinds of actionable possibilities are being uncovered, opening up new opportunities for each individual to further optimize their own wellness. Most people were so enthusiastic that the vast majority of them have gone on to the next stage of this programme.

The next stage is the creation of a consumer-facing scientific wellness company that utilizes the scientific wellness strategy described above. We easily raised about 40 million US dollars to fund this company. In just six months we have recruited more 1000 people and now we have a long waiting list. It is very likely that within 18 months we will have 10,000 individuals with dense and dynamic personalized data clouds – meaning that we will have more than hundred times as much data as we have today available for analysis.

Are there clear boundaries between wellness and disease?

No, the boundaries are not clear. If you look at definitions of wellness they are all psychiatric or psychologically-oriented definitions. What we found is that by identifying actionable possibilities from each individual's dense and dynamic data cloud, you can deal with wellness in a more objective manner – specific for each individual. Moreover, in analysing individuals that transition from wellness to greater wellness, we can begin to identify blood biomarkers for wellness that will provide a quantitative assessment of wellness – eventually both physical and mental.

Interview continues on the next page →

How did the participants' physicians react to the study?

A third of the physicians were absolutely enthusiastic and wanted to learn all about it. A third were indifferent – they were too busy to think about it. And a third of them had concerns about the project. I think for the latter group it was mostly a defensive reaction to something they did not understand. A key task we have ahead of us is to educate physicians as to the benefits of scientific wellness.

How does your approach fit with the role of the FDA?

The FDA has a responsibility to prevent direct-to-consumer companies, such as Arivale, from practicing medicine. Hence Arivale has been very careful to avoid any hint of practicing medicine. We have MD's analyse the individual data and talk with the coaches about what are appropriate actionable possibilities. We obviously learn a great deal about individuals that we cannot communicate to them because this would be view as practicing medicine (e.g. pharmacogenomics variants that provide insights about how individuals react to common drugs).

What will it take to bring the scientific wellness approach to clinics?

We need to convince the payers (insurance companies) that the scientific wellness approach is really going to save healthcare dollars. I am confident that if we can develop ten thousand dense and dynamic data clouds we will have enough examples to begin to set up compelling economic and social arguments for this approach. In fact, we are beginning to approach healthcare systems to convince them to become payers directly in order to benefit from savings that come from scientific wellness.

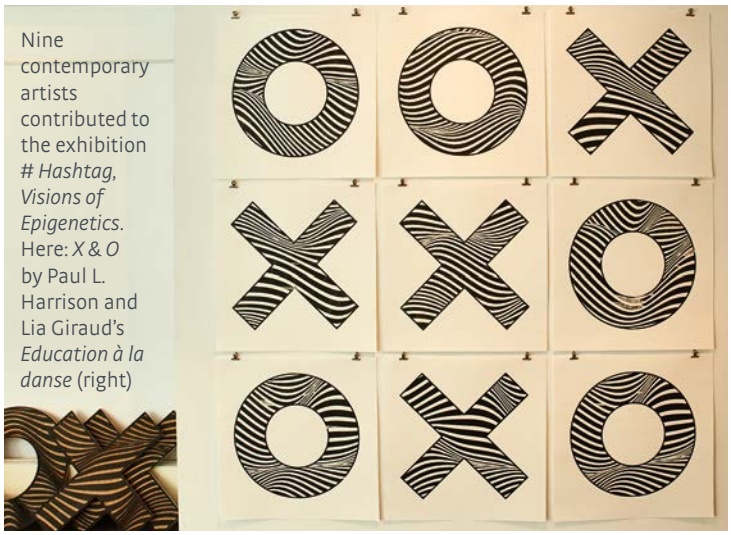
Which technological developments are you particularly interested in for longitudinal personal phenotyping?

In wellness, one of the things you want to do is to measure complex traits that integrate many different types of physiological information. A great example is heart rate variability: it beautifully integrates parasympaphetic and sympathetic nervous system activity. A restricted heart rate variability is unhealthy and often reflects some type of disease.

Facial features represent complex phenotypes and potentially are a rich source of systems-integrated information. What computer facial recognition software can achieve these days is incredible. Leveraging this technology to explore how dynamical facial measurements relate to disease transition is going to be fascinating.

We are also working on a protein chip to get 2500 organ-specific proteins: fifty proteins from each of 50 different organs. From a drop of blood once a month these assays will allow you to follow wellness to disease transitions for all of your major organ systems. Once you set such assay systems up they are infinitely stable.

There are two areas we consider really important in the future. One is the immune response, which is involved in every disease and many aspects of wellness. The other thing I want to do deep phenotyping on is the brain. I would like to be able to map specific changes in different regions of brain. Those are the areas of opportunity that I really see coming: Obtaining and measuring more complex phenotypes and going deeply into systems that are really critical for humans. The immune system is one of them and the brain another one.



Nine contemporary artists contributed to the exhibition *# Hashtag, Visions of Epigenetics*. Here: *X & O* by Paul L. Harrison and Lia Giraud's *Education à la danse* (right)

© Ulysse Fiévé

© Lia Giraud (PSL/EnsadLab/La Paillasse)

EpiGeneSys final meeting in Paris

After five-and-a-half years, the FP7 Network of Excellence EpiGeneSys (Moving Epigenetics Towards Systems Biology) will reach the end of its lifetime as an EC-funded initiative at the end of March 2016. Led by EMBO Council member Geneviève Almouzni, director of the Research Centre at Institute Curie and coordinated by the Centre National de la Recherche Scientifique (CNRS), the network has outgrown its beginnings of 22 teams and now unites more than 170 laboratories all across Europe from the areas of epigenetics and systems biology.

The focus of the EpiGeneSys research programme lies on using computational methods and mathematical modelling to address key questions of epigenetics. The network's interdisciplinary approach has demonstrated how synergies between disciplines help to provide comprehensive answers to current scientific challenges. So far, almost 360 papers have been published stemming from EpiGeneSys research.

The network put a special focus on career development with a programme for junior group leaders. The 20 young PIs selected through open calls have put their stamp on the activities of the network, and in turn benefitted from the opportunities offered. Suzana Hadjur, group leader at University College London, describes her experience: "The RISE1* programme has been instrumental in the success of my young group. First, it has given me access to the best scientists in Europe, all of whom have been very supportive and receptive to idea exchange. Secondly, the programme has specifically encouraged collaborations between systems biology and basic biology groups, which has dramatically enriched my research."

EpiGeneSys also includes an extensive training scheme: 850 young scientists attended seven courses, ten workshops and two summer schools, as well as four open calls for small research projects, all dedicated to building a bridge between epigenetics and systems biology. Additionally, the lab exchange programme has supported approx. 600 days of training for junior researchers. A *Science in Society* programme sought to leave the confines of the ivory tower: The research of the network inspired nine contemporary artists, who contributed last May to the exhibition *#Hashtag, Visions of Epigenetics*, which attracted several hundred people on the opening night alone.

It is clear that the network has to continue in one way or another. Coordinator Geneviève Almouzni sees the final meeting that took place from 11 – 13 February in Paris, as a new beginning for promoting scientific exchange, mentoring and training opportunities. The main objective is to take scientific interaction to an international level beyond Europe.

www.epigenesys.eu

* RISE1: Research Integrating Epigenetics and Systems Biology

From Parkinson's Disease to ubiquitin

Mechanistic studies on a few curious proteins associated with familial Parkinson's disease have led researchers in the EMBO community on a journey to cast surprising new light on the universal cellular ubiquitin modification system.

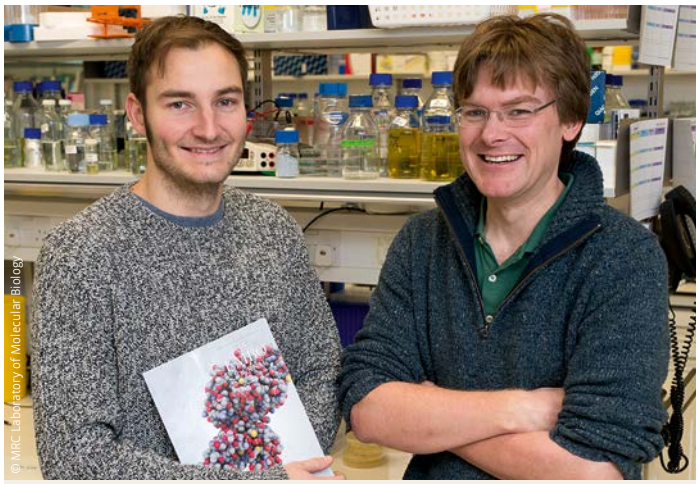
Neurodegenerative disorders, including Alzheimer's (AD) and Parkinson's disease (PD), have become a major burden especially in Western societies. They usually unfold gradually due to sporadic mutations as people age, and consequently the molecular causes of these pathologies have been difficult to understand and reconcile into unifying schemes. However, less frequent familial forms, often developing already early in life, have been causally linked to inherited mutations in specific genes, whose study may therefore shed light onto underlying disease mechanisms. This is why EMBO Young Investigator Helen Walden, when starting her own lab at CRUK's London Research Institute, focused on a protein called Parkin. Mutations in the parkin gene are among the most frequent causes of hereditary early-onset PD, but it was not clear how all of these mutations affect the Parkin protein, a ubiquitin ligase capable of linking chains of ubiquitin to itself and to other substrate proteins. With an interest in ubiquitination mechanisms originating from her postdoctoral research, Helen decided to characterize wild-type and mutated Parkin proteins *in vitro*. Looking at full-length Parkin, a multi-domain protein, she surprisingly discovered that it is not constitutively active as commonly assumed, but auto-inhibited by one of its accessory domains. Several disease mutations cluster in this ubiquitin-like (Ubl) domain, so-called for its sequence resemblance to ubiquitin itself. Strikingly, when introduced into the recombinant protein, these mutations disrupted the intramolecular interactions and resulted in loss of auto-regulation, suggesting for the first time how they affect Parkin function in cells.[1]

Further understanding of Parkin function and the effect of PD mutations required insights on Parkin's molecular structure, but despite his curiosity, structural biologist David Komander at the MRC Laboratory of Molecular Biology (LMB) in Cambridge initially shied away from such a project. "Since I knew that several groups had been trying to achieve this for a while, I told my student to rather focus on related proteins", says Komander, also an EMBO Young Investigator at the time and now EMBO Member. However, his student Tobias Wauer was undeterred and while proceeding with his main project, continued with attempts to crystallize Parkin constructs on the side. "Only when he had his first promising results did he admit this to me", Komander recounts, "and after that everything went very fast. Because of rumors about competing studies, we submitted a manuscript to *The EMBO Journal*, where we knew that we had 'scooping protection' while under consideration." Their crystal structure showed Parkin's ubiquitin ligase domain in the auto-inhibited state, and together with three related structural studies appearing at the same time, helped to understand several more disease mutations in the protein.[2]

But how was Parkin activated? Helpful clues came from the study of another protein, PINK1, whose gene is also the target of hereditary PD mutations. PINK1 is a protein kinase involved in Parkin activation, and strikingly, it turned out to directly phosphorylate both ubiquitin and the Parkin ubiquitin-like domain on corresponding residues. With this information at hand, both Komander and Walden, together with collaborators and alongside the group of Kalle Gehring at Montreal's McGill University, could now structurally and biochemically define how binding of phosphorylated ubiquitin released the Ubl domain from Parkin's ubiquitin ligase module, and how subsequent phosphorylation of the Ubl domain further facilitated Parkin release from auto-inhibition.[3,4,5,6] Says Walden, now at the MRC Protein Phosphorylation and Ubiquitylation Unit in Dundee, "It was immensely gratifying to finally see all Parkin domains at atomic resolution, providing a molecular explanation of our puzzling initial observations and interpretations."

While there is still a long way to go towards fully understanding the molecular pathology of Parkinson's Disease, the exciting new findings about Parkin auto-regulation may in time enable the design of therapeutic compounds that trigger Parkin activation despite PINK1 or Parkin mutation, and hence rescue disease phenotypes. However, they have also revealed intriguing insights into the universal cellular regulatory mechanism of ubiquitin conjugation, whose seminal discovery had been honored with the 2004 Nobel Prize in Chemistry to EMBO Members Avram Hershko and Aaron Ciechanover. Ubiquitin consists of only 76 amino acids and was generally considered an inert post-translational modifier, but as the Komander lab could show in additional work, its own post-translational modification by PINK1 phosphorylation not only affects enzymatic conjugation and deconjugation of ubiquitin, but can also alter its three-dimensional conformation.[7] "That the well-known and intensely studied ubiquitin molecule undergoes such conformational change is mind-boggling, and suggests there may be yet-unidentified binding partners for the new conformation", says Komander. So the journey from disease pathology to basic cell biology and back is sure to continue, with more exciting findings to come.

Helen Walden



David Komander with his student Tobias Wauer (on the left)

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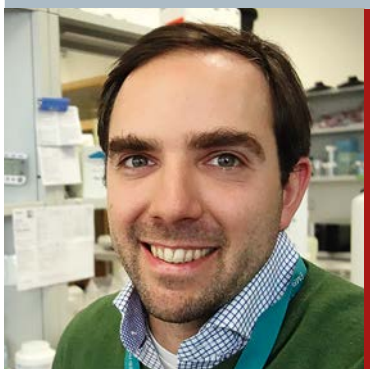
By Hartmut Vodermaier
Senior Editor, *The EMBO Journal*

MEET THE SCIENTIST

EMBO INSTALLATION GRANTEE 2015



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Sebastian Glatt

2015 EMBO Installation Grantee
Malopolska Centre of Biotechnology (MCB), Jagiellonian University, Krakow, Poland

What made you go to Poland? My position as a Max Planck Research Group Leader outside of Germany is quite unique and offers lots of opportunities and responsibilities for a junior group leader. I was very interested in the opportunity to act as a link between a new research institute in Poland and an established research institution abroad. And Krakow is a truly beautiful city and in many aspects reminds me of Vienna, my hometown.

What were your first five months like at the MCB? The team around Kazimierz Strzałka (MCB Director) was very helpful during the installation phase and after merely a few weeks we were able to conduct the first experiments. In addition, the EMBO Installation Grant allows me to carry out additional research ideas. I have also been very lucky that several young scientists with excellent international backgrounds joined my team right from the start, which made the hard and stressful work of establishing the lab a great team-building experience.

Changing directions Originally, I am a trained cell biologist who turned into a structural biologist and protein biochemist during my time at EMBL in Heidelberg. I am fascinated by the atomic details that x-ray crystallography and electron microscopy provide these days, but for me the translation of structural information into functional knowledge is still the most exciting moment in science. I would like to specifically acknowledge my former boss, Christoph W. Mueller, who has strongly supported and mentored me over the last few years.

What are you working on at the moment? My group is interested in the detailed structural and functional characterization of tRNA modification enzymes and other macromolecular complexes involved in the control of protein synthesis using x-ray crystallography, electron microscopy, biochemistry and cell biology. The resulting tRNA modifications act as gatekeepers for cellular proteomes. Alterations of these modification pathways in humans are associated with the onset of neurodegenerative diseases, specific cancer types, and also affect intellectual capabilities.

EMBO ADVANCED FELLOW 2014

© private

David Schwefel

2014 EMBO Advanced Fellow
The Francis Crick Institute, London, United Kingdom

What fascinates you about structural biology? As a structural biologist, I am fascinated by the possibility of obtaining direct insights into the inner workings of cells, and the possibility of generating testable models of cellular processes. Specifically, I am interested in how viruses hijack the cellular protein degradation machinery to get rid of antiviral host factors. Here, you can learn a lot about viral replication itself, and what mechanisms the host uses to fight virus infection. In future, I would also like to extend these studies to learn how specificity is generally achieved in protein degradation and how the degradation machinery could be modified.

How did the EMBO Advanced Fellowship help your career? The EMBO Advanced Fellowship was very important to bridge the gap between the end of my first two postdoc years and the present time. We already had important results, but the additional funding allowed us to complete our work. Furthermore, the funding gave me freedom to write a successful grant application and to start preliminary experiments for the next stage of research. In my opinion, it is impossible to achieve all this with only two years of postdoctoral funding.

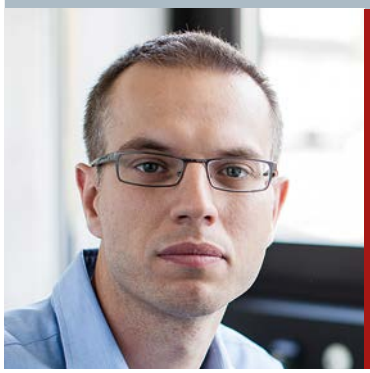
In May, you will establish your own laboratory at the Charité. How excited are you about moving to Berlin? I am very excited to move on to my new DFG-funded position in Berlin, and about the chance to pursue my own line of research. It will be hard work, but now we also have more hands to do it. I am very grateful for this opportunity.

What does it mean to you to be part of the EMBO network? The EMBO network is the cornerstone of my scientific career. The Long Term Fellowship provided me with the means to gain international research experience, which I value very much, and the Advanced Fellowship allowed me to continue and extend the work. Moreover, *The EMBO Meetings* are always a good opportunity to learn something new and to meet old and new friends. Especially, I would like to recommend the EMBO Laboratory Management Courses, which introduce new lines of thinking into the daily lab and office routine.

What is your vision for your research & career? I would like to continue to pursue solid and innovative basic research in order to add to the understanding of my specific area of work and life sciences in general.

MEET THE SCIENTIST

EMBO YOUNG INVESTIGATOR 2015



Martin Jinek

2015 EMBO Young Investigator
University of Zurich, Switzerland

What do you like about being a scientist? What I like most is having the freedom to pursue my natural curiosity and study the molecular basis of life. Doing an experiment that gives an interesting result and realizing that you might be the first person in the world to discover something new is a great feeling. Having had my own research group for three years now, I also discovered that I really like working with people. I still think that running an academic research lab the best job in the world. It can be stressful sometimes, but it's a lot of fun too.

What is it that you do not like? I do not like it when science gets political and when personal clashes get in the way of doing good science.

What was your career like before and after CRISPR? I am a chemist by training and I did my PhD in structural biology, specifically X-ray crystallography. Due to my interest in RNA biology, I chose to go to Berkeley to Jennifer Doudna's lab to study RNA-mediated gene regulation for my postdoc. There, I initially worked on projects (some successful and some not) focusing on macromolecular complexes that mediate microRNA-guided RNA silencing. I got involved in the CRISPR-focused effort in the Doudna lab by collaborating with students and postdocs who needed help solving crystal structures of CRISPR-associated proteins. Thanks to this, I gradually became more interested in the CRISPR systems and was looking to work on my own standalone project. I ended up picking Cas9 and the rest, as one might say, is history.

Is the hype around CRISPR helpful for your own research agenda? The CRISPR revolution has certainly helped to get exposure for my new lab in Zurich and attract funding for my research. Very early on, we managed to determine crystal structures of the Cas9 genome editor and its complexes, which helped to prove my scientific independence. CRISPR-Cas genome editing has attracted a lot of attention from the media. While all this publicity has generally been very good for us, it also meant that I have to dedicate part of my time to working with journalists and to public outreach, which takes time away from research.

What is your current research focus? My lab is focused on two general themes: RNA biology and genome editing. We continue studying the molecular mechanisms of CRISPR-Cas systems, both to shed light on the basic biology of these systems and to contribute towards further development of genome editing technologies. We actively collaborate with labs that develop applications or apply genome editing to study interesting biological problems. My other projects focus on protein-RNA interactions and complexes involved in eukaryotic RNA metabolism. In our work, we combine structural biology with biochemical approaches to obtain insights at the atomic level.

Which part of the Young Investigator package is particularly interesting to you? The annual PhD student course is a great benefit and will help with training my students in scientific writing and presentation skills. I also like the idea of the sectoral special topic meetings and I am looking forward to participating in them.

EMBO ADVANCED FELLOW 2014

Suewei Lin

2014 EMBO Advanced Fellow
Institute of Molecular Biology, Academia Sinica, Taiwan

Selection as EMBO Advanced Fellow Last year I was fortunate to be awarded an EMBO Advanced Fellowship. It gave me an edge in the job market and helped me land my current position at the Institute of Molecular Biology at Academia Sinica, Taiwan. My initial EMBO long-term fellowship, received in 2013, allowed me to continue my postdoctoral work in the fantastic lab of Scott Waddell at the Centre for Neural Circuits and Behaviour at the University of Oxford, where I laid the foundation for my current research.

New position The Institute of Molecular Biology (IMB) at Academia Sinica is a leading research institute in Taiwan. I am very excited to work as a research fellow here and looking forward to making some interesting discoveries. I also enjoy working in my home country, close to my family.

What does it mean to you to be part of the EMBO network? It means I am connected to many brilliant scientists around the world! Through the EMBO network I also receive updates on lots of great meetings and courses, which is very useful for a young scientist like me.

What is your research area? I study the molecular and neural mechanisms that underlie thirst-driven water seeking behavior in the fruit fly *Drosophila*. Thirst is a physiological state that influences how a fly values water vapor and learned olfactory cues previously associated with water. When exploiting the neural circuit of thirst in *Drosophila*, powerful genetic techniques and the relative simplicity of the brain allow us to manipulate neural circuits with fine temporal precision at single-cell resolution. By doing this I hope to gain a better understanding of how the brain integrates multiple pieces of information such as sensory cues, internal states and memory, to select an appropriate course of action.

New hopes for treating obesity

Recent results from the young laboratory of ANA DOMINGOS, an EMBO Installation Grantee at the Gulbenkian Institute of Science, Portugal, put forward the idea that a sympathomimetic action away from the brain could be the way to treat obesity. Her research results triggered a debate among neuroscientists worldwide on how to address obesity therapeutically.

In a paper published in September 2015, Domingos and her lab showed that sympathetic neurons directly innervate adipocytes. These sympathetic neurons are the peripheral effectors of leptin action in the brain, to mediate fat break-down. The newly discovered neurons in fat close the neuroendocrine loop of leptin action in the brain, to promote lipolysis, and keep fat mass in a very narrow window of variation. Domingos' team tested the function of the sympathetic neurons using optogenetics. They found out that local activation of the sympathetic neuron-adipose junction is sufficient to promote lipolysis and fat mass reduction. According to the lead author of the study: "This result provides new hopes for treating central leptin resistance, a condition in which the brains of obese people are insensitive to leptin."

The possibility of achieving fat mass reduction by targeting these peripheral neurons, without interfering with the brain, is now subject of many debates. Specifically, why target the central nervous system if the track record of brain targeting anti-obesity compounds has been deceptive? Moreover, considering the difficulties of getting drugs across the blood-brain barrier, targeting the brain may be neither the shortest, nor the safest path to reach a therapeutic solution. Domingos is working out the fundamental biology underlying a new generation of anti-obesity compounds that she coined as targeted sympathomimetic drugs (TSDs).

Obesity is a worldwide epidemic with unmet medical need. Most anti-obesity therapies that have been approved by the regulatory agencies were later withdrawn from the market due to severe side effects. For instance, reverse agonists of the cannabinoid receptor-1 (CB1) are potent appetite suppressants. However, in 2007 and shortly after market introduction, several reports of deep depression and suicidal thoughts made the US Food and Drug Administration (FDA) vote against its approval as an anti-obesity therapy.

The side effects stem from unspecific action in the brain, which seems to be a recurring concern in anti-obesity medication. Not surprisingly, some of the most efficient anti-obesity compounds sit in the broad class of sympathomimetic drugs, such as amphetamines that suppress food intake. However, the sympathomimetic nature of this class of drugs has mostly been regarded as a side effect, and not at the core of the anti-obesity mechanism.

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Succeeding in science in Central Europe

The Central European Institute of Technology is setting an example for the entire region.

Central and Eastern Europe still face many challenges in the way science is being performed – although more than a quarter of a century have passed since the fall of the iron curtain. Changes in the form of bureaucracy, infrastructure and general practices have not been as rapid as within the private sector.

The Central European Institute of Technology (CEITEC) in Brno, Czech Republic, is addressing these challenges by bringing in best practices that exist in other parts of the world. The institute was established by Masaryk University and approved by the European Commission in 2011. The underlying premise for the formation of CEITEC was to improve the research potential of the organization and the region in general, but also to spark transformation in the way research is done in the Czech Republic, to support entrepreneurship and innovative business models.

Five years on, CEITEC has gained an immense influence in the entire region. The new laboratories, completed in 2015, offer jobs for nearly 500 scientists and more than 1,300 students. The institute works closely with local government to shape the regional innovation strategy. As the first scientific centre in the Czech Republic, it integrates Research & Development in the fields of life sciences, advanced materials and technologies.

After an initial exodus of their young scientists, the Czech Republic – among other Eastern European countries – is seeing a return of its talents back home. Four life scientists have received an EMBO Installation Grant to set up their laboratories at CEITEC: Lukáš Trantírek, Peter Lukavský, Pavel Plevka and Karel Říha.

CEITEC also hosts international conferences and workshops including EMBO funded events such as the Practical Course *Analysis of small non-coding RNAs: per aspera ad astra* held in July 2015, and the EMBO Conference *Signalling in Plant Development* held last September.

„Our most important task is to focus on the quality of science and to support the best scientists to achieve success. As a unique institute in Central Europe, CEITEC has a lot to offer. We are looking for ways to engage more with interested partners, which can help CEITEC become an integral part of the international scientific community, " states CEITEC Executive Director Markus Dettenhofer.

www.ceitec.eu

Boost for basic and applied science in Poland

The Foundation for Polish Science (FNP), headed by EMBO Member MACIEJ ŻYLICZ, is launching a new programme for financing innovative research in Poland. Funding will be available for experienced researchers as well as young postdoctoral students seeking support for establishing their first research group. A special fund is reserved for people with experience in implementing research results for the development of technologies, processes or innovative projects in cooperation with commercial partners.

The Foundation will also make it easier for postdoctoral researchers to return to science after parental leave or after working in a non-scientific area. Postdoctoral fellowships will be offered to researchers wishing to return to Poland or to come to Poland from abroad.

"The funding programmes are pursuing two goals," said Maciej Żylicz. "First, to invest in people. We want the well-equipped laboratories that have been built in recent years in Poland to be filled with outstanding researchers from Poland and abroad, pursuing research to meet contemporary challenges. Second, to bring science and the economy closer together. We want members of the scientific and business communities to enter into an effective dialogue so that research results are not filed away, but implemented and used by entrepreneurs."

A new programme "International Research Agendas" supports the creation of specialised scientific units in Poland applying global best practice with regard to research programmes and topics, Human Resources policy, management of Research & Development and commercialisation of its results.

The funding amounting to the total of 615 million PLN until 2023 (roughly 154 million Euros) will cover more than 350 grants and support more than 2,100 researchers. Recruitment rounds will take place twice a year until 2019.

www.fnp.org.pl
www.fnp.org.pl/en/oferta/international-research-agendas-ira/

The Foundation for Polish Science, founded in 1991, is the largest source of science funding in Poland outside the state budget

Fiona Watt with guests at the launching ceremony

New hub for stem cell research

EMBO Member Fiona Watt is heading the new Centre for Stem Cells and Regenerative Medicine, which was launched at Guy's Hospital in December 2015. The centre brings together stem cell research currently taking place across King's College London and its partner the NHS Trust.

Through the centre, King's College London aims to drive collaboration between scientists and clinicians to translate the potential of stem cells into clinical reality for patients. The goal of the centre is to understand how stem cells interact with their local environment. Its 54 (and counting) investigators work on different types of stem cells but have a common interest in how interactions with the environment affect cell behaviour.

"By bringing different types of expertise to bear in a collaborative environment I think we can do some exciting work. We are very well placed being in one great teaching hospital and affiliated to other hospitals. We can reach out to the clinicians, offer collaborative resources and learn from them," said centre director Fiona Watt, who has been announced as this year's FEBS | EMBO Women in Science Awardee (*see also article on page 5*).

The institute is supported by major funders of UK biomedical research including the Wellcome Trust and the Medical Research Council. It has recently been refurbished at a cost of more than eight million British Pounds. The 150 guests who gathered to celebrate its launch last December enjoyed splendid views from the centre, which is situated on the 28th floor of Guy's Hospital Tower Wing in central London.

Student with a scientist at a summer school at IFOM

Science: an experience to share

Who says students prefer to spend their holidays at the seaside, relaxing and enjoying the sun? For some of them working for two intense weeks in an international basic research laboratory in close contact with scientists and current technologies is a great way to spend summer.

This is the opportunity that YouScientist, the science and society program of the FIRC Institute of Molecular Oncology (IFOM) based in Milan, Italy, offers every year to ten talented Italian high schools students through its summer school "Lo studente ricercatore". Every year, hundreds of students in their 4th grade are selected based on an online test to assess their scientific literacy and their academic performance. The best ten candidates, with the direct supervision of a tutor, begin a full immersion experience into the scientific life of the institute: they perform experiments at the bench, but also participate in lab meetings and lectures, discussing science with scientists. All the EMBO members of the institute and their groups participate in the programme.

Students also attend a science communication course to learn how to communicate science topics to different audiences. They elaborate scientific posters and write popular science articles to describe to a lay public their results and their experience in science. Science communication products are disseminated during a final celebrative event, the Poster Day, where students discuss their results in front of scientists, but also other students, families and teachers.

Over the last few years, approximately 200 students attended IFOM summer school: 62% of them enrolled in bio-medical Universities, while 28% of them enrolled in other scientific faculties. When asked whether their experience in IFOM was useful in helping to choose the course of study, 91% answered positively. Indeed, before attending the summer school most of them declared an interest in science, but were still undecided about their future.

Initiatives such as the IFOM summer school are an effective way to inspire young generations of scientists-to-be. They also increase the awareness among scientists of the importance of outreach activities and of sharing their passion for research.

Assunta Croce
Head of the YouScientist program
(Assunta.croce@ifom.eu)
www.ifom.eu/en/science-society

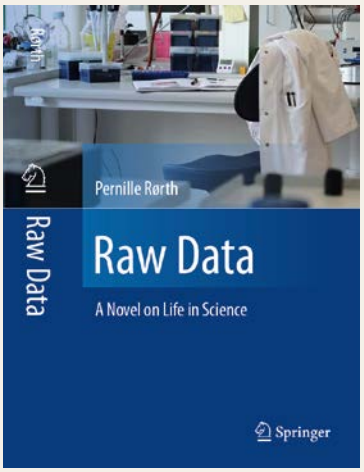
BOOK REVIEW

A science thriller

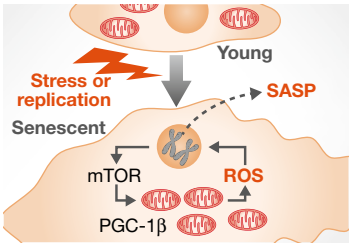
After working for 25 years as an active scientist, EMBO Member Pernille Rørth has written a novel about life in science – a fascinating portrait about the world of top-level science. The book entitled Raw Data is focused on two young scientists at a critical stage of their careers. Chloe and Karen work in a top-tier research institute in the United States and are both about to set up their own independent laboratories. This stressful time is a fertile ground for frustration, jealousy and fear of being scooped, but also for exciting discoveries and personal recognition. An investigation of potential misconduct is part of the plot.

"The story is pure fiction and not a fictionalized version or a real case," assures Rørth, who served as editor in chief of *The EMBO Journal* for five years. "I wanted to tell a story that would make the world of lab science come alive for non-scientists, while keeping it real for scientists. Scientific misconduct is placed at the dramatic centre. It has enormous consequences, yet is often somehow banal. It also cuts to the heart of what science is."

Raw Data: A Novel on Life in Science
Pernille Rørth
Springer
February 2016
ISBN-10: 3319239724



THE EMBO JOURNAL



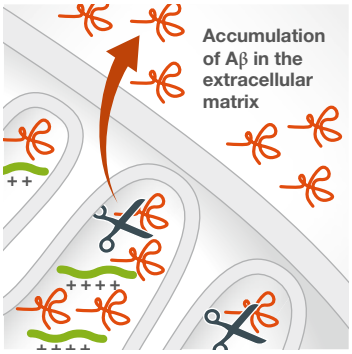
RESEARCH ARTICLE

Mitochondria drive senescence

Cell senescence is an important tumor suppressor mechanism and driver of ageing. Both functions are dependent on the development of senescent-associated changes in gene expression and protein secretion. However, the exact mechanisms regulating these phenotypes remain poorly understood. Here, we show the critical role of mitochondria in cellular senescence. In multiple models of senescence, absence of mitochondria reduced a spectrum of senescence effectors and phenotypes while preserving ATP production via enhanced glycolysis. Transcriptome analysis revealed that a vast number of senescent-associated changes are dependent on mitochondria, particularly the pro-inflammatory phenotype. The ATM, Akt and mTORC1 phosphorylation cascade integrates signals from the DNA damage response towards PGC-1β-dependent mitochondrial biogenesis, contributing to a ROS-mediated activation of the DDR and cell-cycle arrest. Finally, we demonstrate that reduction of mitochondrial content *in vivo* prevents senescence in the ageing mouse liver. Our results suggest that mitochondria are a candidate target to reduce the deleterious impact of senescence in ageing tissues.

Mitochondria are required for pro-ageing features of the senescent phenotype
Clara Correia-Melo, Francisco DM Marques, Rhys Anderson, Graeme Hewitt, Rachael Hewitt, John Cole, Bernadette M Carroll, Satomi Miwa, Jodie Birch, Alina Merz, Michael D Rushton, Michelle Charles, Diana Jurk, Stephen WG Tait, Rafal Czapiewski, Laura Greaves, Glyn Nelson, Mohammad Bohlooly-Y, Sergio Rodriguez-Cuenca, Antonio Vidal-Puig, Derek Mann, Gabriele Saretzki, Giovanni Quarato, Douglas R Green, Peter D Adams, Thomas von Zglinicki, Viktor I Korolchuk, João F Passos
Read the paper:
http://emboj.embopress.org/search/10.15252%252Fembj.201592862

EMBO Molecular Medicine



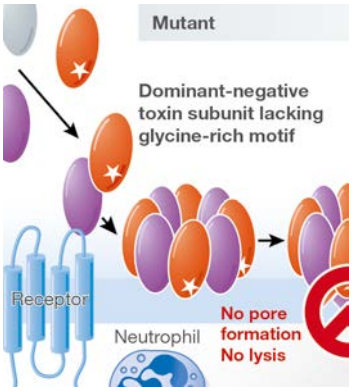
RESEARCH ARTICLE

Role of PITRM1 in neurodegeneration

Two siblings of a consanguineous family with a peculiar and slowly progressive neurodegenerative disorder of unknown origin were investigated to establish the cause. We found a homozygous, disease-segregating missense mutation in the PITRM1 gene in both siblings. The pathogenic role of the mutation, which causes PITRM1 instability, was validated by *in vitro* assays, characterisation of mutant fibroblasts from patients, in PITRM1 knocked-down human fibroblasts and in a mutant yeast model. A hemizygous PITRM1 knockout mouse displayed reduced amounts of PITRM1 and slowly progressive neurodegeneration, characterised by accumulation of amyloid beta (Aβ) in the brain. In conclusion, we have identified a clinically peculiar human neurodegenerative disorder caused by a pathogenic, homozygous mutation in PITRM1, a gene encoding an oligopeptidase of the mitochondrial inner compartment. The neuropathology of a Pitrm1 /+ mouse provides genetic evidence that Aβ is present within mitochondria, and demonstrates a link between impaired PITRM1 activity and Aβ amyloidotic neurodegeneration in mammals.

Defective PITRM1 mitochondrial peptidase is associated with Aβ amyloidotic neurodegeneration
Dario Brunetti, Janniche Torsvik, Cristina Dallabona, Pedro Teixeira, Pawel Sztromwasser, Erika Fernandez-Vizarra, Raffaele Cerutti, Aurelio Reyes, Carmela Preziuso, Giulia D'Amati, Enrico Baruffini, Paola Goffrini, Carlo Viscomi, Ileana Ferrero, Helge Boman, Wenche Telstad, Stefan Johansson, Elzbieta Glaser, Per M Knappskog, Massimo Zeviani, Laurence A Bindoff
Read the paper:
http://embomolmed.embopress.org/content/early/2015/12/23/emmm.201505894

EMBO reports



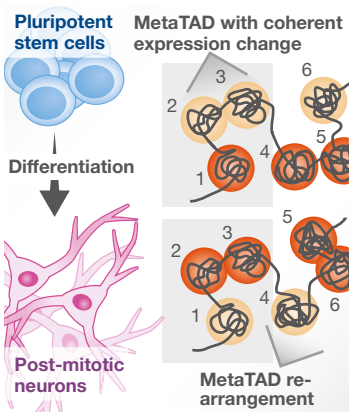
RESEARCH ARTICLE

Dominant-negative toxins to combat *Staphylococcus aureus* pathogenesis

S. aureus is a human pathogen that relies on the subversion of host phagocytes to support its pathogenic lifestyle. *S. aureus* strains can produce up to five beta-barrel, bi-component, pore-forming leukocidins that target and kill host phagocytes. Thus, preventing immune cell killing by these toxins is likely to boost host immunity. Here, we describe the identification of glycine-rich motifs within the membrane penetrating stem domains of the leukocidin subunits that are critical for killing primary human neutrophils. Remarkably, leukocidins lacking these glycine-rich motifs exhibit dominant-negative inhibitory effects toward their wild-type toxin counterparts as well as other leukocidins. Biochemical and cellular assays revealed that these dominant-negative toxins work by forming mixed complexes that are impaired in pore formation. The dominant-negative leukocidins inhibited *S. aureus* cytotoxicity towards primary human neutrophils, protected mice from lethal challenge by wild-type leukocidin, and reduced bacterial burden in a murine model of bloodstream infection. Thus, we describe the first example of staphylococcal bi-component dominant-negative toxins and their potential as novel therapeutics to combat *S. aureus* infection.

Exploiting dominant-negative toxins to combat *Staphylococcus aureus* pathogenesis
Tamara Reyes-Robles, Ashira Lubkin, Francis Alonzo III, D. Borden Lacy, and Victor J. Torres
Read the paper:
http://embor.embopress.org/content/early/2016/02/08/embr.201540994

molecular systems biology



RESEARCH ARTICLE

Dynamic changes in chromatin contact hierarchies

Mammalian chromosomes fold into arrays of megabase-sized topologically associating domains (TADs), which are arranged into compartments spanning multiple megabases of genomic DNA. TADs have internal substructures that are often cell type specific, but their higher-order organization remains elusive. Here, we investigate TAD higher-order interactions with Hi-C through neuronal differentiation and show that they form a hierarchy of domains-within-domains (metaTADs) extending across genomic scales up to the range of entire chromosomes. TAD interactions are well captured by tree-like, hierarchical structures irrespective of cell type. metaTAD tree structures correlate with genetic, epigenomic and expression features, and structural tree rearrangements during differentiation are linked to transcriptional state changes. Using polymer modelling, we demonstrate that hierarchical folding promotes efficient chromatin packaging without the loss of contact specificity, highlighting a role far beyond the simple need for packing efficiency.

Hierarchical folding and reorganization of chromosomes are linked to transcriptional changes in cellular differentiation
James Fraser, Carmelo Ferrai, Andrea M Chiariello, Markus Schueler, Tiago Rito, Giovanni Laudanno, Mariano Barbieri, Benjamin L Moore, Dorothee CA Kraemer, Stuart Aitken, Sheila Q Xie, Kelly J Morris, Masayoshi Itoh, Hideya Kawaji, Ines Jaeger, Yoshihide Hayashizaki, Piero Carninci, Alistair RR Forrest, , Colin A Semple, Josée Dostie, Ana Pombo, Mario Nicodemi
Read the paper:
http://msb.embopress.org/content/11/12/852

Practical Courses

Advanced optical microscopy
UK-Plymouth, 6–16 April 2016

Characterization of post-translational modifications
DK-Odense, 7–13 April 2016

Single cell gene expression analysis
DE-Heidelberg, 11–16 April 2016

***In vivo* plant imaging**
DE-Heidelberg, 24 April–1 May 2016

Bioinformatics and genome analyses
TR-Izmir, 2–14 May 2016

Computational molecular evolution
GR-Heraklion, 8–19 May 2016

Structural characterization of macromolecular complexes
FR-Grenoble, 21–27 May 2016

Non-neuronal optogenetics: From design to application in cell signalling and tissue morphogenesis
DE-Heidelberg, 29 May–4 June 2016

Computational analysis of protein–protein interactions: Sequences, networks and diseases
HU-Budapest, 30 May–4 June 2016

Fluorescence microscopy methods to study protein–protein interactions in living cells
FR-Rennes, 6–11 June 2016

Regulatory small and long ncRNAs: Durat et lucet
IT-Trento, 11–17 June 2016

Advanced methods of electron microscopy in cell biology
CZ-České Budějovice, 14–24 June 2016

Computational biology: Genomes to systems
DE-Heidelberg, 19–23 June 2016

3D developmental imaging
PT-Oeiras, 1–9 July 2016

Integrative modelling of biomolecular interactions
ES-Barcelona, 4–9 July 2016

Correlative light electron microscopy
UK-Bristol, 10–15 July 2016

Multidimensional NMR in structural biology
DE-Joachimsthal, 10–15 July 2016

Light sheet microscopy
DE-Dresden, 15–26 August 2016

Cryo-electron microscopy and 3D image processing
DE-Heidelberg, 28 August–5 September 2016

Analysis of high-throughput sequencing data
UK-Cambridge, 5–10 September 2016

Protein expression, purification, and characterization (PEPC10)
DE-Hamburg, 12–20 September 2016

New approaches to study ubiquitin and ubiquitin-like modifications
IT-Alghero, 17–24 September 2016

Non-coding RNA in infection
DE-Würzburg, 18–24 September 2016

Targeted NGS in patients with cancer, mendelian or complex diseases
PL-Krakow, 19–23 September 2016

Modelling cellular processes in space and time
FR-Hyères, 15–22 October 2016

High throughput microscopy for systems biology
DE-Heidelberg, 17–23 October 2016

Solution scattering from biological macromolecules
DE-Hamburg, 17–24 October 2016

Biomolecular interaction analysis 2016: From molecules to cells
PT-Porto, 7–11 November 2016

Workshops

Multiple functions of piRNAs and PIWI proteins
FR-Montpellier, 6–9 April 2016

Neural control of metabolism and eating behaviour
PT-Cascais, 5–7 May 2016

Molecular biology of mitochondrial gene expression
SE-Bro, 23–26 May 2016

Mechanisms of neuronal remodelling
DE-Seeon, 5–9 June 2016

RNA structure meets function
SE-Stockholm, 12–15 June 2016

Dendritic anatomy, molecules and function
GR-Heraklion, 18–21 June 2016

Membrane fusion in health and disease
FR-Paris, 20–24 June 2016

New model systems for early land plant evolution
AT-Vienna, 22–24 June 2016

Chromosome segregation and aneuploidy
IE-Galway, 25–29 June 2016

AIDS-related mycoses
ZA-Cape Town, 13–15 July 2016

Advanced proteomics
IT-Varna, 31 July–6 August 2016

Molecular mechanisms of ageing and regeneration: From pluripotency to senescence
GR-Spetses, 16–24 August 2016

Integrating genomics and biophysics to comprehend functional genetic variation
TR-Istanbul, 26–28 August 2016

Actualizations in membrane trafficking in health and disease
CL-La Serena, 4–9 September 2016

Bacterial cell division: Orchestrating the ring cycle
CZ-Prague, 14–17 September 2016

Cell size regulation
DE-Joachimsthal, 14–18 September 2016

Organelle contact sites: Intracellular communication and role in disease
IT-Domus de Maria, 15–18 September 2016

Nuclear function and cell fate choice
GR-Kyllini, 18–22 September 2016

The modularity of signalling proteins and networks
AT-Seefeld in Tirol, 20–25 September 2016

Glycosylation in the Golgi complex
IT-Vico Equense, 24–28 October 2016

Conferences

Visualizing biological data (VIZBI 2016)
DE-Heidelberg, 9–11 March 2016

Telomeres, telomerase and disease
BE-Liege, 26 April–1 May 2016

Imaging the brain
PL-Warsaw, 18–21 May 2016

Cellular signalling and cancer therapy
HR-Cavtat, 27–31 May 2016

Gene transcription in yeast: From chromatin to RNA and back
ES-Sant Feliu de Guixols, 11–16 June 2016

The biochemistry and chemistry of biocatalysis: From understanding to design
FI-Oulu, 12–15 June 2016

Problems of listeriosis (ISOPOL XIX)
FR-Paris, 14–17 June 2016

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

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

Viruses of microbes 2016
UK-Liverpool, 18–22 July 2016

The nitrogen nutrition of plants: Nitrogen 2016
FR-Montpellier, 22–26 August 2016

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

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

Wnt meeting 2016
CZ-Brno, 14–17 September 2016

The molecular and cellular basis of regeneration and tissue repair
IT-Laura, 17–21 September 2016

Tuberculosis 2016: Interdisciplinary research on tuberculosis and pathogenic mycobacteria
FR-Paris, 19–23 September 2016

Retinal proteins
DE-Potsdam, 2–7 October 2016

Translational research in cancer cell metabolism
ES-Bilbao, 4–6 October 2016

Cilia 2016
NL-Amsterdam, 4–7 October 2016

Experimental approaches to evolution and ecology using yeast and other model systems
DE-Heidelberg, 19–22 October 2016

Structure and function of the endoplasmic reticulum
ES-Girona, 23–27 October 2016

From functional genomics to systems biology
DE-Heidelberg, 12–15 November 2016

EMBO | FEBS Lecture Courses

Chromatin and the environment
GR-Spetses, 8–14 August 2016

The new microbiology
GR-Spetses, 24 August–1 September 2016

EMBO | EMBL Symposia

Tumour microenvironment and signalling
DE-Heidelberg, 3–6 April 2016

New model systems for linking evolution and ecology
DE-Heidelberg, 8–11 May 2016

Microtubules: From atoms to complex systems
DE-Heidelberg, 29 May–1 June 2016

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

Global Exchange Lecture Courses

Structural and biophysical methods for biological macromolecules in solution
KR-Suwon, 19–26 June 2016

Small brains, big ideas
CL-Las Cruces, 10–19 November 2016

Other EMBO events

EMBO Laboratory Management Courses
DE-Leimen, Various dates

The EMBO Meeting
DE-Mannheim, 10–13 September 2016

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For a complete and up-to-date list of EMBO events please go to ***events.embo.org***

Awards of Excellence

EMBO MEMBERS

Louis-Jeantet Prize for Medicine

Andrea Ballabio and **John Diffley** have been announced winners of the 2016 Louis-Jeantet Prize for Medicine. They will both receive 700,000 Swiss Francs (approx. 670,000 Euros) for their "fundamental biological research that is expected to be of considerable significance for medicine".

Gottfried Wilhelm Leibniz Prize

Frank Bradke, **Emmanuelle Charpentier** and **Marina Rodnina** are among the ten researchers who received the 2016 Leibniz Prize. Each of the ten winners will receive 2.5 million Euros to support their future research. The Leibniz Prize is Germany's most prestigious research prize.

Liliane Bettencourt Prize for Life Sciences

Thomas Lecuit is the 2015 laureate of the Liliane Bettencourt Prize for Life Sciences. The prize (300.000 Euros) has been awarded annually since 1997 to a European researcher recognized by the scientific community for the quality of international publications, the leadership in his or her field, a promising project and mentoring qualities.

Ernst Jung-Prize

Hans-Georg Rammensee was awarded the 2016 Ernst Jung-Prize for his groundbreaking work on the molecular structure of cell surface peptides. The Ernst Jung Prize for Medicine, worth 300,000 Euros, is one of Europe's highest research prizes.

Genetics Society of America Medal

Detlef Weigel has been awarded the Genetics Society of America Medal for his outstanding contributions to the field of genetics in the last 15 years.

Alice and C.C. Wang Award in Molecular Parasitology

Mike Ferguson has been named as the recipient of the 2016 Alice and C.C. Wang Award in Molecular Parasitology. The prize, awarded by the American Society for Biochemistry and Molecular Biology (ASBMB), recognizes scientists who are making seminal contributions to the field.

Cloëtta Prize

Dominique Soldati-Favre has been awarded the 2015 Cloëtta Prize. Worth 50,000 Swiss Francs, the prize is awarded annually by the Max Cloëtta Foundation based in Zurich since 1974.

Gregori Aminoff Prize

The Royal Swedish Academy of Sciences has awarded the Gregori Aminoff Prize in crystallography 2016 to **Poul Nissen**, Aarhus University. Poul Nissen is the first Dane to receive the Aminoff Prize. This prize is intended to reward an individual contribution in the field of crystallography.

Eraldo Antoni Award for Porphyrin Chemistry

Maurizio Brunori has been selected as the winner of the 2016 Eraldo Antoni Award for Porphyrin Chemistry. The award will be presented to him during the International Congress on Porphyrins and Phthalocyanines to be held in Nanchino, China on July 3–8, 2016.

The Marcel Benoist Prize

Laurent Keller is the winner of the Marcel Benoist Prize 2015. This prize has been awarded every year since 1920 to scientists working in Switzerland who have made "the most useful scientific discovery or study, in particular in disciplines which are of significance for human life."

Knight in the Legion of Honour

Isabelle Mansuy was elected Knight in the Legion of Honour by the French Minister of Research and Education. The order Legion of Honor was established by Napoleon Bonaparte in 1802 and is the highest decoration in France.

Gagna A. & Ch. Van Heck Prize 2015

Steve Jackson was awarded the Gagna A. & Ch. Van Heck Prize 2015, "for his cardinal contributions related to cellular events that detect, signal the presence of and repair DNA damages". The triennial prize of 75,000 Euros is funded by the Fonds de la Recherche Scientifique-FNRS, based in Brussels, Belgium.

European Academy of Microbiology

Judith Armitage, **Cecilia Arraiano**, **Antje Boetius**, **Carmen Buchrieser**, **Emmanuelle Charpentier**, **Guy Cornelis**, **Antoine Danchin**, **Dusko Ehrlich**, **Jeff Errington**, **Urs Jenal**, **Regine Kahmann**, **Bruno Lemaitre**, **Colin Murrell**, **Peter Sebo**, **Jörg Vogel** and **Arturo Zychlinsky** have been elected to the European Academy of Microbiology.

Academy of Medical Sciences

Ewan Birney, **Sarah Bray**, **Elaine Dzierzak**, **Matthew Freeman**, **Kairbaan Hodivala-Dilke**, **Laurence Hurst**, **Sarah Teichmann** and **Michael Way** 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.

German Cancer Prize

Johannes Zuber has received the German Cancer Prize 2016 in experimental cancer research. The prize worth 22,500 Euros is awarded annually by the German Cancer Society and the German Cancer Foundation for groundbreaking work in experimental research, translational research and clinical research in oncology.

EMBO YOUNG INVESTIGATORS

Friedrich Miescher Award

Petr Broz has been awarded the 2016 Friedrich Miescher Award by the Swiss Society for Molecular and Cellular Biosciences (SSCMB). The 38-year-old infection biologist receives this award for his work on the inflammasome, a cytosolic signaling complex in the body's cells, which is important for the detection and restriction of bacterial pathogens.

Irene Joliot-Curie Young Female Scientist Prize

Rut Carballido-Lopez won the Irene Joliot-Curie Young Female Scientist Prize for 2015 from the French Academy of Sciences and the French Ministry of Education and Research.

Max Delbrück Prize of the University of Cologne

Thorsten Hoppe received the 2016 Max Delbrueck Award for outstanding achievements in aging research. The University of Cologne annually grants this prize to senior researchers for outstanding research within the last five years.

Young Investigator Award

Matteo Iannacone has been awarded the Young Investigator Award by the European Association for the Study of the Liver (EASL).

National Latsis Prize

The National Latsis Prize 2015 has been awarded to **Richard Benton** for his work on the fruit fly's sense of smell. Worth 100,000 Swiss Francs, the prize is awarded for exceptional scientific achievements by a researcher under the age of 40 working in Switzerland.

A Good Read – Publications from the EMBO Community

The sexual identity of adult intestinal stem cells controls organ size and plasticity

Irene Miguel-Aliaga (EMBO Young Investigator), Bruno Hudry (EMBO Advanced Fellow) and colleagues

Nature | 18 February 2016
doi:10.1038/nature16953

Divergent evolution of vitamin B9 binding underlies Juno-mediated adhesion of mammalian gametes

Luca Jovine (EMBO Young Investigator) and colleagues

Current Biology | 8 February 2016
doi:10.1016/j.cub.2015.12.034

A 3´UTR-Derived Small RNA Provides the Regulatory Noncoding Arm of the Inner Membrane Stress Response

Jörg Vogel (EMBO Member) and colleagues

Molecular Cell | 4 February 2016
doi: http://dx.doi.org/10.1016/j.molcel.2015.12.023

Dual RNA-seq unveils noncoding RNA functions in host–pathogen interactions

Jörg Vogel (EMBO Member) and colleagues

Nature | 28 January 2016
doi:10.1038/nature16547

A structured interdomain linker directs self-polymerization of human uromodulin

Luca Jovine (EMBO Young Investigator) and colleagues

Proceedings of the National Academy of Sciences | 25 January 2016
doi:10.1073/pnas.1519803113

Touch, act and go: landing and operating on nucleosomes

Titia K Sixma (EMBO Member), Andrea Mattevi (EMBO Young Investigator) and colleagues

The EMBO Journal | 19 January 2016
doi:10.15252/embj.201593377

Transcriptome-wide distribution and function of RNA hydroxymethylcytosine

François Fuks (EMBO Member) and colleagues

Science | 15 January 2016
doi:10.1126/science.aac5253

Targeting aberrant epigenetic networks mediated by PRMT1 and KDM4C in acute myeloid leukemia

Eric So (EMBO Young Investigator) and colleagues

Cancer Cell | 11 January 2016
doi: 10.1016/j.ccell.2015.12.007

The transcriptional coregulator PGC-1β controls mitochondrial function and anti-oxidant defence in skeletal muscles

Daniel Metzger (EMBO Member) and colleagues

Nature Communications | 17 December 2015
doi:10.1038/ncomms10210

A transcription-independent epigenetic mechanism is associated with antigenic switching in Trypanosoma brucei

Luisa Miranda Figueiredo (EMBO Installation Grantee) and colleagues

Nucleic Acids Research | 15 December 2015
doi: 10.1093/nar/gku1459

Isoform diversity in the Arp2/3 complex determines actin filament dynamics

Michael Way (EMBO Member), Jasmine V. G. Abella (EMBO Fellow) and colleagues

Nature Cell Biology | 14 December 2015
doi:10.1038/ncb3286

Ankyrin-mediated self-protection during cell invasion by the bacterial predator *Bdellovibrio bacteriovorus*

Andrew L. Lovering (EMBO Young Investigator) and colleagues

Nature Communications | 2 December 2015
doi:10.1038/ncomms9884

Synthetic lethal targeting of oncogenic transcription factors in acute leukemia by PARP inhibitors

Eric So (EMBO Young Investigator) and colleagues

Nature Medicine | December 2015
doi:10.1038/nm.3993

A gut-vascular barrier controls the systemic dissemination of bacteria

Elisabetta Dejana, Maria Rescigno (EMBO Members) and colleagues

Science | 13 November 2015
doi: 10.1126/science.aad0135

Histone H1 couples initiation and amplification of ubiquitin signalling after DNA damage

Niels Mailand (EMBO Young Investigator) and colleagues

Nature | 21 October 2015
doi:10.1038/nature15401

Immunosurveillance of the Liver by Intravascular Effector CD8+ T Cells

Matteo Iannacone (EMBO Young Investigator) and colleagues

Cell | 23 April 2015
doi: http://dx.doi.org/10.1016/j.cell.2015.03.005

PredictSNP: Robust and Accurate Consensus Classifier for Prediction of Disease-Related Mutations

Jiri Damborsky (EMBO/HHMI Scientist) and colleagues

PLOS Computational Biology | 2014
doi: 10: e1003440

BOOKS

Microbial Biochemistry (fourth edition)

Georges Cohen (EMBO Member)

Springer | 2016
ISBN 978-94-017-7579-3

Molecular Biology of Assemblies and Machines

Wolfgang Baumeister (EMBO Member) *et al.*

Garland Science | 15 March 2016
ISBN 9780815341666

The Society of Genes

Itai Yanai (EMBO Member) *et al.*

Harvard University Press | January 2016
ISBN 9780674425026

YOUNG INVESTIGATORS 2015

Andrea Alimonti
Molecular Medicine
CH Oncology Institute of Southern Switzerland (IOSI), Bellinzona

Marek Basler
Microbiology, Virology & Pathogens
CH Biozentrum, University of Basel

Isabel Bäurle
Plant Biology
DE Universität, Potsdam

Priscille Brodin
Microbiology, Virology & Pathogens
FR Institut Pasteur, Lille

Clemens Cabernard
Cell Cycle
CH Biozentrum, University of Basel

Karin De Visser
Immunology
NL Netherlands Cancer Institute, Amsterdam

Thijs Ettema
Evolution & Ecology
SE Uppsala University

Ana Eulalio
RNA
DE University, Würzburg

Pablo Huertas
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ES CABIMER, Sevilla

Matteo Iannacone
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Shalev Itzkovitz
Cell & Tissue Architecture
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SG Genome Institute, Singapore

Romain Koszul
Genome Stability & Dynamics
FR Institut Pasteur, Paris

Yogesh Kulathu
Signal Transduction
UK University, Dundee

Gaelle Legube
Genome Stability & Dynamics
FR Laboratoire de biologie cellulaire et moléculaire du contrôle de la prolifération (LBCMCP), Toulouse

Naoko Mizuno
Structural Biology & Biophysics
DE MPI für Biochemie, Martinsried

Paola Picotti
Systems Biology
CH ETH Zurich

Nicolas Plachta
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SG Institute of Molecular and Cell Biology A*STAR, Singapore

Jochen Rink
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DE MPI für Physik komplexer Systeme, Dresden

Robert Ryan
Microbiology, Virology & Pathogens
UK University, Dundee

Alessandro Vannini
Structural Biology & Biophysics
UK Institute of Cancer Research, London

INSTALLATION GRANTEES 2015

Çağlar Çekiç
Immune cell regulation
US La Jolla Institute for Allergy and Immunology
TR Bilkent University, Ankara

Sebastian Glatt
Translational control in neurodegenerative diseases
DE EMBL, Heidelberg, Germany
PL Jagiellonian University, Krakow

Maria Górna
Structural studies of RNA-binding proteins
AT CeMM, Vienna
PL University of Warsaw

Aşkın Kocabaş
Information processing in the nervous system
US Harvard University, Cambridge
TR Koç University, Istanbul

Yongsoo Park
Neurotransmitter release in psychiatric disorders
DE MPI for Biophysical Chemistry, Göttingen
TR Dokuz Eylul University, Izmir

Umut Şahin
PML nuclear bodies
FR Université Diderot (Paris 7), Paris
TR Boğaziçi University, Istanbul

Ondřej Štěpánek
Antigenic signalling and fate decisions in T cells
CH University Hospital Basel, CH
CZ Institute of Molecular Genetics, Prague

EMBO ADVANCED FELLOWS 2015

Bharat, Tanmay
High-resolution *in situ* imaging of plasmid segregation by the ParMRC system
UK Medical Research Council Laboratory of Molecular Biology, Cambridge

Hudry, Bruno
Cellular context of sex chromosome regulation
UK Medical Research Council Clinical Sciences Centre, Imperial College London, London

Ichim, Gabriel
Revisiting old paradigms: Mitochondria and caspase activation as oncogenic drivers
UK Cancer Research UK Beatson Institute, University of Glasgow, Glasgow

Kato, Saul
Decision making by nonlinear brain dynamics in C. elegans
AT Research Institute of Molecular Pathology, Vienna

Martincorena, Inigo
Unravelling the extent of somatic mutation in normal tissues and its role in the progression to cancer
UK Wellcome Trust Sanger Institute, Hinxton

Events

EMBO Member **David Hopwood** is co-organizing the sixth *John Innes | Rudjer Bošković Summer School in Applied Molecular Biology on natural products with the title Microbial Diversity and Specalised Metabolites* to be held at the **Inter-University Centre, Dubrovnik, Croatia, 10–18 September 2016**. See www.jic.ac.uk/science/molmicro/Summerschool/ for details.

Editorial

Editor, E-Newsletter
Yvonne Kaul

Print & Web layout
Sandra Krahl

Proof reading
Meryl Schneider, Martin Cairns

Web version
Aditya Jati

Upcoming deadlines

EMBO Young Investigators
1 April
EMBO Installation Grants
15 April
ERS-EMBO Short-Term Fellowships
15 April
EMBO keynote lectures
1 June
The EMBO Meeting 2016
Early registration and abstract submission deadline:
8 June
EMBO Courses & Workshops
1 August

Next issue

The next *EMBOencounters* issue – **Summer 2016** – will be dispatched in **July 2016**. Please send you suggestions, contributions and news to **communications@embo.org** by **16 May 2016**

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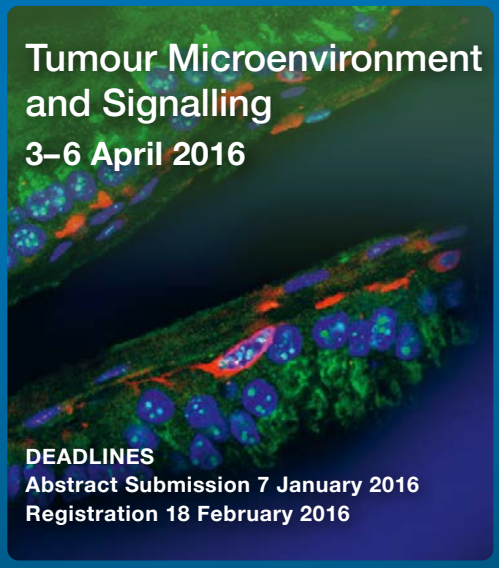
A New Age of Discovery for Aquatic Microeukaryotes

26–29 January 2016

DEADLINES
Abstract Submission 22 October 2015
Registration 3 December 2015

Tumour Microenvironment and Signalling

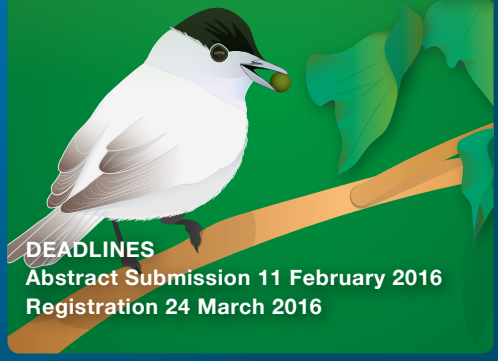
3–6 April 2016



DEADLINES
Abstract Submission 7 January 2016
Registration 18 February 2016

New Model Systems for Linking Evolution and Ecology

8–11 May 2016



DEADLINES
Abstract Submission 11 February 2016
Registration 24 March 2016

Microtubules

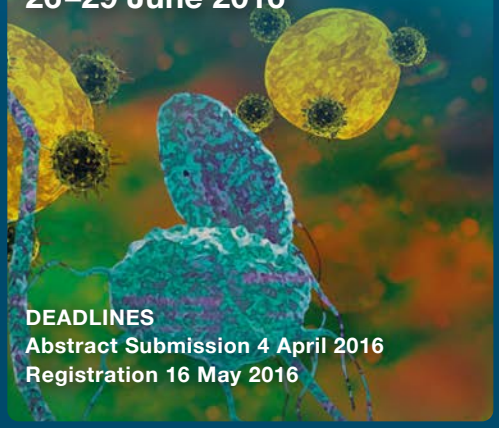
From Atoms to Complex Systems

29 May – 1 June 2016

DEADLINES
Abstract Submission 3 March 2016
Registration 14 April 2016

Innate Immunity in Host-Pathogen Interactions

26–29 June 2016

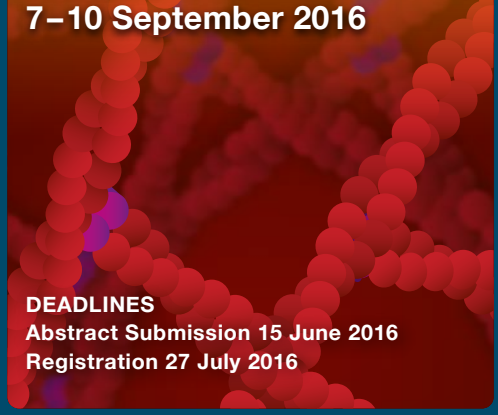


DEADLINES
Abstract Submission 4 April 2016
Registration 16 May 2016

Actin in Action

From Molecules to Cellular Functions

7–10 September 2016



DEADLINES
Abstract Submission 15 June 2016
Registration 27 July 2016

Organoids

Modelling Organ Development and Disease in 3D Culture

12–15 October 2016

DEADLINES
Abstract Submission 21 July 2016
Registration 1 September 2016

The Complex Life of mRNA

5–8 October 2016

DEADLINES
Abstract Submission 13 July 2016
Registration 24 August 2016

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