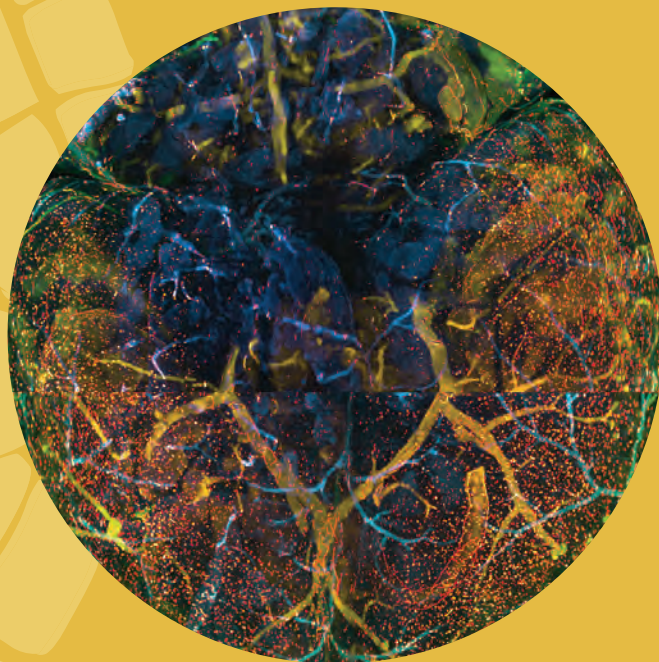


IRB
BARCELONA

INSTITUTE
FOR RESEARCH
IN BIOMEDICINE



IRB
BARCELONA

2013

ANNUAL
REPORT
SUMMARY

While the economic climate continues to provide challenges, IRB Barcelona continues to weather this well and in 2013 we have continued to push forward with excellent science and other related activities. We've continued to attract exceptional talent, with the incorporation of a new Group Leader, postdocs, predocs and technical experts. More than half of our faculty researchers are now recognised by prestigious bodies such as ICREA and the ERC, and we are also active in promising and high-impact European flagship projects. We continue to achieve our milestones, and do so in the characteristic positive IRB Barcelona spirit.

Here you can find a summary of our highlights.

You can read the full document here:

www.irbbarcelona.org/annualreport2013

Joan J. Guinovart
IRB Barcelona Director



CREDITS

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IRB Barcelona

PHOTOS

Gianluca Battista/Massimiliano Minocri
Office of Communications and External Relations (p. 4, p. 5, p. 6)
Marta Sánchez (p. 2, p. 13)

Cover image by Julien Colombelli. Samples courtesy of Sebastian Munck and Enrico Radaelli, VIB Leuven, Belgium. MacroSPIM, showing Alzheimer-related plaques (in red) and a subset major blood vessels, colored for depth.

DESIGN AND DEVELOPMENT

Formas Naturales S.L.

LEGAL DEPOSIT

B-7912-2010

THE KEY TO OUR SUCCESS

In July, IRB Barcelona welcomed Group Leader **Salvador Aznar Benitah** and his group to the Oncology Programme.

Their focus on stem cells and epithelial cancer carries over from their work at the CRG, and complements and builds on the strategic research lines within the Programme.

With the departure of David Rossell in May to the University of Warwick, the leadership of the Bioinformatics and Biostatistics Unit was taken over by **Camille Stephan-Otto**, who now serves as Acting Facility Manager.

In July, we also recruited a manager, **Nuno Vasconcelos**, for the new Histology Service. Under Nuno's guidance, the service will provide an added boost to research activities primarily in the Oncology Programme.



Salvador Aznar Benitah



Nuno Vasconcelos



Camille Stephan-Otto

SCIENCE OF EXCELLENCE AT IRB BARCELONA

4 ERC Advanced Grants
1 ERC Consolidator Grant
1 ERC Starting Grant

erc

11 ICREA Researcher contracts
(in 2013, Roger Gomis
and Xavier Salvatella)
1 ICREA Academia Awardee

icrea

Eduard Batlle received the
2013 Dr. Josef Steiner
Cancer Research Award

CHANGES IN IRB BARCELONA GOVERNANCE AND ADVISORY BODIES

At its meeting in December, the Board of Trustees officially approved changes to IRB Barcelona's statutes to incorporate a change in composition of the Board.

BBVA Foundation director, **Rafael Pardo**, and two external academics, **Jerzy Duszyński**, former director of the Nencki Institute of Experimental Biology in Warsaw, Poland, and **Joan Modolell**, researcher at the Institute of Cell Biology at the Centre for Molecular Biology in Madrid now sit on the committee, together with delegates from the Catalan Ministries of Economy and Knowledge and of Health, and the University of Barcelona.

These new members will contribute to increasing our international projection, visibility and capacity to attract philanthropy, and provide a valuable new perspective for other members of the Board.

In recognition of the fact that IRB Barcelona has now achieved solid footing within the landscape of international biomedical research institutes and has consolidated its internal strategic management, **Joan Massagué** has transitioned his position at IRB Barcelona from Adjunct Director to that of Chair of the External Advisory Board.

In October, the first visit of the newly-established **Business Advisory Board** took place. The board, composed of 10 international experts from pharma, venture capital and consultants and academics specialised in promoting public-private business agreements, met to familiarise themselves with the Institute's activities and get a feel for the projects with the greatest potential for transfer.



Business Advisory Board

POSITIVE REPORT CARDS

2013 was a year for evaluation for the Institute. In May, the External Advisory Board met to take stock of our progress and offer their suggestions for continued improvement. The board specifically evaluated the Molecular Medicine, Chemistry and Molecular Pharmacology and Oncology programmes, as well as our training programmes for pre- and postdocs, with highly positive feedback and constructive suggestions on how to increase collaboration between chemists and biologists, and to achieve critical mass in some scientific fields, including structural biology.

In a separate evaluation, the CERCA committee of the Catalan Government also evaluated the Institute's activities, again with very positive feedback.

And finally, IRB Barcelona's progress was evaluated as part of the Spanish Ministry of Science and Innovation's Severo Ochoa Centres of Excellence Programme, once again with highly positive feedback.



TRAINING ON TRACK

PhD training activities continue to go from strength to strength at IRB Barcelona, thanks to the impetus given by **Raúl Mendez**, Chair of Graduate Training, to the active participation of the PhD Committee and the Student Council, and to the support of the Academic Office. A total of 13 fellowships were offered this year, through the "la Caixa"-Severo Ochoa/IRB International PhD Fellowship programme, as well as the FPIs granted to us under the Severo Ochoa grant.

Our PhD students are to be commended on the successful organization of the **3rd International PhD Symposium: *The Clock of Life***, held at the Pedrera in November. The event was an outstanding achievement, with 177 participants, nearly half of whom were from other local and international institutes.

Postdoc activities also had a successful year, with the successful launch the third call of the COFUND-Marie Curie Action programme, which offered 8 interdisciplinary positions.



Joan J. Guinovart with "La Caixa"-Severo Ochoa Fellowship awardees.



PhD Symposium Organising Committee members

IRB BARCELONA'S PARTNERSHIP

IRB Barcelona's objectives include strengthening its collaborations with other research centres.

CLINICAL PARTNERSHIPS



TECHNOLOGY PARTNERSHIPS

CCIT3

CENTRES CIÈNCIES I TECNOLOGIES
Universitat de Barcelona



CSIC



Barcelona Supercomputing Center
Centro Nacional de Supercomputación

INTERNATIONAL PARTNERSHIPS



LEADERS IN PUBLIC ENGAGEMENT

January 2013 saw the launch of **Crazy About Biomedicine**, a pilot programme for high school students that brings them into the lab on Saturdays throughout the year for a combination of theoretical and practical sessions on biomedical research topics.

More than 400 applications were received for this first call, for a total of 24 places. The pioneering programme was considered such a success by our collaborating organisation, the Catalunya-La Pedrera Foundation, that they have extended it to five other centers for 2014. Through this activity, IRB Barcelona has established itself as a leader and reference in the area of outreach and education. This is a direct result of the commitment and passion of our young scientists who have led the activities.

Other outreach activities of note include a new teachers workshop on *Cancer, Metastasis and Personalised Medicine* held in November, again in collaboration with the *Catalunya-La Pedrera Foundation's Professors i Ciència Programme*.

Researchers from our Oncology Programme, led by Elena Sancho, provided a comprehensive course on current research in this field.

—
Fundació
—
Catalunya
—
La Pedrera
—



TECHNOLOGY TRANSFER

Innovation activities at IRB Barcelona continued to flourish in 2013 with the expansion and extension of several collaboration agreements, as well as the filing of patent applications. Over the course of the year, we hosted representatives from major pharmaceutical companies interested in learning more about IRB Barcelona's top-level science. Of special note is the consolidation of the projects chosen by the Botín Foundation's *Mind the Gap* programme. The projects, *Colostage* (Eduard Batlle) and *Nostrum Drug Discovery* (Modesto Orozco), have continued with their validation and are moving closer to the market. Additionally, the CancerTec initiative, supported by Obra Social "la Caixa," has grown and now covers all areas of research, prompting a change in its name to *BiomedTec*. The second call of this initiative awarded a total of 6 projects (new and continuing) that show promise in reaching the market.

BARCELONA BIOMED CONFERENCES IN 2013

The Microtubule Cytoskeleton in Development and Disease (organised by Jens Lüders and Tim Stearns, Stanford University, March 2013)

Frontiers in Dynamics Simulations of Biological Molecules (organised by Modesto Orozco and Charles A. Laughton, Nottingham University, November 2013)

Gene Translation: Fidelity and Quality Control (organised by Lluís Ribas and Peter Dedon, MIT Center for Environmental Health Science, December 2013)



BARCELONA BIOMED SEMINARS IN 2013

185 experts from more than **62 institutes** in **15 countries** from a broad range of areas of the biomedical sciences presented and discussed their latest research results with IRB Barcelona scientists.



Fundación **BBVA**

A LOOK TO THE YEAR AHEAD

Challenges and opportunities are a way of life in biomedical research. We can look forward to the following in 2014:

- Continuing to recruit group leaders to increase critical mass in some scientific areas, specifically structural, computational and chemical biology.
- Implementing measures to concretely integrate chemistry and biology research.
- Fortifying and expanding our collaborations with other research centers with strengths in clinical research and technological facilities, both locally and abroad.
- Increasing our capacity to attract competitive funding from European and international grants and from private entities.
- Creating a network of the more than 700 researchers that have passed through IRB Barcelona's doors since its foundation, with the launch of a new Alumni Network.



IRB BARCELONA SCIENTIFIC PRODUCTION IN 2013

In 2013, IRB Barcelona researchers published a total of 203 papers in international peer-reviewed journals. Of these, nearly 80% belong to the top 25% (Q1). A selection of these appears here.



Bava FA, Eliscovich C, Ferreira PG, Miñana B, Ben-Dov C, Guigó R, Valcárcel J and Méndez R.

CPEB1 coordinates alternative 3'-UTR formation with translational regulation.
Nature, 495 (7439), 121-5 (2013)

Mosca R, Céol A and Aloy P.

Interactome3D: adding structural details to protein networks.
Nat Methods, 10 (1), 47-53 (2013)



Januschke J, Reina J, Llamazares S, Bertran T, Rossi F, Roig J and Gonzalez C.
Centrobin controls mother-daughter centriole asymmetry in *Drosophila* neuroblasts.

Nat Cell Biol, 15 (3), 241-8 (2013)

Just-Baringo X, Bruno P, Ottesen LK, Cañedo LM, Albericio F and Álvarez M.
Total synthesis and stereochemical assignment of baringolin.
Angew Chem-Int Edit, 52 (30), 7818-21 (2013)



Nevola L, Martín-Quirós A, Eckelt K, Camarero N, Tosi S, Llobet A, Giralt E and Gorostiza P.

Light-regulated stapled peptides to inhibit protein-protein interactions involved in clathrin-mediated endocytosis.

Angew Chem Int Edit, 52 (30), 7704-8 (2013)

Tintoré M, Gállego I, Manning B, Eritja R and Fàbrega C.

DNA origami as a DNA repair nanosensor at the single-molecule level.
Angew Chem-Int Edit, 52 (30), 7747-50 (2013)





Tulla-Puche J, Góngora-Benítez M, Bayó-Puxan N, Francesch AM, Cuevas C and Albericio F.

Enzyme-labile protecting groups for the synthesis of natural products: solid-phase synthesis of thiocoraline.

Angew Chem-Int Edit, 52 (22), 5726-30 (2013)



Pérez-Montero S, Carbonell A, Morán T, Vaquero A and Azorín F.
The embryonic linker histone H1 variant of Drosophila, dBigH1, regulates zygotic genome activation.

Dev Cell, 26 (6), 578-90 (2013)

Pelay-Gimeno M, García-Ramos Y, Jesús Martín M, Spengler J, Molina-Guijarro JM, Munt S, Francesch AM, Cuevas C, Tulla-Puche J and Albericio F.

The first total synthesis of the cyclodepsipeptide pipecolidepsin A.

Nat Commun, 4, 2352 (2013)

Muñoz JP, Ivanova S, Sánchez-Wandelmer J, Martínez-Cristóbal P, Noguera E, Sancho A, Díaz-Ramos A, Hernández-Alvarez MI, Sebastián D, Mauvezin C, Palacín M and Zorzano A.

Mfn2 modulates the UPR and mitochondrial function via repression of PERK.

Embo J, 32 (17), 2348-61 (2013)



Candotti M, Esteban-Martín S, Salvatella X and Orozco M.

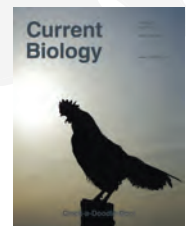
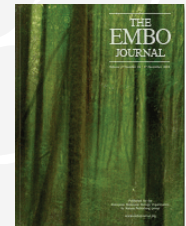
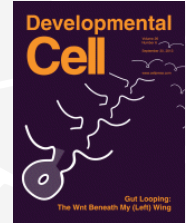
Toward an atomistic description of the urea-denatured state of proteins.

Proc Natl Acad Sci U S A, 110 (15), 5933-8 (2013)

Boulan L, Martín D and Milán M.

Bantam miRNA promotes systemic growth by connecting insuling signalling and ecdysone production.

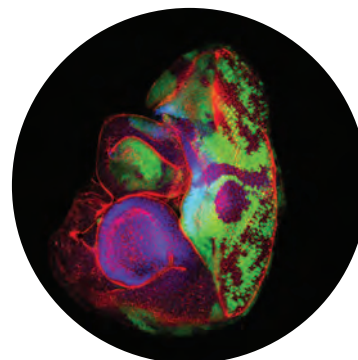
Curr Biol, 23 (6), 473-8 (2013)



RESEARCH PROGRAMMES AND CORE FACILITIES

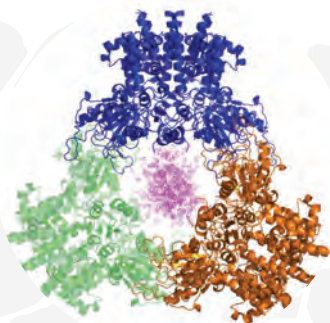
Cell and Developmental Biology

This Programme comprises 5 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 the studied processes underlie pathological conditions.



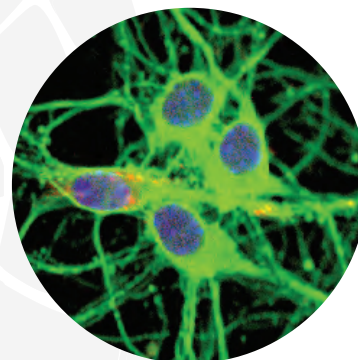
Structural and Computational Biology

Including 4 laboratories, this Programme brings together researchers from a variety of computational, physical, chemical, mathematical and statistical backgrounds with the common aim to study biological processes from a structural viewpoint and to further biomedical knowledge.



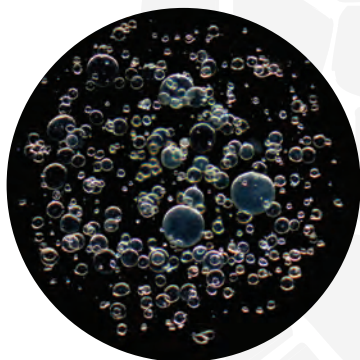
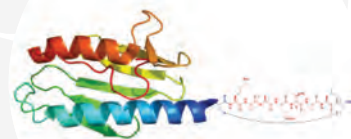
Molecular Medicine

In this Programme, 5 laboratories seek to further our knowledge of the molecular mechanisms that underlie physiological processes and their associated diseases and conversely to use insights from alterations in human diseases to solve fundamental biological problems. The creation of an active interface between the member research groups and clinical researchers is one of its goals.



Chemical and Molecular Pharmacology

Comprising 4 laboratories, this Programme is one of the key assets of our 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.



Oncology

The 5 groups forming 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, in collaboration with partners in university hospitals and the pharmaceutical industry, the possibilities of new diagnostic tools and therapies for cancer. A new group joined the Institute in 2013, focussing especially on cancer stem cells.

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, allowing the Institute to obtain outstanding results. Seven facilities are currently operating at the Institute: Advanced Digital Microscopy (ADM), Functional Genomics, Biostatistics/Bioinformatics, Mass Spectrometry, Mouse Mutant, Protein Expression, Histology.



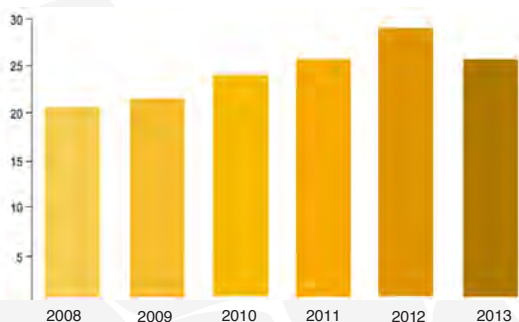
FACTS & FIGURES

12,446,542 €

Total of competitive funding obtained in 2013 by IRB Barcelona researchers through grants, networks and personnel grants.

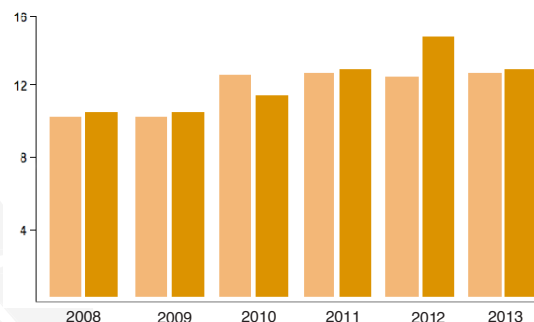
FUNDING

RUNNING BUDGET (million €)



The decrease of 2013 vs. 2012 is due to the fact that in 2013 six labs left IRB Barcelona as a result of the External Advisory Board evaluations.

COMPETITIVE FUNDING (million €)



COMPETITIVE FUNDING SOURCES (2013)

42%	Spanish Government
5%	AGAUR
22%	European Commission
31%	Private Foundations / Industry

154

National and international research projects and networks

IRB Barcelona Members

419
people

348	Laboratories
28	Core Facilities
43	Administration

Scientific Staff by Category

376
people

23	Group Leaders
7	Core Facility Managers
34	Research Associates
102	Postdoctoral Fellows
127	PhD Students
54	Technicians
21	Core Facility Officers
8	Other

COUNTRY OF ORIGIN OF FOREIGN STAFF MEMBERS



42%

Percentage of PhD students
who are non-Spanish nationals

58%

Percentage of Postdocs
who are non-Spanish nationals

36

Countries represented
at IRB Barcelona

IRB Barcelona

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IRB
BARCELONA

INSTITUTE
FOR RESEARCH
IN BIOMEDICINE

Board of Trustees:



**Generalitat
de Catalunya**



Universitat de Barcelona

Fundación BBVA

Location:



**Parc Científic
de Barcelona**

With the collaboration of:



European Union

European Regional Development Fund

Recognised as:



NARCÍS MONTURIOL PLAQUE RECIPIENT