

# EMBL & cetera

Newsletter of the European Molecular Biology Laboratory

24

December 2004



celebrating the EMB-family ...page 2



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## Iceland becomes EMBL's 18th member state

Iceland has joined EMBL to become the Laboratory's 18th member state. The new membership will begin on January 1, 2005. Icelandic Minister of Education and Science Ms. Thorgerdur Katrin Gunnarsdottir expressed her enthusiasm about the decision: "Iceland hopes to contribute to EMBL activities and derive the many benefits from participating in such a distinguished organization. It is of great importance for the future of science in a small nation such as Iceland to be a part of a world-class center of excellence such as the EMBL."

## EMB-family celebrates big anniversaries

On November 15, EMBL, EMBC and EMBO celebrated anniversaries at a joint event in Mannheim's Rosengarten. EMBO marked its 40th birthday, EMBC celebrated 35 years, and EMBL turned 30. On hand for the festivities were representatives from the three organizations and from ministries and research councils, policy-makers, and scientists. Highlights included musical interludes by EMBL and EMBO staff, the ceremonial cutting of the birthday cake, and a sumptuous banquet dinner. [on page 2](#)

## Science and Society tackles Time and Aging

"Time and Aging" was the fascinating topic for this year's EMBO/EMBL Science and Society joint conference held on November 5-6 in Heidelberg. Close to 300 participants heard presentations on the latest research in the field, listened to a diverse panel of experts, and engaged in discussions about the ethical issues that would accompany an extension of our life span. [on page 2](#)

## Friends and colleagues gather at the first EMBL Alumni Association reunion

Friendly faces from the past gathered at EMBL Heidelberg for the last weekend of November to catch up on the latest at the lab, hear what former colleagues are now up to, and well, partake in lots of merriment. The occasion? The first EMBL Alumni Association Reunion: EMBL Yesterday, Today and Tomorrow. The jam-packed schedule included scientific talks from past and present EMBL staff, poster sessions, practical discussions about how alumni can help each other, and a science and society session on stem cell research and preimplantation diagnostics. Alumni feasted and danced the night away at a traditional Scottish ceilidh and Burns night dinner, and were also treated to a special concert by EMBL musicians. [on page 4](#)

## EMBL PhD student symposium 2004

Scientific talks by leading experts in the field, graduation ceremonies, public lecture, a writing competition, and a big party. What more could you want? The organizers of the 5th International EMBL PhD Students' Symposium, "Design of Life: Learning from Nature" brought a fun-filled weekend to Heidelberg on December 2-4. During the symposium the students received word from Brussels that the EC has awarded a substantial grant to fund the event for the next three years. This will allow greater participation by students at the EMBL Outstations, as well as a virtual web-based event. [on page 5](#)

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## EMBL, EMBC and EMBO celebrate anniversaries in style

On November 15, EMBL, EMBC and EMBO celebrated their anniversaries at a joint event in Mannheim's Rosengarten. EMBO marked its 40th birthday, EMBC celebrated 35 years, and EMBL turned 30.

400 guests heard representatives from 16 countries speak on the historic and future importance of these organizations in the life sciences in Europe. Speakers included representatives from the three organizations and

from ministries and research councils, policy-makers, and scientists. The programme was interspersed with musical interludes, performed by EMBL and EMBO staff, and concluded with a banquet dinner.



Scenes from the Rosengarten in Mannheim. Clockwise from left: The event included speeches from officials; scientist Helga Nowotny discusses the future of life sciences in Europe along with a broad panel of scientists, member state delegates, policy-makers and ministry representatives; Frank Gannon and Fotis Kafatos toast the anniversaries; an attentive audience; guests enjoy a coffee and chat during a break.

Photos by Maj Britt Hansen and Marietta Schupp

## Science and the art of extending human life

"Time and Aging" was the fascinating topic for this year's EMBO/EMBL Science and Society joint conference held on November 5-6 in Heidelberg. Close to 300 participants heard presentations on the latest research in the field, listened to a diverse panel of experts, and engaged in discussions about the ethical issues that would accompany an extension of our life span. This fifth annual conference brought together a broad set of speakers including biologists, bio-gerontologists, bio-demographers, anthropologists, economists, bio-ethicists and researchers from the cosmetics industry.

The diversity of the experts reflected the complexity of the field of aging and life-span research in which philosophers, alternative medicines, and anti-aging mystics once reigned. Some researchers claim that science may give us the power to live significantly longer – perhaps even to 150 years and beyond. But is this really possible? Several speakers voiced their doubts. The validity of carrying out experiments in life extension in animal models, such as mice, and extrapolating those results to humans is questionable as the human aging process is very different and complex compared to other animals.

And what about the quality of an extended life? Experts noted that trying to measure this in humans may prove impossible – no scientist would live long enough to com-

plete the experiment. And of course, there would be enormous ethical implications in launching such studies. But even if science were technically able to increase our life span – would it be desirable? Imagine living to be 200 years old. When would you want to get married? Have children? Retire? Would we get tired of living so long or would we all be content?

The interesting topic and diverse views of the speakers led to lively discussions. One participant noted that "the conference was rich in very interesting topics, great speak-

ers and a lot of different approaches. I especially liked that it wasn't only about research – but also about ethics and society."

Keep an eye out for an upcoming special issue of *EMBO reports* on "Time and Aging," due out in early summer 2005, which will have contributions from many of the conference speakers.

For more information on EMBO/EMBL joint conferences, please visit:

[www.embl.org/aboutus/sciencesociety/conferences.html](http://www.embl.org/aboutus/sciencesociety/conferences.html)



Conference participants debate the possibilities and pitfalls of extending human life at the 2004 EMBO/EMBL Joint Conference on Science and Society, "Time and Aging: Mechanisms and Meanings," held at EMBL-Heidelberg on November 5-6.

Photo by Maj Britt Hansen

## Winter Council: EMBL acquires 18th Member State; Fotis looks back

Iceland's application to join the EMBL member states and Fotis Kafatos' retrospective of 12 years of service as Director General were the high points of the winter council meeting, held in Heidelberg on November 17 and 18 on the heels of the Laboratory's anniversary celebrations.

Iceland has long been a member of the European Molecular Biology Council, and its government recently decided to apply to become an EMBL member state. The Icelandic delegate will be Dr. Eirikur Steingrímsson. Halldór Stefánsson officially presented the application, which was unanimously accepted by representatives from the other 17 member states. Membership will officially begin on January 1, 2005.

The Director General's report was a look back on twelve years at EMBL. The full report will soon be available on the EMBL intranet and then will be published as part of the next Annual Report.

Eero Vuorio (SF) was confirmed to serve another term as Chair of Council and so was Vice-Chair Reinhard Lührmann (D). Glauco Tocchini-Valentini (I) was also elected Vice-Chair of Council, replacing Denis Duboule (CH), whose term ends this year.

David Smith (UK) ends his term as Chair of the Finance Committee, to be replaced by Isabella Beretta (CH). Elisabeth Tischelmayer (A) was appointed Vice-Chair of the committee.

The Scientific Advisory Committee (SAC) presented its review of the EMBL Monterotondo unit, conducted from 23-24 September. The report was extremely positive, representing a strong endorsement of this latest branch of EMBL. The unit in Italy is now seen as a well-established center with major strengths in research, particularly themes related to molecular medicine, as well as strong training programmes for graduate students and postdocs and its leadership roles in EU-wide initiatives. Nadia Rosenthal, the Coordinator, Glauco Tocchini-Valentini, the director of the IBC, CNR, and Klaus Rajewsky as the first head of the Outstation were recognized for their commitment and invaluable contributions in bringing the unit to its present level. "The Research Programme at Monterotondo has successfully managed the transition from a pioneering, experimental phase to a fully established Outstation of EMBL," says the SAC report.

Two new SAC members were elected: Dr. Genevieve Almouzni (Institut Curie, Paris, France) and Prof. Roberto Di Lauro (Stazione Zoologica Anton Dohrn, Naples, Italy). Carl-Henrik Heldin, Ronald Laskey and Christiane Nüsslein-Volhard have reached the end of their terms and are leaving SAC at the end of the year.

The Grenoble Outstation and Cell Biology and Biophysics Programme are next up for review, to be carried out in spring 2005.

Swiss delegate Isabella Beretta presented the conclusions of the Working Group on Terms and Conditions of Employment at EMBL, which was set up one year ago. This is a regularly recurring exercise to ensure that the working conditions at EMBL are comparable to other international and national research organizations. Members of the WG include Council members, representatives from member states, EMBL administration and the Staff Association. Data were collected from 11 international and national institutions. The WG made several recommendations which were adopted by Council:

- to increase paid maternity leave from 14 to 16 weeks
- to increase children allowances by the equivalent of 26 euros per child per month
- to abolish the prorated reduction of child allowances for part-time staff
- to amend article 3 of the Health Insurance Scheme defining a monthly pension and thereby amending the health insurance contributions for pensioners

A request for capital investments for the renovation of the Heidelberg building was made to Council and was in general received positively by the delegates. However, further discussions are necessary in the member states to finalize a decision, and it was therefore decided to hold an extraordinary Council meeting on April 13 2005 in Heidelberg.

## PhD Programme gathering steam through E-STAR fellowships and new partnerships

### E-STAR fellows selected

EMBL's E-STAR programme has kicked into full swing as 18 predocs have been selected to receive the fellowships. E-STAR stands for Early-Stage Training in Advanced Life Science Research Across Europe, and is funded by the EC as part of a Marie Curie Early Stage Training institutional grant awarded to EMBL in August. This programme aims to provide young researchers with structured scientific or technological training opportunities. The grant totals nearly 2.5 million euros over 3 years.

E-STAR fellows were selected from the current body of EMBL PhD students, who are already hard at work in EMBL labs and are on the road to completing their doctoral degrees. In addition to their usual responsibilities, they will have special duties, for example, participating in training teachers and developing new classroom resources with the European Learning Laboratory for the Life Sciences.

Part of the grant included a generous mobility allowance for students who aren't working in their home countries. New E-STAR fellows decided to make voluntary donations of these extra contributions to a special fund; it will be used to support activities that the PhD students consider important, including a long-desired, but previously unaffordable, predoc retreat.

### New partnership agreements signed

The Catholic University of Leuven (Belgium), Université Paris 7 – Denis Diderot (France), Lomonosov Moscow State University (Russia), the University of Stockholm and the Karolinska Institutet (Sweden) are the latest universities to sign a partnership agreement with EMBL's International PhD Programme. The map of Europe is filling up: this brings the total to 20 partnerships to award joint degrees with universities in 14 countries.

### Graduation day

15 members of the class of 2004 received their diplomas, roses and a handshake at the

graduation ceremony held on December 2. The ceremony was immediately followed by the 5th International EMBL PhD Students' Symposium, "Design of Life: Learning from Nature," which took place at EMBL Heidelberg on December 2-4, 2004. See pages 5-6 for more.



Emmanuel Busch receives his diploma at the PhD graduation ceremony in December.



## Friendly faces (and legs) gather for the first EMBL Alumni Association Reunion



Photos by Maj Britt Hansen and Marietta Schupp

Clockwise from left: Noreen Murray and Mary Holmes; Karin Römisch; Ken Murray and Waltraud Ackermann; the Schlaegers and the Tollerveys; Isabel Palacios and Kishor Sharma; David Tollervey, Angus Lamond, Joe Lewis and Iain Mattaj (not necessarily in that order – guess who's who!); Elisa Izaurralde and Artur Jarmolowski; Angus Lamond. A full (and uncensored) photo gallery is available at [www.embl.org/aboutus/alumni/reunion04](http://www.embl.org/aboutus/alumni/reunion04).

Friendly faces from the past gathered at EMBL Heidelberg for the last weekend of November to catch up on the latest at the lab, hear what former colleagues are now up to, and well, lots of merriment. The occasion? The first EMBL Alumni Association Reunion: EMBL Yesterday, Today and Tomorrow.

The reunion was a great success. A mixture of nostalgia, exciting science and interesting ethical discussions made for a meeting with breadth and depth. The Saturday morning practical session produced extremely positive ideas for the future role of the Alumni Association. Angus Lamond reminded members that the Association has an important role to play in supporting former members of the EMBL community at many different levels, as well as providing a means for us to maintain contact with EMBL and work with current staff across the EMBL Units to our mutual benefit. In contrast to the operation of many other alumni organizations, funds generated through EMBL alumni activities will be channeled back into the association rather than as a source of laboratory funding.

For example, one project is to establish active local chapters, a key step towards providing an effective and useful support network for EMBL alumni. Renata Stripecke (EMBL-USA) presented her progress in setting up a North American chapter. Enthusiastic chapter leaders are currently active in Spain and Portugal, France, UK, Greece, Switzerland, the Nordic countries, Italy and Austria. We hope that alumni in other countries will soon follow suit.

Sarah Sherwood introduced the restructured Alumni Association website which includes a growing list of services and information.

Registered members can search the directory to find current contact information, biographies and homepages for their former colleagues; the database will soon be expanded to include members' current research interests, facilitating exchange and collaborations. Other services under development include access to enabling technologies and a funding resource center. You'll also find interesting alumni statistics; did you know that there are over 3,500 EMBL alumni throughout the world? Local chapters webpages contain contact information for the chapter head in your area. The revamped website can be a powerful tool to bring together the alumni network; please visit, get in touch and get involved. ([www.embl.org/aboutus/alumni/](http://www.embl.org/aboutus/alumni/))

Anne Ephrussi presented an overview of the EMBL International PhD Programme. She reminded alumni of an initiative set up to link them with PhD candidates who were favourably reviewed for the EMBL programme, but for lack of places available, were not offered positions. Alumni can now have access to this pool of exceptional applicants by contacting the graduate office ([predocs@embl.de](mailto:predocs@embl.de)).

Scientific talks from Angus Lamond, Annalisa Pastore, Jan Ellenberg and Johan Ledin demonstrated the high quality of work being carried out by past and present EMBL staff. Johan is the recipient of the first Alumni Association Postdoctoral Fellowship, funded by the Swedish Foundation for Strategic Research, made possible through the efforts of Lennart Philipson. Directors General past and present provided us with insights into their strategic vision for the Lab and the challenges it must meet, passing on tips, both

political and scientific, to incoming Director General Iain Mattaj. Matthias Wilmanns gave a historical perspective on the development of the Hamburg Outstation and an exciting vision of its future development. Riccardo Cortese charmed us with his wit and élan, reminding us of the early days in the Lab and taking personal responsibility for the former strong Scottish representation, explaining that he needed to counterbalance the perceived southern European bias in the lab with imports from the far north.

Other highlights of the reunion included a concert by EMBL musicians and a lively Scottish ceilidh and traditional Burns night dinner. Artwork donated by Silvia Stabel (a postdoc in Lennart Philipson's lab from 1983 to 1985) was intended to be auctioned off during the evening, but the whiskey tasting had got a bit out of hand, Iain was in his pyjamas and ready for bed, and time simply ran out! Instead, the paintings have now found a permanent home in the Lab in Heidelberg, and can be enjoyed by alumni when they come to visit. A donation has been made to the Association fund.

For a more in-depth review of the meeting please check the Alumni Association web pages. On behalf of all the participants in the reunion, the Association would like to thank EMBL and all of the staff who worked so hard to make us feel welcome and to ensure that the whole meeting ran smoothly. Meanwhile, we encourage all alumni to get involved in the organization and benefit from the network.

– The EMBL Alumni Association Board

## PhD students hold their 5th symposium: thoughts from a self-organizing colony

The organizing committee of the 5th International EMBL PhD Student Symposium has just wrapped up this year's event – a resounding success. Here are their thoughts on

### choosing a theme...

We wanted this year's topic to deal with the cutting-edge of today's science, of what is possible in science and technology at the moment, and what will be in the future. Finding ideas for this is easy if you look at science fiction movies. Though these films usually take place in the distant future, the storylines are often rooted in today's high-end scientific and technological achievements. Wouldn't it be great if we could regenerate our tissues like a Terminator? Is technology advanced enough to create a robot that can melt into liquid crystals and morph into another shape? Do machine-man interconnections exist only in the "matrix"?

"Design of Life: Learning from Nature" sounded like a fascinating topic, and indeed turned out to be a good choice. We attracted over 120 PhD students from 23 countries. The sessions, "Molecular Design," "Going Artificial," "Staying Natural," "Mimicking Nature" and "Bionanotechnology," reflected futuristic fields in which biology fuses with other sciences.

Thomas Chang (McGill University, Canada), gave an outline of the requirements to create an artificial cell: a membrane that is semi-permeable and can exchange nutrients with the environment, and robust enough to carry a cargo molecule through the body without causing an immune response. As early as 40 years ago Chang had proposed the use of ultrathin polymer membranes as protective capsules for cellular components, allowing scientists, for example, to produce artificial red blood cells. The potential for the use of these revolutionary nano-containers in medicine is clear. Chang explained that artificial cells are ideal blood substitutes for people needing transfusions in regions with a high incidence of HIV: the cells can be stored for months, do not require refrigera-

tion and pose no risk of disease transmission.

After the sessions "Going Artificial" and "Staying Natural," speakers and the audience participated in a lively discussion that contrasted the opposing concepts. However, it was clear from the discussion that neither approach on its own will be successful – a combination of both is needed. Furthermore, the acceptance of a new technology cannot always be predicted. Sir Alan Fersht (University of Cambridge, UK) pointed out that what is considered "artificial" today may be considered "natural" tomorrow.

Panel member Gordana Vunjak-Novakovic (Massachusetts Institute of Technology, USA), pointed out that the potential for the development of many types of technology has existed for years, but is often halted by boundaries between different disciplines. She drew on the example of her own research into cartilage and heart tissue engineering, where geneticists, cell biologists, physicists and physicians managed to cross disciplines and work together to engineer complex tissues from stem cells.

### to organize or not to organize...

Michael Krieger (Rockefeller University, USA) showed how the behaviour of self-orienting robots can shed light on that of other social groups. Trained as an ant biologist, Krieger pioneered studies in the field of "social robots." He compared the robots to a nest of social insects, attempting to understand how a colony can efficiently follow task specialization without being organized into a hierarchical system. By the end of the symposium the organizers had learned that PhD students are not so different from these social robots. Just like the organizers, ant-like robots manage to supply the colony with sufficient nest energy to get a job done – without the need for a central command.

Good news came on the last day of the symposium. The European Commission sent word that they have awarded a substantial grant which will secure funding for the EMBL PhD student symposia for the next three years. The grant will allow greater par-

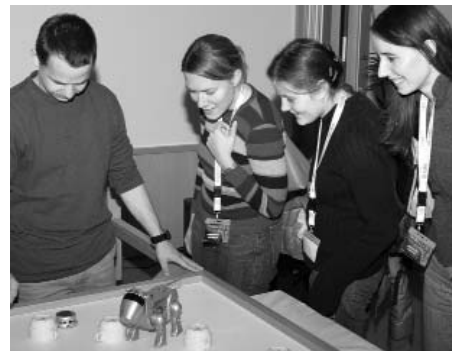


Photo by Maj Britt Hansen

Self-orienting robots will organize themselves into a workforce to get a job done. So will EMBL PhD students when organizing their annual symposium.

participation in the organization of events by students at EMBL Outstations (EMBL Monterotondo will hold one in May), as well as a virtual web-based event.

### all sorts of interactions...

EMBL's annual PhD symposium has proved to be a great way to promote interactions between students and established scientists. Many students take advantage of the relaxed atmosphere; they ask questions after the talks and discuss over coffee and during the poster sessions. As always, the breaks and end-of-symposium party provided plenty of opportunity for students and speakers to get to know each other. Interactions with industry were also a highlight of this year's event. Our sponsors got in on the fun; each company awarded a prize for the best student-sponsor interaction.

But interactions are not just about scientists communicating with one another. In order to promote the communication of science towards the public, we launched two initiatives. On the Sunday following the symposium, we invited the Heidelberg public to the Print Media Academy to attend a lecture on "Making Technology more Natural." Peter Bentley from the University College London presented an audio-visual show explaining how computers can explore the means of evolution. He demonstrated how the principle of evolutionary algorithms can create art: a computer knows how to reject and how to promote certain patterns. From those it keeps, it creates hybrids and eventually comes up with an infinitely beautiful piece of art! The second initiative was a science writing competition. High-school students from Germany and PhD students from across Europe submitted original essays that communicated scientific issues to a non-scientific audience. The winning authors received prizes, and the essays were compiled into a small booklet and distributed at the conference. The winning essay by a PhD student appears on page 6 of this issue.

For more see

<http://symposium.predocs.org/>

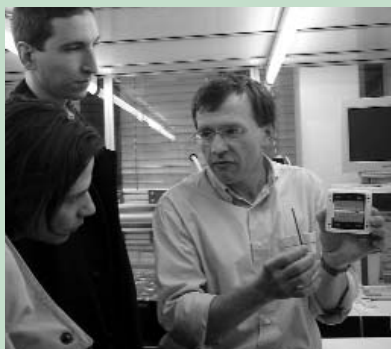


Photo by Rita Moura

The CNRS (Centre National de la Recherche Scientifique), France's main research organization, wants to raise awareness of the EMBL among its researchers. Thus in December, the CNRS sponsored a visit of twenty young researchers (predocs and postdocs) working in French CNRS laboratories to the 5th EMBL Predoc Symposium. The visitors presented posters at this symposium; they also got a first-hand look at the Laboratory, including a tour of four core facilities, then had an opportunity to meet EMBL scientists and symposium speakers. Here, they see EMBL's genomics core facility and learn about the latest in high-throughput genomics technology.



In the June issue of *EMBL & cetera* we announced that EMBL PhD students were holding a science writing competition as part of their annual symposium. Two prizes were to be awarded: one for German high school students, the other for PhD students across the globe. The jury, composed of scientists, science journalists, educators, high school students, and representatives from EMBL's education programmes, the DKFZ and the Heidelberg Life Science Lab, sifted through the nearly 40 entries received. Lukas Mezger won the High School Student contest with his essay "The scientific frontier." In it, Lukas questions the postmodern age of science. "The times of sitting under a tree and waiting for an apple to fall on one's head are over," he says. Instead of letting the overwhelming challenges in science discourage us, he points out the responsibilities everybody will have to take. Julia Gross took top prize in the PhD student competition with an essay about Benny, a 12-year-old boy who has to swallow pills to fight a genetic heart tissue disease. We have reprinted it here for *EMBL & cetera* readers. Prizes of books and cash (thanks to Springer Verlag, Aventis, ELLS and the Heidelberg Life Science Lab!) were awarded during a public lecture delivered by Peter Bentley, distinguished scientist and writer from University College London, on "Making Technology More Natural", at Heidelberg's Print Media Academy on Sunday, December 5.

## Old soul in a young body – or young soul in an old body?

Benny was sitting in the bright light of the bathroom waiting for his mom to help him to get ready for bed. Although he was turning 12 next month, he often felt too weak at the end of the day. In his hands he was holding a new package from the pharmacy; while fishing out the leaflet of the medication, his thoughts turned to his health problem. His heart was not pumping enough blood into his body, a rare condition for a young boy these days. Some would even call kids like him genetically disabled. Although prenatal diagnostic tests were readily available, his parents hadn't taken any measures to determine whether or not their child would suffer from a genetic disease. Thanks to Dr. Yüctas, Benny was treated successfully with a stem cell therapy called heart muscle regeneration. It was originally developed for older people suffering from stroke or heart ischemia. Benny remembered how the doctor had explained the problem to him:

"The heart is the most important muscle in your body. It is similar to other muscles in the way that it needs a lot of oxygen and energy delivered by the blood stream. But unlike other muscles that are just connected to the blood system, the heart is its pump. Although blood is running through the heart every second, that is not the way the heart gets its part of the oxygen and energy. It is connected to many small blood vessels located on the outside of the heart, called coronary vessels.

"When people get older and these blood vessels are more rigid than in younger years, some coronary vessels can suddenly become blocked and oxygen delivery to the heart muscles is cut down. After a couple of minutes without oxygen, this affected area of the heart tissue dies. As you can imagine, all the cells of the heart have to contract together to push blood out of the heart and if some fail, it gets harder for the rest of the heart to transport the same amount of blood than before. In the worst case, the stroke leads to a breakdown of the whole body caused by the lack of oxygen, and the patient dies. In case of heart ischemia the problem is similar, but the coronary vessels close one by one during a longer period of time, and patients get tired and worn out easily – a sign of the missing oxygen and energy in the whole body.

"Back in your grandparents' days these so-called cardiovascular diseases were the

number one cause of death in industrialised countries. Therefore the development of stem cell therapy was an unimaginable success."

"That's really interesting," thought Benny unfolding the little medication leaflet and starting to read:

Salvarix®

Efficient HSC and MSC Mobilisation – The support medication for your heart tissue regeneration

Dear patient,

as you become more and more aware of your health and medication, Biomed has decided to give you the information necessary to understand how Salvarix can improve your health after a stroke or if you suffer from chronic heart ischemia.

Stem Cells

Your body is a system of millions of cells that build tissues and organs of various kinds. Most cells only live some days or weeks; in contrast, a human can easily live a hundred years, meaning that each cell which grows old has to be replaced by a new one so that the organ itself stays functional.

These replacement cells are called stem cells and are in a state similar to a fertilized egg cell at the beginning of an organism's life; they contain the potential to develop into a whole body or range of cells. Stem cells are sister cells of this egg cell and they remain in a state of youth even while the organism is getting older. When a new cell is needed, a stem cell divides into two cells; one develops into an adult cell while the other one remains the same, explaining how the body keeps its regenerative ability into old age. Stem cells stay in a protected environment, called a niche, where they get signals and special nutrition from surrounding tissue cells, called nursing cells. One of these niches is the bone marrow. Here we find stem cells that can produce all the necessary cells of the blood (called Hematopoietic Stem Cells) and other stem cells that can regenerate tissues like bones, cartilage and muscles (called Mesenchymal Stem Cells).

Until the 1990's scientists believed that adult stem cells could only develop into certain cell types of the adult body, and had lost the vast ability, called omnipotency, of

the egg cell to develop into every kind of cell, for example to grow into neurons or muscle cells. Later it was shown that the fate of a stem cell was mainly dependent on the signals it would get from its surroundings. And it became possible to regenerate nerves and muscles.

To recognise stem cells in the context of other cells, scientists identified tags on the surface of cells, called markers, which give information about the cells like size tags in your pullover. Stem cell niches were discovered like that. As some of these cells grow and become mature, they change their tags, so they can be classified into a new group. For example, Hematopoietic Progenitor Cells are "adolescent" HSC and a lineage of HSC that can only become a type of blood cell.

Interestingly HSC and MSC do not exclusively reside in their niche in the bone marrow, but when a little more mature they circulate throughout the body via the blood stream and look for damaged sites in the tissues where they stay and replace dying cells. This was shown to happen in the heart muscle tissue after a stroke. And it was very surprising, as scientists thought it was impossible to regenerate heart muscle tissue.

This effect of self-renewal is a natural phenomenon, discovered through scientific research; scientists then tried to enhance it through biomedical methods. They extracted HSC and MSC from the bone marrow and injected it into the blood or directly into the heart of heart stroke patients. They were able to restore contractive activity in heart areas that had been dead days before. After these first experiments, they later discovered ways to produce a stem cell signal in these areas to stimulate the development of the cells into heart muscle...

Suddenly the door opened and Benny's mother came in and handed him a glass of water to swallow the tablets. Without noticing, he had been sitting on the edge of the bathtub while reading. "What an amazing story," he thought. It was as if he could feel the stem cells finding their way into his heart and dividing to replace his weak and old heart muscle cells.

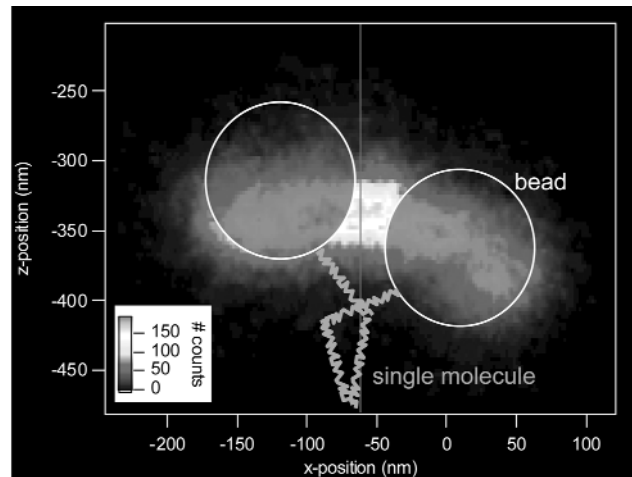
– Julia Gross

## PFM: an alternative view of molecular interactions

Structures in biological systems continually take up energy through collisions with the environment and then release it again. As a consequence, objects exhibit random movement (diffusion), which is stronger the smaller the objects are. In a fluid environment, molecules are jostled about, fast or slow, with different orientations. This is nature's way of permitting structures to interact in an optimal way, providing they are close enough to each other. Bringing them together in the first place involves the complex cellular problem of transport. But once that hurdle has been overcome, molecules can interact, and it would be nice to have an instrument that could draw them together to watch how they behave in the natural noisy environment. The resolution of light microscopy, however, is not high enough to get a detailed look at the behavior of a lot of the objects we would like to observe.

Fortunately, we have an instrument capable of overcoming this problem at EMBL: the photonic force microscope, or PFM. In principle, it's a regular microscope, equipped with a movable optical trap – which is just a highly-focused laser beam – and a position detection system. Optical forces around the focus of the beam suck nearby particles into the trap. If one of these particles has been diffusing, it will continue to do so in the trap, but now we can observe it at a rate of one million pieces of information per second. Moreover, it can be controlled; the beam can be used to draw a molecule attached to a small latex bead toward the area where an interaction might

take place. Then the trap can be tuned down to a weak level, allowing the molecule to interact with a partner. If that happens, the fluctuations of the bead change in a characteristic way, and the detection system of the PFM can observe it in three dimensions, with nanometer precision and microsecond resolution. The result is a picture that gives infor-



This image shows two possible positions of a fluctuating bead, which is tethered to a surface by a single protein. The histogram in the background gives information about the bead's position over time, and scientists can interpret it to reveal features of the protein's mechanics.

mation not only about whether two molecules interact, but also about the strength and dynamic properties of their interaction.

Why hasn't PFM become a standard tool adopted by labs everywhere? The first reason is time and manpower. The PFM is more complicated than other types of microscopes; like the atomic force microscope, bringing it to the point where it can be

applied to complex biological systems requires a thorough understanding of physics and optics.

Secondly, working with probes is tricky; it's hard to find optimal probes that interact with a sample. Either a probe like a bead has to be carefully coated with molecules, or you have to directly trap an organelle or a small bacterium. One ongoing project at EMBL, for example, aims to understand the way macrophages bind and uptake trapped particles – at a time-frame of microseconds.

One pressing challenge in PFM is to develop smaller probes than the current beads, with new materials and shapes and increased trapping capabilities. It still won't be possible to trap single molecules. But if we assume that a protein coated on a small sphere behaves nearly the same as a single molecule, it's clear that the method has great potential. Recently we measured and characterized the nano-mechanics of a native Myosin II protein tethered to a small bead. The experiment was conducted under near-physiological conditions, just by stretching and compressing the molecule gently with environmental noise, transferred by the probe. (Becker *et al.*, *Physical Review E*, 2005).

Most work in molecular biology is based on the study of protein interactions. There's still a lot to learn – especially about the dynamics of these systems. PFM is an excellent tool to give us insights that are hard to obtain through any other means.

– Alexander Rohrbach

## First steps towards the 7th Framework Programme – what scientists should know

We are currently in the middle of the EU's Framework Programme 6, but the foundations are already being laid for the next funding period, Framework Programme 7 (FP7). The European Commission is welcoming scientists' ideas about the themes that will be used to fund research from 2007-2013. Scientists are strongly encouraged to submit their ideas. Time is short – the deadline for proposals from institutions or groups of research teams should reach the Commission no later than Dec. 31 this year.

FP6 witnessed the beginning of the European Research Area (ERA), and the results of the first calls have shown that FP6 implementation is well on track. The main idea behind FP7 will be to further the creation of the ERA in order to make Europe one of the world's best knowledge-based economies by 2010. To reach the "Lisbon

agenda," the research investment has to be increased to 3% and the number of European scientists must rise considerably as well.

Experiences and feedback from FP6 have resulted in new incentives that will integrate EC policies within FP7:

- Creation of European centres of excellence by means of collaboration between laboratories
- Launching of technological initiatives on an EU scale in promising industrial sectors by creating joint undertakings
- Boosting the creativity of basic research by means of competition between individual teams at the European level
- Making Europe more attractive to the best researchers by increasing support for them

- Developing research infrastructures of European interest based on the example of the trans-European networks
- Strengthening coordination between national research programmes.

The Commission wishes to identify thematic domains as a continuation of FP6 as well as newly emerging ones. Three criteria have been put into place to identify these domains:

- Contribution to EU policy objectives
- European research potential
- European added value

For more info, please see

[http://europa.eu.int/comm/research/future/themes/index\\_en.html](http://europa.eu.int/comm/research/future/themes/index_en.html)

– Genevieve Reinke, Grants Office

## Adventures in Beijing: the EBI goes to the HUPO World Congress

The opportunity to travel to far-flung places is one of the undisputed privileges of a career in science. But the chance to experience new science and a different culture in a previously unexplored place often comes at a price. Getting there is trivial, but getting the EBI's exhibition stand there is quite another matter...

The Human Proteome Organization (HUPO) World Congress has become a major event in the EBI diary, not least because we coordinate HUPO's Proteomics Standards Initiative (PSI). PSI is making great strides towards defining community standards in proteomics, which will make it much easier for researchers to access, compare, exchange and verify proteomic data. We also host a wide range of proteomics resources. There was no avoiding it...the stand and I would have to find our way to this year's event, held in Beijing, China, from October 25-28.

The stand set off first – two weeks before I did, accompanied by 28 copies of my signature. We next encountered each other the day before the conference. It was buried in a large pile of crates in the conference centre car park. I was flooded with relief at catching sight of it, but also slightly miffed – our plans to set up that evening were totally scuppered.

By 7 the next morning the stand had made its way to our booth. Shortly afterwards it was followed by two wonderful PhD students, Di Liu and Xin Wu, from Jingchu Luo's group at Peking University. Di and Xin not only helped us to cope with the enormous number of people who visited the stand, but also helped to make our visit to Beijing great fun – we had numerous new culinary experiences. The conference was a huge success on many counts and culminated in our very own Rolf Apweiler sharing the HUPO Distinguished Achievement Award in Proteomics with

Angelika Görg of the Technical University, Munich.

For more, see:

HUPO:

<http://www.hupo.org/>

Proteomics Standards Initiative:

<http://psidev.sourceforge.net/>

– Cath Brooksbank



Di, Xin and Sandra cope with mobs of bioinformatics enthusiasts at the EBI stand.

## EMBLEM on the launch pad for outer space

You may soon see the logo of EMBLEM, the Laboratory's technology transfer company, on a payload destined for outer space. As part of a Commercial Agent Network with ISS Lab Ruhr (Germany), Medes (France) and AGT (Italy), EMBLEM has been awarded a contract by the European Space Agency (ESA) to market its spaceflight services for companies which are active in the field of biotechnology. ESA will directly support the group, which comprises leading experts from industry and the science and spaceflight sectors.

One of the goals of the International Space Station (ISS) is to do research on technologies and products that may one day be useful on Earth. As one of the space stations' sponsors, ESA recently announced

that it was looking for an agent to help commercialize biotechnology. It issued a call for tender and subsequently awarded the contract to EMBLEM and its biotech commercialization consortium.

The ISS has always carried out R&D work; now opportunities are being opened to European companies who might be interested in testing products in space. "Many of the effects of space flights closely mimic the way our body degrades as it ages or is kept inactive," says an ESA spokesman. "This includes effects such as bone and muscle loss, a weakened immune system and sensory disorientation. Especially in the health sector, the specific environment of space offers a wide range of research and testing possibilities for companies."

### from the Staff Association

**Staff Association negotiates improvements to Rules and Regulations.** Following petitions from the Staff Association via the Working Group on the Terms and Conditions of Employment and with the support of the Administration, Council recently authorized several improvements to the Rules and Regulations. As of January 1, 2005, maternity leave will be increased from 14 to 16 weeks to be in line with other international organizations. Also as of January 1, the children's allowance will

increase by 26 euros per month, and part-time staff will receive the entire amount instead of a pro-rated allowance. As of July 2005, pensioners' health insurance contributions will be calculated using their actual income (70 percent of the basis for the current pension plus annual cost of living raise) instead of using a salary base that also included annual standard of living increases, which was the basis for the calculations up to now but which the pensioners do not receive.

## news & events

**Intermedex**, EMBL's health insurance clearing house, has published a handy brochure containing information, rules and guidelines on health insurance cover. Copies are available from Intermedex, the personnel section, or your programme secretary, or you download a pdf version at [www.intermedex.de/healthscheme.pdf](http://www.intermedex.de/healthscheme.pdf)

**New EMBL-Heidelberg website released.** The new site contains information related to the organization, research groups, services and training specific to EMBL-Heidelberg. The site also includes a new intranet with information regarding personnel, finance, services and other administrative functions for EMBL staff in Heidelberg. Check it out at [www.embl-heidelberg.de](http://www.embl-heidelberg.de)

**10 Finnish PhD students** travelled to Grenoble on October 26-28 to learn of the latest developments in structural biology happening at the EMBL Outstation. Scientific sessions were held with presentations by the visitors as well as EMBL researchers. In addition, the Finns met with predocs and postdocs and toured the campus facilities. There were very useful interchanges concerning a common interest in the structure of complex viruses. The trip was organized by Council delegate Marja Makarow and Eeva Sievi of the Viikki Graduate School in Biosciences at the University of Helsinki, and EMBL's Stephen Cusack and Christoph Müller. The students were accompanied by EMBL alumna Sarah Butcher.

**The EMBL-Staff Association Summer party date has been set for 2005.  
It's July 2nd. Mark your calendars!**





## Going for Gold: Spanish cancer researcher wins 2004 EMBO Gold Medal

Finding your way in research is not easy. María Blasco, Director of the Molecular Oncology Program at the Spanish National Cancer Centre (CNIO) in Madrid, would certainly testify to that. Yet as her selection as the 2004 EMBO Gold Medal winner demonstrates, she has managed to navigate her course remarkably smoothly in the 11 years since gaining her PhD.

María was singled out by the EMBO selection committee for her landmark work in the area of telomeres. Her research has had a groundbreaking impact on cancer research and received wide recognition in the field.

For María, the EMBO Gold Medal has special significance as it also represents acknowledgment from beyond her field. "It's a great honour to receive recognition from such a diverse and respected community of molecular biologists as EMBO. I hope the award will highlight the good work being done in my field and encourage other young researchers to persist in their careers."

This is the main aim of the EMBO Gold Medal. As Frank Gannon, EMBO Executive Director, explains, "One way of promoting quality and momentum in research is to put a spotlight on the very best molecular biologists in Europe. The EMBO Gold Medal highlights the accomplishments of young researchers, showing just what can and is being achieved. María is a fine example. Her contribution to cancer research is unquestionable and her dedication makes her the ideal role model for young researchers."

María is more modest about her achievements. She attributes her rapid headway to being in the right place at the right time. "When I first got into telomere research at Cold Spring Harbor Laboratory, the field was relatively undiscovered and there was great potential for further advances." María's work at CSHL led to the discovery

of the mammalian telomerase RNA component. Soon after that she knocked out the telomerase RNA in the mouse, producing a powerful tool to understand the role of telomerase in cancer and aging.

Returning to Spain in 1997, María secured funding from the Spanish National Research Council and set up her own research group. In 2003, she moved her group to the CNIO in Madrid, where their discoveries so far have been impressive. Most recently, María's group produced the first characterization of mammalian telomeric heterochromatin. Other breakthroughs include the generation of the first telomerase transgenic mouse and the demonstration it is prone to tumours.

Despite her modesty, it is clear that there is more than just luck to María's success. Perseverance, a passion for her field and an outstanding research record have more than earned her the EMBO "Gold". And she has some valuable advice for other young researchers struggling to get started in research: "Don't think twice – be brave and just go for it. Don't give up at the first hurdle."

[www.embo.org/press/gold\\_medal2004.html](http://www.embo.org/press/gold_medal2004.html)

– Lindsay Johnson

## Investigating alternatives: EBI organizes symposium on alternate transcript diversity

Biologists have known for a long time that the "one gene, one transcript" concept does not apply in many cases: eukaryotes use all sorts of tricks, including alternative splicing, start sites and polyadenylation sites, to increase their repertoire of gene products. Researchers have been studying these processes for many years, but it's only in the past 5-6 years that they've started to characterize all the variants in a systematic way. In doing so, our estimates of the proportions of genes with alternative transcripts have skyrocketed, from 5% to 70% in the case of alternative splicing in human. Reports on low gene counts for the human genome have further fuelled interest in large-scale characterizations: how can such a small number of genes be enough for the cellular and molecular processes of an organism as complex as a human?

There are three types of large-scale approach to characterizing transcript diversity: the microarray community examines transcript variants over a range of tissues and cell conditions; genome annotation projects deduce multiple transcripts from genomic sequence information; and bioinformaticians deduce data on transcript variants using EST/mRNA sequence resources and make it

available to the community along with value-added annotation. These three communities are strongly interdependent and can learn a lot from each other, which is why the EBI's Alternative Splicing Team, together with the EBI Industry Programme, organized a two-day symposium on alternate transcript diversity on November 22 and 23.

The meeting was a great success and we were delighted that all three parts of the community were represented. More than 130 participants from five continents got together to discuss many aspects of the topic, from mechanisms to therapeutic applications, and from experimental to bioinformatic approaches.

The symposium ended with an open invitation from the programme chair (Alphonse Thanaraj) to the community to collaborate to create a universal index of splice events and their properties. Anyone interested in contributing to this collaboration can contact Alphonse at [thanaraj@ebi.ac.uk](mailto:thanaraj@ebi.ac.uk).

Symposium web page:

[www.ebi.ac.uk/Information/events/atd-sympo/](http://www.ebi.ac.uk/Information/events/atd-sympo/)

## New microinjection service at the ALMF

The ALMF recently started a new service: microinjection into tissue culture cells with the computer-controlled injection system AIS 2 from CellBiology Trading. Rudolf Kern is a representative of this company and will be at EMBL-Heidelberg on regular basis to introduce new users to the system, and to help interested scientists solve their microinjection tasks. He will also be involved in a research project with Rainer Pepperkok, comprising fully-automated microinjection. If you need more information about the system, please visit [www.ais2.com](http://www.ais2.com) or the ALMF page, where the system is already integrated:

[www.embl.de/ExternalInfo/almf/htdocs/almf\\_website/](http://www.embl.de/ExternalInfo/almf/htdocs/almf_website/)

# people @EMBL



**Darren Gilmour** is a new Group Leader in the Cell Biology and Biophysics Programme with a joint appointment in the Developmental Biology Programme. He received his PhD in 1996 from the University of Cambridge and joins the Laboratory after postdoctoral work at the Max Planck Institute for Developmental Biology in Tübingen. At EMBL Darren and his group will study the role of dynamic cell interactions in regulating the guidance and shape of migrating tissues.

## awards, honours & cetera

Awards for EMBL researchers abounded at the Human Proteome Organization's 3rd World congress in Beijing in October. **Thomas Franz**, head of EMBL's Proteomics Core Facility, was awarded a HUPO 2004 Young Investigator Award. Thomas received the distinction for his research on the Asian disease *Moyamoya*. As part of his proteomics studies of the disease, he found and sequenced a protein marker that contained an important and interesting mutation. **Robert Ventzki**, visitor to the Scientific Core Facilities, also received a Young Investigator Award for his work on the comparative analysis of protein aggregates by 3-D geometry gel electrophoresis. **Rolf Apweiler** (EBI) shared the HUPO Distinguished Achievement Award in Proteomics with Angelika Görg of the Technical University, Munich.

Group Leader **Wolfgang Huber**, together with Markus Ruschhaupt and Annemarie Poustka (Division of Molecular Genome Analysis at the DKFZ Heidelberg) and Ulrich Mansmann (Department of Medical Biometry at the University of Heidelberg), have won the "Paul-Martini-Prize 2004" from the *Deutsche Gesellschaft für Medizinische Informatik, Biometrie und Epidemiologie*. The 2,500 euro prize was in recognition of their work entitled, "A compendium to ensure computational reproducibility in high-dimensional classification tasks."

Group Leader **Elisa Izaurralde** has been appointed to the Board of Directors of the RNA Society. The Society was formed in 1993 to facilitate sharing and dissemination of experimental results and emerging concepts in ribonucleic acid research; membership includes about 800 scientists around the world. Elisa will take up her duties starting in January, 2005.

## The EMBL book club recommends:

**The Quiet American** by *Graham Greene*. Sometimes in life we have to decide between the heart and the head. Do we always do what we should? Do we ever manage to do what we want?

**Norwegian Wood** by *Haruki Murakami*. Japanese love story with a twist. Can Toru rescue Naoko from herself before it's too late?

**The Pickup** by *Nadine Gordimer*. What makes us belong to a place? What makes us believe we understand our partner?

**The Curious Incident of the Dog in the Night-time** by *Mark Haddon*. Emotionally impaired but intellectually brilliant teenager

decides to visit the real world (ring any bells?).

**The Plague** by *Albert Camus*. How do we react in the face of tragedy? Are we able to learn anything from tough experiences?

The EMBL book club is about to celebrate its first year anniversary. We have been meeting once a month to put on glasses to look more intellectual, choose books and then share opinions over a glass of wine. If you're interested in coming to the next meeting, contact us by writing to [bookclub-administrator@embl.de](mailto:bookclub-administrator@embl.de).

Literacy (glasses or otherwise) not strictly enforced.

– Will Norton

## lab limericks...

The group of FC Kafatos,  
who have mastered the dialect of Mt. Athos,  
and can speak Greek and Flemish  
with scarcely a blemish,  
must now learn to say "tom-ah-toes"

lain will tell you for free  
of the pleasures of RanGTP  
– if you join him or not,  
as long as it's hot –  
for a haggis... or two... or three

## Who's new?

Mikael Andersson (EBI External Services), Daniela Bodem (Mechanical Engineering), Katherine Brown (Wittbrodt), Carlo Carolis (Suck), Claudia Casanova (Mattaj), Louise Daugherty (EBI Sequence Database), Mechthilde Falkenhahn (Schneider), Georgina Clare Fletcher (Rørth), Konrad Förstner (Bork), Sven Fraterman (Wilm), Keren Guy (Arendt), Johan Hattne (Lamzin), Mark Hink (Bastiaens Group), Helena Jambor (Ephrussi), Arulanandam Arockia Jeyaprakash (Conti), Sara Kangaspeska (Gannon), Michal Karzynski (Furlong), Iva Kronja (Karsenti), Judit Kiss (Hentze), Anamarija Kruljac-Letunic (Karsenti), Johan Ledin (Neumann), Irena Maravic (Frangakis), Jessica Marlind (Hentze), Irmtraud Meyer (Goldman), Julien Mozziconacci (Karsenti), Tuija Mustonen (Treier), Efstratios Mylonas (Svergun), Evangelos Pafilis (Schneider), Csaba Pal (Bork), Kratsios Paschalis (Rosenthal), Ricardo Pires (Weissenhorn), Eli Reuveni (Rosenthal), Phill Rogers (Ellenberg), Bettina Roth (Schneider), Vladimir Rybin (Protein Expression and Purification Core Facility), Venkata Satagopam (Schneider), Eleanor Schaefer-Gustafson (Furlong), Nataliya Sklyar (EBI Database Applications), Andrea Washington (Director General's Office), Frank Weissmann (Furlong)

## events @EMBL

25 January, 2005

EMBL-Heidelberg, Forum on Science & Society:  
"Impact of agricultural biotechnology  
on biodiversity: myths and facts"  
Klaus Ammann, Botanical Garden,  
University of Bern, Switzerland

18 February, 2005

EMBL-Heidelberg  
Distinguished Visitor Lecture Series:  
Alan Aderem  
Institute for Systems Biology, Seattle, USA

For more events, see  
[www-db.embl.de/jss/EmblGroupsOrg/t\\_1](http://www-db.embl.de/jss/EmblGroupsOrg/t_1)

## obituary

It is with deep regret that we inform the EMBL community that Andreas Kisner (LAR) passed away on October 29, 2004. Andreas will be missed by his friends and colleagues.