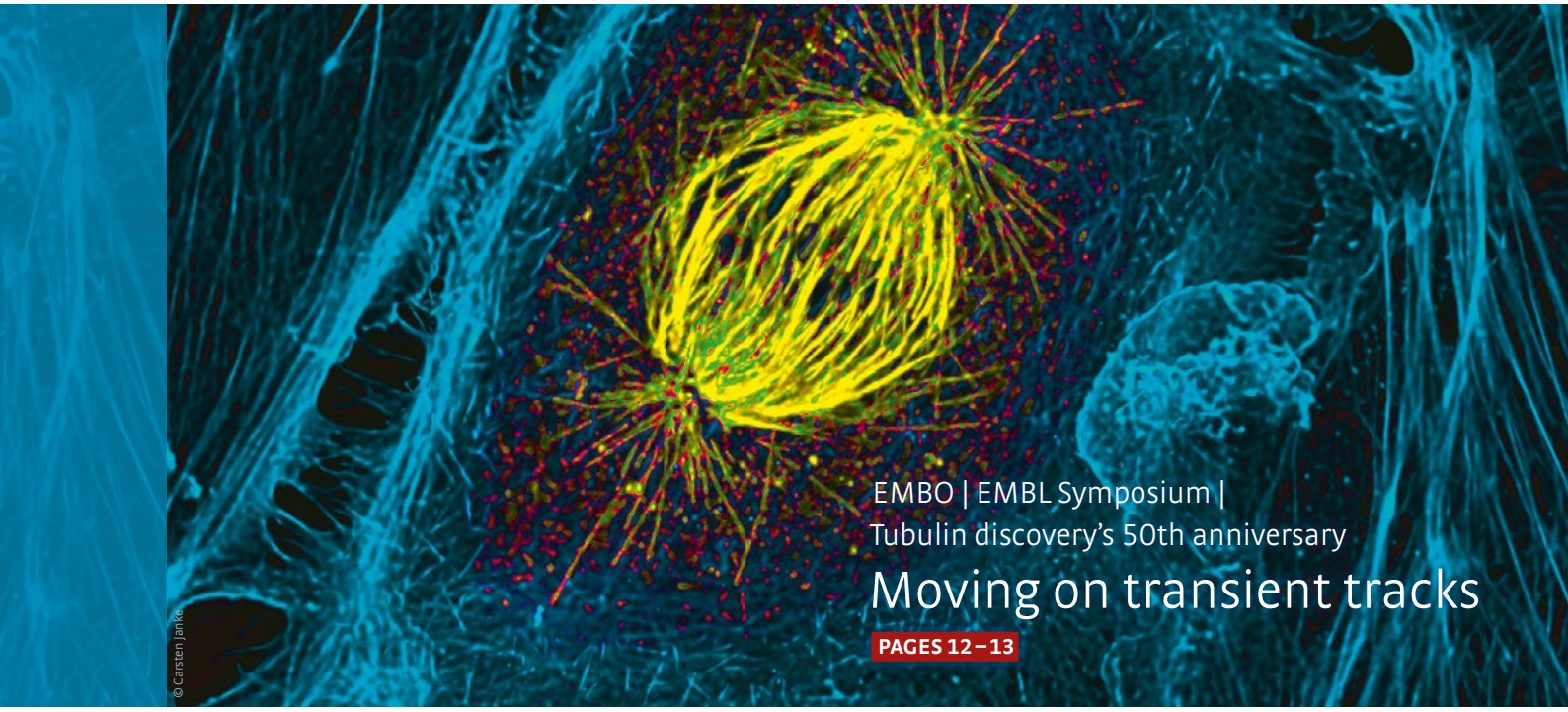
SUMMER 2016

ISSUE 33

EMBO encounters



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EMBO excellence in life sciences

www.embo.org

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Editorial

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Since the creation of EMBO and its intergovernmental funding body EMBC, the European idea has probably never been questioned more than in the last few months. With the vote in the UK to leave the European Union, European organizations will have an important role in showing the value of an a common and open European space – in general, but also for us a scientists in particular. On pages 8 and 9, we publish commentaries from two concerned scientists. EMBO will not directly affected by the UK leaving Europe, as its funding comes from an intergovernmental organization of which the UK will remain a member. EMBO was founded with instrumental participation from UK scientists, and its UK constituency will remain an active and valued part of the EMBO community.

In this summer issue of EMBO Encounters, we report on a variety of achievements: from the EMBO programmes and the EMBO community members, including the accession of two new member states to the EMBC, the election of 58 researchers from various fields in the life sciences as EMBO Members, the award of this year's EMBO Gold Medal to Ben Lehner and Richard Benton, new EMBO Fellows and Young Investigators, and some impressive examples on how researchers in Europe and beyond drive life science research.

Developments in science policy in Europe and in scientific publishing are keeping EMBO staff busy, and there is a good chance that they may redefine the way scientists publish and share their results in future. We look at several of these developments in this newsletter. EMBO will continue to shape these for the benefit of the life sciences.

Maria Leptin,
Director, EMBO

The EMBO community welcomes Malta and Lithuania

MALTA and LITHUANIA join EMBC as a new member states

Malta and Lithuania have joined EMBO's intergovernmental funding body, the European Molecular Biology Conference (EMBC). In March this year, Malta was the 28th country to be accepted into the EMBC, followed by Lithuania in June as the 29th member state.

"Malta has shown an impressive commitment to enhancing its scientific research base," stated EMBO Director Maria Leptin. "It has made strong use of European Union funding to invest in the life sciences and EMBO is glad to be able to offer Malta the opportunities and support available to our member states".

"Malta has shown an impressive commitment to enhancing its scientific research base"

"Life sciences in Lithuania have advanced at an impressive rate in recent decades, driven by robust investment in applied research and commercial biotechnology," she also said. "We look forward to helping Lithuania build on its achievements and take advantage of the support for our member states".

"Life sciences in Lithuania have advanced at an impressive rate in recent decades, driven by robust investment in applied research and commercial biotechnology"

Researchers working in Malta and in Lithuania will now be eligible to apply to EMBO for Long-term Fellowships, Short-term Fellowships, Courses and Workshops funding and the EMBO Young Investigator Programme. Access to support in these areas helps some of Europe's finest scientists to excel in their research and to engage in professional networking with an international community of peers.

"Access to funding and networking opportunities is vital to effectively support the life sciences. This agreement with the EMBC and EMBO will significantly drive the career advancement of Maltese life scientists and of those working in Malta," added Evarist Bartolo, Minister for Education and Employment, Malta.

About EMBC

The European Molecular Biology Conference (EMBC) is an intergovernmental organization comprising 29 Member States. EMBC promotes a strong transnational approach to the life sciences. Within EMBC, Member States pool their resources to improve the quality of research at a national level and to contribute to the advancement of basic research in Europe.

For more information: www.embc.embo.org

"Life sciences are a particular strength of Lithuania and it is a pleasure to see our country become part of the EMBO family," said Professor Virginijus Šikšnys of Vilnius University's Institute of Biotechnology. "EMBO membership creates new opportunities for our young researchers and strengthens our links with the European life sciences community".

58 life science researchers elected as new EMBO Members 2016

Adam Antebi
Biological mechanisms of longevity
Cologne, Germany

M. Madan Babu
Regulatory genomics and systems biology
Cambridge, United Kingdom

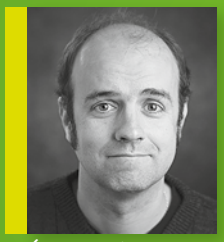
Laure Bally-Cuif
Adult neural stem cell maintenance in vertebrates
Gif-sur-Yuette & Paris, France

Jason S. Carroll
Estrogen Receptor biology in breast cancer
Cambridge, United Kingdom

Andrew P. Carter
Structural biology of the motor protein dynein
Cambridge, United Kingdom

Agnieszka Chacinska
Quality control of mitochondrial protein biogenesis
Warsaw, Poland

Kristina Djinović-Carugo
Structural biology of the actin-based cytoskeleton
Vienna, Austria & Ljubljana, Slovenia



Óscar Fernández-Capetillo
Replicative stress as a driver of cancer and aging
Madrid, Spain & Stockholm, Sweden

Jan O. Korbel
From genomic variation to molecular mechanism
Heidelberg, Germany & Cambridge, United Kingdom

Pekka Lappalainen
Actin and plasma membrane dynamics
Helsinki, Finland

Helder Maiato
Spatial and temporal regulation of mitosis
Porto, Portugal

Marcos Malumbres
Cell division and proliferation in mammals
Madrid, Spain

Fatima Mechta-Grigoriou
Oxidative stress and stromal diversity in cancers
Paris, France

Jane E. Parker
Plant innate immunity signalling pathways
Köln, Germany

Matthieu Piel
Quantitative, molecular and physical cell biology
Paris, France

Simona Polo
Ubiquitin (de)regulation of signaling pathways
Milano, Italy

Hans-Reimer Rodewald
Hematopoietic stem cells and immunology
Heidelberg, Germany

Claire Rougeulle
Long non-coding RNAs in development and disease
Paris, France

François Spitz
Genome architecture and gene regulation
Paris, France

Didier Stainier
Vertebrate organ development and homeostasis
Bad Nauheim, Germany

Kate G. Storey
Regulation of neural differentiation
Dundee, United Kingdom

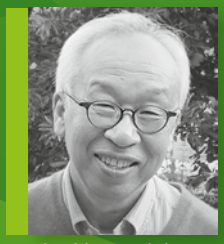
Peter ten Dijke
TGF-beta family signaling in diseases
Leiden, Netherlands

Pavel Tomancak
Patterns of gene expression in animal development
Dresden, Germany

Xiaodong Zhang
Structures and mechanisms of macromolecular machines
London, United Kingdom

Juleen R. Zierath
Skeletal muscle glucose metabolism and development
Stockholm, Sweden

George Fu Gao*
Protein interactions in virus entry and immunity
Beijing, China



Hiroshi Hamada*
Origin of body asymmetries in the mouse embryo
Kobe, Japan

Marc W. Kirschner*
Cell cycle regulation, mass spectrometry
Boston, United States

* EMBO Associate Member

Mohamed Bentires-Alj
Breast cancer diversity, resistance and metastasis
Basel, Switzerland

Michael Brand
Regeneration of the vertebrate brain and retina
Dresden, Germany

Dana Branzei
DNA replication and chromosome structure integrity
Milano, Italy

Frank Buchholz
Genome editing and functional genomics in medicine
Dresden, Germany

Ana I. Caño-Delgado
Brassinosteroid signaling in stem cell development
Barcelona, Spain

Darren Gilmour
Collective cell biology of organ formation
Heidelberg, Germany

Ian A. Graham
Plant natural products and seed biology
York, United Kingdom

Manajit Hayer-Hartl
Molecular chaperones and Rubisco biogenesis
Martinsried, Germany

Carl-Philipp Heisenberg
Cell and tissue morphogenesis in gastrulation
Klosterneuburg, Austria

István Katona
Endocannabinoid signaling in the brain
Budapest, Hungary

Maria M. Mota
Biology and physiology of malaria
Lisbon, Portugal

Daniel J. Müller
Molecular and cellular biophysics of membranes
Zurich, Switzerland

Eugene Myers
Image-based systems biology for development
Dresden, Germany

Ove Nilsson
Regulation of flowering time and tree phenology
Umeå, Sweden

Ruth H. Palmer
ALK signaling in *Drosophila*, mice & human cancer
Gothenburg, Sweden

Raffaella Santoro
Chromatin dynamics in cancer and stem cells
Zurich, Switzerland

Uwe Sauer
Systems biology of metabolism
Zurich, Switzerland

Hans R. Schöler
Programming and reprogramming in mammals
Münster, Germany

Melina Schuh
Meiosis in mammalian oocytes
Göttingen, Germany

Roberto Solano
The jasmonate signaling pathway in plants
Madrid, Spain

Ian Tomlinson
Cancer genetics and evolution
Oxford, United Kingdom

Jernej Ule
RNA regulatory networks
London, United Kingdom

Antonella Viola
Immune cell signaling
Milano, Italy

Douglas J. Winton
Functional properties of intestinal stem cells
Cambridge, United Kingdom

Gulnara Yusupova
Mechanism of protein biosynthesis at the ribosome
Illkirch, France

Timothy J. Mitchison*
Mechanisms of cell organization & movement
Boston, United States

Huck-Hui Ng*
Self-renewal and differentiation of stem cells
Singapore

Virginijus Šikšnys*
Mechanisms of antiviral defense in prokaryotes
Vilnius, Lithuania

Hong Wu*
PTEN controlled signaling pathway and tumorigenesis
Beijing, China

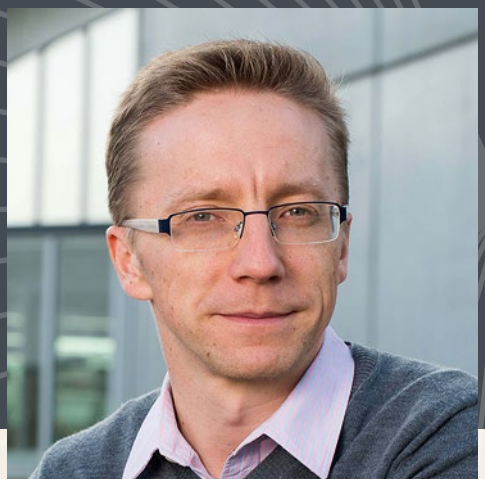
Xiaowei Zhuang*
Advanced imaging of cellular structures
Cambridge, United States

* EMBO Associate Member

Richard Benton and Ben Lehner awarded EMBO Gold Medal 2016

RICHARD BENTON of the University of Lausanne, Switzerland, and BEN LEHNER of the Centre for Genomic Regulation (CRG), Barcelona, Spain, are the recipients of the EMBO Gold Medal 2016. The EMBO Gold Medal, endowed with 10,000 Euros, is awarded annually to young scientists for outstanding contributions to the life sciences in Europe. The award ceremony will take place on September 11, 2016, at the opening session of *The EMBO Meeting* in Mannheim, Germany.

Richard Benton



Ben Lehner

Richard Benton was awarded the EMBO Gold Medal 2016 for his work on olfactory perception in insects. There are many similarities between the organizational structure of the neural systems underlying olfaction in insects and vertebrates. However, Benton and his colleagues found that the molecular basis for recognizing smell is different. He showed that insect odorant receptors, the molecular detectors of scent, define a novel class of genes, with evolutionary roots in the common ancestor of animals and plants. He discovered a second family of odorant receptors – the fly's "second nose", as he called it – that belongs to a group of proteins previously thought to function only in the communication between neurons.

Building on these discoveries, Benton expanded his research to related fields. "Richard Benton has been praised by the referees for his courage and perseverance in challenging dogma regarding odorant receptors, while also contributing to behavioral ecology and evolutionary biology," said Maria Leptin, EMBO Director. Insect olfaction provided an ideal model to explore the evolution of new genes as there is a strong pressure to cope with an ever-changing olfactory environment. In addition, Richard Benton and his group have made discoveries in the field of behavioral biology addressing, for example, how chemosensory and mechanosensory pathways interact to elicit collective behaviors.

Ben Lehner received the EMBO Gold Medal 2016 for his contributions to understanding the origins of phenotypic diversity in development and evolution. People differ from each other and this is, according to textbook knowledge, due to differences in genetics as well as environment. However, working with the roundworm *C. elegans*, Lehner discovered another player in the game. Genetically identical worms grown in the same environment may nonetheless not look identical. He showed that this can be explained by stochastic variances in gene expression early in development. Extrapolating to humans, this means that it may not be possible to predict disease outcomes from genome analysis alone. Gene expression levels need to be taken into account.

Lehner then continued on the general theme of genotype-phenotype relations, pursuing a diverse array of questions. "Ben Lehner has impressed the award committee with a very broad research interest, ranging from the genetics of cancer, to evolution, circadian oscillations, and the dynamics of gene expression networks," commented Maria Leptin. Part of his work has focused on the question why different cancers accumulate different mutations. Ben Lehner and his team found that regions of active gene expression have a lower mutation rate due to a repair mechanism that works more efficiently in these regions.

Are biologists ready for preprints?

EMBO Associate Member RON VALE and EMBO's Head of Scientific Publications BERND PULVERER make the case for the sharing of preprint manuscripts

Access to scientific data, or Open Science, is a topic of lively discussion between scientists, publishers and funding bodies. This theme is particularly relevant in light of the recent announcement from EU Commissioner Carlos Moedas, which included a statement that all publicly funded scientific papers published in Europe should be freely accessible by 2020 (see Science Policy page 10).

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Passionate about preprints: Ron Vale, University of California

What are preprints?

Preprints are complete scientific manuscripts that are shared on a publicly accessible server before peer review. Preprints are freely accessible and usually free for authors. They can be read, cited and critiqued by the community and revisions can be uploaded by the authors. Preprints can be submitted in parallel to their posting on a server, to most peer reviewed journals for formal publication.

For Ron Vale of the University of California, San Francisco, giving biologists the ability to rapidly share original research papers with their peers before publication in scientific journals is a big step forward in simplifying the dissemination of new data and engaging scientists in commenting on each others work before publication. However, Vale acknowledges that for the sharing of preprints to become widespread in biology, they need to be accepted by funding bodies and publishers as well as by scientists themselves. Once funders explicitly consider preprints for research assessment and journals universally encourage preprint posting, scientists are more likely to appreciate their utility.

In June 2016, EMBO Director Maria Leptin chaired a meeting including a presentation by Vale on the merits of preprints, along with an editor's perspective by the head of scientific publications at EMBO, Bernd Pulverer. Vale explained that sharing preprints is not a replacement for traditional journal publication, but that the peer-review and editorial process can be lengthy and unpredictable, while preprints offer the ability to communicate new findings with minimal delay, in a form that is stably archived and citable yet open to community discussion and revision. Adding a new manuscript to a preprint server can provide evidence of priority for new findings and evidence of productivity for grant or fellowship applications. In response to concerns about research being posted prematurely in order to stake a claim on a new finding, Vale noted that researchers would likely be conservative in releasing unvetted information in order to protect their reputations.

Pulverer stated that the majority of scientific journals, including those of *EMBO Press*, had embraced preprints, defining their own role as providing the point of record with peer-reviewed and edited research papers. The two streams of communication have been working alongside each other in the physical sciences for 25 years, where uploading research to the arXiv preprint repository is a firmly established practice. Pulverer also emphasized that the comments on preprints can enhance the quality of journal submissions and reduce the pressure towards rapid journal publication. Authors can submit directly from a preprint server to all four *EMBO Press* journals at the click of a button.

"Scholarly communication should be a joyful process where you share the research on which you have worked so hard", said Vale. Recent enthusiasm towards preprints from funders and journals at two workshops organized by Vale and colleagues (see http://asapbio.org) suggests that preprints could become a routine part of communicating findings in biology, as open science becomes more widely embraced.

How transparency in publishing is opening up research

By BERND PULVERER

Science is a process of building upon earlier discoveries, co-operating with fellow researchers to share information and turning each advancement into the basis for the next. For this progress to occur, researchers need unimpeded access to the latest results. Traditionally, this has happened through two complementary forms of communication: conferences, where "hot off the bench" results are presented for discussion, and journal publication, where peer review offers a reliable standard of quality and reproducibility and which preserves an archive of research.

Increasingly, given the competition for limited funding and continuous research assessment informed by publication output, conference presentations are covering published or in-press research. The reluctance to present unpublished research often stems from a fear of being "scooped" by someone replicating findings and managing to publish faster – in the worst case with less data – instead of offering cooperation to publish jointly. Such hesitance to present unpublished data is understandable, as primary research publication is crucial for career advancement.

At *EMBO Press*, we encourage researchers to make their findings accessible at all stages of the scientific process – as long as they are reliable and usable by others. We do so, on one hand, through policies that protect researchers from losing priority and that optimize informed, rapid and impartial quality control and, on the other hand, through new infrastructure:

Preprints

We encourage the use of preprint servers to share manuscripts describing completed research prior to formal publication. This can be considered a broadly accessible extension of the role of conferences, opening up research to peers for discussion. Everyone benefits, as community feedback can improve research before submission to a journal, and everyone has access to the latest results before journal publication.

Preprint manuscripts are issued with a DOI (Digital Object Identifier) and can be formally cited. They are also time-stamped when uploaded and are visible to the whole community, establishing priority and encouraging collaboration rather than "scooping".

Preprint revisions are version-controlled to allow for transparent updates and *EMBO Press*,

Continues on next page →

along with most other reputable journals, do not consider preprints to undermine the novelty of a manuscript; indeed, we have implemented a "one click" submission procedure from the preprint server bioRxiv to all *EMBO Press* publications.

Scooping Protection

We do not consider related publications that appear during review or revision to undermine the conceptual advance of a manuscript; we merely request citation. We have now extended this policy to manuscripts posted on recognized preprint servers.

"We now have expanded scooping protection to manuscripts posted on preprint servers."

Hopefully scooping protection and preprints will help to depressurize the system sufficiently to allow for careful and constructive review and revision.

Transparent Process

EMBO Press has developed an efficient and effective editorial process. Authors can consider referee reports in their entirety and only essential requirements for revision are clearly communicated. As a result, over 90% of papers are published after one round of revision. *EMBO Press* journals publish referee reports (anonymous unless referees chose otherwise), editorial decisions and authors' responses in full, dating each step in the editorial process. We have also established referee cross-commenting as a mechanism to improve the quality of peer review.

Source Data

Once published, we aim to make results as useful and accessible as possible. For a number of years we have been encouraging the publication of the source data underlying figures and around half of *EMBO Press* papers are now enhanced in this way.

EMBO's SourceData project has developed a platform that renders published scientific figures and their underlying source data into a machine-readable and searchable format. Currently in the pilot stage, SourceData allows researchers to directly find specific data figures by searching not only for text or keywords but by specifying a particular biological component or experimental design. *EMBO Press* releases the source data from all journals into the public domain, meaning that everyone has free access to the core of research and can share data with the wider community.

www.embopress.org | biorxiv.org
sourcedata.embo.org

Brexit and research: goodbye EU money and colleagues?

A commentary by the previous EMBO Director Frank Gannon, published in *EMBO Reports*

Frankly, I am not surprised by the British voters' decision to leave the EU. If you ask a nation or community "Do you want to control your own destiny or let pesky outsiders decide things for you?", there can be only one answer to this simplistic question. To understand the details of leaving and to consider the alternatives would require a thorough debate and not just sound bites. But many years of anti-EU propaganda and jingoism fused into a simple choice to the person on the street. In addition, Brussels is an easy target and it is political expediency to imply that this "foreign body" imposes its rules. Just as it is easy to "blame the committee" when some necessary but unpopular decisions are announced, "Europe" was the shield for introducing many decisions that help consumers, ensure better fiscal discipline or for collective approaches to climate change. Being Irish, I also saw many positive societal changes not just in my country, but all across the continent, thanks to the "outside body" in Brussels. And yet, the trend for the past few years has been to vote against the status quo. The Brexit vote, the Austrian presidential election, the rise of new right- and left-wing parties in Holland, France, Germany, Greece, Spain and the success of Donald Trump in the USA: the voters will no longer buy the same-old, same-old. [...]

There is no doubt that many universities, research institutes and scientists in the UK are top class and that research is well funded. The life sciences in particular are supported by two research councils and major charities such as the Wellcome Trust and Cancer Research UK. Of course, scientists never have as much funding as they have good ideas, but our colleagues in the UK are doing fairly well. Major pharmaceutical companies are based in the UK owing to the large pool of talented scientists—and because of the favourable tax offerings and because (say it quietly) it provides an English-speaking entry point to the EU market. Research in the UK benefits from great leaders and institutions, is well organised and productive, and demonstrates its social and economic impact.

Most of those factors will not change, so all is good then for a Brexited UK? It is hard to be sure how post-Brexit discussions will affect British science. In the extreme case, it means Britain slamming the door and becoming a EU-free country: no more complex applications and rules, no more signing time sheets, and all the other bureaucratic annoyances, but, also, no more money from the collective purse. That will mean a loss for many laboratories and researchers as the EU has become a major source of research funding for British scientists. The leading British laboratories did not partake much in the earlier Framework programmes, but, with time, UK scientists became enthusiastic and important participants. It is estimated that 16% of the research funding for universities in the UK come from the EU purse. Similarly, the UK government first opposed the idea of an European Research Council (ERC), which scientists from all over Europe were lobbying for. The argument that more competition would raise the standards throughout the continent was not selling in the UK with its top-class research. However, the UK eventually came on board to support the creation of the ERC, presumably because Lord Sainsbury, then minister of research, realised that laboratories in the UK would be the major beneficiaries. Indeed, Britain has been the most successful country in attracting ERC funds since 2007: 636 grants were awarded compared to 441 grants in Germany, which ranks second place despite the fact that it has a larger population and invests more into research. This means 636 laboratories were able to hire the best postdocs and perform the most expensive, and hence most thorough experiments, while colleagues with less resources elsewhere fell behind. A 16% cut will hurt. Of course, the UK could increase its national funding by using money it once transferred to the EU, but that is an unlikely outcome. [...]

We have witnessed the power of the electorate. It cannot be ignored. We have to move on from wishful thinking that it will be business as usual and work to minimise the damage that could result, at least with regard to research. What happens in laboratories, wherever they are located, remains a global enterprise, and facilitating the continuation of that is necessary for the benefits to flow from research to mankind.

Commentary by Frank Gannon
DOI 10.15252/embr.201643057 | Published online 27.07.2016
Abridged version reprinted with kind permission from *EMBO Press*

What is the meaning of Brexit?

A commentary by Stephen Curry, also published in *EMBO Reports*

In the UK referendum on 23 June 2016 the British electorate delivered a majority vote in favour of leaving the EU. The margin was small—52 to 48 %—but the result was clear. Since then, nothing has been clear.

The roiling waters of UK politics have delivered a new Prime Minister, Theresa May, and a new conservative government, but the flow of events remains turbulent. Amid the ongoing confusion over exactly how the referendum result will reconfigure Britain's relationship with the EU—which looks likely to stretch well beyond 2017—it is difficult to judge the impact on the future of UK and European science. The PM's announcement that "Brexit means Brexit" may have relieved the leavers in her party, but has done little to reassure anyone else. Her new Foreign Secretary, Boris Johnson, is confident that a "balance can be struck" between access to the single market and freedom of movement, but has yet to win the confidence of Paris or Berlin. Boris's soberer younger brother, Jo Johnson, has been re-appointed as Minister for Universities and Science, providing a degree of continuity. He has made reassuring noises in the aftermath of the referendum, but his refusal to answer questions on Brexit at the recent ESOF 2016 meeting in Manchester was a disappointment.

During the referendum campaign, the pro-Brexit lobby group Scientists for Britain confidently asserted the UK could enjoy full access to the EU research ecosystem as an associated state rather than a full member, just like Norway or Switzerland. Unfortunately, this is as fanciful as Johnson's "pro having my cake and pro eating it" policy on the EU. It overlooks the crucial fact that the Norwegians and Swiss have access only by adhering to EU rules on freedom of movement. Switzerland will lose these privileges if it does not reverse a 2014 vote to limit mass immigration by the end of this year [1]. Nor should it be forgotten that Norway and Switzerland also have to pay the same contributions as EU members, yet have no say on EU research policy. Britain can hardly expect to play by different rules.

And nor is it likely to be able to sell freedom of movement pledges to the UK electorate, since immigration was such a hot topic in the referendum. Research by the Resolution Foundation [2] showed that it was an especially influential issue among voters in regions where immigration has surged in recent years even if the size of the local immigrant population remained low. It matters little that there is no evidence that immigration from the EU or elsewhere has taken jobs—the UK currently has more or less full employment—or significantly depressed wages [3]. [...]

The UK scientific community has to make its case not just to politicians but to the public at large. We should try to avoid charges of elitism, or of being out of tune with post-referendum political realities. We need to be aware that many other employment sectors will want to make their own arguments for worker mobility. In reaching out to the public, we should be sensitive to the possibility of coming across as money-grubbing and self-serving. [...]

This will be a difficult undertaking—though it is already partly in train through the open science agenda—but for the sake of science and for the sake of society, we have to try. Because the referendum result has taken the UK and the EU into entirely uncharted territory, and the shape of the new settlement is still in play.

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2 http://www.resolutionfoundation.org/media/blog/why-did-we-vote-to-leave-what-an-analysis-of-place-can-tell-us-about-brexit/
3 https://fullfact.org/immigration/immigration-and-jobs-labour-market-effects-immigration/

Commentary by Stephen Curry
DOI 10.15252/embr.201643113 | Published online 04.08.2016
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How objective can one be?

Panel session at ESOF on limitations of metrics for research assessment

Research assessment is crucial to identify promising research projects. However, there is growing unease in the community with the metrics applied and the scope of their use. Panelists at the session "Research assessment: New metrics? More metrics? No metrics?" at the EuroScience Open Forum (ESOF) in July in Manchester, chaired by EMBO Science Policy Programme Manager Michele Garfinkel, critically reviewed widely used proxy measures of research performance such as journal impact factor or journal prestige. The panelists discussed their concerns with metrics, but also pointed to approaches to overcome their limitations.

Anne Cambon-Thomsen (CNRS, France) presented proposals for developing a guideline to standardize the citation of bioresources including data in journal articles, databases or biological samples. Ismael Rafols (INGENIO, Spain) suggested that widely applied metrics may be harming research, and called for a broader metrics toolkit with pluralized indicators which show that pre-defined research goals were pursued.

Bernd Pulverer (*EMBO Press*) pointed out that the journal impact factor is not predictive of the impact of specific research and that the publication of citation distributions helps alert readers to this fact. He postulated that experts should be given incentives to evaluate research in detail if refereeing itself were part of research assessment. Finally, Sarah de Rijcke (CWTS, Netherlands) stressed the importance of scrutinizing indicators regularly and of updating them. She proposed to add 'socially robust' responsible metrics.

The session ended with an animated debate whether metrics are applied transparently and appropriately in the evaluation of research and researchers, underlining the need for continued and critical analysis of existing and future metrics.

www.esof.eu/the-programme/event-information/research-assessment.html

From potential to policy

Interview with EU commissioner Carlos Moedas

Integrated initiatives, creative collaboration and open objectives topped the agenda as EMBO and EMBL hosted a visit from CARLOS MOEDAS, European Commissioner for Research, Science and Innovation. We spoke to Commissioner Moedas to find out more.

What were your main goals during your visit of EMBO and EMBL in Heidelberg in April?

The meeting in Heidelberg was a great chance to discuss some of the many common goals of the European Commission, EMBO and EMBL – I feel that the Commission should always be involved in discussions on the molecular life sciences at the European level. I also wanted to show support for both EMBL and EMBO signing of the San Francisco Declaration on Research Assessment (DORA), and highlight our viewpoint that, although the Impact Factor is an easy and well-known indicator of research performance, others should also be considered, which is why we have set up an expert group on Alternative Metrics.

This visit was also the ideal platform to discuss progress, successes and areas for potential improvement for the newly-signed EC-EMBL Work Plan 2016-2017; this outlines common objectives in areas such as research infrastructures and e-infrastructures, personalised medicine, research data sharing, mobility and training of excellent researchers.

I was also interested in engaging in active discussion on how we could work together to fulfil the common goals of open science and open innovation.

What do you regard as the main day-to-day challenges of implementing the Horizon 2020 scientific funding programme? How might the role of the scientific community in achieving the goals of the programme evolve in a positive manner?

The high volume of applications to Horizon 2020 is both a proof of success and one of the challenges we face. We received more than 90,000 proposals between 2014 and March 2016, each of which underwent an in-depth evaluation by independent experts, and we continue to carefully monitor success rates and take measures to increase applicants' chances of success.

We are in constant dialogue with the scientific community – we listen carefully to their views to ensure that the programme is on track and that all the possibilities offered by Horizon 2020 meet the needs of our beneficiaries. We engage independent observers – senior figures from the research, industry or public sectors – to evaluate funding applications, and regularly assess the efficiency of our processes thanks to the feedback of experts and programme managers. The role of the scientific community here is vital for the success of Horizon 2020.

Horizon 2020 is largely organised around 'grand societal challenges': how will you ensure that the funding environment for basic, fundamental research – which has contributed significantly in developing ways to tackle these challenges – remains healthy? What new challenges and opportunities do you see for researchers studying basic, fundamental science?

Horizon 2020 consists of complementary elements, one of which is the European Research Council (ERC) that supports frontier research and excellence in science. The ERC was established also thanks to the contribution of EMBO and EMBL, and is a striking example of how an EU initiative can completely transform the European research and innovation landscape.

Under Horizon 2020, the ERC has a budget of €13 billion, which I think is a healthy amount, even if one could argue that there is always room for more excellent research to be funded across Europe. Fundamental research is under economic and political pressure to deliver impact, but here we need a long-term view and patience, because the talented researchers who benefit from ERC grants are an integral part of what keeps us globally competitive. Their work already delivers a remarkable scientific impact. History shows that real breakthroughs often come from purely curiosity-driven basic research. Such research is the solid foundation of knowledge creation and innovation. It's important for Europe to lead the way when it comes to giving researchers independence to conduct basic research, while at the same time in ensuring the best results for EU research and innovation as a whole.

How might the scientific community work better on issues such as opening up access to data and literature? What progress has been made? What are the sticking points? What do you see as the role of governments and publishers?

In our Horizon 2020 projects, open access to results and publications is already the norm and we have been running a pilot initiative on open research data generated by Horizon 2020 projects. But policies are not enough and to gain leadership, we must also invest in the necessary infrastructure. For Europe's 1.7 million researchers and 70 million science and technology professionals, we will create a new European Open Science Cloud: a virtual environment to store, share and re-use their data across disciplines and borders. Researchers and innovatorswill be able to access and re-use data, while reducing the cost of data storage and high-performance analysis.

"In our Horizon 2020 projects, open access to results and publications is already the norm and we have been running a pilot initiative on open research data generated by Horizon 2020 projects."

We have the full support of the European Member States on this: in late May, the Competitiveness Council adopted the concusions of the European Council on "Open, data-intensive and networked research as a driver for faster and wider innovation" which states that Member States "look forward to the possible development of action plans or strategies for open science". Member States have also expressed interest in the development of a European Open Science Agenda.

We need to work together to make sure that open science develops in the right way to make the EU more competitive and maintain excellence in science. This requires the involvement of all key-stakeholders involved, including publishers, research performing organisations, research funding organisations, and businesses, and will imply a review of how science is evaluated, the creation of new research funding mechanisms, and alternative ways of publishing.

One of the major concerns for enhancing the impact of science and technology on our economies is how we smooth the path for innovative ideas to achieve their full potential. What approach is needed to do this? Why is this a good time to address this? How might it take shape?

Europe is excellent at research, but not so good at translating its results into new products and services. We must do better in market-creating innovations like new internet services, clean energy technologies and better health care. That is why I am advocating for the creation of a European Innovation Council to attract the best innovators and help them to grow their companies in Europe.

We launched a public consultation this spring to gather everyone's views. This Call for Ideas attracted over a thousand responses, and the main messages are clear: the vast majority agree that market-creating innovation is indeed a particular challenge for Europe, and many have also expressed their concern that innovators find it hard to find their way in the current range of EU support schemes. These responses confirm my impression that we should further improve EU innovation support and the EIC should address this issue.

We're also looking at new innovation-funding instruments to support Europe's most promising innovators. They need more venture capital: this is the biggest weakness in the European innovation system: we invest less than a fifth in venture capital than the US does (€5 billion in 2014 compared to €26 billion in the US) and this must change. So the Commission is developing a proposal for a pan-European venture capital Fund-of-Funds to tackle three main problems. First, European funds are too small — and small funds can only invest in small firms, and can't finance them as they grow. Second, 90% of venture capital is concentrated in just eight Member States, and cross-border investments are uncommon – this fragmentation prevents larger funds emerging. And third, EU venture capital draws heavily on public funding. The latest figures from 2014 shows that public funding makes up 35% of EU venture capital, up from 14% in 2008 – we need to attract much more investment from private and institutional investors, such as pension funds. This last point is our primary objective and the main added value of this initiative. The next step will be the launch of a call for expression of interest to manage the pan-European Fund-of-Funds, which I expect to take place in the coming few months.

What progress have you seen in driving forward improvements to issues such as gender balance in science? What challenges remain in terms of enhancing diversity in laboratories and addressing other issues such as boosting mobility for researchers?

Promoting gender equality is a priority of the European policy for research and innovation, and the Commission is making a tremendous effort in that direction. Our statistics show some positive trends, for example, the proportion of female PhD students went up from 43.4% in 2004 to 47% in 2012. Similarly, the proportion of female researchers grew from 30% in 2006 to 33% in 2012, and that of female heads of institutions in the higher education sector went from 15.5% in 2010 to 20.1% in 2014.

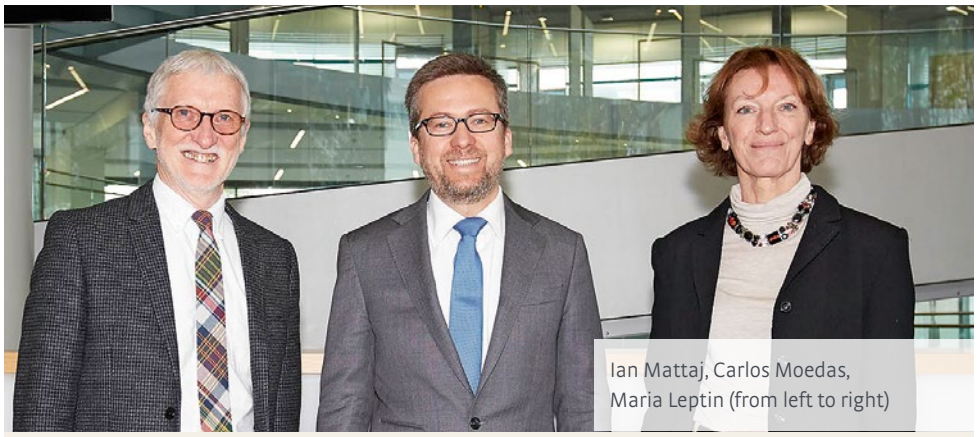
So things are moving in the right direction, but slowly. I am committed to accelerating this trend and have included specific criteria to that effect in Horizon 2020: for instance, gender balance in research teams is now a ranking factor for proposals, when all other factors are equal.

When it comes to mobility, surveys show that European researchers are highly mobile, with around 30% having worked abroad for more than three months during the last ten years. Up to 94% of EU researchers who have worked abroad consider it was beneficial to their career progression.

We want to promote mobility even further: later this year, we plan to launch RESAVER, a pan-European pension scheme for researchers to enable them to retain their supplementary pension benefits when taking up a job in a different country.

EURAXESS is another side of that effort: this pan-European initiative offers more than 250 service centres in 40 European countries to advise European and third-country researchers planning their move, on issues like visas, social security arrangements, housing and child care. The EU also strives to attract talent from all over the world with the help of the Scientific Visa package, which simplifies the procedure of admitting third-country researchers to Europe for the purpose of scientific research.

This interview was conducted by Adam Gristwood and is co-published in the 2016 summer issue of EMBL etc. magazine.



Ian Mattaj, Carlos Moedas, Maria Leptin (from left to right)

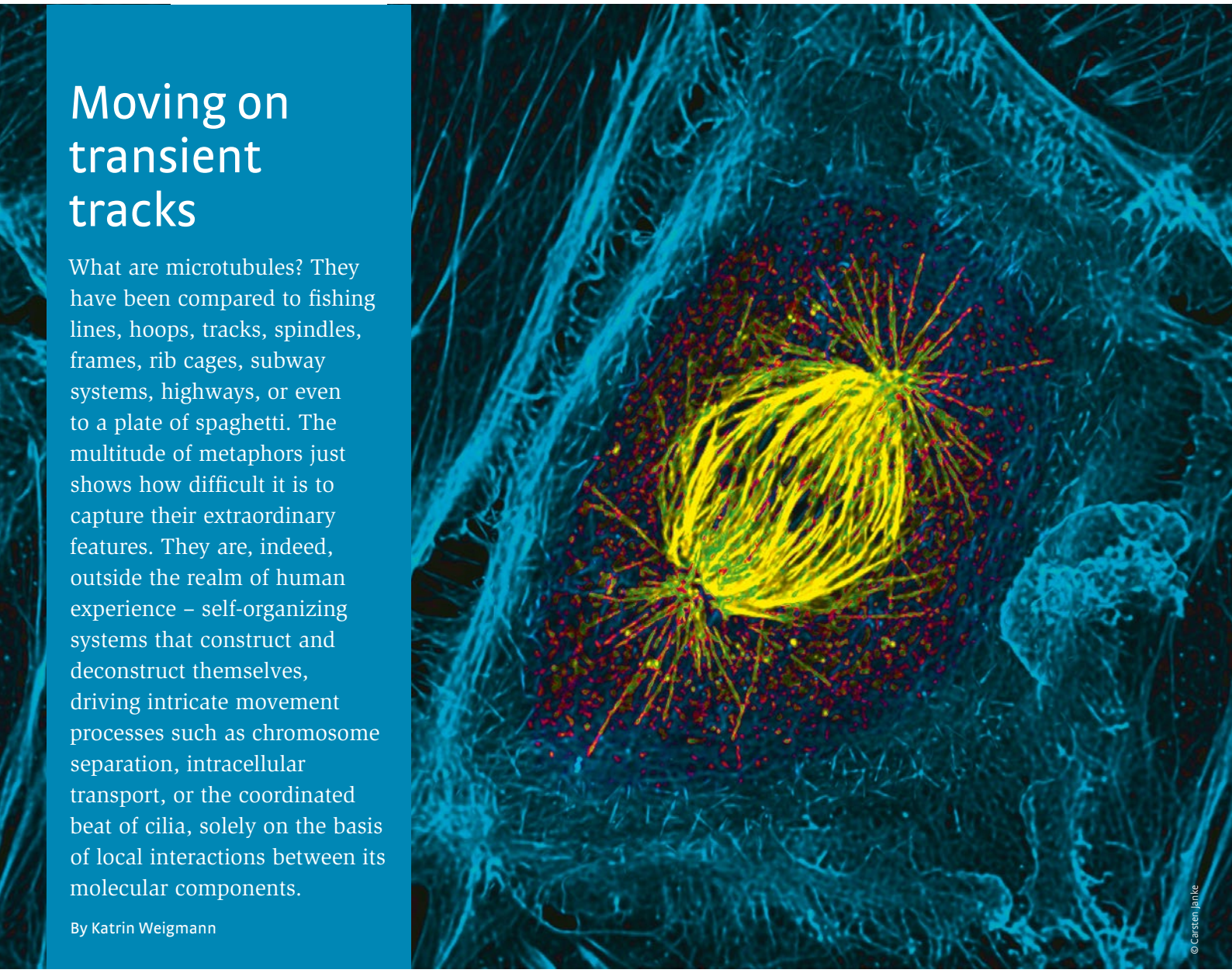
High on the agenda: research integrity and open science

In April this year, Carlos Moedas together with delegates from the State of Baden-Wuerttemberg, visited EMBO and EMBL in Heidelberg. Commissioner Moedas discussed with EMBO Director Maria Leptin and EMBL Director General Iain Mattaj ways in which EMBO and EMBL can cooperate with the Commission to serve the needs of researchers and innovators in the life sciences in Europe. "We were pleased that our conversation with Commissioner Moedas revealed so many points of convergence on key issues such as data integrity, open science and, more generally, transparency in the scientific process," said Leptin. "As we continue our work on research integrity and develop a concrete approach to open science with EMBO's SourceData initiative, we look forward to continued and productive interactions with the Commission to strengthen European scientific excellence and global reach."

Moving on transient tracks

What are microtubules? They have been compared to fishing lines, hoops, tracks, spindles, frames, rib cages, subway systems, highways, or even to a plate of spaghetti. The multitude of metaphors just shows how difficult it is to capture their extraordinary features. They are, indeed, outside the realm of human experience – self-organizing systems that construct and deconstruct themselves, driving intricate movement processes such as chromosome separation, intracellular transport, or the coordinated beat of cilia, solely on the basis of local interactions between its molecular components.

By Katrin Weigmann



Mitotic spindle (yellow) in a dividing cell with the actin cytoskeleton labeled in blue.

Microtubule research is as multifaceted as the structures themselves. Scientists in the field study the molecule's structure and dynamics, its function in cell division, cell migration or axon growth, its role in evolution or disease development. "The tubulin field has become so broad you can hardly call it a field anymore," said Carsten Janke, who co-organized a large EMBL | EMBO symposium on microtubules in May this year to bring the different communities together and to celebrate tubulin's 50th anniversary.

Discovering the building blocks

The history of molecular microtubule research began in the 1960s, when Gary Borisy in the lab of Edwin Taylor embarked on a risky PhD project – isolating the components of the mitotic spindle to understand its function. In a very elegant approach, he used colchicine, which was thought to block mitosis by interfering with the spindle, as an entry point.

But after Borisy succeeded in isolating the "colchicine-binding protein", he found, to his surprise, that it was also present in non-dividing cells, particularly in brain. In fact, it could be isolated from a number of different sources that all had one thing in common: They contained microtubules. Borisy and Taylor thus suggested that the "colchicine-binding protein" – today known as tubulin – was the microtubule subunit. It was the beginning of a long story full of exciting discoveries.

Counting individuals

For many years thereafter, researchers were puzzled about how microtubules form and disappear. They suspected some sort of "dynamic equilibrium" between tubulin molecules and polymers, but the details were unknown until Timothy Mitchison in the lab of Marc Kirschner discovered them as a side project in the 1980s.

The goal of Mitchison's PhD thesis was to purify centrioles, the structures that nucleate mitotic spindles, using an assay of growing microtubules to test the purity of his fractions. But he couldn't isolate enough protein to do anything useful, so he started taking a closer look at his assay instead. "I counted the number of nucleated microtubules as a function of tubulin concentration and realized this strange behavior where microtubules were just disappearing," he recalled. The researchers coined the term "dynamic instability" to describe this behavior: microtubules switch between phases of growth and rapid shrinkage, called "catastrophe", whereby growth and catastrophe were generated by different mechanisms. "All prior work was done on microtubules in bulk and averaging them," said Mitchison. He discovered a new phenomenon by looking at individuals and counting their numbers.

The discovery of dynamic instability explained a lot. Growth and sudden depolymerization could do mechanical work, like pulling chromosomes. Mitchison and Kirschner also proposed that microtubules would display an "exploratory

behavior", where they would grow until they either attach to something or collapse. This "search and capture" mechanism could explain, for example, how microtubules catch hold of chromosomes.

Looking for myosin and finding kinesin

Discoveries are not always straightforward. When Ronald Vale discovered kinesin, he was really looking for a non-muscle myosin. Vale was interested in how material is transported along axons and suspected some form of myosin, since myosin was known to move along actin cables in muscle cells. But eventually, using a combination of *in vitro* biochemistry and electron microscopy, he noted that organelles in axons were actually moving along microtubules. When he managed to isolate the corresponding motor protein, he called it kinesin.

"The roots of cell biology come from studying muscle and cilia, where myosin and dynein had been discovered. But those were considered very specialized tissue. It really took the discovery of kinesin to realize the sliding mechanism in cilia can be generalized to the motor for transport in neurons and other cells," said Mitchison.

Kinesin moves along microtubules – but how? Does it jump, flip, walk, or slide? Understanding the mechanism required looking at single molecules. Joe Howard, working with Ron Vale, looked hard for conditions for single molecule motility – and found them. "Single molecules had thus far only been studied in the ion channel field," Howard explained, referring to work by Erwin Neher and Bert Sakmann that was later awarded the Nobel Prize. Howard's assay for kinesin was the first single molecule assay outside the ion channel field. Thanks to this technology, we now know that it walks, we know its step size and how it generates force.

From atoms to complex systems

Microtubule research was driven by a love of detail and attention to small things – single molecules – to explain general principles, and this work is ongoing. "One of the open questions in the field still is catastrophe," said Howard. It is known that microtubules are protected in the growth phase by a "GTP cap" and losing the cap results in microtubule teardown. But how is the cap lost, what controls the length of microtubules? Many labs are working on this problem, using single molecule techniques and advanced microscopy.

But there is another movement going on, which is alluded to in the EMBL | EMBO symposium title: Microtubules: From Atoms to complex systems. "The next challenge is to look at microtubules in the context of cells and organisms" said Janke. This approach may, eventually, also lead to clinical applications. Taxol, for example, binds microtubules and is used to treat cancer. It causes side effects, particularly in neuronal tissues, but just the fact that it is somewhat specific to cancer cells is curious enough. "How can there be any selectivity between tissues, if the drug's target protein is in virtually every cell?" asked Mitchison. "If we understood how Taxol killed cancer cells, that would help us develop better drugs," he said.

Similarly, genetic phenotypes that affect microtubules are often selective to certain cell types, despite the fact that the respective proteins are expressed ubiquitously. Different tubulin gene variants and post-translational modifications may generate subtle differences in microtubule behaviour. "For a long time the significance of these small differences was a puzzle. But we now know that they manifest in situations where processes need to be precisely controlled, like in neuronal development," said Janke. Indeed, many mutations that cause neurodevelopmental disorders are either in a tubulin gene or a gene for microtubule-associated proteins. Understanding the consequences of these small changes in the context of the whole organism is still an open field. "I expect that the number of people interested in microtubules will increase exponentially. And neuronal development is really one of the most important aspects," said Howard.

Participants at the EMBO | EMBL Symposium on microtubules

© Pictures: Marietta Schupp, EMBL Photolab

Time line and people

1966 Gary Borisy and Edwin Taylor, University of Chicago, discover tubulin.

1984 Timothy Mitchison and Marc Kirschner, UCSF, discover dynamic instability.

1985 Ronald Vale at UCSF and colleagues discover kinesin.

1989 Jonathon Howard and Ronald Vale describe the movement of single kinesin molecules on microtubules.

2016 EMBO conference *Microtubules: From Atoms to Complex Systems*, organized by EMBO Members Marileen Dogterom, Carsten Janke, Andrea Musacchio and Michel O. Steinmetz.

Carsten Janke in discussion with microtubule research pioneer Gary Borisy

Update from the EMBO Programmes

Demand for EMBO Long-Term Fellowships remains high, with 735 eligible applications received in the spring 2016 selection. 95 candidates were chosen, 68 of whom will work in EMBC member states and 27 in non-member states, predominantly in the United States. The funding is awarded for a period of up to two years and supports post-doctoral research visits to laboratories throughout Europe and the world. A committee made up of 23 EMBO Members is responsible for the selection. This year, six new committee members joined the board, including Yehudit Bergman, Marie-Anne Felix, Erin Schuman, Nancy Hynes, James Briscoe and Mariagrazia Pizza.

Fellows who have recently completed their two-year stipend met at the annual Fellows' Meeting in Heidelberg from 16-19 June. 60 post-doctoral students came together to share their experience and establish new collaborations and contacts. Forty attendees presented their current work in short lectures during the four-day meeting. "The atmosphere was excellent," said David del Álamo, new Fellowship Programme manager.

Over the course of the meeting, fellows learned more about financial issues from Anna Lönnroth from the European Research Council (ERC). Lönnroth spoke about funding opportunities and the ERC. Anne Faerch Nielsen from *The EMBO Journal* spoke about scientific publishing at EMBO.

EMBO Fellows who work in the United States are invited to a separate meeting that will be held at the Massachusetts Institute of Technology in November this year.

www.embo.org/funding-awards/fellowships

EMBO Fellows' committee members met in Heildelberg

Matthias Merkenschlager

London workshop on experimental and computational biology

It sounded straightforward: "What should be our scientific strategy? Where are the opportunities? And who should we be bringing to the Institute to help us with this?" Clear goals from EMBO Member Matthias Merkenschlager as he opened a workshop in central London this spring.

Merkenschlager was co-organiser, along with Oliver Howes, of what proved to be anything but a straightforward two-day event. Attendees found themselves on an exhilarating journey through the latest thinking in experimental and computational biology, organised by the MRC Clinical Sciences Centre (CSC).

Groups working on Integrative Biology (IB) have reached a critical mass at the CSC. Late last year, a new IB section won strategic backing from the UK's Medical Research Council, to bring to bear both experimental and computational methods in tackling scientific questions. The workshop served both as a celebration and as a way to look to the future, including bringing in new groups.

With the intriguing backdrop of the Wellcome Collection, scientists first heard from Nikolaus Rajewsky of the Max Delbrueck Centre (MDC) in Berlin and Stuart Cook of the CSC. Rajewsky talked about his work on circular RNA, and discussed "droplet sequencing" as a method he claimed can provide sequencing data some two orders of magnitude cheaper than current techniques. Stuart Cook described his quest to understand why it is that some one per cent of the world's population carry a genetic mutation known to be linked to heart disease, with no apparent effect. The hearts of such people may be "primed to fail" if they suffer a second hit, whether genetic or environmental, he thinks, and preventative drugs might hold potential for this group.

Embo Young Investigators 2016

Speed networking and effective negotiation

Current and new members of the EMBO Young Investigator Programme gathered for the annual meeting in Heidelberg from 11–13 May 2016. The meeting attracted 50 Young Investigators and Installation Grantees from all over Europe. Each gave a brief talk describing their current research.

New to this year's agenda was a "speed networking" session on the first evening of the meeting, when scientists discussed topics of mutual interest. This one-hour-session was much appreciated. Raquel Oliveira from the Gulbenkian Science Institute: "The 'speed networking' session was fun and a very efficient way of getting to know each other. Of course the allocated time was often too short to really finish the discussed topics. But it was a great icebreaker and interesting discussions were then continued during coffee breaks, meals or over a beer."

On the second day of the meeting, Michele Garfinkel from EMBO Science Policy and Bernd Pulverer from *EMBO Press* jointly ran a session on Science, Policy, Publishing: why responsible conduct of research matters. Questions on topics such as preprint servers and open data triggered vivid discussions during the session.

On the practical side, participants were offered media training for on-site filming. Former BBC reporter Ali Sargent explained how to plan and produce a short video on a research topic. Those who opted for the negotiation workshop had a chance to polish their negotiation skills in a four-hour-workshop before the actual meeting took off.

The comments of the Installation Grantee Sebastian Glatt echo those of many other participants: "It was very interesting to find out more about other network members and their outstanding research. The meeting allowed me to interact with almost everybody in a very short time."

embo.org/funding-awards/young-investigators

Suffrage science: creating a web of women in science

EMBO Young investigator Petra Hajkova hosted an evening of celebration and inspiration for women in the life sciences. In a ceremony at the Royal Society on International Women's Day in March this year, ten female scientists and one science communicator were handed awards to recognise their scientific achievements and ability to inspire others.

This new group joined awardees recognised under the Suffrage Science scheme, established by the MRC Clinical Sciences Centre (CSC) five years ago. Each received an "heirloom" item of jewellery created by students of London's art and design college, Central St Martins-UAL. This draws inspiration from scientific research and from jewellery worn by the Suffragettes. As each piece is passed on, this creates a connected group of women that reaches across multiple generations of scientists.

Petra Hajkova

Petra Hajkova, who leads the MRC CSC's Reprogramming and Chromatin group, talked of her shock at the results of a pan-European survey last year in which some 67% of 5,000 respondents did not believe women have the skills to be senior scientists. The evening explored two themes, the nature of inspiration in science, and how each awardee will make a difference for women in science over the two-year cycle of the award.

This year's recipients hail from industry and academia and from subjects as diverse as epigenetics to early brain development to personalised medicine. One awardee, Michelle James of Stanford University, California, said it is important to show the next generation that science is tough. "It takes a lot of effort, emotion and strength. But it's not just that it's hard. We can do this together. I think it's important for us to show that you can be a strong woman in science, a passionate leader, and kind and respectful to your students."

csc.mrc.ac.uk/suffrage-science-creating-a-web-of-women-in-science/

www.theguardian.com/women-in-leadership/2015/sep/24/67-of-europeans-dont-believe-women-have-the-skills-to-be-scientists

New building for the Berlin Institute for Medical Systems Biology

Nikolaus Rajewsky and Thomas Sommer from MDC together with architect Alfred Nieuwenhuizen put the time capsule into the cornerstone

© David Ausserhofer/MDC

The Berlin Institute for Medical Systems Biology (BIMSB) is part of the Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC). It was initiated in 2008 and is headed by EMBO Member Nikolaus Rajewsky. The institute currently employs 200 scientists in 14 research teams with the number of groups set to rise to 25 in the coming years.

To accommodate the growing number of researchers, a new building in the heart of Berlin is currently being built. Its construction started in 2015. Last May the BIMSB scientists and guests celebrated the laying of the foundation stone at the huge construction site in Berlin-Mitte. "With the BIMSB we want to undertake important scientific activities that were previously missing at the MDC, including the systematic quantification of molecular interactions in simple model organisms and innovative technical and theoretical methods," said Rajewsky. "The new location is an important driver for the Max Delbrück Center as a whole."

The new building will accommodate up to 300 people. In addition to the state-of-the-art laboratories and technology areas, a communications hall is planned for hosting public events on art, society and life sciences. The centre will open its doors in 2018.

www.mdc-berlin.de/en/bimsb

"Match-making" services

A new "match-making service" in Cambridge was launched in 2015 to unite researchers and pharmaceutical firms in a bid to develop new drugs. The Milner Therapeutics Consortium brings together scientists from three academic centres in the United Kingdom (University of Cambridge, Babraham Institute and Sanger Institute) and the region's biggest pharmaceutical firms including Astex, AstraZeneca, GlaxoSmithKline and Shionogi. EMBO Member Tony Kouzarides heads the consortium and will also lead the Milner Therapeutics Institute, a brand new research centre at the city's biomedical campus due to open its doors in spring 2018. The construction of the new building has been made possible through a five million GBP donation from entrepreneur Jonathan Milner, a former member of Kouzarides' research group.

The consortium provides the outreach programme of the new institute, giving researchers access to novel therapeutic agents (including small molecules and antibodies) across the portfolio of drugs being developed by each of the companies in order to investigate their mechanism, efficacy, and potential. "We believe this form of partnership is a model for how academic institutions and industry can work together to deliver better medicines," says Kouzarides. One example of research collaboration set up by the consortium is the joint project between AstraZeneca and the team of EMBO Member Carlos Caldas at the University of Cambridge to investigate how different sub-types of breast cancer respond to different treatments.

© Milner Therapeutics

Tony Kouzarides

www.milner.cam.ac.uk

Under one roof

The University of Exeter will open its new Living Systems Institute (LSI) in September 2016. This interdisciplinary research centre will pioneer the investigation of diseases from a completely new and interdisciplinary approach, embracing mathematics, engineering, physics, cell biology and genetics.

The LSI initiative has been led by the University of Exeter under the guidance of EMBO Member Nick Talbot. The founding director of the Institute, EMBO Member Phil Ingham, will join the University in Summer 2016 from his current position as Vice Dean of Research at Nanyang University Singapore.

The LSI building is the University's single largest investment in science.

www.exeter.ac.uk/livingsystems

Molecular biology and regenerative medicine in southern Europe

The Andalusian Centre of Molecular Biology and Regenerative Medicine (CAMBIER) is a multidisciplinary biomedical research centre in Sevila, Spain, which draws together basic and applied research. Since April, CABIMER has been directed by the EMBO Member Andrés Aguilera. CABIMER is now celebrating its 10th anniversary. Throughout the years, it has provided a rich intellectual environment that supports individual researchers and fosters collaboration among faculty members, postdoctoral fellows, trainees, and visiting scientists. Some recent highlights are due to the success of CAMBIER researchers in obtaining funding from highly competitive programmes that include three ERC grants, an H2020 network project as part of a strong international consortium, and the nomination of two of its young PIs, Felipe Cortés-Ledesma and Pablo Huertas, as EMBO Young Investigators.

CAMBIER is formed by 19 independent research laboratories that are grouped into three broad topics that range from basic molecular biology to translational research: 1. Genome dynamics, which focuses on the study of DNA and the effects of its exposure to multiple physical and chemical agents on cell death, mutations, and genome reorganization, hallmarks of cancer cells and a number of syndromes and hereditary diseases often resulting in cancer or ageing; 2. Cellular homeostasis, which studies the mechanisms and proteins that control cell behaviour with the goal of advancing knowledge of neoplastic, autoimmune, and degenerative pathologies, both on the individual level and in the context of organs and tissues; 3. Stem cell and regenerative medicine, which tries to understand the molecular and cellular mechanisms of differentiation, proliferation, and cellular reprogramming.

www.cabimer.es/web/en/

DNA for synthetic biology

In April, the DNA Synthesis and Construction Foundry opened at Imperial College London. "Synthetic biology is an exciting interdisciplinary field that aims to merge engineering design principles with molecular and cellular biology towards constructing and testing novel biological systems and cells at the genetic level for basic and applied research", says EMBO Member Paul Freemont, who is one of the two directors of the foundry. One main engineering tenant of synthetic biology is the design-build-test-learn cycle where researchers can apply bioinformatics and bio-CAD tools to design specific genetic constructs, which are then assembled and transformed into specific host cells and tested for specified or desired functions. By measuring specific reporters and cell biomarkers using mainly 'omics' technologies, researchers can assess whether their designs have worked, allowing further design cycles to achieve desired functional outcomes. To enable this, the foundry aims to make the design and engineering of biological systems systematic and standardised.

www.synbicite.com

Biomedical centre in Munich opened

The Biomedical Center Munich (BMC), which opened last October, represents one of the largest science investments in Germany in recent years. EMBO Member Peter Becker was appointed coordinator of the project in 1999, when the first proposal for the institute was drafted. It took ten years to receive the necessary funds. Today, the institute houses eight biomedical departments of the Ludwig-Maximilians-University that were previously scattered all over Munich. "We see ourselves as an international centre of excellence," says Becker who holds the Chair of Molecular Biology at the BMC.


Peter Becker

Of its 500 staff members, three quarters are scientists working in 60 research groups. Their research topics include epigenetics, DNA repair, cell structure, cell differentiation and the establishment of nerve cell networks. Aiming to bridge basic research and clinical application, the BMC will also investigate clinical research on neurodegeneration, neurogenesis, immunity and various aspects of cardiovascular physiology. The institute hosts five core facilities for bio-imaging, bioinformatics, protein analytics, biophysical methods and flow cytometry. These provide a variety of complex high-tech instruments that no single department could afford. The animal facilities at the BMC offer space for 20,000 mice.

www.campusmartinsried.de/en/biomedical-center-of-the-lmu/

Practical Courses

PT-Oeiras | 1–9 July 2016 | G. Martins
3D developmental imaging

ES-Barcelona | 4–9 July 2016 | A. Bonvin
Integrative modelling of biomolecular interactions

UK-Bristol | 10–15 July 2016 | P. Verkade
Correlative light electron microscopy

DE-Joachimsthal | 10–15 July 2016 | C. Griesinger
Multidimensional NMR in structural biology

DE-Dresden | 15–26 August 2016 | P. Tomancak
Light sheet microscopy

DE-Heidelberg | 28 August–5 September 2016 | C. Sachse
Cryo-electron microscopy and 3D image processing

UK-Cambridge | 5–10 September 2016 | G. Rustici
Analysis of high-throughput sequencing data

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

IT-Alghero | 17–24 September 2016 | D. Komander
New approaches to study ubiquitin and ubiquitin-like modifications

DE-Würzburg | 18–24 September 2016 | J. Vogel
Non-coding RNA in infection

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

FR-Hyères | 15–22 October 2016 | F. Nedelec
Modelling cellular processes in space and time

DE-Heidelberg | 17–23 October 2016 | R. Pepperkok
High throughput microscopy for systems biology

DE-Hamburg | 17–24 October 2016 | D. Svergun
Solution scattering from biological macromolecules

PT-Porto | 7–11 November 2016 | F. Silva
Biomolecular interaction analysis 2016: From molecules to cells

ES-Barcelona | 13–18 November 2016 | E. Sabidó
Targeted proteomics: Experimental design and data analysis

UK-Cambridge | 13–17 February 2017 | R. Salek
Metabolomics bioinformatics for life scientists

DE-Cologne | 26 March–7 April 2017 | P. Schulze-Lefert
Plant microbiota

PT-Faro | 24–29 April 2017 | T.M. Embley
Tree building: Advanced concepts and practice of phylogenetic analysis

GR-Thessalonica | 5–17 June 2017 | C. Ouzounis
Bioinformatics and genome analyses

Workshops

ZA-Cape Town | 13–15 July 2016 | T. Bicanic
AIDS-related mycoses

IT-Varna | 31 July–6 August 2016 | B. Kuster
Advanced proteomics

GR-Spetses | 16–24 August 2016 | C. Englert
Molecular mechanisms of ageing and regeneration: From pluripotency to senescence

TR-Istanbul | 26–28 August 2016 | Z.H. Gumus
Integrating genomics and biophysics to comprehend functional genetic variation

CL-La Serena | 4–9 September 2016 | M.P. Marzolo
Actualizations in membrane trafficking in health and disease

CZ-Prague | 14–17 September 2016 | O. Massidda
Bacterial cell division: Orchestrating the ring cycle

DE-Joachimsthal | 14–18 September 2016 | M. Fainzilber
Cell size regulation

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

GR-Kyllini | 18–22 September 2016 | S. Taraviras
Nuclear function and cell fate choice

AT-Seefeld in Tirol | 20–25 September 2016 | B. Mayer
The modularity of signalling proteins and networks

IT-Vico Equense | 24–28 October 2016 | S. Parashuraman
Glycosylation in the Golgi complex

FR-Mandelieu-la-Napoule | 27 November–1 December 2016 | L. Johannes
Transducing glycan information into function: Lessons from galectins

AT-Obergurgl | 10–14 January 2017 | A. Villunger
Cell death, inflammation and cancer

AT-Goldegg am See | 10–15 January 2017 | M. Zerial
Emerging concepts in cell organization

ES-Calvia | 23–25 April 2017 | E.F. Wagner
Metabolic disorders and liver cancer

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For further information see: www.embo.org/funding-awards/courses-workshops

Conferences

FR-Strasbourg | 6–10 July 2016 | M. Yusupov
Ribosome structure and function 2016

UK-Liverpool | 18–22 July 2016 | M. Clokie
Viruses of microbes 2016

FR-Montpellier | 22–26 August 2016 | A. Gojon
The nitrogen nutrition of plants: Nitrogen 2016

DE-Heidelberg | 31 August–3 September 2016 | C. Schultz
Chemical biology 2016

IT-Pontignano | 3–7 September 2016 | C.T. Baldari
Lymphocyte antigen receptor signalling

DE-Mannheim | 10–13 September 2016 | J. Ellenberg
The EMBO Meeting

CZ-Brno | 14–17 September 2016 | V. Bryja
Wnt meeting 2016

IT-Laura | 17–21 September 2016 | P. Ferretti
The molecular and cellular basis of regeneration and tissue repair

FR-Paris | 19–23 September 2016 | R. Brosch
Tuberculosis 2016: Interdisciplinary research on tuberculosis and pathogenic mycobacteria

DE-Potsdam | 2–7 October 2016 | P. Hegemann
Retinal proteins

ES-Bilbao | 4–6 October 2016 | A. Carracedo
Translational research in cancer cell metabolism

NL-Amsterdam | 4–7 October 2016 | R. Roepman
Cilia 2016

DE-Heidelberg | 19–22 October 2016 | L. Steinmetz
Experimental approaches to evolution and ecology using yeast and other model systems

ES-Girona | 23–27 October 2016 | P. Carvalho
Structure and function of the endoplasmic reticulum

DE-Heidelberg | 3–4 November 2016 | H. Stefánsson
17th EMBL | EMBO Science and Society Conference
The past in the present: The making of memories

DE-Heidelberg | 12–15 November 2016 | E. Furlong
From functional genomics to systems biology

DE-Heidelberg | 20–23 November 2016 | D. Panne
Molecular machines: Integrative structural and molecular biology

IN-Thiruvananthapuram | 27 November–1 December 2016 | S. Radhakrishnan
Bacterial morphogenesis, survival and virulence: Regulation in 4D

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

DE-Berlin | 30 November–2 December 2016 | C. Romagnani
Innate lymphoid cells – 2016

NL-Groningen | 6–8 March 2017 | D.J. Slotboom
Towards novel therapies: Emerging insights from structural and molecular biology

HR-Dubrovnik | 18–22 March 2017 | A. Driessen
Protein translocation and cellular homeostasis

DE-Heidelberg | 3–6 May 2017 | A. Akhtar
Chromatin and epigenetics

GR-Heraklion | 7–10 May 2017 | C. Hoogenraad
Cell biology of the neuron: Polarity, plasticity and regeneration

ES-Girona | 14–19 May 2017 | A. Bertolotti
Protein quality control: Success and failure in health and disease

DE-Heidelberg | 23–26 May 2017 | D. O'Carroll
Advances in stem cells and regenerative medicine

EMBO | EMBL Symposia

DE-Heidelberg | 7–10 September 2016 | P. Lénárt
Actin in action: From molecules to cellular functions

DE-Heidelberg | 5–8 October 2016 | A. Ephrussi
The complex life of mRNA

DE-Heidelberg | 12–15 October 2016 | J. Knoblich
Organoids: Modelling organ development and disease in 3D culture

DE-Heidelberg | 10–13 May 2017 | T. Alexandrov
Metabolism in time and space: Emerging links to cellular and developmental programmes

DE-Heidelberg | 14–17 May 2017 | R. Benton
Neural circuits in the past, present and future

DE-Heidelberg | 21–23 May 2017 | B. Brügger
Molecular and cell biology of membranes

Lecture Courses

EMBO | FEBS Lecture Courses

GR-Spetses | 8–14 August 2016 | A.G. Ladurner
Chromatin and the environment

GR-Spetses | 24 August–1 September 2016 | P. Cossart
The new microbiology

IT-Sicily | 14–20 May 2017 | P. Tammaro
Biophysics and medicine of channels and transporters: Electrifying new insights

EMBO Global Exchange Lecture Courses

CL-Las Cruces | 10–19 November 2016 | J. Ewer
Small brains, big ideas

IN-Madurai | 29 January–11 February 2017 | A. Das
Malaria genomics and public health

New trend in science journals

Hand-drawn 'scribble' video abstracts with a voice-over

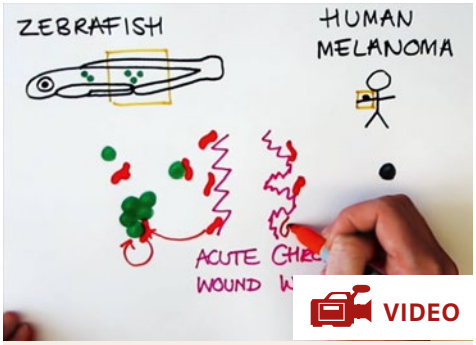
© Marietta Schupp, EMBL Photolab

Scientific manuscripts often contain an overwhelming amount of detailed information, posing a challenge for the busy academic. Science journals are accordingly beginning to publish video abstracts explaining articles in a nutshell to help readers grasp the key elements of a story and decide whether to commit more time to reading it in detail. *EMBO Press* recently introduced this new feature as an add-on to some if its papers. The very first movie went live in October and was created by Laura Ward, a postdoctoral scientist at the University of Bristol. In April, the young British scientist spent a month as an intern with *The EMBO Journal* editorial team where she demonstrated how to put this new, interesting approach into practice.

"The idea of showcasing complex scientific content as a simple story is not new, but doing so in the form of a short hand-drawn video posted online has become increasingly popular," says Ward. The movies typically last between two and five minutes. The initial image introduces the title and the authors of the paper. The next shot shows a quickly moving hand that populates a sheet of white paper with simple drawings while a narrative in the background talks the viewer through the highlights of the paper. For example, Laura's video accompanying Paul Martin's most recent paper in *The EMBO Journal* starts with a simple sketch of a zebrafish and discusses using this model organism to investigate early stages of cancer initiation and inflammation. The image evolves as the story goes deeper.

"To explain scientific findings in a few minutes without the use of fancy slides makes them much more accessible to a broader audience," comments Karin Dumstrei, senior editor at *The EMBO Journal*, who acted as Laura's host during her internship in Heidelberg.

Hand-drawn video abstracts act as a recorded version of a chalkboard talk but with the focus on the results and narrative rather than the presenter. As well as being cheap and easy to make, they also offer a solution for those who prefer not to be interviewed on camera as a talking head. "The whole process of planning, making and editing a video abstract takes around one day so it is definitely worth the effort," says Ward.



To watch the abstract video to Paul Martin's publication in *The EMBO Journal* entitled *The wound inflammatory response exacerbates growth of pre-neoplastic cells and progression to cancer* go to:
embopress.org/video_EMBOJ-2014-90147

BOOK REVIEW

Analogies between cells and human world

Life's blueprint: the science and art of embryo creation is a recent book by EMBO Member Benny Shilo, a molecular genetics professor at the Weizmann Institute of Science. The book was the outcome of a year's sabbatical at Radcliffe Institute of Advanced Study at Harvard University, when Shilo left active research for a year to concentrate on photography (see also EMBOencounters issue 21). During his sabbatical, he shot dozens of pictures that were eventually displayed at a show at Radcliffe and also published in his book.

Shilo describes the process of embryonic development as one of the most complex processes in nature. He explains what is now known about the mechanisms of embryonic development and the commanding role of genes. For each phenomenon, he provides a pair of pictures: a scientific image and a photograph of everyday life as a metaphor.

The book is jargon-free and aimed at people with little or no background in developmental biology who are curious to learn about embryonic development.

Life's blueprint: the science and art of embryo creation
Benny Shilo
Yale University Press |
October 2014
ISBN: 9780300196634
shilobook.weizmann.ac.il/?page_id = 65

Awards of Excellence

EMBO MEMBERS

Paul Ehrlich- und Ludwig Darmstaedter Prize

The Paul Ehrlich Foundation announced **Emmanuelle Charpentier** and **Jennifer Doudna** as winners of the Paul Ehrlich- und Ludwig Darmstaedter-Preis 2016. Both researchers were also recognized by the 2016 L'Oréal-UNESCO For Women in Science Award in the field of life sciences.

Liliane Bettencourt Prize for Life Sciences

Thomas Lecuit has received the 2015 Liliane Bettencourt Prize for Life Sciences worth 300.000 Euros. Each year, the Bettencourt-Schueller Foundation awards the prize to a young researcher under 45 in recognition for the quality of his or her international publications.

Robert Koch Gold Medal

Kai Simons, Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, receives the Robert Koch Gold Medal for his lifetime achievements, in particular for his characterization of membrane-forming lipids and the development of the Lipid Raft Model.

Cloëtta-Preis

Andreas Lüthi of the Friedrich Miescher Institute has been announced winner of the Cloëtta-Prize 2016 for his work on learning processes in the brain. He received the prize together with Michel Gilliet of the Lausanne University Hospital. Both winners will receive 50,000 Swiss Francs from the Max Cloëtta Foundation based in Zurich.

Heatley Medal and Prize

The 2017 Heatley Medal and Prize will be awarded to **Ian Graham** of the University of York for his contributions to the understanding of plant metabolism and seed biology. The Heatley Medal and Prize is awarded by the Biochemical Society for exceptional work in applying advances in biochemistry.

Australian Academy of Science

Matthias Hentze was elected as a Corresponding Member of the Australian Academy of Science. Corresponding Members are a special category within the Academy's Fellowship comprising of eminent international scientists with strong ties to Australia. The academy has 31 corresponding members worldwide and only two have been selected this year.

Cogan Award

In recognition of his important contributions to research in visual science directly related to disorders of the human eye, **Botond Roska** has been awarded the 2016 Cogan Award from the Association of Research in Vision and Ophthalmology. The Cogan Award is the most prestigious award in vision research for scientists under the age of 45.

Lelio Orci Award

Gisou van der Goot of the École Polytechnique Fédéral in Lausanne has won the 2015 Lelio Orci Award. The award was initiated by Lelio Orci, Professor Emeritus at the University of Geneva, in order to honour outstanding scientists or promising young researchers in cell biology. The Lilio Orci Award includes a bursary of 10,000 Swiss Francs and was given for the first time this year.

Israel Society for Microscopy

The Israel Society for Microscopy has selected **Ruth Sperling** as an Honorary Fellow of the Society in recognition of her outstanding academic achievements as a scientist and a teacher, and her contributions to microscopy in Israel.

Bruce and Ruth Rappaport Foundation

Yinon Ben-Neriah has received the 2016 Prize for Senior Israeli Bio-Medical Researcher and Ido Amit is the 2016 winner of the Prize for Young Israeli Bio-Medical Researcher awarded by the Israeli Bruce and Ruth Rappaport Foundation.

EMBO YOUNG INVESTIGATORS

Miller Visiting Professorship

Thomas Richards has been awarded the Miller Visiting Professorship at University of California Berkeley. The purpose of the Visiting Miller Professorship is to bring promising or eminent scientists to the Berkeley campus on a short-term basis for collaborative research interactions.

Congratulations to EMBO Members, Young Investigators and Installation Grantees who recently received the Advanced Grants awarded by the European Research Council for 2015. The full list of names can be found at https://erc.europa.eu/sites/default/files/document/file/erc_2015_adg_results_ls.pdf

Good Read – Publications from the EMBO community

The structure of sperm Izumo1 reveals unexpected similarities with Plasmodium invasion proteins

Luca Jovine (EMBO Young Investigator) and colleagues

Current Biology | 30 June 2016
doi: http://dx.doi.org/10.1016/j.cub.2016.06.028

HIV-Tat immunization induces cross-clade neutralizing antibodies and CD4+ T cell increases in antiretroviral-treated South African volunteers: a randomized phase II clinical trial

Barbara Ensoli (EMBO Member) and colleagues

Retrovirology | 9 June 2016
doi: 10.1186/s12977-016-0261-1

Midbrain circuits for defensive behaviour

Andreas Lüthi (EMBO Member) and colleagues

Nature | 1 June 2016
doi:10.1038/nature17996

The impact of crystallization conditions on structure-based drug design: A case study on the methylene blue/acetylcholinesterase complex

Joel L. Sussman (EMBO Member) and colleagues

Protein Society | June 2016
doi: 10.1002/pro.2923

Characterization of proteins by in-cell NMR spectroscopy in cultured mammalian cells

Lucia Banci (EMBO Member) and colleagues

Nature Protocols | 19 May 2016
doi:10.1038/nprot.2016.061

Dense EM-based reconstruction of the interglomerular projectome in the zebrafish olfactory bulb

Rainer W Friedrich (EMBO Member) and colleagues

Nature Neuroscience | 18 April 2016
doi:10.1038/nn.4290

Dual function of C/D box small nucleolar RNAs in rRNA modification and alternative pre-mRNA splicing

Ruth Sperling (EMBO Member) and colleagues

Proc Natl Acad Sci USA | 22 March 2016
doi: 10.1073/pnas.1519292113

Exploiting bacterial operons to illuminate human iron–sulfur proteins

Lucia Banci (EMBO Member) and colleagues

J. Proteome Res.| 18 February 2016
doi: 10.1021/acs.jproteome.6b00045

Inflammatory networks underlying colorectal cancer

Yinon Ben-Neriah (EMBO Member) and colleagues

Nature Immunology | 16 February 2016
doi:10.1038/ni.3384

The presence of extra chromosomes leads to genomic stability

Batsheva Kerem (EMBO Member) and colleagues

Nature Communications | 15 February 2016
doi:10.1038/ncomms10754

SLE-key® rule-out serologic test for excluding the diagnosis of systemic lupus erythematosus: Developing the ImmunArray iCHIP®

Irun R. Cohen (EMBO Member) and colleagues

Journal of Immunological Methods | 2016
doi: http://dx.doi.org/10.1016/j.jim.2015.12.003

Upcoming deadlines

for applications

EMBO Keynote Lectures
1 October
EMBO Young Investigators
1 April
Installation Grants
15 April

Editorial

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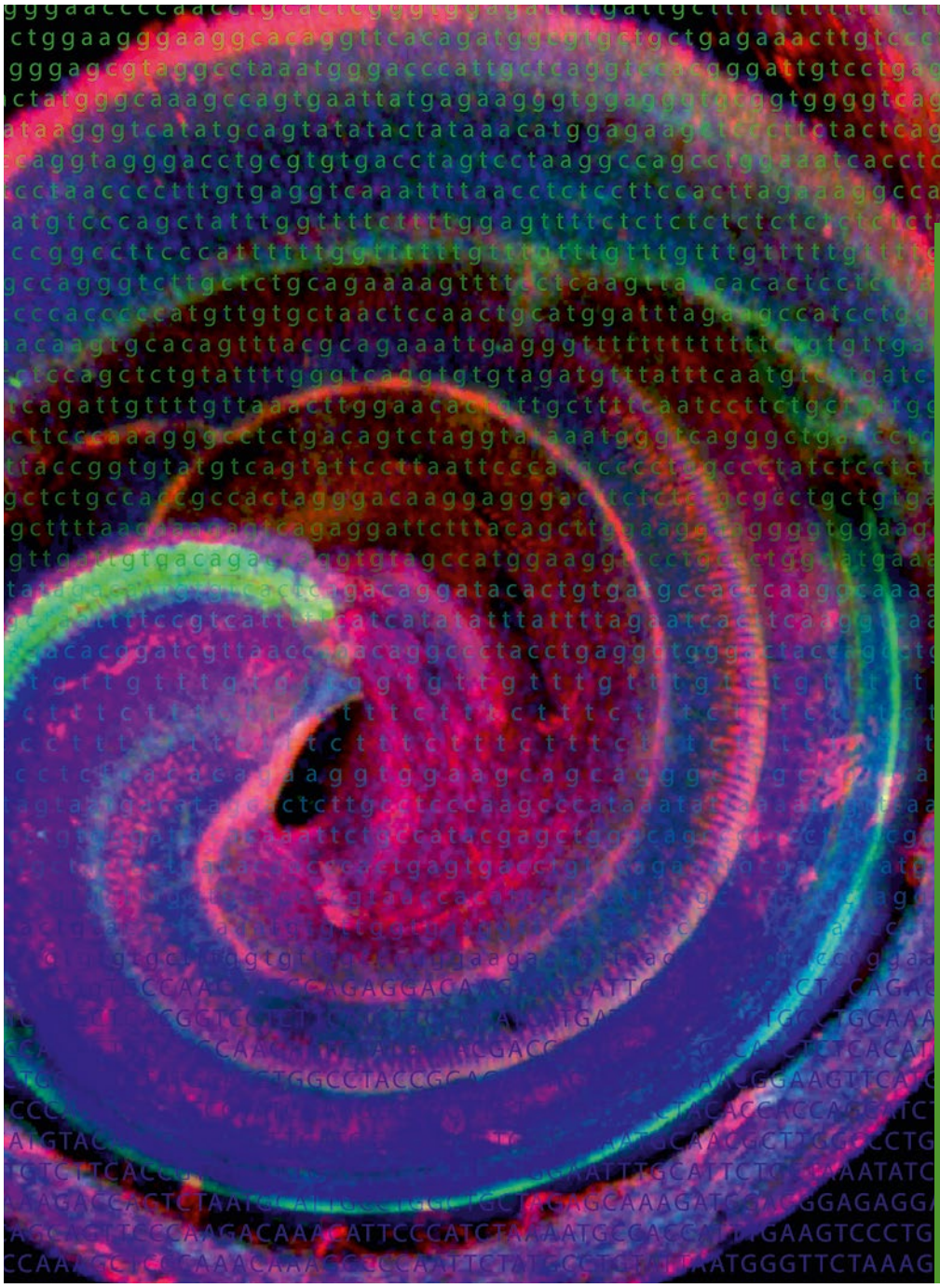
Next issue

The next ***EMBO Encounters*** issue will be dispatched in **October 2016**. Please send your suggestions, contributions and news to **communications@embo.org** by **September 16**.

Philip Zegerman, 2014 EMBO Young Investigator and group leader at the John Gurdon Institute, Cambridge/UK explains his research on DNA replication and cell division
www.youtube.com/watch?v=T8raBnKBYb8

Nobel Prize winner **John Gurdon** describes his work on cell reprogramming and talks about the early days of the Gurdon institute
www.youtube.com/watch?v=5wxd5UREROI



Exhibition at the Ben-Gurion airport

The image shows the spiral structure of the inner ear, which is composed of neurosensory hair cells and other types of cells that together enable us to hear. The background sequence is connexin 26, the most common gene with mutations leading to deafness in humans. The image was produced in the laboratory of Karen Avraham, EMBO Member and professor of human genetics at Tel Aviv University.

This composition is one of sixty works currently on display in an exhibition at the Ben-Gurion Airport in Tel Aviv. The exhibition features major scientific discoveries coming from Israel that have had direct and indirect influence on the lives of millions of people around the world. The team in Karen Avraham's laboratory works to understand the molecular basis of deafness – the most prevalent sensory impairment in both childhood and adulthood.

mfa.gov.il/mfa/innovativeisrael/sciencetech/pages/israeli-scientific-discoveries-that-affected-the-world-29-feb-2016.aspx

BOOK REVIEW

Narcissism in science: good or bad?

Bruno Lemaitre is professor at the École Polytechnique Fédéral de Lausanne in Switzerland and he has been an EMBO Member since 2007. He recently published a book entiteld An Essay on Science and Narcissism: How do high-ego personalities drive research in life sciences?, in which he explores the link between narcissism and science, with a focus on life sciences.

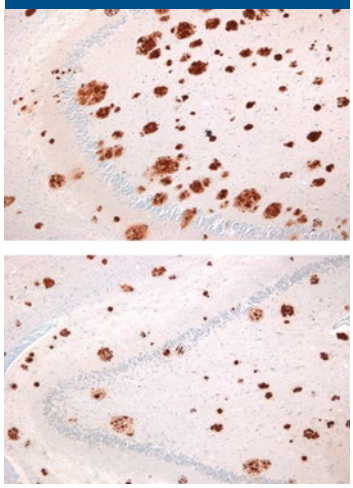
Lemaitre's conclusion is that it is impossible to see narcissism as either good or bad. The trait is often useful for scientists and a certain dose of narcissism, maybe essential to becoming a scientist – and succeeding in an academic environment. Yet people with an overly strong narcissistic character negatively influence the community – in many different ways. "Unfortunately, the present system and science organization greatly favours narcissists, to the point that even bright people and hard workers may find the research environment too hostile," Lemaitre writes.

The author also discusses the origins of narcissism and its recent increase in Western society – with all the negative, destabilizing effects: "Narcissistic behavior becomes a serious threat as more and more individuals become increasingly self-centered."

James Briscoe, also an EMBO Member, recently commented on the book on Twitter: "Just read Lemaitre's book on narcissism in science. Provocative, but depressingly familiar."

The book is available on this website:
brunolemaitre.ch/product/an-essay-on-narcissism-and-science/

EMBO Molecular Medicine



RESEARCH ARTICLE

Cascade hypothesis: beta-version

A hallmark of Alzheimer's disease is the deposition of amyloid beta (Aβ) aggregates in the brain. But do they cause the disease? In the March issue of *EMBO Molecular Medicine*, Benedikt Kretner at al. present data that strongly support this view.

Aβ exists in different forms, such as Aβ40 and Aβ42. Aβ42 is prone to form Aβ deposits. According to the amyloid cascade hypothesis, familial Alzheimer's disease (FAD) is caused by an increased Aβ42 to Aβ40 ratio due to mutations in presenilin, the catalytic subunit of a secretase that cleaves Aβ from a larger precursor protein. According to the presenilin hypothesis, however, FAD is caused by a loss of presenilin functions rather than Aβ aggregation.

A major argument supporting the presenilin hypothesis is the observation that a nearly inactive presenilin-1 mutant, L435F, causes FAD. Kretner *et al.* now refute this argument, showing that the little Aβ the mutant does generate consists primarily of Aβ43, a highly amyloidogenic species that was overlooked in previous studies.

Generation and deposition of Aβ43 by the virtually inactive presenilin-1 L435F mutant contradicts the presenilin loss-of-function hypothesis of Alzheimer's disease
Benedikt Kretner, Johannes Trambauer, Akio Fukumori, Janina Mielke, Peer-Hendrik Kuhn, Elisabeth Kremmer, Armin Giese, Stefan F Lichtenthaler, Christian Haass, Thomas Arzberger, Harald Steiner
Read the paper: embomolmed.embopress.org/content/8/5/458

molecular systems biology

RESEARCH ARTICLE

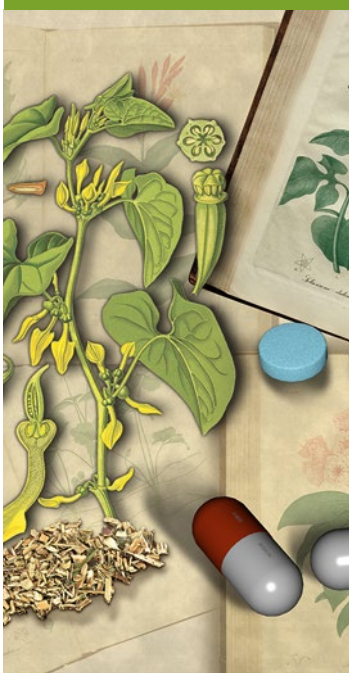
Smoke signals on DNA

A study by Tobias Bauer *et al.*, published in the March issue of in *Molecular Systems Biology*, shows that smoking during pregnancy causes long-term epigenetic changes to the DNA – external modifications that do not change the DNA sequence. This may put the unborn child at risk of developing diseases later in life.

The researchers performed a comprehensive characterization of DNA methylation changes linked to smoking in expectant mothers and their children, combined with histone modification and gene expression analysis. They found that differential methylation is enriched in enhancers that act on distal genes – so called "commuting" enhancers – and that these changes persist over years. One commuting enhancer that is hypomethylated in smoking mothers and their newborn children targets c-Jun N-terminal kinase 2 (JNK2). This epigenetic change correlates with an increase in JNK2 transcription and with an increased risk for the children to develop lung disease later in life.

Environment-induced epigenetic reprogramming in genomic regulatory elements in smoking mothers and their children
Tobias Bauer, Saskia Trump, Naveed Ishaque, Loreen Thürmann, Lei Gu, Mario Bauer, Matthias Bieg, Zuguang Gu, Dieter Weichenhan, Jan-Philipp Mallm, Stefan Röder, Gunda Herberth, Eiko Takada, Oliver Mücke, Marcus Winter, Kristin M Junge, Konrad Grützmann, Ulrike Rolle-Kampczyk, Qi Wang, Christian Lawerenz, Michael Borte, Tobias Polte, Matthias Schlesner, Michaela Schanne, Stefan Wiemann, Christina Geörg, Hendrik G Stunnenberg, Christoph Plass, Karsten Rippe, Junichiro Mizuguchi, Carl Herrmann, Roland Eils, Irina Lehmann
Read the paper: msb.embopress.org/content/12/3/861

EMBO reports



SCIENCE AND SOCIETY ARTICLE

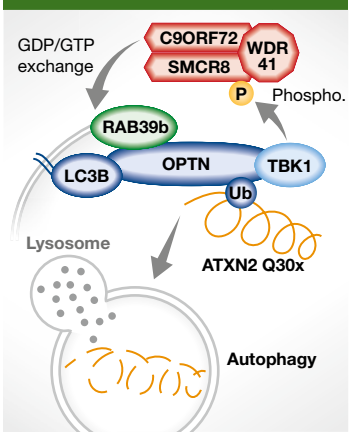
Herbal remedy warning

Herbal medicines are highly popular. However, only a few have been tested systematically for toxicity or carcinogenicity. In an article in the Science and Society section of the April issue of *EMBO reports*, Arthur Grollman and Donald Marcus call for more effective regulation of herbal medicine use.

The authors take Aristolochia as an example to describe how the potent toxicity and cancerogenicity of a widely used family of medical herbs only came to light through recent epidemiologic studies – which involved one of the authors – of cases of unusual high numbers of cancers of the urinary tract. It is likely that many more medical herbs cause serious side effects, as plants are known to produce a number of toxic compounds to fend off pathogens and herbivores. The authors therefore express serious concerns about the "rampant adulteration of commercial herbal products with pharmacologically active compounds and prescription drugs". Moreover, they criticize the "failure of the WHO to recognize and deal with this aspect of herbal medicine use".

Global hazards of herbal remedies: lessons from Aristolochia
Arthur P Grollman, Donald M Marcus
Read the paper: embor.embopress.org/content/17/5/619

THE EMBO JOURNAL



RESEARCH ARTICLE

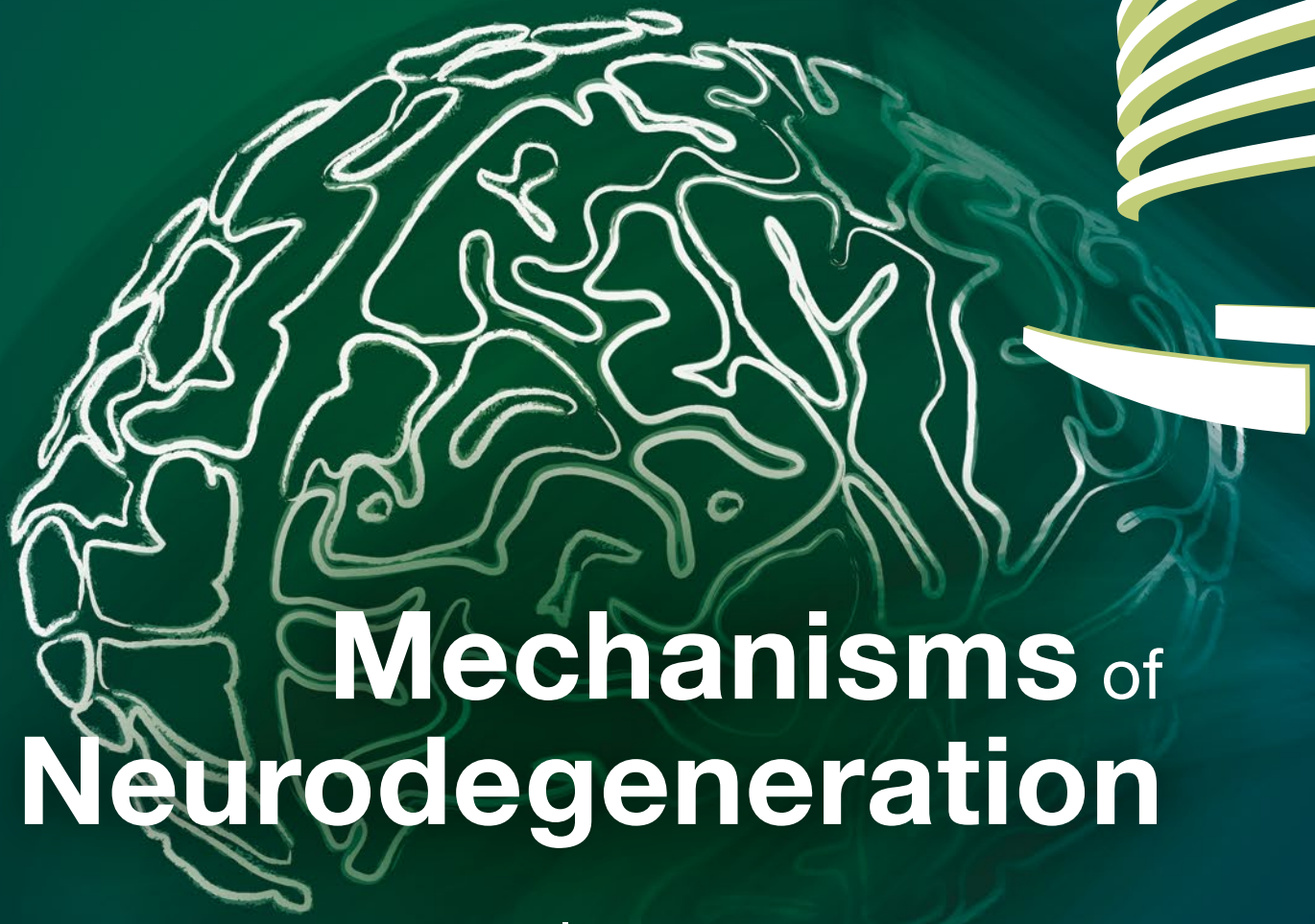
When the cell's dustmen strike

A common genetic cause for two neurodegenerative diseases, amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD), is an expanded GGGGCC repeats within the first intron of the C9ORF72 gene. However, little is known about how this insertion causes disease, nor about the normal function of C9ORF72. On the one hand, pathology could be directly linked to the GGGGCC repeat sequestering RNA binding proteins or producing toxic translation products. On the other hand, a reduction in gene expression of C9ORF72 may also contribute to disease progression.

In the April issue of *The EMBO Journal*, Chantal Sellier *et al.* provide evidence for the latter and show that C9ORF72 is part of a multi-molecular complex that regulates autophagy, the cellular waste recycling process. Moreover, decreased expression of C9ORF72 potentiates the toxicity of a particular form of Ataxin-2 that is known to be a genetic modifier of ALS and FTD. In conclusion, decreased expression of C9ORF72 alone might not be sufficient to cause neuronal cell death but may synergize neurodegeneration caused by the accumulation of toxic proteins.

Loss of C9ORF72 impairs autophagy and synergizes with polyQ Ataxin-2 to induce motor neuron dysfunction and cell death
Chantal Sellier, Maria-Letizia Campanari, Camille Julie Corbier, Angeline Gaucherot, Isabelle Kolb-Cheynel, Mustapha Oulad-Abdelghani, Frank Ruffenach, Adeline Page, Sorana Ciura, Edor Kabashi, Nicolas Charlet-Berguerand
Read the paper: emboj.embopress.org/content/35/12/1276

EMBO | EMBL



Mechanisms of Neurodegeneration

EMBO|EMBL Symposium

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Heidelberg | Germany
EMBL Advanced Training Centre

Keynote lecture

Susan **Lindquist**
Whitehead Institute for Biomedical Research, USA

Eric **Reiman**
University of Arizona, USA

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