



TEACHING AND TRAINING DOUBLE ACT

The CRG now has two great spaces for training and outreach activities. Early this year we opened Teaching & Training Lab 1, and Teaching and Training Lab 2 is now also up and running. In these two labs, the CRG has more than 100 m² equipped with the most up-to-date research equipment for training courses for researchers, new equipment demonstrations and educational workshops for students and the general public.

Much of the equipment has been donated by companies related to research such as Eppendorf, Life Technolo-

gies, BIO-RAD, Werfen Group – IZASA, Grupo Taper, Gilson, Nirco and Biogen Científica S.L. Thanks to the apparatus in the new labs our scientists have access to the most advanced research techniques.

From now on, lots of experiments, demonstrations, courses and hands-on workshops will take place in these two new labs. So, remember to check their availability in the intranet room-booking system and contact the General Services department if you have any doubts or questions. <

THE CRG JOINS BARCELONA GLOBAL

The CRG together with other scientific institutes in Barcelona has joined Barcelona Global, a private, independent and non-profit platform made up of business leaders, professionals and entrepreneurs committed to Barcelona and its future.

From now on, research will be part of this platform, which, through transversal collaboration between different areas and collective initiatives including pri-



Mr. Antoni Castellà, Secretary for Universities and Research (left), and Josep M. Martorell, Director General for Research (right).

vate and public partnerships, aims to open up the economy and make Barcelona more attractive for both business and talent.

To strengthen links between different partners, a delegation from Barcelona Global visited the CRG on March 22. After talks with Andreu Mas-Colell, the Minister for Economy and Knowledge of the Catalan Government, they visited the IRB, the PRBB and the CRG. The tour helped them realise the key role Barcelona research institutes are playing in promoting Barcelona internationally. They also had the chance to get to know more about biomedical research by participating in a hands-on workshop in the CRG Teaching and Training Lab. <

EDITORIAL



Marian Marrodan
CEO

In his last appearance in the Catalan parliament, the Economy & Knowledge Minister confirmed the government's commitment to continue working on the three strategic focuses that define the path to excellence: a) continuity in attracting and retaining talent through the ICREA programme, b) research centres and the establishment of policies to stimulate the transfer of technology and knowledge, and internationalisation, and c) major infrastructures. A clear indicator of this commitment was the 8% increase in the 2012 research budget.

All these statements are being translated into concrete action, which from the CRG's perspective must be seen very positively. It is worth highlighting the announcement of the budget continuity and the shielding of competences in research centres, in terms of protecting our personnel and financial autonomy, and freedom for recruiting high-profile scientific staff. In addition, the Minister spoke ex-

plicitly about their continuing commitment to the EMBL placing one of its outstations at the CRG.

Issues such as the proposed rationalisation of the research system in Catalonia and the preparation of the first Catalan Science Act were also mentioned. Finally, thanks to the upward trend of excellence indicators over the past two years, Catalunya now ranks third in the EU by number of ERC grants per capita, and the CRG is a great example of this; the Minister insisted that full advantage must be taken of the new opportunities that the Horizon 2020 programme for R+D+i will present.

Above all, in this extremely complex situation, it is good to know that the CRG and other research centres can count on institutional support to move forward. Thanks to this backing and the commitment of the entire CRG community, we have become an internationally recognised reference centre. <

CRG & CO

PEGGY JANICH AWARDED THE EPPENDORF PRIZE FOR THE BEST CRG DOCTORAL THESIS

Peggy Janich has been awarded the Eppendorf Prize for the best CRG doctoral thesis for 2011-2012. She did her doctoral work, entitled "The role of circadian rhythms in epidermal homeostasis", in the Epithelial Homeostasis and Cancer Group led by Salvador Aznar-Benitah. She has already published her results in relevant journals including *Nature*, and was selected as a finalist in the "Vanguardia de la Ciencia" competition. She is currently a postdoc researcher at the Centre for Integrative Genomics (www.unil.ch/cig) in the University of Lausanne. <

FUNDING FOR EVALUATION PROJECT ON OSTEOPOROSIS AND CANCER

The Catalan government and the *Obra Social "la Caixa"* are promoting excellence in research and innovation through five evaluation and knowledge transfer projects in the fields of photonics, biomedicine, chemistry, bioengineering and genomics. These projects are the result of a collaboration agreement between the two institutions, on which the bank will spend 2.5 million euros over two years, the aim being the commercial exploitation of research results.

At the CRG, the funded project is led by Luis Serrano and entitled "Synthetic RANKL variants: New therapeutic

agents for osteoporosis and cancer." The researchers want to demonstrate the therapeutic potential of synthetic variants of RANKL using an *in silico* strategy. The development of these synthetic variants may have application in the treatment of osteoporosis, diabetes and cancer, and be extended to other related proteins for the treatment of inflammatory and autoimmune diseases.

In April, there was a public presentation of this and the other projects funded, chaired by the Minister of Economy and Knowledge, Andreu Mas-Colell, the CEO of the *Fundació "La Caixa"*, Jaume Lanaspá, the Secretary for Universities and Research, Antoni Castellà, and the director of the Science and Environment department of the *Fundació "la Caixa"*, Enric Banda. <

INSIDE

BAKE SALE

Joao Curado

From March on, a not-to-be-missed event is being held on the 5th floor terrace. The CRG is hosting a fundraising bake sale every second Tuesday of each month. It is organised by “The



The organizers and some “customers” during the first Bake Sale.

Incubakers” with the support of a number of friends and colleagues. The proceeds will be donated to a different charity every month. The March collection went to The Flying Classroom (www.theflyingclassroom.com), that from April to Intermon Oxfam Trailwalker (<http://trailwalker.intermonoxfam.org>) and in May it is destined for El Casal del Raval.

Hope to see you on May 14 on the 5th floor terrace and, remember that you can join in by baking, donating, helping with logistics, suggesting a charity, or sharing ideas and suggestions. Please contact kiana.toufighi@crg.eu or joao.curado@crg.eu for more information. <

CRG ORGANISATIONAL SHAKE UP

David Ordaz

Following the Scientific Advisory Board recommendations and the Executive Committee resolutions, the CRG now has 4 research programmes: Bioinformatics and Genomics; Cell and Developmental Biology; Gene Regulation, Stem Cells and Cancer; and Systems Biology.

In addition, certain organisational modifications were made in the management area, adopted to offer better service by keeping in mind the new scientific organisation and introducing the recommendations from the recent external audit.

The new scientific and management structure can be accessed easily through the organisation charts on the CRG website www.crg.eu. <

A QUICK DIP IN THE SEA, THE NEW PhD TRADITION

Bernhard Paetzold

After 10 years with no great graduation ritual, as there exists in other institutes all over Europe, the PhD community felt it was time to establish a CRG graduation tradition. The doctoral students were asked to vote for their favourite ceremony and 47.9% opted for a quick “dip in the sea”.

Alejandro Burga, from Ben Lehner’s lab, was the first to enjoy the new “dip in the sea” tradition. Alejandro was taken down to the beach by his group leader and fellow students and “helped” into the water. This is exactly where he needed to be after so many years working hard in the lab. Salva Capella and Judith Wodke have already followed in his footsteps and had a short swim despite the wintery weather. So, from now on... after every thesis defence, drag your fellow students down to the beach and throw them in the sea. <

BEN LEHNER AWARDED THE NATIONAL RESEARCH AWARD FOR YOUNG TALENT

Ben Lehner received the National Research Award for Young Talent from the President of the Catalan Government, Artur Mas. The Catalan Foundation for Research and Innovation (FCRI) and the Government of Catalonia present this award in recognition of young scientists with outstanding research careers and the quality and excellence of their work.



CRG researcher Ben Lehner and Artur Mas, President of the Catalan Government during the award ceremony

The ceremony was held at the National Theatre of Catalonia and was attended by several celebrities and representatives of Catalan science and industry. The President affirmed that Catalonia has excellent research centres, talent and infrastructures. He also explained that despite it being a small country (just 0.1% of the global population), Catalonia has risen from producing 0.4% to 1% of the world’s scientific output in just a few years”. <



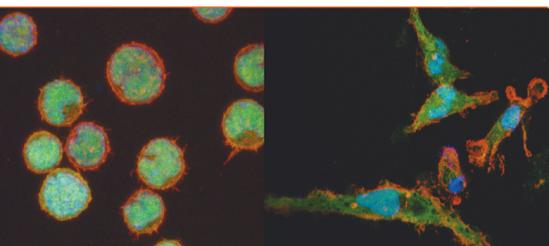
CELL REPROGRAMMING TO CURE LEUKAEMIA AND LYMPHOMA

Leukaemia and lymphoma are two types of cancer affecting blood cells. Both illnesses are widely studied and are currently treated mainly with chemotherapy, radiotherapy and antibodies in order to destroy the cancer cells. Unfortunately, there are still a considerable number of patients that do not respond to existing therapies.

Thomas Graf and his laboratory have recently published, in *Cell Reports*, a study in which they managed to reprogramme lymphoma and leukemia cells to halt their malignancy by using the C/EBP α transcription factor. The researchers have not only transdifferentiated malignant cells, but the reprogrammed cells also maintain their new state as macrophages over time and definitively.

Their results offer the possibility of a new type of treatment for combating blood cancer in the future. Even though the treatments used currently allow cancerous cells to be eliminated, they still do not reduce the capacity to generate new tumours.

“We now know that human cancer cells can be successfully reprogrammed and also that the reprogramming decreases the possibility of the cancer reproducing. Now we are trying to find chemical compounds (or pharmaceuticals) with the same treatment capacity, not only in culture but also in patients”, insists Thomas Graf. <



Left: cancer lymphocytes / Right: lymphocytes reprogrammed into macrophages

THE ROLE OF ENZYME TET2 IN BLOOD CELL FORMATION AND CANCER DEVELOPMENT

In a study published in *Molecular Cell*, CRG researchers describe the way the enzyme TET2, might act in the gene regulation of myeloid leukemia. The study was carried out by transforming one blood cell type (B lymphocyte) into another (macrophage), a process called transdifferentiation. “Learning how to induce transdifferentiation of cells with transcription factors allows us to understand the genetic instructions that define a specialised cell type,” says **Eric Kallin**, first author of the study and postdoctoral fellow at the Haematopoietic Stem Cell Biology and Differentiation laboratory led by Thomas Graf.

They found that TET2 is required to facilitate the activation of myeloid genes in our system. The next step is to discover how TET2 finds the genes that it activates and also how general this mechanism is in other types of cells. <

SEQUENCING THE GENOME OF CITRUS GREEN MOULD

Researchers have published the genome sequence of the citrus green mould (*Penicillium digitatum*). The work, which represents the first species for which the genome has been entirely sequenced at the CRG, will enable, among other things, an understanding of the molecular basis for its resistance to pesticides and alternative methods for minimising the financial losses caused by this mould. In addition, these fungi are often a source of natural compounds with antimicrobial activity, such as penicillin, and having the genome available should help in their detection.

“By sequencing this genome, we have been able to find mutations that confer resistance to fungicides, something which will enable us to explore possible solutions to this growing problem”, states Toni Gabaldón, head of the Comparative Genetics group and co-author of the study. <

TUNING STEM CELL FATE

The CRG group led by Luciano Di Croce has discovered that the RYBP and CBX7 proteins, both essential for gene regulation, are at the heart of the most critical decision faced by embryonic stem cells: what type of cells to become. This work is part of the European 4DCellFate project studying epigenetic protein complexes that control cell fate.

The Polycomb repressive complex 1 (PRC1) is an epigenetic regulator essential for stem cell function and cancer progression. It has only recently become clear that PRC1 comes in different types, depending on which specific proteins are incorporated into it (such as either CBX7 or RYBP). Using the most advanced sequencing technology, scientists analysed 2.64 billion DNA nucleotides from embryonic mouse stem cells to determine which regions are controlled by PRC-RYBP as compared to PRC1-CBX7. “Surprisingly the two complex subtypes can have different roles, with one more involved in metabolism and the other more in development”, comments Lluís Morey, first author of the paper. <

NEW WEB PORTAL TO GET TO KNOW EUROPEAN HEALTH RESEARCH

Juan Sarasua

Horizon Health (www.horizonhealth.eu) is a European Commission initiative within the **CommHERE** project (www.commhere.eu). It aims to present all the FP7 EU-funded projects (only Health area) in an attractive and understandable way for a general audience. The idea of the Horizon Health portal is to become a valuable resource for journalists, educators and researchers. The web was launched on the 21st of March, in Brussels. Very frequently, these kind of research projects are collaborations between an important number of research institutes and universities across Europe. The CRG is participating in 2 coordinated projects: 4DCellFate (www.4dcellfate.eu), with Luciano Di Croce and Ben Lehner, which aims to elucidate how some polycomb complexes work in cell differentiation, health and disease. The second project is SystemTb (www.systemtb.org), coordinated by Luis Serrano, which is trying to understand the biology of *Mycobacterium tuberculosis* from different angles: classical biology, latest generation mass-sequencing techniques, genomics and mathematical models. <



FROM BASIC RESEARCH TO CLINICAL APPLICATION AND INTO THE MARKETPLACE

The “Mico pLung” project, coordinated by Luis Serrano, has been selected for funding from the European Research Council (ERC) “Proof of Concept” programme. This initiative, which provides 150,000€ for projects previously awarded ERC grants, aims to help convert research innovations into marketable applications.

The inception of this project stems from the results obtained from other research carried out by Serrano’s laboratory in the *CellDoctor* project. *CellDoctor* received 2.4 million euros from the ERC in 2009 to completely understand the *Mycoplasma pneumoniae*, to be able to genetically manipulate it and eventually make it a healing agent acting from within our cells. Now, thanks to the Proof of Concept programme, the work begun by *CellDoctor* is making the leap to innovation. The research goes beyond the generation of knowledge; it is arriving in the marketplace and having an impact on society.

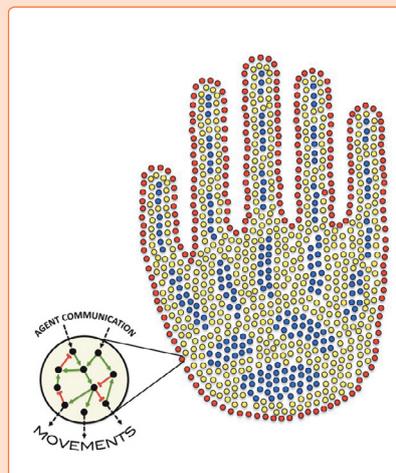
‘Mico pLung’ aims to develop new possibilities in the treatment of respiratory and genital tract illnesses based on the use of bacteria to act as vectors which, instead of causing illnesses, could cure them. <

FROM COMPLEX LIVING SYSTEMS TO SMARTER COMPUTERS

The ICREA Research Professor and acting coordinator of the CRG Systems Biology Programme, James Sharpe, coordinates the European research Project “SWAM-ORGAN”. The aim of this project is to understand complex living systems such as the cells making up an organ, or the spatially-controlled growing of a plant, and apply these principles to technological systems, in particular more intelligent and adaptable robot swarms.

It focuses on systems containing large numbers of autonomous but relatively simple agents, whose goal is to collec-

tively organise themselves into complex spatial arrangements despite each agent having only local awareness. They form complex patterns and deal with conflict or damage by acting locally but for the benefit of the whole. “Although we orig-



inally came from the biological questions of embryo development, I’ve become increasingly fascinated by the potential similarities between multicellular organs, and robot swarms” explains James Sharpe. “The plan is that this project will be equally relevant to both fields, by focusing on the underlying organisational principles”.

Comparing networks between different biological processes, researchers will be able to identify patterns and fundamental principles that can be applied to technology.

The project, with a 2,221,000€ budget, is funded by the European Commission as part of the 7th Framework Programme and will be carried out by researchers in Spain, the United Kingdom and the Netherlands. <

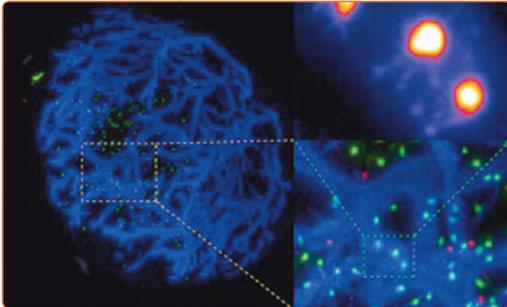


FEATURING CRG

LIGHT SHEET WORKSHOP IN BARCELONA

Jim Swoger

A workshop presenting state-of-the-art light sheet microscopy techniques took place on February 28 – March 1 in Barcelona. Jointly hosted by the Centre for Genomic Regulation (CRG) and the Institute for Research in Biomedicine (IRB), it attracted approximately 70 international participants. The workshop was based around a half-day mini-symposium, involving lecturers from several European laboratories that have been developing light sheet microscopy systems. The remainder of the 2-day event consisted of practical sessions at the CRG, IRB and Institute of Photonic Sciences (ICFO), where groups have been developing a variety of bio-imaging platforms based around light-sheet illumination. Participants in these practical sessions acquired hands-on experience of sample mounting, imaging, and data analysis for systems such as worms, fruit flies, and mice. The workshop was generously sponsored by Carl Zeiss Microscopy S.L., who provided their newly released Lightsheet Z.1 microscope for the practical sessions. <



The figure shows an intact murine popliteal lymph node imaged with a light sheet (SPIM) microscope at the CRG, demonstrating resolution from whole-organ to sub-cellular levels. Red, OT-II T cells. Green, dendritic cells. Blue, high endothelial venules. Jim Swoger, CRG.

CRG ANNUAL SYMPOSIUM

Blanka Wysocka

This year's CRG Symposium, entitled "BCN2 - Biological Control Networks in Barcelona", will be held on **October 30 to 31, 2013**. This meeting aims to bring together world-leading biologists and theoreticians from a wide range of subjects, but is focused on the common theme of biological control networks (BCNs). These will include gene regulatory networks, signalling pathways, genetic interaction networks, synthetic systems and neural networks among others - ideally discussing the relationship between the structure/organisation of the network and its function and/or aspects of network evolution.

Further information on the symposium will be available soon on www.crg.eu. <

CORE FACILITIES

SECONDARY SCHOOL STUDENT DISCOVERS PROTEOMICS

Eduard Sabido

This Easter the CRG Proteomics Unit, in collaboration with the research group of Mara Dierssen, opened its doors to a high-school student, Míriam Solé, who started her "treball de recerca" research project at the CRG.

Míriam is interested in learning what effects the DYRK tyrosine protein kinase can have on cell signal transduction. DYRK protein kinase is located in a Down syndrome critical region of chro-



mosome 21, and it has been associated to the learning defects observed in that genetic disorder. Using phosphoproteomics and mass-spectrometry techniques, Míriam has been analysing the effect that trisomy-like tissues, with three copies of DYRK, have in the phosphoproteome of neurological-related murine tissues. She will continue her work in the unit during the summer holidays. <

NEW ACQUISITION AT ALMU

Arrate Mallabiarrena

The ALMU has lately incorporated a second super-resolution microscope: the Leica SR GSD system (Super-Resolution Ground State Depletion). This technology is based on the localisation microscopy method, by which the microscope does not look at an ensemble of simultaneously emitting fluorophores, but at clearly separated, individual fluorophores that can be located with nanometre precision (20-30nm). Together with the STED microscope, the ALMU offers the latest technologies for Super-Resolution Imaging. <

CRG & SOCIETY

MARA DIERSSEN ONCE AGAIN COORDINATES BRAIN AWARENESS WEEK IN BARCELONA

Mara Dierssen, CRG group leader and elected president of the Spanish Society of Neuroscience (SENC) has been involved in World Brain Awareness Week for almost 10 years. She has again coordinated the Barcelona events together with the Institute of Culture of Barcelona City Council.

By recruiting fellow scientists she has once more been able to present an absolutely amazing programme with many activities for students and the general public. From lectures and workshops to entirely new activities such as the “Neuro-Des-Conferència”, an event where the audience participates as much as the scien-

tists themselves, and together go further and learn collectively. We are organising a new edition of the Neuro-Des-Conferència. Please, find more information on the website www.crg.eu/neuro-desconferencia. Hope to see you there! <



Neuro-Unconference participants

NOT SO YOUNG BUT STILL STUDENTS

Annick Labeeuw

Just like every year, the CRG has received a visit from the *Aules d'Extensió Universitària* (university extension for older people). These students are unique individuals aged over 50 who have decided to study science and who do so through a non-profit cultural association that aims to promote culture, at university level, amongst older people.

The CRG has now been collaborating with them for more than three years and offers various guided tours which, thanks to the participation of the researchers at the centre, allow these students to get to know the CRG and its projects and labs at first hand. This academic year around 150 students from the *Aules d'Extensió Universitària* have visited the CRG and it is clear that their motivation and level of participation is the same as or greater than that of the younger students who also visit us. <

OUT OF THE LAB: THE ELECTROPHORESIS KIT

Annick Labeeuw

The CRG electrophoresis kit is already up and running. This kit is given free of charge to schools and colleges in Catalonia that wish to use it for a practical lab class in their own facilities.

The CRG has developed several stories that can be used to explain its use, from a murder case through fingerprint analysis like in CSI, to the case of the genetic study of a family related to the detection of cancer. At the same time, we provide all material necessary to undertake this practical anywhere in Catalonia.

This new electrophoresis kit has allowed many schools to have access to materials and knowledge that had seemed far from the classroom. Already about 1,000 students have benefited from the kit. Thanks to this initiative the ideas and science of the CRG do not only reach students that visit us physically, but instead we can take the CRG wherever needed, from schools in the Pyrenees all the way down to the Ebro Delta. <

“THE NEW BIO” YET AGAIN A SUCCESS

Between January and April, 2013, we celebrated the 5th course for secondary school teachers: “The new bio: from the lab to the classroom”. The course, in which more than 100 teachers participated, was once again so popular that there was a waiting list. The teaching staff gave a very positive assessment of both the topics on offer as well as the researchers who took part and the practical resources available. These are just some of their comments: “My expectations have been more than met. I enjoyed learning more about epigenetics and bioinformatics!”, “It’s great to get to know what cutting-edge research is being done in Barcelona and it allows me to touch on the “latest of the latest” in class”, “the resources on offer will be very useful for me and I will apply them in the classroom”, “This course has made me aware of how interdisciplinary biomedical research is today. I will definitely convey this to my students”. <



PEOPLE @ CRG

WELCOMES

We warmly welcome;
Avinash Khandelwal, Thomas Pengo, Elisabeth Dagueuet, Joaquim Calbo, Arcadi Navarro, Àngel Carreño, Jordi Rambla, José Luís Rodríguez, Salvatore Cappadona, Montserrat Serra, Oriol Pich, M. Teresa Botta-Orfila, Juan José Fraire, Philippe Julien, Cristina Hidalgo, Jasna Lalic, Javier Diego, Patrick Simon Welz, Alexandra Avgustinova and Joana Ribeiro.

FAREWELLS

Our best wishes to:
Maria Llamas, Julia Riedl, Christian Tornador, Eric Kallin, Michael Wierer, Elisabeth Simboeck, Brigit Kagerbauer, Michael Sammeth, Giovanni Bussotti and Christos Gekas.

AWARDS AND HONOURS

Roderic Guigó, coordinator of the Bioinformatics and Genomics Programme has been awarded the 2012 city of Barcelona Award in the category of Scientific Research for his research on bioinformatics and his contribution to the ENCODE project.

Ben Lehner, group leader of the Genetic Systems laboratory has been awarded the National Research Award for Young Talent from the Catalan Government and the Catalan Foundation for Research and Innovation (see pag. 3).

Johannes Jaeger, group leader of the Comparative Analysis of Developmental Systems has been awarded the 2013 Society for Experimental Biology (SEB) President's Medal in the Cell Section.

Isabelle Vernos, group leader of the Microtubule Function and Cell Division laboratory, has been elected member of the Spanish Science, Technology and Innovation Advisory Council. This new council will be a body representative of scientific and entrepreneurial fields, as well as recognised unions, to advise the government on the development of the Strategy for Science, Technology and Innovation.

DIARY

23/05/13

CRG Core Facilities Technology Symposium. "Frontiers in Genomics and Epigenetics"

www.crg.eu/technology_symposium_130523.
Registration deadline: **May 13**.

28/05/13

Neuro-Desconferencia

Centre Cívic La Sedeta,
Carrer Sicília 321, Barcelona.
www.crg.eu/neuro-desconferencia

30/05/13 - Easy Science Conference
"Great Ideas of Biology".

Speaker: **Sir Paul Nurse**.
Sala Cotxeres, Palau Robert,
Passeig de Gràcia 107, Barcelona.
www.crg.eu/ciencia_facil

31/05/13 - PRBB-CRG Session

Speaker: **Sir Paul Nurse**.
12 pm, PRBB Auditorium
www.crg.eu/prbb-crg_sessions

09-14/06/13 - Courses@CRG

Summer Course Modeling for Systems Biology 2013

www.crg.eu/SB_Summer_Course_2013

15-16/06/13

Festival of Science (Festa de la Ciència).

Parc de la Ciutadella, Barcelona.

01-05/07/13 - Courses@CRG

Advanced proteomics course for molecular and cellular biologists

www.crg.eu/proteomics_course_2013.

Registration deadline: **May 31**.



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