



BIOCORES@BCN: A NEW SCIENTIFIC FACILITIES SEARCH ENGINE

If you're planning an experiment... 70 registered research facilities from 15 recognised institutes make up the new BioCores@BCN directory (www.biocoresbcn.eu). It's a directory and search engine for the core facilities, technological platforms, and scientific services currently to be found in the Barcelona area.

It would be very difficult to house so many research areas in a single location. The fast pace of development of new technologies, the many research institutes focusing on specific tools, and the ever-present need to have the right specialists to perform your detailed experiments, makes it necessary to have a comprehensive and efficient network of collaborators. With this in mind, the CRG set up an initiative to

gather together all the expertise in the biomedical research areas currently providing service in the Barcelona area. The directory has no membership fees and it is a really efficient tool to find out who does what in Barcelona.

If you are planning an experiment, the service can give you details on the infrastructures in the area, like a who-does-what directory for Barcelona: the techniques they utilise, the range of services they offer, some example of applications and the equipment used. Then you can contact them directly and ask for a quote.

You can find out more by reading our editorial, by Monica Morales, head of the Core Facilities service at the CRG. <

THREE SEVERO OCHOA CENTRES OF EXCELLENCE JOIN FORCES IN COMPUTATIONAL BIOLOGY

The Barcelona Supercomputing Centre (BSC), the Centre for Genomic Regulation (CRG), and the Institute for Research in Biomedicine (IRB Barcelona) have launched a Joint BSC-CRG-IRB Programme in Computational Biology.

This programme will provide researchers with unique computational and



experimental resources for tackling complex biological problems, fighting diseases, and attracting the best scientists in the world to Barcelona. The research lines range from computational biochemistry to computational biology and biomedicine.

The three institutions will work together for a period of five years (renewable every three years) and are supported by 300,000€ a year of funding. The programme is headed up by Modesto Orozco (IRB), Roderic Guigó (CRG) and David Torrents (BSC), and comprises 10 research groups from these three centres.

All of the institutes are Severo Ochoa Centres of Excellence and nodes of the Spanish Bioinformatics Network. Their long-term expertise and research quality will make Barcelona one of the most outstanding clusters worldwide. <

EDITORIAL



Monica Morales

Head of the Core
Facilities

In the past, the dependency of life sciences on cutting-edge technologies evolved into the concept of core facilities. Research centres surrounded their individual labs with core platforms staffed with expert technicians operating state-of-the-art equipment and offering specialised services to the scientific community. Thus, institutions developed a structure where the core facilities offer involved shared access to sophisticated and expensive technologies that would be hard or impossible for any institute to provide to each research group independently.

Renowned life sciences research centres need to guarantee their scientists' access to highly-specialised technologies that keep them at the forefront. However, with the rapid emergence of new technologies, equipment becomes obsolete very fast, and it is unlikely that each institution can provide all the services its users need, nor house all of the platforms and equipment. Thus, each centre must specialise in a few technological areas in which it can excel, whilst ensuring its researchers have access to those platforms that cannot be provided with the same quality in-house.

With this view in mind, we developed the Biocores@BCN project with the aim of providing the scientific community with information on all Core Facilities located in research centres in the Barcelona area, so that researchers can quickly and easily identify the places that develop and offer a specific technology. The concept evolved into a web platform where institutions can present their services, equipment, and technologies, and, in turn, users are able to quickly access information on any technology that is offered in and around the city. The major challenge of keeping the information up-to-date was solved by granting each institution editorial access to the site, so that they can directly update the information on their services, in addition to their latest technological developments and new equipment purchases.

BioCores@BCN (www.biocoresbcn.eu) provides a tool for finding a wide range of cutting-edge and state-of-the-art technologies, equipment, and applications to support both biomedical and life sciences research and the scientific community. In the future, our goal is to extend this initiative to other regions and countries, and create a portal where scientists from public institutions and companies, as well as technology providers interact and share knowledge and ideas for future technological developments. <

INSIDE

ICE BREAKING ACTIVITIES FOR GROUP LEADERS AND PhD STUDENTS

The PhD students have recently started a new initiative to promote communication between them and the group leaders, with the aim of increasing the students' confidence in asking questions and getting advice, as well as improving

their understanding of the topics studied in other CRG groups. On the flip side, group leaders have the opportunity to get to know the students from their institute a little better.

The format is up to the participants, but generally a group of 5-8 students just go out for a drink after work with one or two PIs, so there is a good atmosphere for an informal and pleasant chat!

The meetings started at the beginning of the New Year, under the name "Students-PI Ice breaker". So far, they are considered to have been very successful from both the students' and the group leaders' points of view, and we are looking forward to the spring and summer ice breaking activities!

If you want to take part, please contact phdrepresentative@crg.eu <

TO BE OR NOT TO BE: THE GENE REGULATION, STEM CELLS AND CANCER PROGRAMME

Juan Valcárcel

What a neurone needs to do to build a memory trace, what a T cell needs to do to prevent a recurrent infection, and what a sperm cell needs to do to ensure the transfer of its genetic pool; all written in the same book of common instructions: their DNA.

It was long assumed that DNA instructions were deployed as a programme of somewhat irreversible decisions progressively adopted by cells, from the egg to the differentiated cells that build tissues and organs, with stem cells acting as a partially committed pool dedicated to organ maintenance and repair. It is now clear that the process is fully reversible and that it is possible to generate multipotent or even totipotent cells from “terminally” differentiated cells by activating certain key gene circuits, a finding with profound implications for biology, medicine and possibly philosophy, too! Furthermore, recent findings have uncovered striking parallels between the molecular circuits underlying changes in cellular potency and those leading to cell transformation: the origin of cancer may be indeed understood as key cell fate decisions gone awry.

In the GRSC programme we aim to understand the detailed molecular mechanisms that activate or silence the genome’s instructions, including the cascades of signals that trigger the response to external stimuli, acting either on the DNA or on its RNA products. We frequently find that the same molecular machineries play a role in both stem cell function and cancer initiation. An exciting possibility raised by new technical developments is that the spatial organisation of the genome within the cell nucleus provides a key framework for these regulatory events, something that four groups in the programme have teamed up to address. Understanding molecular mechanisms of genome regulation also provides the means to find efficient ways to reverse cell differentiation decisions and exploit the regenerative power of these processes for medicine. Intensive efforts are being made in these directions by several groups in the programme, with remarkable results.

Our next group leader to be incorporated, Bernhard Payer from Harvard University, will combine many of these common interests to study X chromosome reactivation during development and stem cell reprogramming, a process that involves chromatin remodelling, epigenetics and non-coding RNAs, and which can be a fertile ground for interaction with many groups at the CRG. <

NEW WAYS TO FUND RESEARCH IN SPAIN: THE CASE OF THE ENDOWMENT

One of the goals of the CRG is to pursue excellence in every aspect of research. This includes our management strategies and the different ways we fund our research.

The sources of research funding usually come from government agencies and educational institutions, non-profit organizations and private companies, and funding by international institutions. Private initiatives to raise funds for research are scarce in Spain compared to other countries.

An endowment is a way to ensure ongoing financial support, usually for a non-profit activity. It is a funding approach common-

ly used by academic and cultural institutions in the UK and US, where they have been used for centuries and form a pillar of their scientific success. But it’s a recent development in our country’s science arena.

The AXA Research Fund is a scientific philanthropy initiative of the AXA insurance group. Since 2007 it has dedicated 114 M€ to fund research activities on environmental, life and socio-economic risks. Last March the CRG was one of the two Spanish institutions granted an endowment of one million euros. Ben Lehner, group leader of the Genetics Systems lab, will hold the AXA Chair in Risk prediction in age-related diseases for the next three years. The agreement will last till 2029.

Private funding in Spain is still in its infancy compared to other countries. Spain has dedicated 0,68 % of GDP to fund research or R+D initiatives while the average in Europe is 1,3% (2012), and the number of private initiatives



Chair holders Ben Lehner (CRG), David Rios (ICMAT) with AXA Spain CEO Jean-Paul Rignault at the centre.

dedicated to strongly support scientific research are small. Other institutions such as CNIO (with Mariano Barbacid and María Blasco) and Barcelona Graduate School of Economics (with Joan-Maria Esteban and Albert Marcet) have already joined the AXA Research Fund. They have also stressed the idea to promote and bring to light these kinds of private initiatives aiming to reduce the financial gap with other countries and foster the participation of new actors in the Spanish funding scheme. <



INSIDE

BEN LEHNER AWARDED A CONSOLIDATOR GRANT FROM THE EUROPEAN RESEARCH COUNCIL

Ben Lehner, head of the Genetic Systems research group and ICREA research professor at the Centre for Genomic Regulation (CRG), in Barcelona, was awarded a Consolidator Grant from the European Research Council (ERC) on 14th January. This is the first ERC Consolidator Grant com-

petition, the funding from which will enable already excellent independent researchers to consolidate their own research teams and develop their most innovative ideas across the European Research Area.

Ben's project is entitled "Individual robustness in development and cancer." He focuses first on understanding the cellular and molecular mechanisms that confer robustness to perturbation in biological systems and secondly on why this robustness varies across individuals.

"Understanding and predicting variation in robustness is both a fundamental challenge for biology and one that is central to the development of personalised and predictive medicine" he says. "This is because a patient does not want to know the typical outcome of a mutation or treatment; they want to know what will actually happen to them. The work outlined in this project will contribute to our basic understanding of robustness and its variation among individuals, and it will also directly tackle the problem of predicting and targeting variation in robustness as a strategy for killing tumour cells." <

WE HAVE LEARNED

Sonia Alcázar

Although the accident rate at the CRG is low, the Health and Safety office proposes using the information we have collected on the most relevant accidents. Our goal is to set up a series of actions to be taken in case of accidents at work, specifically adapted to the CRG. The result should be that all laboratory staff, as well as other employees, are more aware and more involved in risk prevention and therefore avoid any situations that could lead to situations involving risk.

A new tool for carrying out our objective is the document WE HAVE LEARNED... It includes the most important aspects of

accidents so that the message reaches the widest possible audience, it focuses everyone on the information, and it raises awareness of the issues. In a light-hearted way the document explains: WHAT HAPPENED? WHY? CORRECTIVE ACTION? HOW CAN WE PREVENT THIS? By introducing this measure along with others we hope to improve working conditions and avoid any possible injuries caused by research work in the laboratories, as well as getting the entire CRG community more involved and more aware of health and safety issues.

Due to an eye accident, the first WE HAVE LEARNED... deals with the use of safety specs in the CRG labs as the main way of protecting the eyes during the handling of chemical, biological or radioactive products. <

SENESCENCE IS EVERYWHERE: WHY BILL KEYES LAB'S RESEARCH WAS AWARDED WITH THE PREMI CIUTAT DE BARCELONA 2013

The "Hayflick limit" describes the number of times a cell divides until it stops at the end of its lifespan. In the arrested state, the cell undergoes a process known as cellular senescence, and this has been suggested to be a main factor in why we age. In addition, cells undergo senescence prematurely in response to oncogenes, as a tumor suppressive mechanism, suggest-



An embryonic day 11.5 embryo showing senescence in the limb and tail tip

ing a link between protection from cancer and aging. But scientists from the Mechanisms of Cancer and Aging lab found out something they didn't expect: that senescence is also an early developmental process. It turns out it is fundamental

to instruct tissue growth and patterning (about this, you may also take a look at the work done by James Sharpe lab), which causes us to rethink what we knew about senescence in cancer and aging.

The study was published in the Journal Cell and got quite a lot of attention both in scientific and general media. Because of this research, Bill Keyes was awarded last February with the "Premi Ciutat de Barcelona" in the category of Life Sciences. This award was created 65 years ago and in recent years scientists like Roderic Guigo, Xavier Estivill and Ben Lehner have been also awarded. Read more at www.crg.eu/news

THE IMPORTANCE OF 'SILENT' MUTATIONS IN HUMAN CANCER

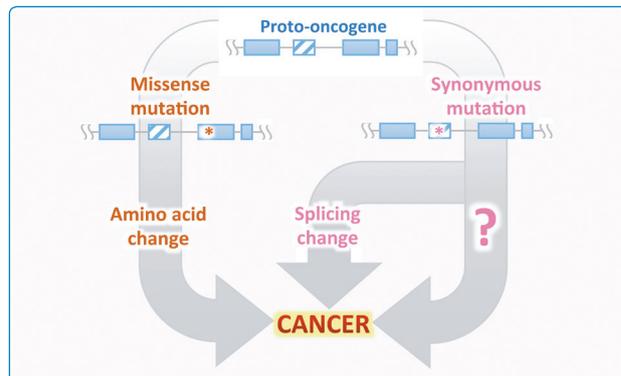
Ben Lehner

Somatic mutations - those acquired in our lifetime - are the primary cause of cancer in humans rather than the genetic variation inherited from our parents. A key challenge in cancer research is to find out which are the cancer-causing 'driver' mutations in each patient's tumour. This identifies both the causes of the cancer and how the tumour can potentially be specifically killed.

In recent years, the genomes of very large numbers of human tumours have been sequenced, which means we can now make unbiased assessments of the types of mutations that contribute to cancer. The data was acquired through services like COSMIC (Catalogue Of Somatic Mutations In Cancer, at the Wellcome Trust) and the Cancer Genome Atlas (from the National Cancer Institute -NCI).

In this study, Supek et al. used data from more than 4,000 human tumours to show that many mutations within human genes that must be contributing to cancer have been overlooked by previous large-scale analyses because they do not directly alter the sequences of the encoded proteins. Rather than directly changing the function of a protein, these 'silent' (or synonymous) mutations alter protein production regulation, for example, affecting the rate at which a protein is made or changing which sections of a gene are used to build a protein.

In particular, the study suggests that approximately half of the 'silent' mutations relevant to cancer change how the informa-



tion encoded in a cancer gene is spliced together into an mRNA that is then translated into a cancer promoting protein. Overall, the study estimates that between 5 and 10% of all the mutations in cancer-promoting genes are these previously overlooked 'silent' mutations.

“We needed to develop a novel statistical approach before we could evaluate the main hypothesis we were testing - finding out if there were synonymous mutations that are causal for carcinogenesis”, points out Fran Supek, first author of the study. “After the method was in place, we also explored other kinds of mutations outside protein coding regions, resulting in an interesting ‘bonus finding’ in our paper: the flanking DNA (3’ untranslated regions or 3’ UTRs) of the oncogenes known to be overexpressed in cancer also appears to harbour causal mutations. This is consistent with the known role of gene 3’ UTRs as encoding post-transcriptional regulatory signals, which these mutations could alter.” <



MORE EVIDENCE ON HOW MODERATE PHYSICAL ACTIVITY IMPROVES YOUR CARDIOVASCULAR HEALTH

Eduard Sabidó

As if it wasn't well-documented enough and sufficiently proven that exercise has beneficial effects on health, a new study

made at the CRG Proteomics Unit in close collaboration with the group of Prof. Francisco Amado (University of Aveiro, Portugal), has shed more light on the potential mechanisms driving this effect in heart mitochondria.

The teams led by Amado and Sabidó performed a mass spectrometry-based proteomics study on the cardiac mitochondria of rats, and they found that laboratory mice which exercised for 54 weeks in a treadmill-running regimen had higher levels of certain proteins in the mitochondria of their heart cells compared to rats that did not exercise. In particular, they identified two protein kinases called RAF and p38, which seem to be responsible for the observed changes that lead to the beneficial cardiovascular effects of lifelong exercise.

This research was part of the Prime-XS European initiative (7th Framework Programme) that brings together leading groups in the field of proteomics with the biological and biomedical research community in Europe. More info at www.crg.eu/news <



SCIENCE @ CRG

WHO'S INTERACTING WITH WHO (AND WHEN)?

Gian Tartaglia

RNA-binding proteins regulate cellular processes such as the synthesis, folding, translocation, assembly and clearance of RNAs. "Recent studies have reported that an unexpectedly large number of proteins are able to interact with RNA, but the RNA partners of these proteins are still uncharacterised", the researchers pointed out that in their work: "we need new approaches that help us characterise protein-RNA interactions"

Gian Tartaglia's Lab recently published a study in Genome Biology that sheds light on RNA-Protein binding interactions. "For the very first time, we have been able to study ribonucleoprotein

networks and quantify the relationship between the interaction and expression of protein-RNA molecules". The authors have developed a web-based platform, catRAPID, to estimate how prone RNAs and proteins are to pair.

catRAPID is a free tool that enables fast calculations on RNA associations and provides exhaustive analysis for organisms such as *C. elegans*, *D. melanogaster*, *S. cerevisiae*, *M. musculus*, *H. sapiens* as well as many others. The software helps in the design of experiments for understanding the role of coding/non-coding RNA in regulatory networks. And it is 89% accurate!

Please find more information on:

The Tartaglia Lab's paper at www.crg.eu/news

And visit the catRAPID website service.tartaglialab.com/ <

CRG & SOCIETY

7 YEARS OF THE CRG SCIENCE CAFÉ

Since 2008, the CRG has been organising the Science Café, a series of outreach talks by distinguished scientists on a wide array of topics. 6 years later, 23 different meetings have been organised with over 1,000 attendees and the collaboration of more than 50 scientists, industry professionals and other relevant figures.

The audience attending these events is varied, from school kids to retired people, anyone interested questioning the scientists first hand.

We encourage you to invite your friends and relatives to attend the next two events, both to be held at the Sala de la Caritat in the Biblioteca Nacional de Catalunya (Raval).

On 21st of May, the café will discuss synthetic biology with Maria Lluch from Design of Biological Systems lab; Carlos Rodriguez-Caso from the UPF, and Kepa Ruiz-Miraz from the University of the Basque Country. On 11th of June, Marc Martí-Renom, group leader of the Structural genomics Lab, will conduct the talk on genome architecture. Please visit the Outreach events section on the CRG web: www.crg.eu/outreach_events. <

FEATURING CRG

V CRG POSTDOC SYMPOSIUM, PRBB AUDITORIUM, June 12th-2014

Now celebrating its 5th anniversary, the CRG postdoc symposium has become an annual tradition. The whole CRG postdoc community makes an effort to put together a day of scientific exchange where postdocs from different CRG programmes take the opportunity to present their work. Although the format of the symposium has changed several times over the years, the main

component is still the same. Making up the largest are talks by postdoc fellows, plus presentations by guest speakers.

This year, the symposium organisers decided to invite two Junior group leaders (one from CRG and one who was previously a CRG postdoc) and open it up to postdoc fellows from other PRBB institutes. So, we will have 2 guest postdocs from UPF laboratories. The whole CRG postdoc community will be very happy to share this day with all of you. <

FEATURING CRG

PROFILE: ORIOL PICH ROSELLO, EVOLUTIONARY GENOMICS LAB

Last year the CRG employed 425 people from 41 different countries. Over 75% of the PhD students come from abroad. This is a significant representation of how attractive the CRG is to researchers from all over the world. Those researchers obviously began their studies and career paths outside the centre. But there are certain exceptions to what appears to be the rule.

Oriol Pich is in his 4th year of medical school at the Hospital Clinic, UB. At the same time, he is also a researcher in Fyodor Kondrashov's lab. But his first encounter with science took place in 2008, at the "Joves i Ciència", the summer science school organised by the Fundació Catalunya La Pedrera. He was only 16 then, and the programme taught by CRG researchers at the science camp at Pallars Sobirà in the Pyrenees, got him hooked.

The next year he had the opportunity to spend a month at the CRG doing science. From amongst the different projects, Oriol chose the one presented by Fyodor Kondrashov, group leader at the CRG, which consisted of studying compensatory evolution in proteins. He chose that project because he got along with Fyodor, the project interested him, and as he did not know anything about bioinformatics, it was a challenge for him to try something new.

In 2010, he was selected to participate in the Rockefeller University's Summer Science Outreach Programme in New York. After that, he began his university studies at the Hospital Clinic, while at the same time he continued collaborating with Fyodor's lab whenever he had the time. He was hired as a part-time employee in 2013, and since then he has been combining his medical studies with the research. Oriol is studying the long-term effects of protein evolution after gene duplication, and now he submitted his first paper to the journal *Genome Biology and Evolution*. <

VOLLEYBALL IS BACK AGAIN

Mariana Lopez

A new edition of the PRBB beach volleyball tournament will start on the 28th of April. Around 500 PRBB residents will enjoy this friendly tournament that has reached a new record of 59 registered teams, of which 17 of them include CRG employees.

Our well-known administration team will once again take part in the competition, as well as many laboratory teams, something which serves to further enhance personal relationships. But it is important to point out that the laboratory team players are not only members of different CRG labs, but also different PRBB institutions.



This reflects one of the aims of our championship: to establish friendly interactions in a scientific environment drawing together the PRBB as a whole.

Two of the La ORG members, Juergen Mayer and Mariana Lopez belong to the CRG. We are very happy to volunteer in the organisation of this tournament year after year, because we believe that doing sport has numerous health benefits and improves our quality of life. <

INGENIUM MINISYMPOSIUM

Ida Theka

On February 3rd, the CRG hosted the INGENIUM MiniSymposium, an occasion that brings together some of the biggest names in the field of epigenetics and genomic imprinting. The event, a Mid-Term Review Meeting, was open to the whole scientific community and was organised by INGENIUM.

INGENIUM is an Initial Training Network funded by the European Commission and coordinated by the Italian Consiglio Nazionale delle Ricerche, Institute of Genetics and Biophysics Adriano Buzzati Traverso. This project aims to connect important European research groups in the field of epigenetics and train young researchers by using a multi-disciplinary approach.

The MiniSymposium started with an introduction from Maria Pia Cosma (CRG) followed by seven talk sessions where the speakers not only presented their recent work, but also gave an overview of the state of the art.

The topics discussed included DNA modification analysis, presented by Wolf Reik (Babraham Institute, Cambridge), mechanisms of genomic imprinting, highlighted by Deborah Bourc'his (Institute Curie, Paris), Jérôme Cavaille (LBME-CRNS, Toulouse), Marisa Bartolomei (UNIPENN, Philadelphia), and David Monk (Idibell, Barcelona). Finally, Luciano di Croce (CRG) and Kristian Helin (University of Copenhagen, DK) focused their talk on the protein complexes regulating development and cancer.

In attendance at the meeting were various researchers and students from both within the PRBB and further afield. The event was an opportunity for different opinions to be exchanged and led to new collaboration possibilities between the different groups. <



PEOPLE @ CRG

WELCOMES

We warmly welcome:



Sebastian Maurer joined the CRG as coordinator of the Cytoskeleton Dependent RNA Distribution Mechanisms group, of the Cell and Developmental Biology programme. He did his Ph.D. at Jacobs University in Bremen, Germany, and before coming to the CRG, Sebastian worked at the EMBL in Heidelberg and the London Research Institute as a postdoc.



Sonja Reiland is now Project Manager at the International Scientific Affairs (ISA) office of the CRG. She has a PhD in biochemistry from ETH Zurich, and has post-doctoral experience from the EMBL, Heidelberg. After this, Sonja worked for BASF in Ludwigshafen for 2 years as an Information Professional.



Ines Fonseca is the newest member of the Human Resources team. With a degree in Psychology and finishing her master in HR, Ines's mission is to promote and implement the institute's HR - talent management area. She is responsible for recruitment, personal development and transversal projects.

Laia Carreté, Cinta Pegueroles (Comparative Genomics); Gloria Mas (Epigenetic Events in Cancer); Marta Inglés, Cristina Militti (Regulation of Protein Synthesis in Eukaryotes); Elizabeth Henaff (Genomic and Epigenomic Variation in Disease); Sonja Reiland (ISA); Maria Guirola (Design of Biological Systems); Krystal Timón (Microtubule Function and Cell Division); Mireia Ortega, Davide D'amico (Cellular & Systems Neurobiology); Esther Blanc, Inés Fonseca, Laia Campos (Management); Ishier Raote (Intracellular Compartmentation); Martina Niksic, Ivica Slavkov, Philip Germann (Multicellular Systems Biology); Dmitry Ivankov, Natalia Bogatyreva, Dinara Usmanova (Evolutionary Genomics); Jennifer García (CRG/UPF Proteomics Unit); Eduard Zorita (Genome Architecture); Mireia Garriga (Cytoskeleton Dependent RNA Distribution Mechanisms); Xianghua Li, Andre Faure (Genetic Systems); Estel Aparicio, Alexandre Esteban (Computational Biology of RNA Processing).

FAREWELLS

Our best wishes to:

Vanessa Chiganças (Reprogramming and Regeneration), Debayan Datta (Genomics Unit), Iris Titos Vivancos (Coordination of Cytokinesis with Chromosome Segregation), Cristina Miró Julià (Organelle Biogenesis and Homeostasis), Livia Caizzi, Santiago Demajo (Epigenetic Events in Cancer), Jasna Lalic (Genetic Systems), Iago Maceda, Marta Melé (Computational Biology of RNA Processing), Susanna Molas (Cellular & Systems Neurobiology).

DIARY

21/05/14 - Science Café

Will biologists be able to create synthetic life?

Sala de la Caritat, Carrer de l'Hospital 56, 08001 Barcelona

02-04/06/14

Next Generation Sequencing Conference (NGS) 2014

PRBB Auditorium, Dr. Aiguader 88, Barcelona.

www.iscb.org/ngs2014

11/06/14 - Science Café

Biologists and architects - can they learn from each other?

Sala de la Caritat, Carrer de l'Hospital 56, 08001 Barcelona

25-26/09/14 -

1st Lightsheet Fluorescence Microscopy International Conference & 6th LSFM International workshop.

Casa Convalescència, Sant Antoni Maria Claret 171, 08041 Barcelona.

www.lsfm2014.com/

06-07/11/14 - 13th CRG Symposium

Gene Regulation, Stem Cells and Cancer

More info coming very soon!

08-13/11/13

ESF-EMBO Conference on Flies, Worms and Robots: combining perspectives on minibrains and behaviour

St.Feliu de Guíxols

<http://minibrains.esf.org/>



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