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EMBO encounters

28 researchers selected

Meet the new EMBO Young Investigators

PAGES 4–5

Award for SourceData

Opening up the scientific literature

PAGE 3

Open Access

Going for gold for a sustainable future

PAGE 11

Transparency at EMBO Press
Responsible and accountable publishing

PAGE 6

Recognition of excellence
Newest EMBO Members welcomed at annual meeting

PAGE 7

Celebrating 10 years ERC
Frank Gannon recounts how it came into being

PAGE 10

EMBO
excellence in life sciences

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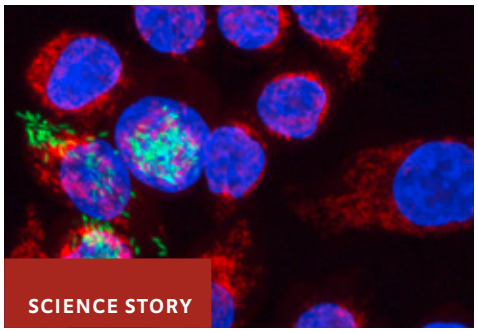
Table of contents



EMBO community

Awards and publications

EMBO events

Fresh from EMBO press

Editorial

With the announcement that all publicly funded research in Europe must be freely accessible from 2020 onwards, the European Union firmly anchored Open Access in the future of scientific publishing. It's an ambitious target, and in the quest for solutions, we mustn't overlook the need for publishing models that are sustainable in the long term (p 11).

At the same time, the 'when' and 'how' to make scientific papers openly available are not the only questions we must think about. Making an article available for free on the internet does not necessarily mean that interested readers, whether they are scientists or not, are able to find and benefit from the publication.

Back in 2009, the 50 millionth scientific article was published. With an estimated growth rate of between 8 and 9%, we will be approaching double that figure in the next two years. Adding to that the fact that the figures and data, which lie at the heart of a scientific publication, are not easy to search, it is becoming increasingly difficult to identify relevant work and keep up with the latest studies in a field.

EMBO's SourceData platform offers a solution by turning figures into searchable entities (p 3). By creating machine-readable descriptions of scientific figures, SourceData makes scientific data more discoverable. A proof-of concept showed that the approach works. The next step will be to work with the community to embed SourceData more widely to make sure we really can open up the scientific literature.

Maria Leptin
Director, EMBO

Opening up the scientific literature

How SourceData aims to combine scientific expertise with machine learning

In the biological sciences, most of the data produced are published in the form of figures. However, the search tools used to find published papers are usually limited to keyword-based text searches.

EMBO's SourceData platform generates a description of these figures, and the data and relationships they contain, in a machine-readable format. As a result, articles can be searched based on the data shown in their figures, and figures that display related results can be linked across papers. The method for this has now been published in a paper authored by EMBO project team members and their collaborators at the Swiss Institute of Bioinformatics (Liechti et al., *Nature Methods*, 2017).

The SourceData approach has the potential to accelerate scientific discovery and "could fundamentally shift how scientists interact with the collective body of knowledge and open up all data to synthesis, reassessment and reuse", as highlighted in a recent editorial (*Nature Methods*, November 2017).

Generating the metadata from figures that are necessary for SourceData's capabilities means identifying the biological entities – the proteins, molecules or genes – referenced in each figure and legend, as well as their relationships.

Eva Benito-Garagorri, who recently joined SourceData as Scientific Coordinator, explains further: "Interpreting this information is relatively easy for humans with the appropriate scientific background, so figures are currently processed for SourceData by professional biocurators." However, developments in machine learning could mean that the future holds a faster and easier way to extract the information from figure legends.

Automation for faster curation

The SourceData platform remains in active development with the goal of establishing an open and effective standard for the discovery and re-use of scientific data. One of the next steps in developing the platform is the acceleration of the figure curation workflow while keeping expert-based supervision to ensure the quality of the information extracted, explains SourceData project lead Thomas Lemberger. "The important task of identifying discrete, named entities from text input is one that can be addressed by automated text-mining technologies."

To explore how text-mining can be used as part of the curation workflow, SourceData joined the 6th BioCreAtIvE (Critical Assessment of Information Extraction systems in Biology) challenge. As part of the challenge text-miners are invited to use the SourceData dataset to train and assess algorithms that match entities found in figure legends with their identifiers from standardised biological taxonomies such as Uniprot or ChEBI, and then output the results in a suitable format for SourceData.

Opening new avenues with artificial intelligence

The potential for automation in the SourceData curation workflow does not end with entity recognition. Thomas Lemberger explains: "We know that machine learning is making rapid progress in being able to extract meaning from natural language. Such methods are used by Twitter to identify sentiment, and by Google Translate to interpret the meaning of phrases. In our case, the task is to identify the nature of the relationship between entities – which one is influencing the other?"

While this methodology remains in development, Lemberger is looking towards new paradigms whereby artificial intelligence algorithms improve themselves by learning from corrections made by expert curators and authors during publication. Successful implementation would make SourceData one of the first examples in publishing of coupling the expertise of scientists with the capabilities of machine learning models. This would open new avenues in scientific publishing, extending SourceData's mission to the extraction and organization of structured scientific knowledge.

More information:
sourcedata.embo.org

Liechti R, George N, Götz L, El-Gebali S, Chasapi A, Crespo I, Xenarios I & Lemberger T (2017) SourceData - a semantic platform for curating and searching figures, *Nature Methods* 14: 1021-1022. Doi: 10.1038/nmeth.4471

Editorial: The search for data, *Nature Methods* 14: 1017

SourceData wins ALPSP award

SourceData received recognition from the scientific publishing community when it was awarded the ALPSP Award for Innovation in Publishing 2017. The annual award from the Association of Learned and Professional Society Publishers (ALPSP) recognises outstanding innovators in scholarly and professional publishing. SourceData was presented with the award on 15 September 2017 at a ceremony in Amsterdam which brought together many of the major publishing houses. Both SourceData and Publons (publons.com) received awards for innovation and were praised by the chair of judges, David Sommer, who said: "Our winners are the result of successful collaboration and partnership working within the industry to make a positive difference to the academic community for the good of all."

Thomas Lemberger accepts the ALPSP award 2017.

Welcoming the new EMBO Young Investigators

28 group leaders from 11 countries join the EMBO community

28 young researchers were elected as EMBO Young Investigators this year. They join a network of 47 current and 417 past Young Investigators who represent some of the best up-and-coming group leaders in the life sciences in Europe and beyond.

"It is a pleasure to welcome these outstanding scientists to the EMBO community," says EMBO Director Maria Leptin. "Between them, they carry out some very promising life science research that Europe has to offer, and we look forward to supporting them in their professional and scientific endeavours."

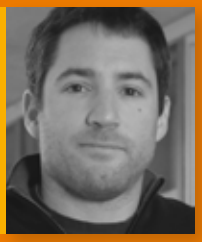
The new Young Investigators are based in 11 different countries, including European Molecular Biology Conference (EMBC) Associate Member States India and Singapore.

Selection to the EMBO Young Investigator Programme is recognition of exceptional research and scientific potential. Through the programme, EMBO identifies and supports researchers under 40 years of age who are in the process of establishing their own laboratory. In addition to financial support, they receive a range of benefits for themselves and their groups (see box).

Filipe Cabreiro
Bacteria: macromolecular machines for nutrition and drugs
London, GB

Axel Innis
Ribosome inhibition by nascent or antimicrobial peptides
Bordeaux, FR

Nicola Iovino
Epigenetic regulation of fertilization
Freiburg, DE



Manuel Irimia
Transcriptomics of vertebrate development and evolution
Barcelona, ES

Daniel Messerschmidt
Epigenetic reprogramming and its implications in development and disease
Singapore, SG

Patrick Müller
Quantitative analysis, control,and engineering of embryonic signalling systems
Tübingen, DE

Elizabeth Murchison
Genetics and evolution of transmissible cancers in dogs and Tasmanian devils
Cambridge, GB

Magdalini Polymenidou
Molecular pathogenesis of neurodegenerative diseases
Zurich, CH

Alvaro Rada-Iglesias
Transcriptional regulation in development and congenital disease
Cologne, DE

Guadalupe Sabio
p38MAPK signalling pathway
Madrid, ES

Noam Stern-Ginossar
Molecular networks of viral-host interaction
Rehovot, IL

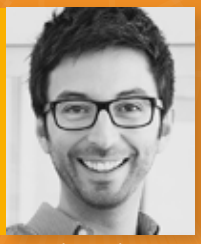
Joanna Sulkowska
SPOUT methyltransferase enzymes
Warsaw, PL

Dario Riccardo Valenzano
Evolutionary and experimental biology of ageing
Cologne, DE

Jeffrey Chao
Imaging mRNAs in single cells
Basel, CH

Luisa Cochella
Transcriptional and post-transcriptional origins of cellular diversity
Vienna, AT

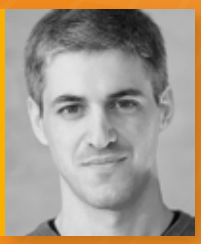
Katie Doores
Glycosylation in infectious diseases
London, GB



Luca Giorgetti
Mechanisms of long-range transcriptional regulation
Basel, CH

Sonja Lorenz
Structural mechanisms of ubiquitin signaling
Wuerzburg, DE

Dahai Luo
Mechanisms of viral infection and host defense
Singapore, SG



Joao Matos
Mechanisms of genome stability and haploidization
Zurich, CH

Vladimir Pena
Structural basis of splicing regulation and DNA-based catalysis
Göttingen, DE

Hendrik Poeck
Cytosolic nucleic acid sensors in tissue homeostasis and cancer immunotherapy
Munich, DE

Sophie Polo
Epigenome maintenance in response to DNA damage
Paris, FR

Schraga Schwartz
Cracking the epitranscriptome
Rehovot, IL

Elena Seiradake
Adhesion G protein-coupled receptor complexes
Oxford, GB

Arun Shukla
Structure, function and allosteric modulation of G protein-coupled receptors
Kanpur, IN

Louis Vermeulen
Colon cancer heterogeneity
Amsterdam, NL

Yue Wan
RNA structure and genomics
Singapore, SG

The programme at a glance

During their three-year tenure, EMBO Young Investigators receive a range of benefits:

Support for Young Investigators
- → 15,000 euros award
- → Up to 10,000 euros additional funding
- → Childcare support
- → EMBO Research Leadership course

Support for their labs
- → Young Investigator PhD course and local courses
- → Meeting grants and Nobel laureate meeting
- → Visits to other labs
- → Access to EMBL core facilities
- → Lab retreat and creativity facilitation
- → Listing of job vacancies

Networking opportunities
- → Annual Young Investigator meeting
- → Sectoral meetings
- → Institute visits
- → Support for European networks of junior PIs
- → Joint group meetings

Helping them get noticed
- → Lecture grants
- → Conference support for organisers
- → Listing of awards and publications in print and on social media
- → Inclusion in the EMBO directory and an online database
- → EMBO Press publishing fees covered

More information: embo.org/funding-awards/young-investigators

Responsible and accountable publishing

EMBO Press brings more transparency to the publishing process

Supporting researchers and stimulating the exchange of scientific information are two of EMBO's core goals. This is why EMBO Press offers authors a fair and transparent publishing process.

All four EMBO publications, *The EMBO Journal*, *EMBO Reports*, *EMBO Molecular Medicine* and *Molecular Systems Biology*, employ transparent peer review. Authors can choose to publish the referee reports, editorial correspondence and decision letters alongside their paper, and more than 95% of authors do.

"At EMBO Press, we want you to trust in the quality of our editorial process and the research we publish. We have confidence in the procedures of our journals, so we aim to be as transparent as possible, from start to finish," says Head of Scientific Publications, Bernd Pulverer.

In addition, the editors will respect an author's choice to exclude specific referees from peer review. And there are no confidential reviewer comments, meaning authors and readers can see exactly what EMBO Press editors use to make their decisions.

"For us, transparency extends beyond peer review," adds Pulverer. "To encourage open data sharing, we invite authors to publish their source data – the minimally-processed experimental results underlying their figures." Scientists can also publish replicates, structured datasets, models and detailed protocols to support the key claims in their paper.

embopress.org/a-different-way-to-publish

Honouring two outstanding scientists

Ottoline Leyser and Fiona Watt receive their FEBS | EMBO Women in Science Awards

Ottoline Leyser (centre) receives the Women in Science Award certificate and statuette from Hermona Soreq (left) and Cecilia Arraiano, Chair of the FEBS Women in Science Working Group (right).

© Hanni Naor

The recipients of the 2016 and 2017 FEBS | EMBO Women in Science Awards received their prizes during this year's FEBS Congress, which took place in Jerusalem, Israel, between 10 and 14 September 2017. Fiona Watt and Ottoline Leyser each delivered an award lecture on their work as part of the conference programme.

Fiona Watt, who is the Director of the Centre for Stem Cells and Regenerative Medicine at King's College London, UK, received the award in 2016 for uncovering the mechanisms that control mammalian epidermal stem cell renewal and differentiation, and for discovering how these processes are deregulated in cancer, wound healing and inflammatory skin disorders.

This year's FEBS | EMBO Women in Science Award went to Ottoline Leyser, Director of the Sainsbury Laboratory at Cambridge University, UK, for her work on the evolutionary, developmental and biochemical mechanisms that enable plants to respond and adapt to environmental changes.

Both scientists were also recognized for their commitment to exposing the barriers and challenges that women face when pursuing a career in science and for acting as strong mentors for the next generation of scientists. Fiona Watt said on accepting the award that "science would be better if it were all inclusive, and that a great deal still remains to be done to champion and embed diversity."

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Recognition of excellence

EMBO welcomes its newest members to the organisation

"As a student and postdoc, reading about scientists being elected as EMBO Members was something that felt miles away, something that would happen to excellent, 'grown-up' scientists," says Renata Basto from the Institut Curie in Paris, France, about being elected to the EMBO Membership this year.

"Being elected feels almost like passing the finish line – like an acknowledgement that I am not a junior scientist anymore," she continues. "But it is not only about recognition by my peers. It is also about recognition of the originality of the work that we, as a lab, have been developing. And that is highly motivating."

The EMBO Membership encompasses more than 1700 of the best life scientists in Europe and around the world. Members and associate members are elected on the basis of their outstanding achievements in the life sciences.

"I was pleased to welcome an additional 65 great scientists to our organisation this year," says EMBO Director Maria Leptin. "We received more nominations than ever before during this election cycle, which pays tribute to the strength and diversity of the European life sciences."

Connecting with each other

In order to celebrate their election, each year EMBO invites all new members to a formal meeting in Heidelberg, which also offers an opportunity to find out more about the organization.

This year's meeting took place between 18 and 20 October 2017. 58 new members elected in the last few years were joined in Heidelberg by 19 of their nominators (namely, previously elected members) for three days of presentations and discussions. Each of the new members presented their research in a short talk. A welcome reception at the EMBO building offered members an opportunity to meet each other as well as EMBO employees in an informal setting.

Roberto Sitia from the Vita-Salute San Raffaele University, Milan, Italy, who was elected as an EMBO Member in 1992 and has attended several of these meetings, particularly values the opportunity to meet researchers from other disciplines. He explains: "the trend of modern science often forces people to follow their own discipline in depth, and sometimes one forgets to regard and enjoy the work of 'research neighbours'."

An integral part of EMBO

The participants at the Members' Meeting also heard from EMBO Director Maria Leptin and EMBO Head of Scientific Publications Bernd Pulverer about the ongoing activities and some of the latest initiatives at EMBO and EMBO Press. Whether it is through formal roles on Council or a committee, or more informally, through providing feedback or insight on topics relating to EMBO activities, EMBO Members are an integral part of the organization.

For Sitia, who served on the Courses and Science & Society Committees in the past, participation in EMBO activities has two main advantages. He explains: "You are part of an equilibrium: you give back some of what you are given in return. And you get to meet interesting people and receive different views."

Newly elected EMBO Member Panayiota Poirazi from the IMBB-FORTH, Heraklion, Greece adds: "As an EMBO Young Investigator, I already benefited from many of the organization's activities. Therefore, I sincerely appreciate the effort and commitment required by EMBO Members to maintain the organization's very high standards and expand to new horizons. That's why I'm eager to help towards this challenging goal."

Who are the EMBO Members?

- In total, 2183 scientists have been elected to the EMBO Membership since its foundation in 1964. Membership is lifelong. Today, just over 1700 scientists make up the EMBO Membership.
- EMBO Members and Associate Members live and work in 41 countries around the world.
- Women make up 18% of the EMBO Membership (an increase of 3% since 2010).
- The average age of newly elected members in 2017 was 50.8 years.
- Members represent all areas of the life sciences. Molecular medicine, signal transduction and development are the most highly represented subject areas.

An online directory with all EMBO Members is available at http://people.embo.org/

Impressions from EMBO at Basel Life. Sir Paul Nurse (top right) and Jennifer Doudna (bottom right) gave presentations. Paul Nurse with EMBO Member and next year's keynote speaker Michael Hall (middle right).

EMBO at Basel Life

New conference connected scientists in academia, industry and the clinic

The EMBO at Basel Life conference is the newest kid on the block in European life science meetings. The conference was conceived as broad-scope scientific event on current and emerging life science research. Its first installment took place form 10-13 September 2017 in Basel, Switzerland as part of Basel Life, an initiative organised by researchers from academia, pharmaceutical and biotechnology industry and the City of Basel.

"The conference fostered the exchange between researchers from academia, clinics, and industry, and promoted excellence in the life sciences," said EMBO Member and scientific co-organizer Susan Gasser from the Friedrich Miescher Institute for Biomedical Research in Basel. More than 600 established and young researchers presented and discussed work on all aspects of genome biology, ranging from microbial genomes and genome evolution to transcription, inheritance and clinical approaches as well as techniques, including single molecule imaging and bioinformatics.

The meeting kicked off with a public lecture titled "What is life?" by Nobel laureate and EMBO Secretary General Sir Paul Nurse. He described the fundamental features of life while drawing attention to paintings, which convey these features and which are exhibited at the Basel Art Museum, where he gave his talk.

Jennifer Doudna, co-discoverer of the CRISPR-Cas9 technology, discussed genome engineering research as well as the possibilities and challenges resulting from it in her keynote lecture. Svante Pääbo, the second keynote lecturer, presented his work on exploring the origins of modern humans through sequencing ancient genomes.

With the Louis-Jeantet Prize lectures the conference celebrated the achievements of the 2017 prize winners: neurobiologist Silvia Arber and immunologist Caetano Reis e Sousa. The two scientists presented their research on movement-controlling neuronal circuits and the mechanisms for sensing pathogen invasion and tissue damage, respectively.

The second EMBO at Basel Life conference will take place from 11-14 September 2018.

www.basellife.org/embo

EMBO | EuropaBio Fellowships

Four six-month fellowships for research exchanges available

Dulika Sumathipala is a PhD student at the University of Oslo, Norway. Her research explores the pathogenicity of non-coding variants in whole genome sequencing (WGS) data in children with severe neurological disorders. To advance her research, Dulika applied for an EMBO Short-Term Fellowship, which enabled her to spend some time in Christian Gilissen's group at Radboud University Medical Center in Nijmegen, The Netherlands.

Explaining how this time in another laboratory helped her, she says: "During the stay I learnt bioinformatic analyses of WGS using patient-parent trio data, and I was able to identify candidate pathogenic variants in five genes not previously associated with disease."

Funding for 2018 visits

To support research exchanges in the areas of systems biology, genomics & computational biology, EMBO is funding up to four additional fellowships in 2018. These EMBO | EuropaBio Fellowships are being offered in partnership with the European Association for Bioindustries (EuropaBio). Compared with regular EMBO Short-Term Fellowships, researchers can apply for extended laboratory visits up to six months.

The goal of the EMBO | EuropaBio Fellowships is to facilitate collaborations with research groups applying techniques that are unavailable in the applicant's laboratory. EuropaBio, which represents 79 corporate and associate members and bio-regions, and 17 national biotechnology associations, provided funds for these additional fellowships as part of the collaboration with EMBO.

The application deadline for EMBO | EuropaBio Fellowships is 31 December 2017, and applicants should plan their visits to take place in 2018.

embo.org/funding-awards/fellowships/embo-europabio-fellowships

EMBO delegation visits Taiwan

Series of events marks 5th anniversary of cooperation agreement with the Ministry of Science and Technology

In November 2017, a delegation from EMBO travelled to Taiwan to celebrate the existing partnership with the Ministry of Science and Technology (MOST) and to intensify interactions with the Taiwanese scientific community.

MOST and Academia Sinica signed a cooperation agreement with EMBO five years ago, which allows life scientists based in Taiwan to benefit from a range of EMBO activities. EMBO Member Bertrand Jordan, who headed the delegation, explains: "The trip was organized to mark the 5th anniversary of this agreement and the ongoing commitment to continue and develop this cooperation."

The visit included several days of presentations, meetings and group discussions, which began with a scientific symposium at the Academia Sinica. In addition to learning from EMBO representatives about EMBO funding, training opportunities and science policy work, the participants also heard scientific presentations from EMBO Members, EMBO Young Investigators and other life scientists in Taiwan.

During the following days, the EMBO delegation visited National Yang-Ming University and National Taiwan University. The EMBO representatives spent a day at each university, where they presented EMBO's activities to an audience ranging from students to faculty members.

Bertrand Jordan adds: "One of [the visit's] most successful features was the contact with many younger scientists, including students, that allowed extensive discussions and raised awareness of the possibilities offered by EMBO. I fully expect this will lead to a surge in the number of activities connecting Taiwan with EMBO and European science."

Woei-Jer Chuang, Director General of the Department of Life Science at MOST says: "This visit strengthened the interactions with the EMBO community and provided the opportunity for us to present our scientific achievements from the partnership. We look forward to extending the cooperation with EMBO so that the partnership can catalyze more scientific interactions."

Head of Scientific Publications, Bernd Pulverer, talks about EMBO Press.

Throughout the events, Head of Global Activities Luis Valente, Head of Scientific Publications Bernd Pulverer, Science Policy Programme Manager Michele Garfinkel and Science Policy Programme Officer Sandra Bendiscioli met with researchers in small groups or individually to discuss how EMBO supports scientists and how those based in Taiwan can benefit from the activities that EMBO offers.

Furthermore, Michele Garfinkel and Sandra Bendiscioli delivered an EMBO workshop on Research Integrity at the Academia Sinica. The day-long interactive workshop included presentations and discussions on the value of responsible research conduct, the nature of scientific misconduct, conflicts of interest, publication issues, mentoring and good data practice.

embo.org/about-embo/global-activities

The ERC: from before then to anniversary celebrations

Former EMBO Director Frank Gannon shares the story behind a series of meetings that propelled the European Research Council from idea to reality.

The European Research Council (ERC) is ten years old. This beautiful child has thrived and its many parents should look at it with pride. At the turn of the millennium, many scientists had given up hope that such a structure could come into being. That view turned out to be wrong, because of an unusual persistence by scientists and the organisations that represent them, and a change in the rhetoric of the European Commission (EC). Ever since, the EU has nurtured and supported the council, which it now rightfully presents as one of its major successes.

From idea to formal consideration

The idea of an EU funding agency for basic research moved from the agenda of scientists to that of decision makers at a meeting to discuss future EU expenditures in Sweden in 2001. At that time, the Danish government held the EU Presidency and the Commissioner for Research, Phillipe Busquin, was using the idea of a European Research Area (ERA) to obtain more funding for research in the 6th EU Framework Programme.

At the Stockholm meeting, economists argued that the EU Agricultural Policy, which garnered 50% of EU spending, was merely an excessive subsidy and that the money would be better spent on research. However, the legal basis of the EU's Framework Programme only allowed it to support research with potential economic benefits. Many also questioned the value of basic research per se. Nonetheless, the concept of an ERC was up for discussion, and even at that 2001 meeting the funds for it were placed in the billion euros bracket. Where would that money come from? There were two responses: either from the EU, or from national research funding agencies. It left many wondering if anything would happen next.

Luckily, the Danes had already planned ahead and organised a meeting in Copenhagen in 2002 called "Towards ERA: Do we need a European Research Council?" By the end of the meeting, the answer was a resounding "Yes". The Danish government, working with Julio Celis, who was Secretary General of the Federation of Biochemical Societies (FEBS) and the Danish EMBC representative, then established a working party under Federico Mayor, who had been the Director General of UNESCO. They prepared a report for the EC, thereby making the ERC a topic to be considered formally.

Speaking for science

While the machine of the EU turned at its own pace, FEBS and EMBO (in practical terms: Julio and I) thought the process needed more input from scientists. Together with EMBL we formed the European Life Sciences Forum (ELSF). It started with an open meeting at UNESCO in Paris in 2003 to represent voices from the scientific community. The meeting quickly galvanised around the concept of an ERC to support excellent basic research. Most of the 300 scientists present strongly expressed the opinion that "their" ERC should be at arm's length from the EC, because they did not trust the EC's selection processes or the concept of juste retour, by which countries tended to gain as much in grants as they contributed to the Framework Programme. In addition, the requirement that research must have an economic impact was contrary to the focus on basic research. Busquin attended the meeting and expressed his enthusiasm for an ERC, but stressed the technical and political problems.

The ELSF, soon joined by other organisations, continued to hold meetings that refined what the ERC should be. Questions arose at an early stage as to restricting it to the life sciences as a pilot project, whether support of research infrastructure should be included, and how to encourage interdisciplinary projects. Some of these (especially how to support interdisciplinary research) remain pertinent and unresolved until today. At each of these meetings, the EC sent a high-ranking official, and their messages were encouraging but always came with new pre-requisites.

Because of the strength and cohesion of its organisations, the life sciences were spearheading these discussions, but soon recognised that this could seem like special pleading. In 2004, ELSF broadened its base to include all natural sciences, social sciences and the humanities and established the Initiative for Science in Europe (ISE). Now the barricades were manned by scientists from all disciplines who repeated the message: "What do we want? ERC! When do we want it? Now!"

Re-interpreting the law

But an impasse had been reached around the question of who would fund the ERC. Then, in a complete volte face, Achilles Mitsos, the EC's Director General for Research, gave a speech at an ISE-organised meeting in 2005 where he re-interpreted the EU laws: EU-wide competition, including basic research, met the necessary pre-condition of "added value" for the member states. The way was open to include the ERC in the next Framework Programme in 2006. Clever word-smithing ("basic research" became "frontier research") and fresh interpretations of treaties and rules were required, but once the EC had embraced the project, it moved forward very fast.

And so we are celebrating ten years of the ERC. The scientific community has engaged with enthusiasm, as the spirit of the ERC is clearly in line with the ideas of those who participated in its formation: to identify and support excellence.

Developing for the long haul

However, there is some reason for concern as some countries have such a low level of success that it must be demoralising for their researchers and for their politicians. To illustrate the problem: with a budget of 1.67 billion euros in 2016, the ERC awarded eight grants to Poland, the Czech Republic, Estonia and Portugal collectively, whereas 34 grants went to the Netherlands, which was the fourth ranked country. And University College London alone accounts for many more grants than all Eastern European countries combined since the start of the ERC.

In my view it would be good for European science and for the long-term success of the ERC, if there were a second-tier competition. Such a special excellence-based funding restricted to competitive researchers in countries that are in the lower half of the success league could stimulate better research throughout Europe and help retain the best scientists in the countries that most need them. It could also avert a possible backlash against the ERC by those member states that are getting fewer awards.

Now, the ERC heads into its teen years. These could be turbulent – for instance, the potential impact of Brexit – but it is also the time for maturing and decisions for the longer haul. And yet, there is plenty to celebrate. The ERC has provided scientists with the opportunity to explore interesting new ideas and to be daring. All involved since its launch – the ERC Scientific Council, the Steering Committee, the EC, and the hundreds of scientists – have done a great service to Europe. As a proud parent I salute the ERC and the hundreds of other parents. Cheers!

This is an abridged version of an article first published in *EMBO Reports* (Doi: 10.15252/embr.201745025).

Going for gold

If we want to make Open Access sustainable and useful in the long run, we must choose 'gold' over 'green', argues EMBO Director Maria Leptin.

When – back in May 2016 – the European Commission announced its ambitious target of making all publicly funded research in Europe openly accessible, it joined a host of countries, funders and research organizations pushing for change in scientific publishing.

The Registry of Open Access Repository Mandates and Policies (ROARMAP) currently includes more than 880 open access mandates and policies worldwide. That is double the number registered only five years ago. But despite a growing desire for Open Access (OA) publishing, a viable option for making scientific output freely available in a way that is structured, curated, and quality-controlled as well as financially sustainable still seems some way off.

From sound idea to confusing reality

Growing out of the initial desire of individuals to make scientific findings more widely accessible, the OA movement has resulted in numerous initiatives from publishers, funding bodies and individual researchers. And while everyone is, in principle, aiming for the same thing, namely to ensure that the outputs of scientific work are not hidden behind paywalls, the many different mandates, policies and recommendations on what OA should be and how it should be financed mean that there is now a danger of diverging from this initial aim.

One example of this is green OA, which is an expensive halfway house with limited benefit to the scientific community or indeed the public. 'Green' describes the archiving of a version of a published paper in public repositories or on servers hosted by researchers' institutions. Here, it is freely accessible, usually after a certain embargo period stipulated by the publisher. By contrast, the 'gold' OA model means that the journal in which a paper was published grants immediate free access to the final version of the article. Green OA might look appealing at first, but if we want OA to work in a sustainable manner for papers in high-quality, peer-reviewed journals, it has to be gold, not green.

Why is green OA unsustainable?

In the traditional, subscription-based model, scientific publishers cover the cost for the services they provide through subscriptions. In the case of gold OA, the income from subscriptions is removed because libraries and individuals no longer need to pay to access papers. But journals can find alternatives, for example through charging article processing charges (APCs), although these may not cover all the costs for running a highly selective journal.

In the case of green OA, journals remain responsible for publishing the final peer-reviewed and revised version of a paper, but face subscription losses because a version of the paper can be freely accessed elsewhere.

There are other disadvantages of green OA, too. Not all institutional repositories are well indexed or well connected, or have a guaranteed long-term source of secure financing, meaning the papers are less discoverable than those published in journals. The running of multiple repositories holding duplicate files also results in additional costs. Further, some publishers don't allow posting of the final, reviewed and edited manuscript, which has implications for the scientific record. The posting of earlier manuscript versions in an institutional repository has two important consequences: if the versions are not clearly linked, it can easily lead to confusion over what the copy of record is, and it denies readers access to the improvements and data added through the peer review, editing, curation and quality control processes. Finally, green OA means that either authors themselves or their institutions become responsible for the posting of corrections or retractions to make sure readers using the green OA repositories are aware of them.

Finding a sustainable model

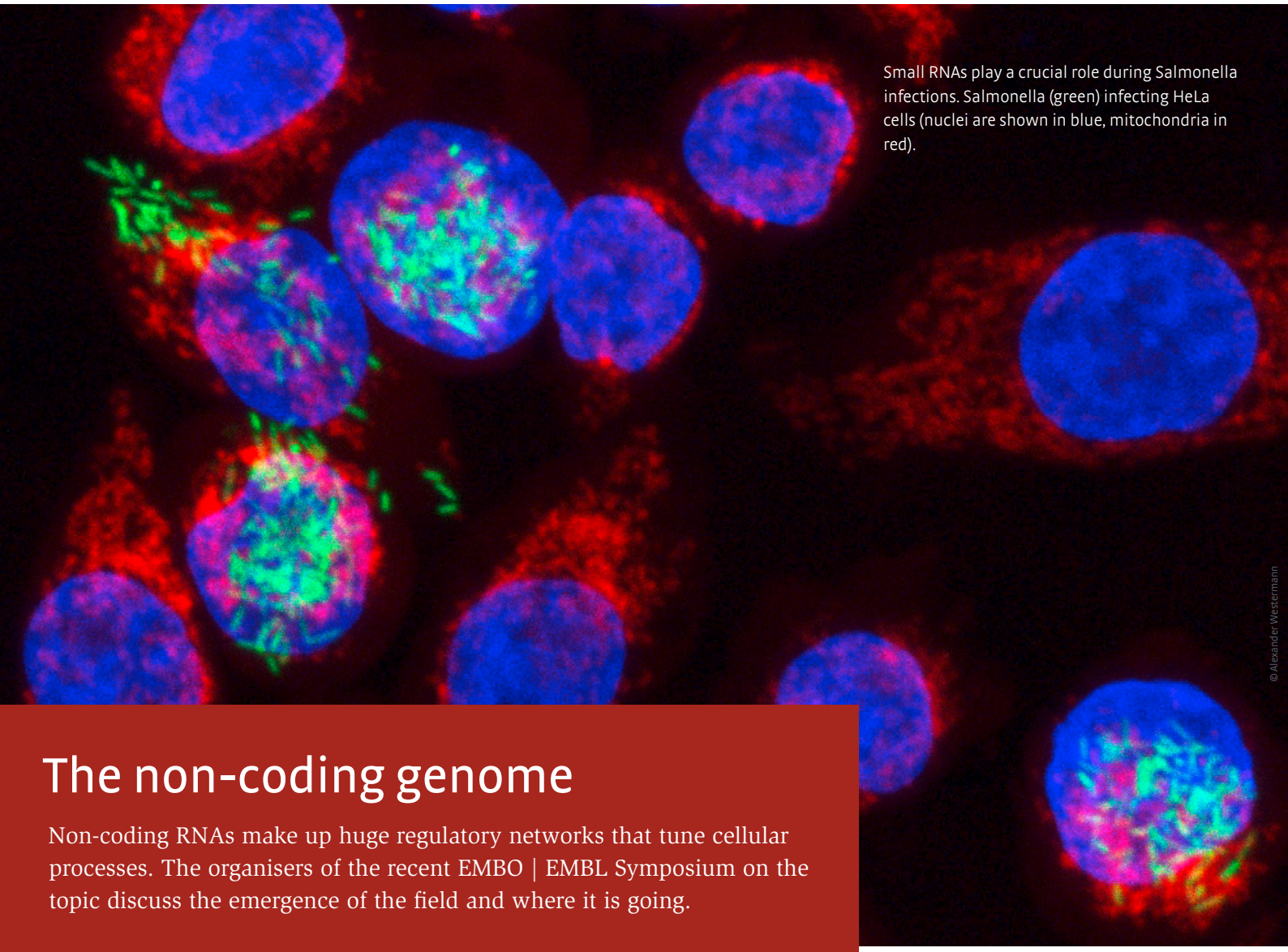
For some time now, green, gold and hybrid OA publishing models have been developing side by side in addition to initiatives on preprint posting, open databases and repositories (hybrid OA refers to journals that offer the choice to publish OA). But if we want to ensure a successful OA future, our community, including authors, funders, publishers and policymakers, must take stock and develop a coordinated effort that maximizes the advantages of OA and makes it a viable option for the long term.

To enable a complete move to OA, we need to find a sustainable and fair way to pay for the services that are provided by journals. Even with a financial model that does not include any profit, providing a quality publishing service still costs a lot of money. Of the currently available models, only gold OA offers the potential for such a solution. As it stands, services like peer review, quality control and archiving are associated with publishers, but there is no reason to say that that will always have to be the case. These services should be carried out by professionals, and must be adequately financed, no matter what type of organization these professionals are associated with.

Thinking beyond the models currently in place, it is, of course, possible to envisage entirely different solutions that revolutionize the reporting and archiving of scientific findings in the long term. For now we must accept that creating a scientific literature that is not only openly accessible but also reliable comes at a cost, and a fair way of financing that service will have to be found.

Open Access Week 2017

Between 23 and 29 October, scientists, journals, libraries, institutes and organizations across the world took part in Open Access Week 2017. Under the theme "Open in order to...", discussions, workshops and events focused on all aspects of open access. Head of Scientific Publications at EMBO, Bernd Pulverer, took part in an event organized by the European Molecular Biology Laboratory (EMBL) Szilard library. Pulverer said: "Open Access is an important driver to ensure broad access to the scientific literature. But we must not drive down costs so much as to erode the quality control function of the publishing process. If framed correctly, Open Access will preserve quality assurance, while also allowing the sharing, archiving and discovery of all significant research outputs."



Small RNAs play a crucial role during Salmonella infections. Salmonella (green) infecting HeLa cells (nuclei are shown in blue, mitochondria in red).

The non-coding genome

Non-coding RNAs make up huge regulatory networks that tune cellular processes. The organisers of the recent EMBO | EMBL Symposium on the topic discuss the emergence of the field and where it is going.

By Katrin Weigmann

"The real voyage of discovery consists not in seeking new landscapes, but in having new eyes," wrote French author Marcel Proust in his novel Remembrance of Things Past. And while Proust was, in fact, describing art, he might just as well have been referring to science. Often, innovative technologies provide researchers with 'new eyes' to look deeper into well-studied matters.

High-throughput sequencing played a central role in understanding the richness of the non-coding RNA world. "Until recently, we did not have the methodology to investigate these molecules," says EMBO Member Jörg Vogel of the University of Würzburg, Germany. But now researchers are uncovering large regulatory networks consisting of non-coding RNAs that had hitherto escaped detection.

This network of sRNAs, microRNAs, siRNAs, piRNAs, lncRNAs and more was the focus of the EMBO | EMBL Symposium "The non-coding genome" that took place in Heidelberg from 13–16 September 2017. The conference, which was co-organized by Jörg Vogel, EMBO Member Elisa Izaurralde, David Bartel and John Rinn, brought together scientists working on all aspects of non-coding RNAs.

Ubiquitous regulators

There are thousands of different non-coding RNAs in each cell. But while they are numerous, their mode of action is usually subtle, and this could be, according to Vogel, the other reason they have been overlooked for so long. "They often lack the strong phenotypes that we see when we knock out, for example, a transcription factor," he explains. "The way they regulate gene expression is very different, they are involved in fine-tuning."

The molecular mechanisms for many of the small non-coding RNAs of plants and animals is very similar: They associate with a protein of the Argonaute family to form a silencing complex, and guide it towards a target mRNA. "It is a two-component system where Argonaute provides the molecular function, and the non-coding RNA is responsible for target specificity," says David Bartel of the Massachusetts Institute of Technology, USA. Moreover, base pairing with the target sequence is usually short, between about 6–20 base pairs. In particular, microRNAs in most animal cells primarily use a short seed sequence of six nucleotides. Accordingly, they each have many targets – about 400 on average and provide a whole additional layer of regulation that affects almost every process in the cell.

Tuning a complex system

The ability of non-coding RNAs to subtly down-regulate the expression of multiple genes at once makes them particularly well suited for fine-tuning regulatory transitions. For example, in a recent study Vogel showed that small RNAs play a crucial role during Salmonella infections, helping the pathogen transit from an invasive state to a state of intracellular replication. "These sRNAs modulate response curves through feedback or feed-forward loops. They can induce threshold values for switching on genes or allow genes to be switched off more quickly. Depending on how the feedback loops are constructed, you will get different time curves of gene expression," says Vogel.

Open questions remain

Much has been learned about non-coding RNAs in the past decade, but there is more to be understood about their exact function, their target genes and their networks. "We do by now have a pretty good idea of how microRNAs work, but other classes have proven to be more challenging," says Elisa Izaurralde of the Max Planck Institute for Developmental Biology in Tübingen. "piRNAs, for example, have been more difficult to understand and many mechanistic questions remain open. There may be more than one mechanism by which they regulate genes."

"For some of the RNA classes, an important future challenge will be to separate the signal from noise. Not everything that is transcribed will also have a function," says Vogel. In addition, the diversity of non-coding RNAs is far from understood. "Research thus far has concentrated on a few model organisms."

Meet-the-Speaker sessions offered participants an opportunity for in-depth discussions.

"Start to learn the language"

The greatest challenge, however, is to understand long non-coding RNAs (lncRNAs). There are many thousands of them and they are part of a very heterogeneous group, unified only by two features as their name suggests – they are long and non-coding. "It took about 10 years to do a cartography and to find out which RNAs to study. Now we are ready to investigate how they work," says John Rinn from the BioFrontiers Institute in Boulder, USA. According to Rinn, an important next step – admittedly, a very large one – is to understand what he calls the syntax of non-coding RNAs – the link between structure and function. "We have a lexicon for the language of proteins, we understand words like 'Zinc-finger domain' or 'kinase domain'. We can predict what they are doing. The RNA language, in contrast, is still hieroglyphic to us. A big task for the future will be to translate these hieroglyphs into meaning," says Rinn.

High-throughput technologies will play a major role in this endeavor. "We can play with the sequence through an evolutionary approach and change it a little and then see if it is still functions," says Rinn. He and colleagues have used this approach to identify sequences and structures required for nuclear localization of non-coding RNAs. "The key is to have a functional assay," he adds. "Once you have that you can start to learn the language".

Towards clinical applications

For decades, researchers have been using non-coding RNA as a research tool to silence genes in a technology called RNAi. Today, this approach is also being used therapeutically. Although the start was slow – there are major problems in drug delivery and toxicity – there has been some success. Only recently, pharmaceutical companies Alnylam and Sanofi announced positive phase 3 clinical data for their RNAi-based drug patisiran that targets a rare genetic disease known as hereditary ATTR amyloidosis with polyneuropathy.

Aside from treating human cells with RNAi, Jörg Vogel sees another option in targeting bacteria. The advantage of RNAi over classic antibiotics is that RNAi can act in a more refined way. This is a great advantage when it comes to treating dysbiosis, a microbial imbalance that most often affects a person's digestive tract. "One of our goals is to specifically manipulate or eliminate some bacteria of the microbiome," says Vogel.

EMBO Member and conference co-organiser Jörg Vogel.

www.embo-embl-symposia.org/

An insider's view

Coming from a background of bacterial genetics, The organisers of the EMBO | EMBL Symposium "The Non-Coding Genome" talk about some of the most exciting questions and developments they are investigating.

David Bartel (Massachusetts Institute of Technology): "We are looking at a regulatory network involving two microRNAs, one circular RNA and one long non-coding RNA, that seem to be regulating neuronal activity in the brains of mice. These studies involve genetic approaches, which are easier to do now that we can more quickly knock out each of the components."

Elisa Izaurralde (Max Planck Institute for Developmental Biology): "Technological advances now allow us to better understand the function of RNA binding proteins. We can knock out proteins such as argonaute using the CRISPR-Cas9 system and look at its effects using high-throughput sequencing. Much work has thus far been done in cell lines, it will be important to investigate functions at the level of the organism."

John Rinn (BioFrontiers Institute): "Many non-coding RNAs are transcribed at very low abundance in a cell-specific manner, and the question is what they do. According to a recent model of ours, it may be the act of transcription that matters, because it induces chromatin remodelling. While the RNA is being transcribed, it might serve as a beacon to show proteins where to bind."

Jörg Vogel (University of Würzburg): "Single cell RNA sequencing is becoming a very important topic. Gene expression can vary considerably between cells and this heterogeneity matters in immune reactions and infection processes. There are host cells that are more susceptible to infection and there are pathogens that are more aggressive than the larger part of the population. We are only now starting to understand why that is."

Giulio Superti-Furga, Erika Tuppy, Hans Tuppy, Maria Leptin, Anton Zeilinger (President of the Austrian Academy of Sciences in Vienna), Heinz Faßmann (University of Vienna)

Tuppy Lectures honour one of EMBO's earliest members

Hans Tuppy is one of EMBO's earliest members and an influential figure in Austrian science. In order to honour the Austrian biochemist and his achievements, the University of Vienna and the Austrian Academy of Sciences initiated the Hans Tuppy Lecture series in 2016. The lectures are given by outstanding scientists who have made pioneering contributions to biochemistry or molecular biology.

On 29 June 2017, EMBO Director Maria Leptin presented the 3rd Hans Tuppy Lecture at the Austrian Academy of Sciences in Vienna. Following an introduction by EMBO Member Giulio Superti-Furga, Research Center for Molecular Medicine in Vienna, she spoke about the interplay between the molecular processes within and between cells during morphogenesis.

The previous two lectures in 2016 were presented by EMBO Members Kim Nasmyth, University of Oxford, and Sir Adrian Bird, University of Edinburgh.

Structural Genomics Consortium expands to Frankfurt

The Structural Genomics Consortium (SGC) is a public-private partnership that aims to facilitate the discovery of new medicines by ensuring free access to a wealth of research data and reagents. The enterprise is funded by non-profit organizations and pharmaceutical companies and includes six laboratories at academic institutions worldwide. Goethe University Frankfurt recently became the first German site of the initiative. EMBO Members Volker Dötsch and Ivan Dikic are actively involved in this endeavour, which is led by Stefan Knapp.

Scientists involved in the SGC have already deposited more than 2000 high-resolution structures of medically relevant proteins in public databases, and identified potential new targets by developing highly specific chemical inhibitors called probes.

The scientists in Frankfurt will take the lead in the new "pharma donated chemical probe programme". Pharma companies hold numerous high-quality chemical probes against a wide array of therapeutic targets. The majority of companies within SGC has now agreed to donate 70 such hidden probes (along with broad characterization data and relevant negative controls) to the scientific community. These will be additionally complemented by SGC labs and academic partners, which include the NIH.

www.thesgc.org/

Chemistry Nobel Prize for two EMBO Members

EMBO Members Jacques Dubochet from the University of Lausanne, Switzerland, and Richard Henderson from the MRC Laboratory of Molecular Biology in Cambridge, UK, were awarded the 2017 Nobel Prize in Chemistry.

Together with Joachim Frank from the Columbia University, New York, USA, Dubochet and Henderson received the prize for the development of cryo-electron microscopy (cryo-EM) to determine high-resolution, atomic-level structures of biological molecules in solution.

In the 1980s, Jacques Dubochet devised a way to vitrify water through rapid cooling – an approach that made it possible to study biological samples under the electron micrograph. In 1990, Richard Henderson and his colleagues showed the potential of using cryo-EM for biological imaging when they generated a three-dimensional, atomic level image of bacteriorhodopsin.

Dubochet and Henderson join 85 other EMBO Members and Associate Members who were awarded Nobel Prizes.

A free collection of recent research published in EMBO Press journals by Joachim Frank and other scientists using cryo-EM to unravel the beauty of biomolecules is available on the EMBO Press website.

www.embopress.org/cryo-em
www.embo.org/members/nobel-laureates

Discussing research funding on a global stage

Maria Elena Torres-Padilla

The Annual Meeting of the New Champions (AMNC) is held annually in Dalian or Tianjin, China. As the World Economic Forum's global meeting on innovation, science and technology, it brings together business leaders, policymakers and scientists for discussions that are aimed at driving future advancements for the benefit of global society.

EMBO Member Maria Elena Torres-Padilla from the Institute of Epigenetics and Stem Cells at the Helmholtz Zentrum München, Germany, co-chaired the 11th edition of the summit, which took place in Dalian between 27 and 29 June and was attended by more than 2000 participants from 80 countries.

Under this year's theme "Achieving Inclusive Growth in the Fourth Industrial Revolution", Torres-Padilla took the issue of funding basic research to the global stage, highlighting its importance for drug discovery and technological innovation, and their positive implications on society. She also highlighted the importance of communicating research results and the integrity of the scientific process to wider society.

"Co-chairing the AMNC was an honour and a great opportunity to meet with individuals committed to making a positive impact on the world," said Torres-Padilla. "Thorough basic research is essential for scientific advancements in the future and something that policymakers need to be aware of to ensure it is protected. Extensive and reliable funding promoting scientific excellence will be essential to support future leaders of research and development, both in academia and industry."

BOOK REVIEW

The Mystery of Human Aging

In his book *The Mystery of Human Aging*, former EMBO Fellow Björn Schumacher from the CECAD Research Center, University of Cologne, Germany, describes the biological insights that are transforming our understanding of the causes of aging and human disease.

"The author explains in clear terms and for a broad audience what we know about the molecular, cellular and physiological basis of aging," says Jan Vijg, Albert Einstein College of Medicine, New York, USA. "Björn takes you by the hand and guides you through a wondrous world of the accomplishments of biomedical research through the ages."

The book begins with a historical excursion, looking at early descriptions of aging – from the Bible to Greek mythology – and the initial scientific studies. Throughout the remainder of the book, Schumacher covers all aspects of aging and research into the molecular mechanisms underlying it, ending with an exploration of whether a 'cure' for aging is a reality. "In recent years, there has been a veritable explosion of new knowledge about aging," says Schumacher. "And that is what this book is about."

The Mystery of Human Aging – Surprising insights from a science that's still young
Björn Schumacher
Algora Publishing | March 2017
www.algora.com/518/book/details.html
ISBN: 978-1628942828

From neural circuits to stem cells at new Exeter institute

Steven West, Phil Ingham, Paul Nurse, Christiane Nüsslein-Volhard, Maria Leptin and David Ish-Horowicz at the institute's opening symposium.

On 5 July 2017, EMBO Secretary General Sir Paul Nurse officially opened the University of Exeter's Living Systems Institute (LSI). The brainchild of EMBO Member and Deputy Vice-Chancellor Research and Knowledge Transfer, Nick Talbot, the LSI is located in a state-of-the-art collaborative research facility in which biologists, mathematicians, physicists and engineers can work together. This integration is designed to foster innovative, interdisciplinary research into the fundamental molecular and cellular processes underlying living systems and the diseases that afflict them.

Fifteen new faculty have been recruited from leading international institutions to join existing faculty under the leadership of EMBO Member Philip Ingham. These include former EMBO Young Investigator Tom Richards and current EMBO Young Investigator Steve West. Research interests range from neural circuit structure and function through stem cell self-renewal and differentiation, organelle structure and function, to the population dynamics and interactions of micro-organisms and their hosts.

A variety of complementary analytical methods and platforms including hydrogen-deuterium exchange mass spectrometry, cryo-electron microscopy, X-ray crystallography, nanophotonics, super resolution microscopy and microfluidics underpin the work carried out at the institute.

Steve West says: "The LSI vision of bringing together researchers from many disciplines under one roof brings with it opportunities beyond the boundaries set by my own expertise. Although we are only a few months in, we are already talking to physicists and mathematicians about how we can visualise and interpret our systems in ways that we had not previously imagined."

A two-day symposium to mark the official opening of the LSI included EMBO Director Maria Leptin, former EMBO Secretary General Christiane Nüsslein-Volhard and EMBO Member Dame Amanda Fisher among the speakers.

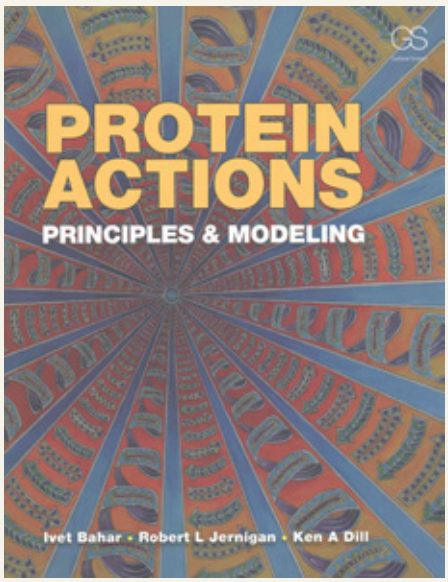
BOOK REVIEW

Protein actions explained

Protein Actions: Principles and Modeling is a new textbook by EMBO Member Ivet Bahar from the University of Pittsburgh School of Medicine, USA Together with her colleagues Robert L. Jernigan, Iowa State University, USA and Ken A. Dill, Stony Brook University, USA she presents an overview of protein structure and function. Bahar says: "We give examples of the power of simple models and methods, while also giving a glimpse of challenges awaiting future researchers."

Bahar presented the book, which is aimed at graduates, advanced undergraduates and those looking for an introduction to proteins, for the first time in February 2017 at the Biophysical Society Meeting in New Orleans. "I wanted to write the sort of book I could have read when I first got interested in biological problems; a book that could inspire graduate students from chemical engineering, chemistry, physics, or computer science to use their skills and knowledge to do research in quantitative biology," she explains.

Protein Actions: Principles and Modeling
Ivet Bahar, Robert L. Jernigan, Ken A. Dill
Garland Science, Taylor & Francis Group | February 2017
www.garlandscience.com/product/isbn/9780815341772
ISBN: 978-0-8153-4177-2



Awards of Excellence

EMBO MEMBERS

Royal Medal

Mel Greaves, The Institute of Cancer Research, London, UK, received the Royal Society's Royal Medal in biological sciences for his research on surface antigens that defined the cellular lineage of different leukaemias. In addition to a silver gilt medal, he will receive a prize of 10,000 pound sterling.

Buchanan Medal

Peter Ratcliffe of the University of Oxford, UK, received the 2017 Buchanan Medal, which is awarded by the Royal Society for distinguished contributions to the biomedical sciences and is endowed with 2,000 pound sterling. Ratcliffe receives the award for ground-breaking research on oxygen sensing and signalling pathways mediating cellular responses to hypoxia.

Francis Crick Medal and Lecture

Miratul Muqit, University of Dundee, UK, was awarded the Royal Society's Francis Crick Medal and Lecture 2018 in recognition of his research on cell signalling linked to neurodegeneration in Parkinson's disease. He will receive a bronze medal and a prize of 2,000 pound sterling.

Gabor Medal

The Gabor Medal 2017 was awarded to **Richard Durbin** from the University of Cambridge, UK. He receives the medal and a prize of 2,000 pound sterling for his outstanding contributions to computational biology, and their impact across many areas of the life sciences.

Helmholtz International Fellow Award

The Helmholtz Association honoured **Nektarios Tavernarakis**, Foundation for Research and Technology-Hellas, Greece, with the Helmholtz International Fellow Award. It honours his research in an area of relevance to the Helmholtz Association's work. In addition to 20,000 euros prize money, Tavernarakis is invited to become a visiting research fellow at one or more Helmholtz Centers.

Lwoff Medal

Jeff Errington, Newcastle University, UK, received the Lwoff Medal at the 7th Congress of European Microbiologists in Valencia, Spain. The medal is offered by the Federation for European Microbiology Societies to recognize outstanding service to microbiology in Europe.

Spinoza Prize

EMBO members **Alexander van Oudenaarden**, Utrecht University and Hubrecht Institute, The Netherlands, and **Albert Heck**, Utrecht University, The Netherlands, were among four recipients of the Spinoza Prize. The prize, which is awarded by the Netherlands Organisation for Scientific Research (NWO), is the most prestigious science prize in the Netherlands. They will receive 2.5 million euros each to be used for scientific research.

Martin Gibbs Medal

Ralph Bock, Max Planck Institute of Molecular Plant Physiology, Potsdam, Germany, was awarded the 2017 Gibbs Medal for his research on horizontal gene transfer and experimental evolution. The medal is awarded biennially by the American Society of Plant Biologists. Bock will receive a medal and is invited to convene a Martin Gibbs Medal Symposium.

Novo Nordisk Prize

The 2017 Novo Nordisk Prize was awarded to **Poul Nissen** from Aarhus University, Denmark, for his pioneering studies of the structure and function of ion pumps. The prize is accompanied by 3 million Danish crowns awarded by the Novo Nordisk Foundation.

Albert Lasker Basic Medical Research Award

Michael N. Hall, Biozentrum Basel, Switzerland, was honoured with the Lasker Award for basic medical research for discoveries concerning TOR proteins and their central role in the metabolic control of cell growth. The award is one of four annual prizes that recognize contributions to the understanding, diagnosis, treatment, and prevention of human disease. It is endowed with 250,000 US dollars.

Ernst Schering Prize

The Ernst Schering Prize 2017 has been awarded to **Elly Tanaka** from the Institute of Molecular Pathology in Vienna, Austria for her outstanding research in the field of regeneration biology. The 50,000 euro prize is awarded annually by the Ernst Schering Foundation to recognize pioneering research that has resulted in new, inspiring models or led to fundamental shifts in biomedical knowledge.

Gregori Aminoff Prize in Crystallography

The Royal Swedish Academy of Sciences awarded the Gregori Aminoff Prize in Crystallography 2018 to **Piet Gros** from Utrecht University in the Netherlands for his fundamental contributions to understanding the complement system-mediated innate immune response. The prize is endowed with 100,000 Swedish kroner.

EMBO YOUNG INVESTIGATORS

IBRO Kemali Prize for Research

Guillermina López-Bendito, Institute of Neuroscience, Alicante, Spain, received the IBRO Dargut and Milena Kemali International Prize for Research in the field of Basic and Clinical Neurosciences for her work on mechanisms of axon guidance in brain development, and in particular in thalamocortical connectivity. The prize, which is awarded to researchers under the age of 45 who have made important contributions in the field of basic and clinical neuroscience, is endowed with 25,000 euros.

Iain T Boyle Award

The European Calcified Tissue Society has awarded its Iain Boyle Award to **Carmine Settembre**, Telethon Institute of Genetics and Medicine, Naples, Italy. The award recognizes young scientists who have made significant progress and contribution to the field of bone and calcified tissue. Settembre receives a prize of 1,000 euros.

Good Read – Publications from the EMBO community

An evolutionarily conserved pathway controls proteasome homeostasis

Anne Bertolotti (EMBO Member) and Adrien Rousseau (EMBO Fellow)

Nature | 11 August 2016
doi:10.1038/nature18943

PKR activation and eIF2α phosphorylation mediate human globin mRNA splicing at spliceosome assembly

Raymond Kaempfer (EMBO Member) and colleagues

Cell Research | 4 April 2017
Doi: 10.1038/cr.2017.39

Global survey of the immunomodulatory potential of common drugs

Giulio Superti-Furga (EMBO Member) and colleagues

Nature Chemical Biology | 24 April 2017
Doi: 10.1038/nchembio.2360

Mapping the human DC lineage through the integration of high-dimensional techniques

Florent Ginhoux (EMBO Young Investigator) and colleagues

Science | 4 May 2017
Doi: 10.1126/science.aag3009

Effector CD8+ T cell-derived interleukin-10 enhances liver immunopathology

Matteo Iannacone (EMBO Young Investigator) and colleagues

Journal of Hepatology | 5 May 2017
Doi: 10.1016/j.jhep.2017.04.020

Metaphase chromosome structure is dynamically maintained by condensin I-directed DNA (de)catenation

Raquel Oliveira (EMBO Installation Grantee) and colleagues

eLife | 6 May 2017
Doi: 10.7554/eLife.26120

Selectivity determinants of GPCR-G-protein binding

M. Madan Babu (EMBO Member) and colleagues

Nature | 18 May 2017
Doi: 10.1038/nature22070

Clonally stable Vk allelic choice instructs Igk repertoire

Yehudith Bergman (EMBO Member) and colleagues

Nature Communications | 30 May 2017
Doi: DOI: 10.1038/ncomms15575

Structural Basis of the Human Endoglin-BMP9 Interaction: Insights into BMP Signaling and HHT1

Luca Jovine (EMBO Young Investigator) and colleagues

Cell Reports | 30 May 2017
Doi: 10.1016/j.celrep.2017.05.011

Signalome-wide RNAi screen identifies GBA1 as a positive mediator of autophagic cell death

Adi Kimchi (EMBO Member) and colleagues

Cell Death and Differentiation | 2 June 2017
Doi: 10.1038/cdd.2017.80

Dynamic changes in murine forebrain miR-211 expression associate with cholinergic imbalances and epileptiform activity

Hermona Soreq (EMBO Member) and colleagues

PNAS | 6 June 2017
Doi: 10.1073/pnas.1701201114

Human fetal dendritic cells promote prenatal T-cell immune suppression through arginase-2

Florent Ginhoux (EMBO Young Investigator) and colleagues

Nature | 14 June 2017
Doi: 10.1038/nature22795

A Unique Microglia Type Associated with Restricting Development of Alzheimer's Disease

Ido Amit (EMBO Member) and colleagues

Cell | 15 June 2017
Doi: 10.1016/j.cell.2017.05.018

Structural Basis of Egg Coat-Sperm Recognition at Fertilization

Luca Jovine (EMBO Young Investigator) and colleagues

Cell | 15 June 2017
Doi: 10.1016/j.cell.2017.05.033

Dynamic changes in murine forebrain miR-211 expression associate with cholinergic imbalances and epileptiform activity

Hermona Soreq (EMBO Member) and colleagues

PNAS | 20 June 2017
Doi: 10.1073/pnas.1701201114

Geometrical frustration yields fiber formation in self-assembly

Martin Lenz (EMBO Young Investigator) and colleagues

Nature Physics | 3 July 2017
Doi: 10.1038/nphys4184

Modulation of Autophagy by BDNF Underlies Synaptic Plasticity

Nektarios Tavernarakis (EMBO Member) and colleagues

Cell Metabolism | 5 July 2017
Doi: 10.1016/j.cmet.2017.06.005

An Ancient Pseudoknot in TNF-α Pre-mRNA Activates PKR, Inducing eIF2α Phosphorylation that Potently Enhances Splicing

Raymond Kaempfer (EMBO Member) and colleagues

Cell Reports | 5 July 2017
Doi: 10.1016/j.celrep.2017.06.035.

Multipotent peripheral glial cells generate neuroendocrine cells of the adrenal medulla

Igor Adameyko (EMBO Young Investigator) and colleagues

Science | 7 July 2017
Doi: 10.1126/science.aal3753

Genome-wide identification and expression profiling of long non-coding RNAs in auditory and vestibular systems

Karen Avraham (EMBO Member) and colleagues

Scientific Reports | 17 August 2017
Doi: 10.1038/s41598-017-08320-3

Practical Courses

ES-Barcelona | 12–17 November 2017 | E. Sabidó
Targeted proteomics: Experimental design and data analysis

DE-Heidelberg | 20–24 November 2017 | M. Paulsen
The fundamentals of high-end cell sorting

CH-Basel | 26 November–1 December 2017 | C. Genoud
Volume electron microscopy by automated serial SEM

CL-Quintay | 9–21 January 2018 | J. Ewer
Developmental biology

UK-Cambridge | 5–9 February 2018 | R. Salek
Metabolomics bioinformatics for life scientists

IN-New Delhi | 18–29 March 2018 | R. Natesh
CEM3DIP 2018: of macromolecular assemblies and cellular tomography

IT-Siena | 6–12 April 2018 | P. Ricciardi-Castagnoli
Molecular interrogation of single-cells to decipher population heterogeneity and plasticity

DE-Heidelberg | 9–13 April 2018 | A. Hendrix
Extracellular vesicles: From biology to biomedical application

DE-Heidelberg | 23–30 April 2018 | J.E. González-Pastor
Microbial metagenomics: A 360° approach

GR-Heraklion | 6–17 May 2018 | A. Stamatakis
Computational molecular evolution

FR-Grenoble | 12–19 May 2018 | M. Marcia
Characterization of macromolecular complexes by integrative structural biology

DE-Würzburg | 12–22 June 2018 | C. Stigloher
Advanced electron microscopy for cell biology

ES-Barcelona | 2–6 July 2018 | A. Bonvin
Integrative modelling of biomolecular interactions

LU-Luxembourg | 4–10 October 2018 | R. Krause
Phenotyping neurological syndromes for systems genetics

IT-Rome | 5–10 November 2018 | A. Via
Computational analysis of protein-protein interactions: Sequences, networks and diseases

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Annika Grandison, Tilmann Kiessling, Stephen Pewter, Katrin Weigmann

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PT-Ericeira | 17–21 November 2017 | P. Domingos
Proteostasis

ES-Tenerife| 16–20 January 2018 | E. Karatekin
Exocytosis and endocytosis: From synaptic vesicles to nanodiscs

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Modelling infectious diseases in the cell and host

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Neural development

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Noncoding RNAs in embryonic development and cell differentiation

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From networks to mechanisms to models

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Nuclear mechano-genomics

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Telomere biology in health and human disease

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Lysosomes and metabolism

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Molecular neurobiology

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Target of rapamycin (TOR) signaling in photosynthetic organisms

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Chromatin dynamics and nuclear organization in genome maintenance

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Gene transcription in yeast: From global analyses to single cells

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New shores in land plant evolution

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Imaging mouse development

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DNA replication, chromosome segregation and fate decisions

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Membrane contact sites in health and disease

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Cilia 2018

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From epigenome towards epitranscriptome in cell fate choice

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IT-Lucca | 21–25 October 2018 | M. Lemberg
Endoplasmic reticulum function in health and disease

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DNA replication: From basic biology to disease

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Innate immunity in host-pathogen interactions

DE-Heidelberg | 5–8 September 2018 | C. Haering
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DE-Heidelberg | 3–6 October 2018 | A. Ephrussi
The complex life of RNA

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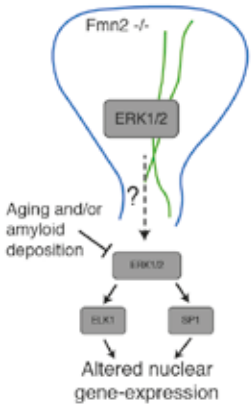
THE EMBO JOURNAL



RESEARCH ARTICLE

Memory mechanisms

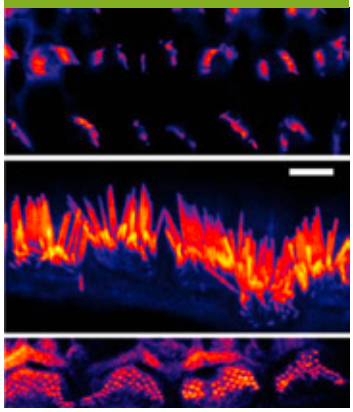
Individuals suffering from post-traumatic stress disorder (PTSD) are more prone to acquiring Alzheimer's disease in later life. A study by Agís-Balboa *et al.*, published in *The EMBO Journal*, sheds light on the molecular mechanism that links the two disorders.

Mice lacking the Formin 2 protein show symptoms reminiscent of PTSD at an early age and acquire age-related memory decline. The researchers propose that developing PTSD via a process that involves Formin 2 could, over time, cause an aberrant activation of many genes that eventually contribute to Alzheimer's. Indeed, whereas young mice lacking Formin 2 were hardly different from normal mice, a deregulation of hundreds of genes built up as they aged.

These results from animal studies are likely to be relevant to humans. The research team showed that Formin 2 is deregulated in PTSD and in patients with Alzheimer's disease. It may thus be possible to develop therapeutic strategies for PTSD patients that, at the same time, lower the risk for developing Alzheimer's disease.

Formin 2 links neuropsychiatric phenotypes at young age to an increased risk for dementia
Roberto Carlos Agís-Balboa, Paulo Pinhero, Nelson Rebola, Cemil Kerimoglu, Eva Benito, Michael Gertig, Sanaz Bahari-Javan, Gaurav Jain, Susanne Burkhardt, Ivana Delalle, Alexander Jatzko, Markus Dettenhofer, Patricia A. Zunszain, Andrea Schmitt, Peter Falkai, Julius C. Pape, Elisabeth B. Binder, Christophe Mulle, Andre Fischer & Farahnaz Sananbenesi
Read the paper: emboj.embopress.org/cgi/doi/10.15252/embj.201796821

EMBO reports



RESEARCH ARTICLE

No BEACH, no hearing

The Lipopolysaccharide-responsive beige-like anchor protein (LRBA) is known to play an important role in the immune response. A study by Vogl *et al.*, published in *EMBO Reports*, shows an additional role of LRBA in auditory function. In mice, LRBA deficiency leads to progressive hearing loss. A closer look at the cellular function of LRBA revealed that it is required to maintain hair bundles in the hair cells of the inner ear. LRBA belongs to a class of proteins that contain a so-called BEACH domain. These proteins have previously been implicated in the assembly of macromolecular complexes. The new data on LRBA function are consistent with this model.

Patients with mutations in the LRBA gene suffer from severe immunodeficiency, but there had thus far been no mention of hearing loss in patient data. However, a closer look at two patients revealed hearing impairments in humans as well, although less severe than in mice. Such hearing loss could gain more importance in the clinical setting if the development of treatment methods allows patients to survive longer.

The BEACH protein LRBA is required for hair bundle maintenance in cochlear hair cells and for hearing
Christian Vogl, Tanvi Butola, Natja Haag, Torben J Hausrat, Michael G Leitner, Michel Moutschen, Philippe P Lefèbvre, Carsten Speckmann, Lillian Garrett, Lore Becker, Helmut Fuchs, Martin Hrabe de Angelis, Sandor Nietzsche, Michael M Kessels, Dominik Oliver, Matthias Kneussel, Manfred W Kilimann, Nicola Strenzke
Read the paper: embor.embopress.org/content/early/2017/09/18/embr.201643689

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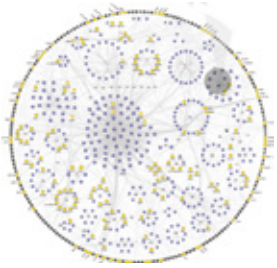


ARTICLE AND REPORT

No more TREM2-bling

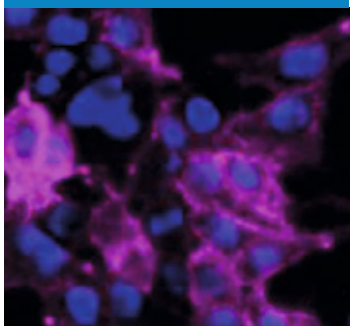
A gene called triggering receptor expressed on myeloid cells 2, or TREM2, has been associated with Alzheimer's disease and other neurodegenerative diseases. Two groups, Thornton *et al.* and Schlepckow *et al.*, now shed light on the role of TREM2 in normal brain function and suggest a new therapeutic target in Alzheimer's disease treatment.

TREM2 is active in the cell membrane of specialized brain immune cells called microglia. Microglia use TREM2 to detect dying cells or lipids associated with toxic protein aggregates. Subsequently, TREM2 is cut in two. The external part is shed from the protein and released, while the part remaining in the cell membrane is degraded. The researchers uncovered that a rare mutant, which increases the risk of Alzheimer's disease, was cleaved more rapidly than the wildtype version. These results suggest that stabilizing TREM2, by making it less susceptible to cleavage, may be a viable therapeutic strategy.

TREM2 shedding by cleavage at the H157-S158 bond is accelerated for the Alzheimer's disease-associated H157Y variant
Peter Thornton, Jean Sevalle, Mike J Deery, Graham Fraser, Ye Zhou, Sara Ståhl, Elske H Franssen, Roger B Dodd, Seema Qamar, Beatriz Gomez Perez-Nievas, Louise SC Nicol, Susanna Eketjäll, Jefferson Revell, Clare Jones, Andrew Billinton, Peter H St George-Hyslop, Iain Chessell, Damian C Crowther
Read the paper: embomolmed.embopress.org/content/early/2017/08/29/emmm.201707672

An Alzheimer associated TREM2 variant occurs at the ADAM cleavage site and affects shedding and phagocytic function
Kai Schlepckow, Gernot Kleinberger, Akio Fukumori, Regina Feederle, Stefan F Lichtenthaler, Harald Steiner, Christian Haass
Read the paper: embomolmed.embopress.org/content/early/2017/08/29/emmm.201707672

molecular systems biology



RESEARCH ARTICLE

Pinpointing protein communities

Proteins rarely work alone. Only through the assembly to protein complexes can they fulfill their cellular functions. Moreover, there are additional layers of functional organization: higher-order assemblies of multiple protein complexes, referred to as protein communities. They ensure the efficient transfer of substrates along enzymatic pathways, the effective transduction of signals, and the synthesis of proteins according to the local cellular needs.

In a study published in *Molecular Systems Biology*, Kastritis *et al.*, have developed a protocol to identify and characterize protein communities in *Chaetomium thermophilum*, a thermophilic filamentous fungus that is ideal for structural biology analysis because of its superior biochemical stability. The researchers identified 27 distinct protein communities that include 108 interconnected complexes, which dynamically associate with each other. The methodology developed in the study complements the emerging single-cell structural biology approaches that provide high-resolution snapshots of subcellular features but are currently unable to pinpoint the underlying biomolecular entities.

Capturing protein communities by structural proteomics in a thermophilic eukaryote
Panagiotis L Kastritis, Francis J O'Reilly, Thomas Bock, Yuanyue Li, Matt Z Rogon, Katarzyna Buczak, Natalie Romanov, Matthew J Betts, Khanh Huy Bui, Wim J Hagen, Marco L Hennrich, Marie-Therese Mackmull, Juri Rappsilber, Robert B Russell, Peer Bork, Martin Beck, Anne-Claude Gavin
Read the article: msb.embopress.org/content/13/7/936

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