

IRB
BARCELONA

INSTITUTE 
FOR RESEARCH
IN BIOMEDICINE

2011
ANNUAL
REPORT
SUMMARY

The 2011 Annual Report of IRB Barcelona is online.

The full document can be found on the webpage
www.irbbarcelona.org/annualreport2011

Picture on the cover:

Section of mouse hippocampus. Green: neurons; red: astrocytes; blue: cell nuclei. Isabel Saéz, Metabolic Engineering and Diabetes Laboratory, IRB Barcelona.



Joan J. Guinovart
Joan Massagué
Directors
IRB Barcelona

In spite of the worldwide recession and its dire consequences for scientific research, 2011 has been an extremely successful year at IRB Barcelona, both in terms of preserving our funding level and of augmenting the impact of our scientific output.

We have consolidated our position as a centre of excellence and the quality of our publications has greatly improved. The scientific prestige we have gained in the six years since the Institute was founded is remarkable and has been possible thanks to the efforts and hard work of the entire IRB Barcelona community. For these accomplishments, we would like to express our deepest gratitude to all of the staff.



Main accomplishments of 2011

The **Severo Ochoa Distinction**, presented by the Government of Spain, was awarded in October in recognition of our commitment to research of excellence. IRB Barcelona is honoured to be among the eight centres in Spain — spanning all scientific disciplines — to receive this award. Only two other centres have been distinguished in the category “Life Sciences.”

Furthermore, IRB Barcelona has achieved 20% (three out of a total of 15) of all **European Research Council (ERC) Advanced Grants** awarded to Spain in 2011. The ERC evaluated the projects presented by Modesto Orozco, Angel R. Nebreda and Cayetano González as ambitious and scientifically outstanding and worthy of funding. These

awards will serve to boost the impact of their lines of research in the years to come.

Among the other important recognitions received during the course of 2011, we would like to give special mention to the prestigious **National Research Prize** awarded by the Ministry of Science to Ernest Giralt.

New group leaders

In 2011, ICREA Research Professor **Raúl Méndez** initiated his research as head of the Translational Control of Cell Cycle and Differentiation Lab. In order to carry out research on the molecular mechanisms controlling mRNA translation, IRB Barcelona has helped to set up a *Xenopus laevis* facility in the Barcelona Science Park. This facility will allow other groups to use this extraordinary animal model.

Furthermore, ICREA Researcher **Roger Gomis** was appointed group leader of the Growth Control and Cancer Metastasis Lab.

First evaluation of our research

In November, 12 of the 14 members of our **External Advisory Board** visited IRB Barcelona to complete the evaluation of group leaders who have been at the Institute for five years. This evaluation process was mandated in November 2010 by the IRB Barcelona Board of Trustees to ensure that research conducted at the Institute is competitive, commensurate with the special investment in direct support of research programmes and core facilities, and at the forefront of excellence.

Events

The **Barcelona Biomed Conferences**, organised with the visionary support of the BBVA Foundation, hosted three conferences covering *Mitochondrial Autophagy*, *Signal Rewiring and Addiction in Cancer*, and *Macromolecular Dynamics*, with exceptional speakers and a strong attendance.

The **2nd Barcelona PhD Student Symposium**, held in November, saw the participation of 170 young international scientists and distinguished



senior scientists, including Nobel Laureate Aaron Ciechanover.

Also during 2011, the **Metcentre** network increased both the number of seminars held and the involvement of people from other centres working in this field.

Training at IRB Barcelona

2011 was an exceptional year for IRB Barcelona training programmes. Ten new PhD students (eight from outside Spain) were sponsored by the “**La Caixa**”/**IRB Barcelona International PhD Fellowship Programme** and began their research in the second half of the year. In addition, five other talented students received fellowships through the **IRB Barcelona PhD Programme**.



Furthermore, the postdoctoral community welcomed more members thanks to a new initiative called the **IRB Barcelona International Postdoctoral Programme**, co-funded by the EU's Marie Curie Programme, which fosters mobility and interdisciplinary research of excellence performed by scientists from all over the world.

With these appointments, by 31 December, **44% of our PhD and 55% of our postdoctoral fellows** were non-Spanish nationals. This composition again confirms the highly international character of the IRB Barcelona community.

Technology transfer

Two spin-off companies took off in 2011, namely **Iproteos**, an initiative of Ernest Giralt and Teresa Tarragó, and **Inbiomotion**, formerly called Supra-

gen, started by Roger Gomis.

The Ministry of Science also awarded the Institute with an **INNCADE** subsidy to strengthen technology transfer activities. Undertakings linked to technology transfer, such as commercial contracts and patents and the promotion of spin-off enterprises, showed remarkable growth in 2011. Five patent applications were filed last year.

Other important achievements in 2011

IRB Barcelona continues to strengthen its outreach capacity. The *Al vol* course for secondary school teachers was organised in collaboration with the EMBL. Through this activity, with the help of our scientists, 22 secondary school teachers from across Catalonia learned about cutting-edge research into *Drosophila* development.

Challenges for 2012

As we step into 2012, IRB Barcelona looks ahead with optimism, firm in our conviction that our endeavours this year will bring further achievements and recognition. Following the proposal of the External Advisory Board, a **call for new group leaders** was announced.

IRB Barcelona is also opening a **Histology Service**, a project that is now feasible thanks to the Severo Ochoa funds.



This service will serve to strengthen the potential of the Oncology and Molecular Medicine Programmes. Our strategic collaboration with the **Barcelona Supercomputing Center** has been renewed until the end of 2012 and will allow our scientists access to *MareNostrum*.

For the fifth year, we are issuing a call for ten PhD students in collaboration with "La Caixa", and a second call for ten more postdoctoral fellows, sponsored by the **COFUND Marie Curie action**.

In May 2012, the **Barcelona Biomed Series** hosted the conference *DNA Damage Response in Human Disease* (organised by Travis Stracker from IRB Barcelona and John H. J. Petrini from the Memorial Sloan-Kettering Cancer Center, USA), while in November the conference *Normal and Tumour Stem Cells* will be held (organised by Eduard Batlle from IRB Barcelona and Hans Clevers from the Hubrecht Institute, Nether-

lands). In December, David Rossell from IRB Barcelona and Don Berry (MD Anderson, Houston, USA) will co-organise the conference *Bayesian Statistics for Medical & Bioinformatics Research*.

Among the meetings planned for 2012, in March we organised a **BioNMR Meeting** and in October we are preparing an **EMBO workshop**.

Once again, a new year implies new challenges for us all. We are convinced that, thanks to everybody's commitment, another fruitful year lies ahead for IRB Barcelona as it steps into maturity. Although economic obstacles and scientific hurdles might arise along the way, the solid research of excellence performed at IRB Barcelona puts us in a privileged position to hoist a sail towards new and exciting goals. ■

Rewarding excellence. The Institute receives one of eight Severo Ochoa Awards

IRB Barcelona has been one of the eight research centres in Spain to be granted recognition as a Severo Ochoa Centre of Excellence. Only three of the institutes to receive this award are devoted to biomedical research, and four were based in Catalonia.

The award brings funding of a level of € 4,000,000 over four years to each of the centres. In October 2011, the then Ministry of Science and Innovation announced the decision regarding the awards corresponding to the 2011 call, in its first edition, which is part of framework of the “Programa de Fortalecimiento Institucional” of the National R+D+I Plan

(2008- 2011).

The Severo Ochoa award allows IRB Barcelona to achieve several strategic goals, including the launch of the **Metastasis Project**, or “Met Project”, a cross-disciplinary initiative that draws on and fortifies IRB Barcelona’s strengths in this important area for biomedical research.

Two evaluation criteria were considered to identify excellence and award the prize: the scientific quality of the centre and the quality of a project for the future. ■



20% of ERC Grants awarded to the whole of Spain in 2011 go to IRB Barcelona

Three of the 15 European Research Council Advanced Grants obtained by Spanish scientists were awarded to IRB Barcelona researchers.

Based on the scientific excellence of proposals that are submitted, ERC Advanced Grants allow exceptional and established research leaders to pursue highly ambitious, pioneering and unconventional projects.

Cayetano González will study tumour growth and aneuploidies - the incorrect distribution of chromosomes during cell division



- using a model for brain tumour development in *Drosophila melanogaster*.

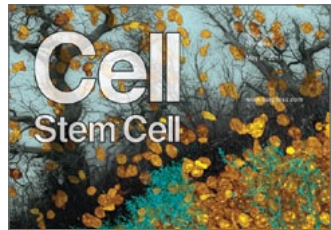
Angel R. Nebreda’s field of expertise is the p38 protein kinase family. Through a combination of studies in biochemistry and cancer cell biology, as well as pharmacology and genetic analyses, his project seeks to unravel the role of p38 in the development of tumours.

Modesto Orozco is a European leader in the simulation of biological systems and an international authority in the theoretical study of macromolecular systems, especially nucleic acids. The simulation of DNA at different scales is the focus of his project. The tools developed in the project will allow scientists to more fully understand the mechanisms that control gene expression. ■

Science highlights in 2011

In 2011, IRB Barcelona researchers published a total of 157 papers in international peer-reviewed journals. Three are highlighted here.

Raúl Méndez (Translational Control of Cell Cycle and Differentiation Laboratory) and collaborators published a paper in *Nature Medicine* describing a new reprogramming mechanism for the expression of the genes responsible for turning healthy cells into cancerous ones. Ortiz-Zapater E, *et al.* Key contribution of CPEB4-mediated translational control to cancer progression. *Nat Med*, **18**, 83-90 (2011).



Eduard Batlle's group (Colorectal Cancer Laboratory) published a paper in *Cell Stem Cell* describing how colorectal cancer exhibits a cell hierarchy similar to that of healthy intestinal tissue. Those cancer cells that resemble normal intestinal stem cells are responsible for relapse. Merlos-Suárez A, *et al.* The intestinal stem cell signature identifies colorectal cancer stem cells and predicts disease relapse. *Cell Stem Cell*, **8**, 511-24 (2011).

Jordi Casanova (*Drosophila* Morphogenesis Laboratory) and his collaborators identified GATA gene 6 as playing a fundamental role in a metastatic-like process that occurs as epithelial cells migrate to a new site. The research was published in *Developmental Cell*. Campbell K, *et al.* Specific GATA factors act as conserved inducers of an endodermal-EMT. *Dev Cell*, **21**, 1051-61 (2011). ■

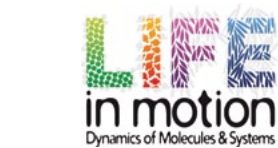


Life in motion attracted 170 young international scientists to Barcelona

The 2nd IRB Barcelona PhD Student Symposium was held on 17-18 November 2011. 170 young international scientists took part in the second edition of this event, which is an unparalleled opportunity for IRB Barcelona students to gain experience in all aspects of organising a scientific symposium. The first event of this kind took place in 2009.



Students made a special effort to identify and invite a panel of outstanding speakers who are among the best scientists in their field. Visitors to Barcelona for the event were: Nobel Laureate Aaron Ciechanover (Israel), Julius Brennecke (Austria), Sarah Teichmann (UK), Anne-Claude Gavin (Germany), Conly Rieder (USA), Piet Gros (The Netherlands), Mónica Bettencourt



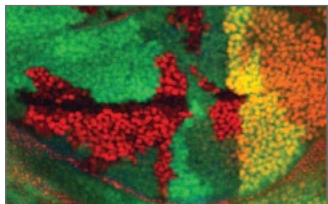
(Portugal), Christian Griesinger (Germany), and Erik Sahai (UK).

The organisers, a committee of 12 PhD students, were gratified by a healthy participation of the

scientists, who expressed great satisfaction with the outcome of the meeting.

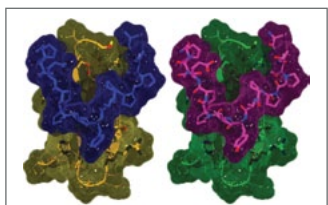
The discussions were lively, and for once, as Nobel Laureate Aaron Ciechanover put it, “the sharks are behind the speakers and not in front of us,” pointing at the fish tank of the room in the Barcelona Aquarium where the conference was held. ■

Overview of IRB Barcelona research programmes and core facilities



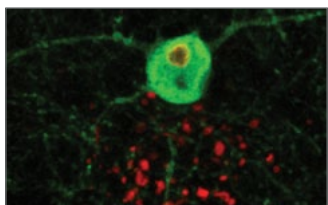
1. Cell and Developmental Biology Programme

The Programme comprises seven laboratories that address questions ranging from pure cell biology issues, such as how the subcellular machinery of the cells is organised and functions, to how cells are organised in time and space, how multicellular organisms develop from a single cell, and how alterations in these processes underlie pathological conditions.



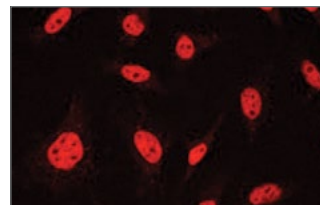
2. Structural and Computational Biology Programme

Including six laboratories, this Programme brings together researchers from a variety of computational, physical, chemical, mathematical and statistical backgrounds with the common aim of studying biological processes from a structural viewpoint and increasing biomedical knowledge.



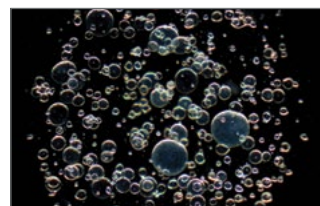
3. Molecular Medicine Programme

In this Programme, six laboratories seek to further our knowledge of the molecular mechanisms that underlie physiological processes and their associated diseases and, conversely, to use insights from the alterations found in human diseases to answer fundamental biological questions. The creation of an active interface between the member research groups and clinical researchers is one of its goals.



4. Chemical and Molecular Pharmacology Programme

Comprising five laboratories, this is one of the key assets of the Institute. Its goals include the conception, design and synthesis of new molecules with potential therapeutic interest, conformational analyses, and molecular recognition studies. Well-consolidated collaborations support its interdisciplinary approach to performing research of excellence at the interface between chemistry and biology.



5. Oncology Programme

The four groups that form this Programme aim to improve the prognosis, prevention and treatment of cancer by studying the basic principles of development of this disease and to explore the potential of new diagnostic tools and therapies, in collaboration with partners in university hospitals and the pharmaceutical industry.



Core facilities

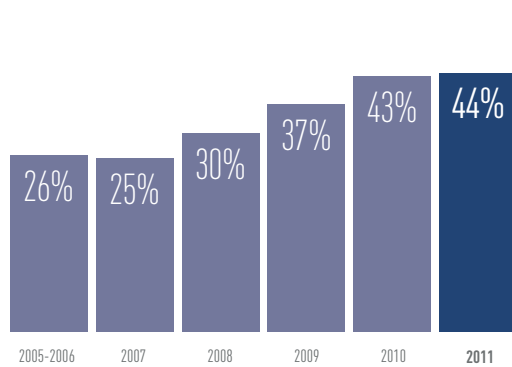
Scientists at IRB Barcelona are supported by an extensive range of common core facilities that provide state-of-the-art technologies and scientific services. These facilities are a key asset for our research. Six facilities currently operate at the Institute: **Advanced Digital Microscopy**, **Functional Genomics**, **Biostatistics/Bioinformatics**, **Mass Spectrometry**, **Mouse Mutant**, and **Protein Expression**.

Facts and figures

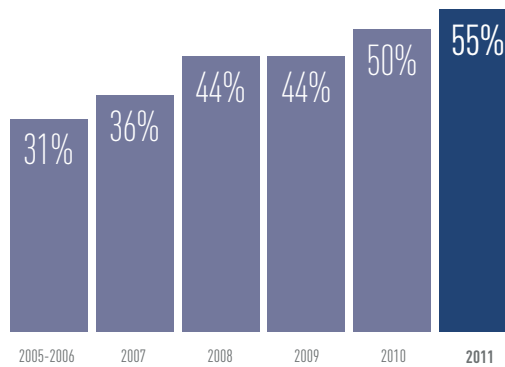
469 from **37**
Members Countries

Laboratories	402
Core facilities	23
Administration	44
TOTAL	469

Evolution of International PhD Students



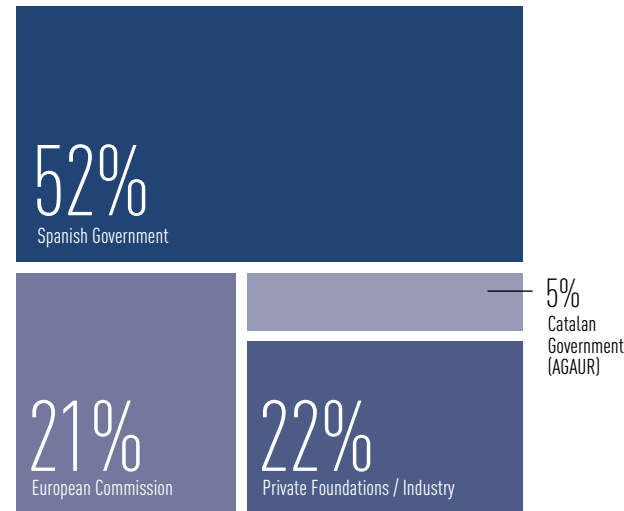
Evolution of International Postdoctoral Fellows



€ 12,561,239

Funding obtained by IRB Barcelona researchers through grants, networks and personnel grants in 2011

Funding Sources



159

IRB Barcelona researchers participated in a total of 159 national and international research projects and networks

Credits

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