



IRB
BARCELONA

INSTITUTE
FOR RESEARCH
IN BIOMEDICINE



Annual Report Summary 2017



2017

A spectacular year of achievements

In 2017, IRB Barcelona made some great achievements, bringing about significant scientific results and important institutional accomplishments.

As an example of one such accomplishment, at the end of the year, we were named for the first time beneficiary of a bequest, amounting to 1.5M €, made by a couple from Barcelona. In line with their wishes, this bequest will be used to fund projects on cancer and metastasis. Proud of this achievement and grateful for the trust placed in us, we will endeavour to make the best use of this donation.

Only by excelling in science, our *raison d'être*, can we rise to meet the expectations of society. In 2017, we continued to strengthen our position, and indeed achieved a great impact in the scientific community, with 182 scientific papers published, 93.1% of our articles falling in the first quartile and 77.7% in the first decile of scientific journals with the highest impact.

These outstanding achievements came about from the labour of our exceptional community, formed by talented professionals—who we strive to attract. Last year the scientific capacity of IRB Barcelona was boosted through the joining of Fran Supek, an outstanding young group leader, and Manuel Serrano, an internationally recognised scientist. Backed by ERC funding, they have chosen to pursue their careers in the stimulating and competitive environment provided by our Institute.

As a public research centre, IRB Barcelona is subjected to periodic appraisals by our Trustees and Evaluation Committees. In 2017, we achieved a maximum score in an evaluation conducted by the CERCA Institution. In this regard, the report stated that IRB Barcelona is performing science at an international level and that it has shown outstanding development in recent years.

Furthermore, in 2017, we continued to channel efforts into increasing our international presence through flagship European projects, maintaining our leadership in science and innovation, strengthening our position by fostering synergies with the other BIST centres, consolidating our Alumni network, and further exploring ways to build on our relationship with the public. Our wide and rich community kept on tackling challenges, overcoming obstacles and developing cutting-edge research of excellence, thus allowing IRB Barcelona to flourish.

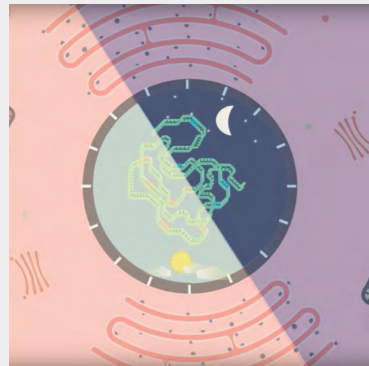
Visit our Scientific Discoveries and Institutional Highlights to learn more about IRB Barcelona's achievements in 2017.

Joan J. Guinovart

IRB Barcelona Director (2005 – 2018)

Discoveries

In 2017 we delivered on high quality scientific results. In this regard, we produced 182 papers, which were published in top-ranking journals, thus reflecting the increasing quality and impact of our research activities. We have excelled in the fields of cancer and metastasis, chemical biology, developmental biology, computational biology, and research into aging, among many other fields.



The biological rhythm of ageing

Two studies published in Cell Press and led by Salvador Aznar Benitah show that aged stem cells conserve circadian rhythm but now perform another set of functions to tackle the problems that arise with age.

Solanas, Guiomar et al. Aged Stem Cells Reprogram Their Daily Rhythmic Functions to Adapt to Tissue-Specific Stress. *Cell* (2017), volume 170, Issue 4, 678 - 692.e20

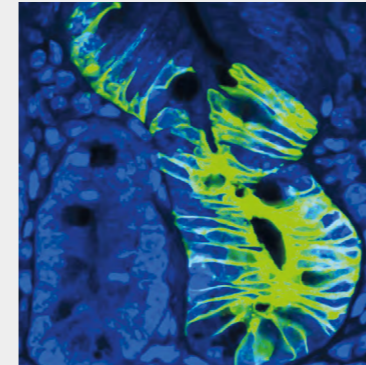
Sato, Shogo et al. Circadian Reprogramming in the Liver Identifies Metabolic Pathways of Aging. *Cell* (2017), volume 170, Issue 4, 664 - 677.e11



Better DNA repair in protein coding regions

Bioinformaticians headed by Núria López-Bigas discovered that protein coding regions in the genome undergo fewer mutations than introns (non-coding regions).

Frigola, Joan et al. Reduced mutation rate in exons due to differential mismatch repair. *Nature Genetics* (2017), volume 49, pages 1684-1692



The intestine has a reservoir of stem cells that are resistant to chemotherapy

A reservoir of previously unknown quiescent stem cells in the intestine intervenes in situations where the normal stem cell population is depleted, according to a study from Eduard Batlle's Colorectal Cancer lab and published in *Cell Stem Cell*.

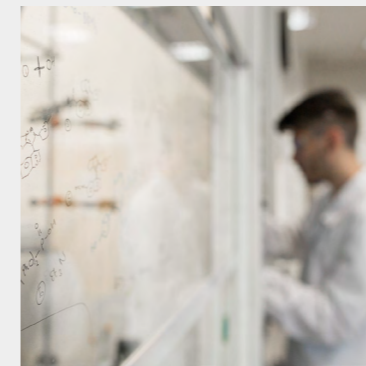
Barriga, Francisco M. et al. Mex3a Marks a Slowly Dividing Subpopulation of Lgr5+ Intestinal Stem Cells. *Cell Stem Cell* (2017), Volume 20, Issue 6, 801 - 816.e7



The protein CPEB4 can protect against fatty liver disease

In a study published in *Nature Cell Biology*, "la Caixa" PhD student Carlos Maíllo revealed that CPEB4 orchestrates the liver stress response to uncontrolled ingestion of fats in mice with fatty liver.

Maíllo, Carlos et al. Circadian- and UPR-dependent control of CPEB4 mediates a translational response to counteract hepatic steatosis under ER stress. *Nature Cell Biology* (2017), 19, pages 94-105

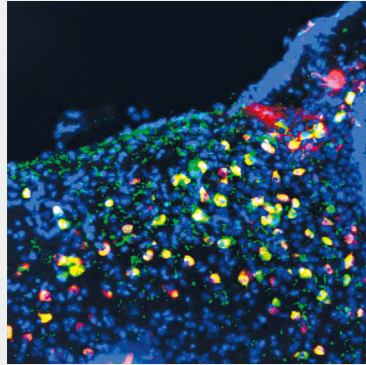


Glycogen synthesis does not require glycogenin protein

A study led by Joan J. Guinovart and postdoc Giorgia Testoni and published in *Cell Metabolism* challenged long-standing assumptions about glycogen biology.

Testoni, Giorgia et al. Lack of Glycogenin Causes Glycogen Accumulation and Muscle Function Impairment. *Cell Metabolism* (2017), Volume 26, Issue 1, 256 - 266.e4

Discoveries



POMC neurons tell pancreas how much insulin to produce

A study co-led by Antonio Zorzano and Marc Claret (IDIBAPS) describes new molecular mechanisms involved in the connection between a group of neurons in the hypothalamus, the detection of nutrient availability and insulin secretion in the pancreas.

Ramírez, Sara et al. Mitochondrial Dynamics Mediated by Mitofusin 1 Is Required for POMC Neuron Glucose-Sensing and Insulin Release Control. *Cell Metabolism* (2017), Volume 25, Issue 6, 1390 - 1399.e6



Towards a deeper understanding of genome regulation

The journal *Nature Structural & Molecular Biology* published a study on the regulation of mRNA translation, authored by researchers in the Translational Control of Cell Cycle and Differentiation lab.

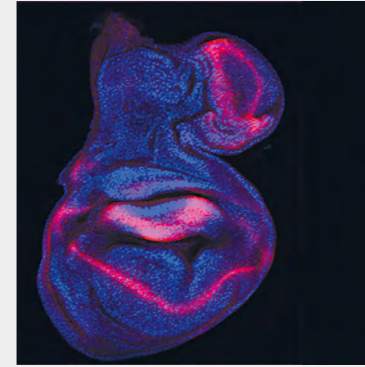
Weill, Laure et al. Musashi 1 regulates the timing and extent of meiotic mRNA translational activation by promoting the use of specific CPEs. *Nature Structural & Molecular Biology* (2017), volume 24, pages 672–681



Histone 1, the guardian of genome stability

Scientists led by Ferran Azorín, CSIC research professor and head of the Chromatin Structure and Function lab at IRB Barcelona, published a study in the journal *Nature Communications* on the function of histone 1, the least known of the five histones.

Bayona-Feliu, Aleix et al. Linker histone H1 prevents R-loop accumulation and genome instability in heterochromatin. *Nature Communications* (2017), volume 8, Article number: 283 (2017)



The fly reveals a new signal involved in limb growth

The JAK/STAT signalling pathway determines where, when and how a wing develops in *Drosophila* flies, concludes a study led by Marco Milán's Development and Growth Control lab and published in *Nature Communications*.

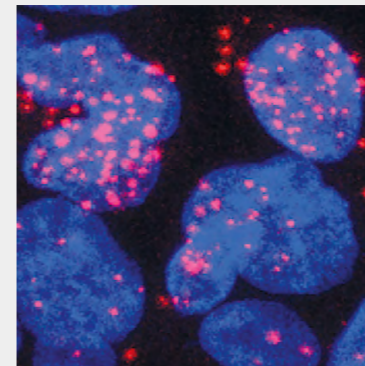
Recasens-Alvarez, C.; Ferreira, A.; Milán, M. JAK/STAT controls organ size and fate specification by regulating morphogen production and signalling. *Nature Communications* (2017) volume 8, Article number: 13815



Understanding the adaptability of Smads

A study published in *Nature Communications* and led by Maria J. Macias highlights new DNA motifs for the Smad proteins.

Martin-Malpartida, Pau et al. Structural basis for genome wide recognition of 5-bp GC motifs by SMAD transcription factors. *Nature Communications*, volume 8, Article number: 2070 (2017)



Tiny target, big promises

A study conducted by Xavier Salvatella found a 20-amino acid motif that is essential to hyper-activate the androgen receptor, a key element in the development of prostate cancer.

De Mol, Eva et al. Regulation of Androgen Receptor Activity by Transient Interactions of Its Transactivation Domain with General Transcription Regulators. *Structure* (2017), Volume 26, Issue 1, 145 - 152.e3

Institutional Highlights



GROUP LEADER RECRUITMENT

Manuel Serrano establishes his Cellular Plasticity and Disease Laboratory at IRB Barcelona

An international reference in cancer, metabolism, ageing and tissue reparation, Manuel Serrano joined the Institute in April 2017 under an ICREA Research Professor contract from the Catalan Government and with funding from the “la Caixa” Foundation.



GROUP LEADER RECRUITMENT

Fran Supek opens new laboratory for analysis of genomic ‘big data’ at IRB Barcelona

The 37-year-old bioinformatics and genomics researcher started his new laboratory, Genome Data Science (aGENDAS), within the Structural and Computational Biology Research Programme.

EUROPEAN PROJECTS

The first ENABLE symposium

The brainchild of IRB Barcelona, three other European centres and a science communication company, ENABLE held the 1st European PhD and Postdoc symposium “Breaking Down Complexity: Innovative Models and Techniques in Biomedicine” in November 2017.



EUROPEAN PROJECTS

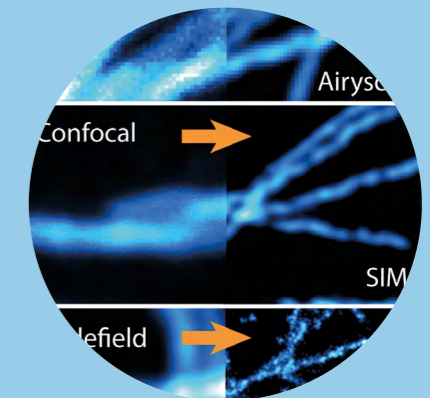
A MuG of genomics

Multiscale Complex Genomics (MuG), a European project headed by Modesto Orozco, held back-to-back workshops on the “Multi-scale study of 3D chromatin structure” in November and December 2017.

NEW SR EQUIPMENT

Standing up for Super Resolution

The Advanced Digital Microscopy facility, led by Julien Colombelli, acquired a new microscope to continue offering state-of-the-art bioimaging services to the scientific community.



Institutional Highlights



PHILANTHROPY

Touched by generosity

IRB Barcelona received a bequest amounting to 1.5M € made by a couple from Barcelona.



PUBLIC ENGAGEMENT

“Scientific discoveries have always had a profound impact on art”

At the beginning of 2017, IRB Barcelona launched its Artist in Residence Programme, which had Anna Rierola as the first invited artist.

ALUMNI

2nd Alumni of Excellence Award: Marc Liesa

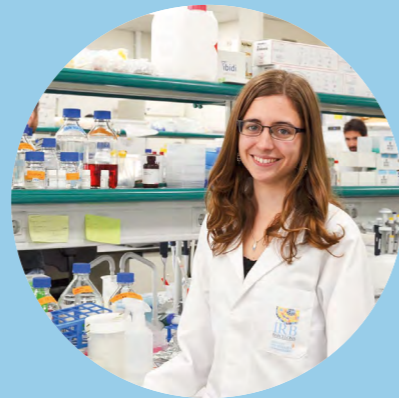
Alumnus Marc Liesa, Assistant Professor-in-residence at the Department of Medicine at the University of California, Los Angeles, was presented the 2017 IRB Barcelona Alumni of Excellence Award.



PHILANTHROPY

Elena Meléndez, recipient of the first “IRB Barcelona Futur” PhD fellowship

The 2017 academic year began with the arrival of 11 new students through IRB Barcelona’s International PhD Programme—among them Elena Meléndez, the recipient of the first “IRB Barcelona Futur” PhD fellowship who joined Manuel Serrano’s Lab.



COMMITTEES

A Committee for Research Integrity is created

Núria López-Bigas chairs the new Committee for Research Integrity, which oversees the promotion of initiatives related to research integrity.

Facts & Figures

Publications



188
Publications

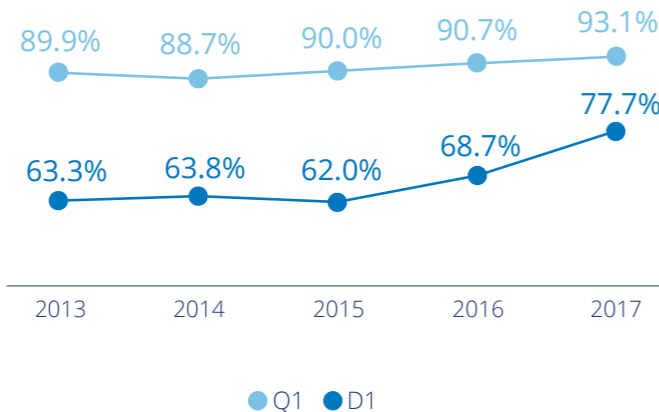


93.1%
Q1 Publications
SJR 2015



77.7%
D1 Publications
SJR 2015

Trends in Q1/D1 since 2013



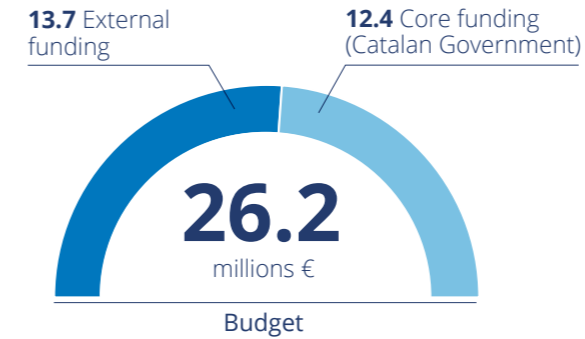
Funding

154

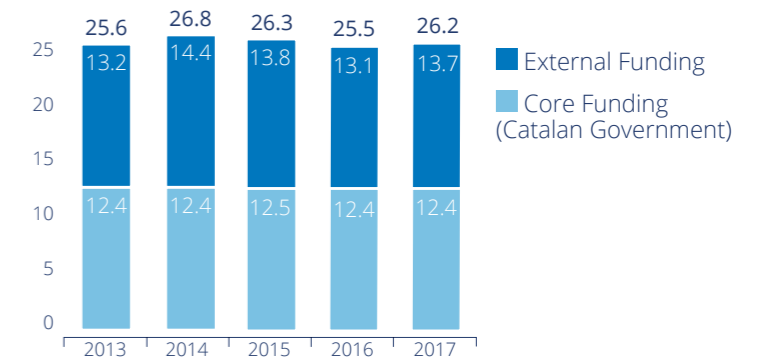
National and international
research projects and networks



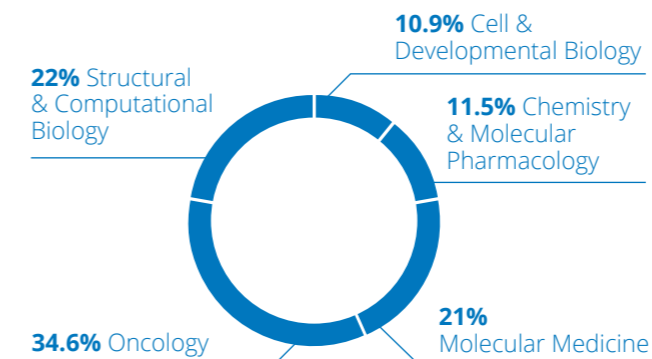
2017 Budget



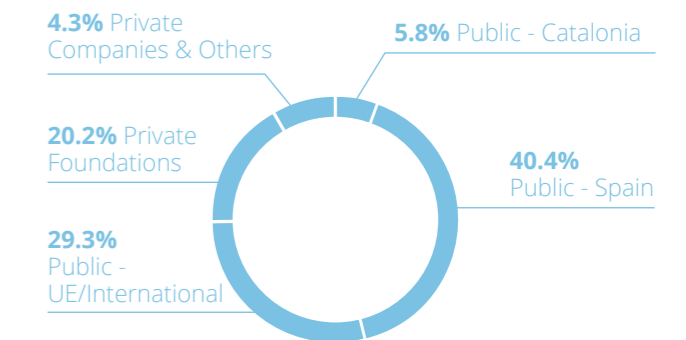
Running budget since 2013



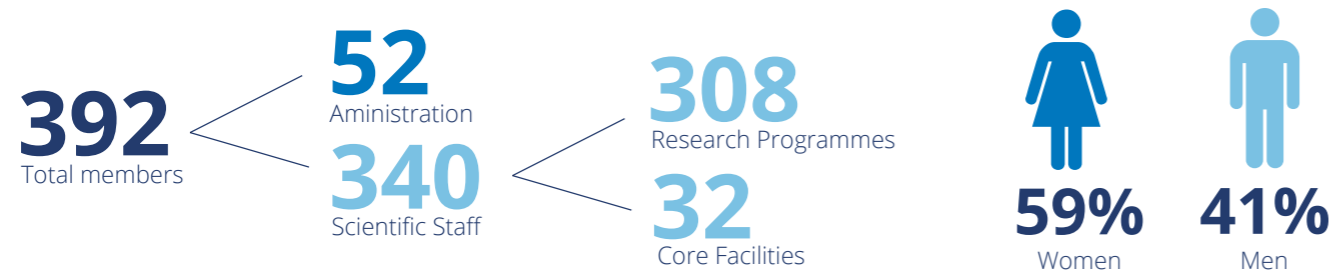
External Funding by Source



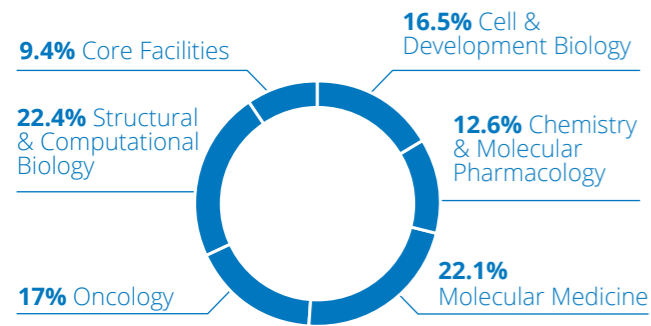
External Funding by Research Area



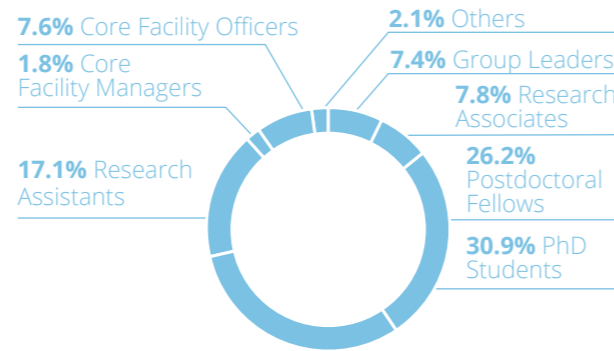
Staff



Scientific Staff by Research Area



Scientific Staff by Professional Category



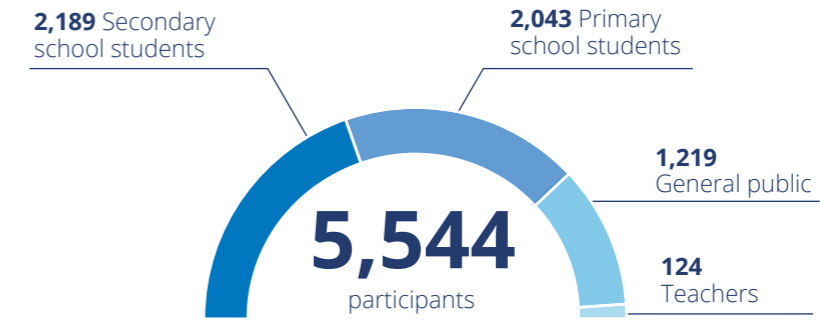
Innovation



Training and scientific events



Public Engagement & Science Education



Press & Social Media & web*



*Data from December 2017



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Credits

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Photos

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