

# CRG Postdoctoral Programme

Boost your career in biomedical sciences





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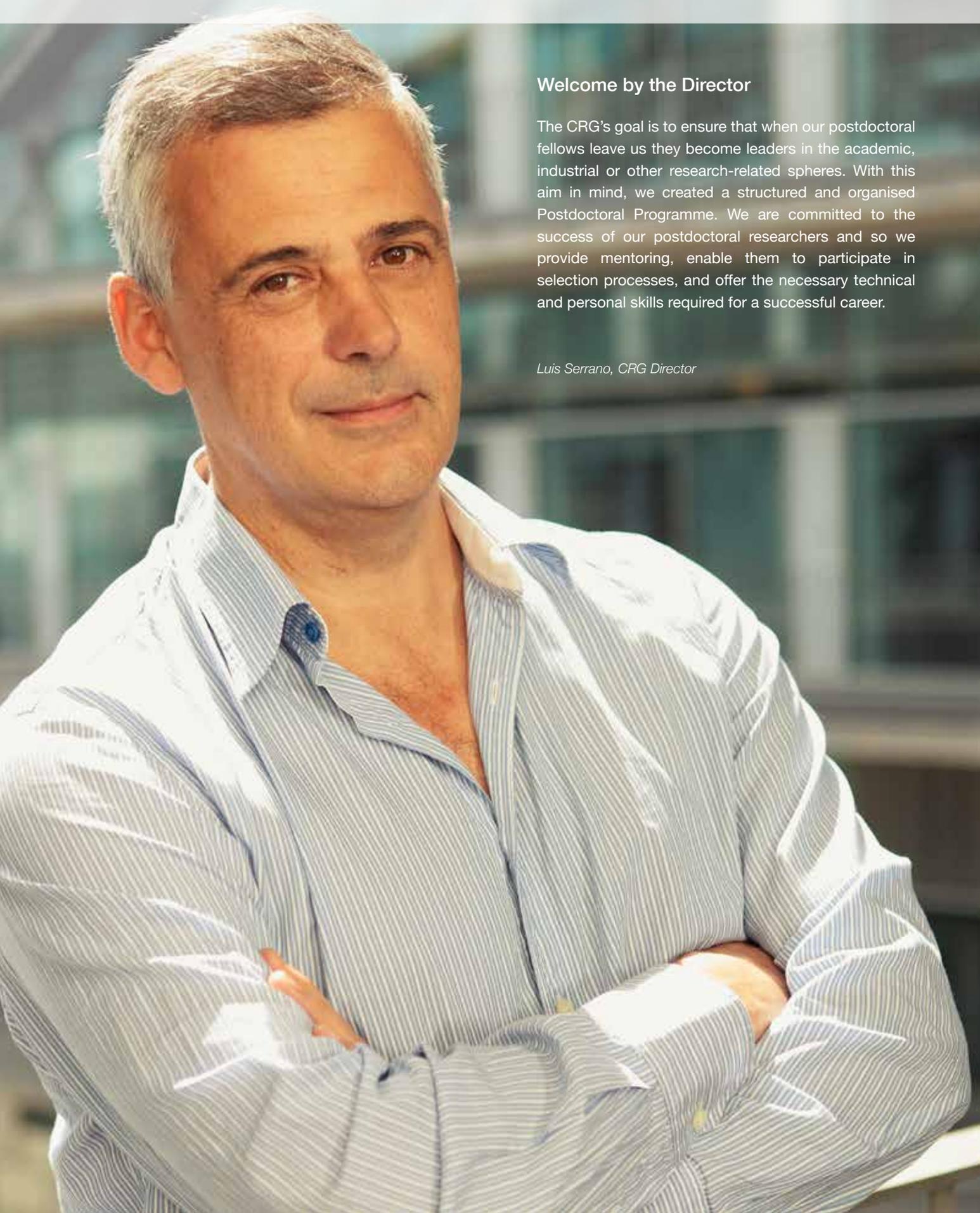
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## WELCOME TO THE CRG POSTDOCTORAL PROGRAMME

### Welcome by the Director

The CRG's goal is to ensure that when our postdoctoral fellows leave us they become leaders in the academic, industrial or other research-related spheres. With this aim in mind, we created a structured and organised Postdoctoral Programme. We are committed to the success of our postdoctoral researchers and so we provide mentoring, enable them to participate in selection processes, and offer the necessary technical and personal skills required for a successful career.

*Luis Serrano, CRG Director*



## Welcome by the Chair of the Postdoctoral Committee

Boost your career in science by stepping into the CRG and becoming a postdoctoral scientist for up to 5 years! This is the perfect environment for you to make fundamental discoveries and become an expert independent scientist in almost any field of science. You can choose between various different laboratories working at the cutting edge of science with just the right mixture of interdisciplinarity and high-gain research endeavours. At the CRG you will find the best environment not only to carry out successful and basic research but you will also meet extraordinary speakers from around the world, mentor Master's students, be trained in communication techniques, and start writing your own grants. On top of all this, you will be provided with the opportunity to enhance your soft skills and learn about technological transfer. The postdoc community at the CRG organises an annual symposium, retreats and invites external speakers. The group's diversity and different nationalities will also enrich your experience. Make your career a success story, come to the CRG and get on the path towards establishing yourself as one of science's future leaders.

*Pia Cosma, Chair of the Postdoctoral Committee*



## SCIENCE AT THE CRG

*“The medicine of the future depends on the ground breaking science of today”*

The CRG, the Centre for Genomic Regulation, is an international biomedical research institute of excellence. The CRG's scientific mission is to advance our understanding of the complexity of life from the genome to the cell to a whole organism and its interaction with the environment, offering an integrated view of genetic diseases.

The breadth of topics, approaches and technologies at the CRG allows us to ask a wide range of fundamental questions in life sciences and biomedicine. Multidisciplinary work involving collaboration between different CRG groups has made it possible to tackle key problems in the fields of genome structure, epigenetics, RNA synthesis and processing, and the role of non-coding RNAs in a variety of experimental systems, such as stem cell differentiation, cancer progression and animal disease models.

With more than 350 scientists from 41 different countries, the CRG's excellence is based on an interdisciplinary, motivated and creative scientific team which is supported by innovative high-end technologies.

*“Science is an international endeavour”*

Scientific excellence at the CRG is nurtured by a dynamic network of collaborations across disciplines, including chemistry, physics, computational science and medicine, and across borders, in Spain, Europe and worldwide.

In recent years, the CRG has spearheaded strategic partnerships with top European institutes to boost excellence in science and technological developments in life sciences, namely EU-LIFE (<http://eu-life.eu>) and CORE FOR LIFE (<http://www.coreforlife.eu>). The institute also participates in research and mobility programmes with the National Centre for Biological Science in Bangalore (Bangalore, India), the Riken Centre for Developmental Biology (Kobe, Japan), the Sidney Brenner Institute for Molecular Biosciences at Wits University (Johannesburg, South Africa), and the University of Buenos Aires (Argentina), to name but a few.

At a European level, since 2006 the CRG has maintained a fruitful partnership with the European Molecular Biology Laboratory (EMBL), which supports the EMBL-CRG Systems Biology Research Unit to advance the understanding of complex biological systems.

Overall, CRG partnerships allow knowledge and capacity to be continuously exchanged with the international scientific community, and attract top talent to the CRG from all over the world (Fig. 1).

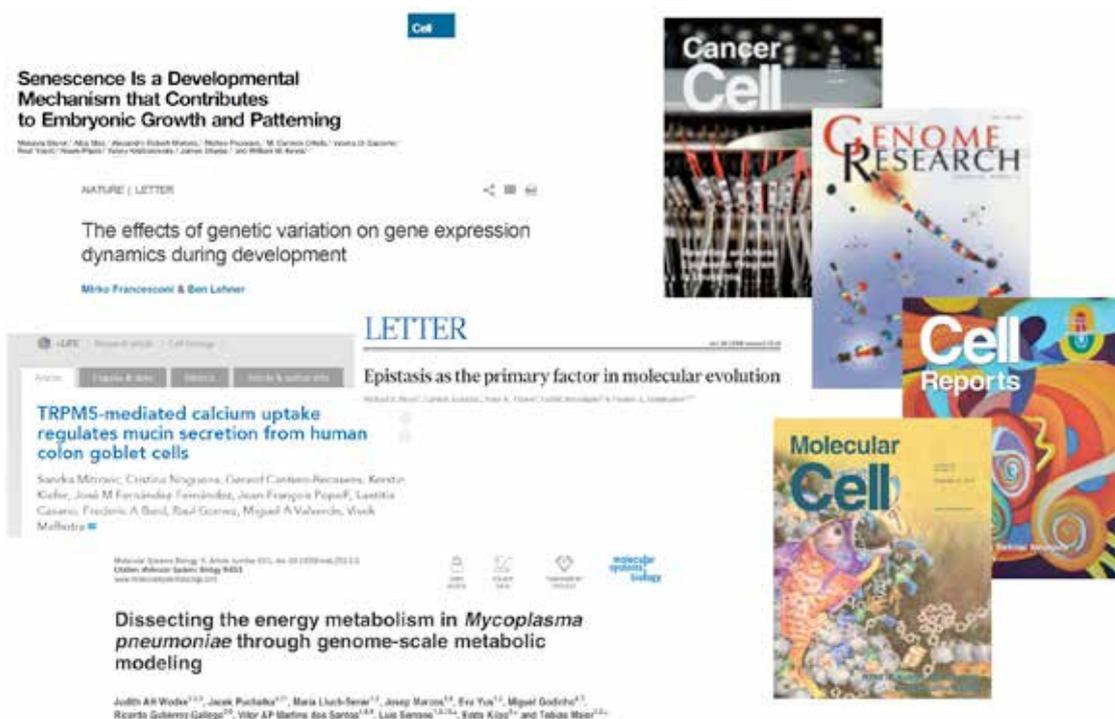
In 2013, the CRG maintained its very successful track record in attracting competitive funding from highly prestigious funding agencies (€11.4 million). Currently, funding from the European Commission (€5.2 million not including projects under negotiation) represents the largest share of competitive funding, taking the CRG to 11th position in the Spanish rankings for EU funds, and 1st by size after the large organisations and companies. As an indicator of excellence, the CRG is the Spanish institute with the most ERC life science grants with 13 current awards (7 Starting, 3 Advanced, 1 Proof of Concept, 1 Consolidator, 1 Synergy – with 2 under negotiation), amounting to 30.5 M€.

Fig. 1: Partnerships



In 2013, CRG researchers published 197 papers in international peer-reviewed journals, putting the CRG in 9th place worldwide according to the Q1 indicator for the health sector (SCImago Institution Rankings World Report 2007-2011) (Fig. 2).

Fig. 2: Publications 2012-2013

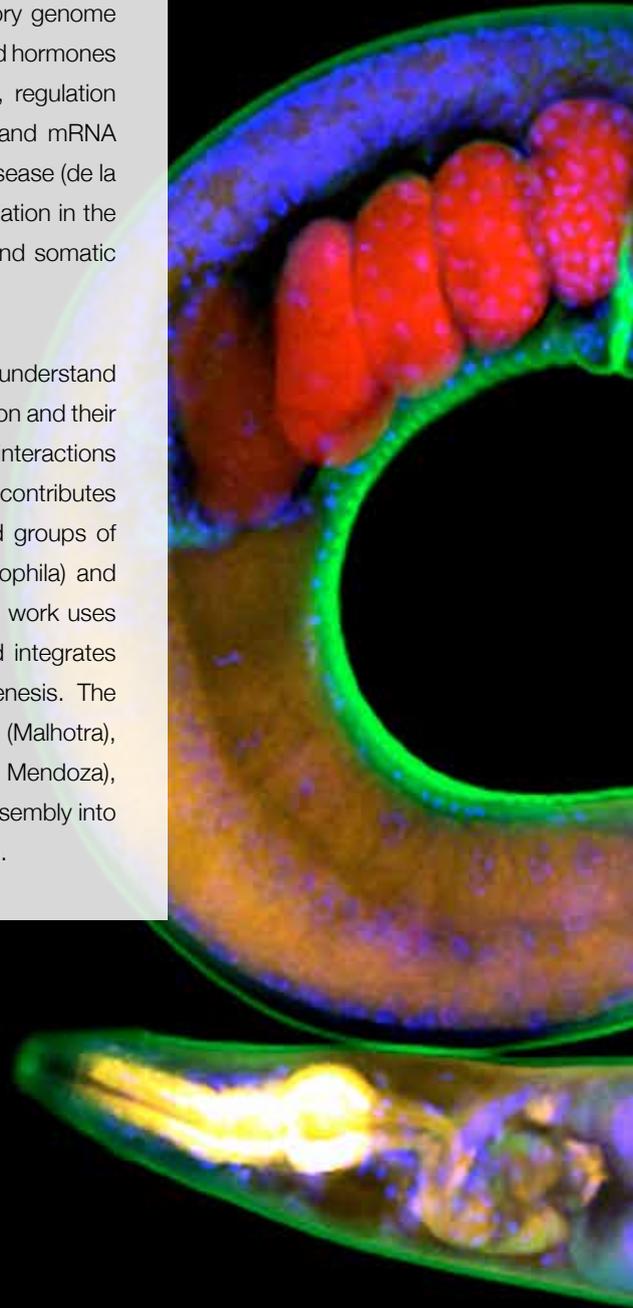


## RESEARCH PROGRAMMES

Research at the CRG centres on four main programmes:

**Gene Regulation, Stem Cells and Cancer** The objectives of this programme are to elucidate the mechanisms of gene expression and epigenetic regulation and the molecular basis of cellular decisions involved in tissue homeostasis and cancer. The main research lines include the organisation and evolution of the regulatory genome (Filion), chromatin structure and transcriptional regulation mediated by steroid hormones (Beato), epigenetic mechanisms in leukaemia and stem cells (Di Croce), regulation of alternative splicing in cancer (Valcárcel); cytoplasmic polyadenylation and mRNA translation (Gebauer); and gene dosage related to signalling pathways in disease (de la Luna). Work on stem cell biology includes differentiation and transdifferentiation in the haematopoietic system (Graf), senescence, cancer and ageing (Keyes), and somatic cell reprogramming and tissue regeneration (Cosma).

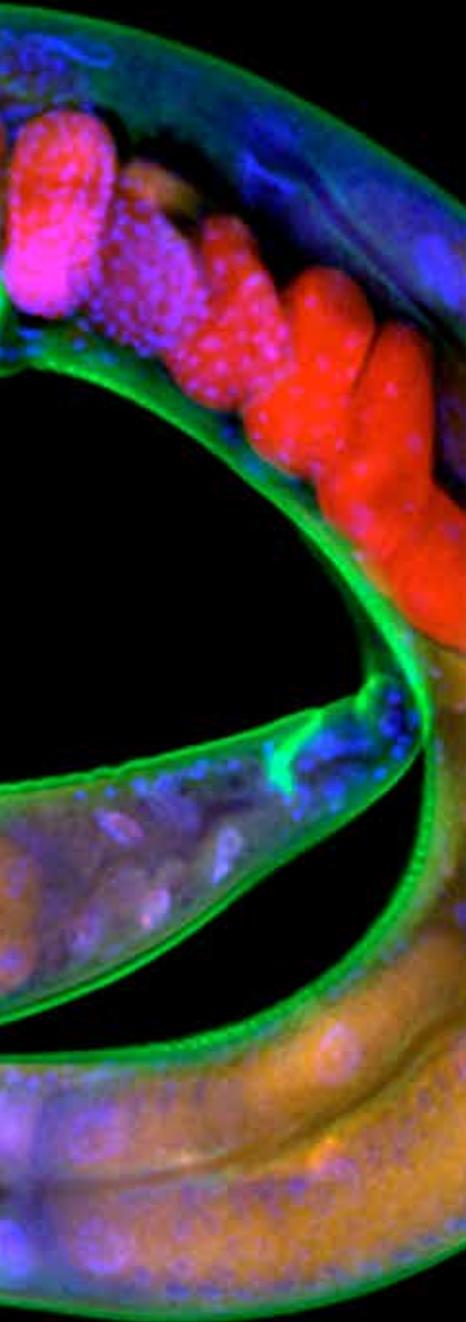
**Cell and Developmental Biology** The objectives of this programme are to understand the mechanisms of cell compartmentalisation, division and tissue organisation and their roles in determining cell-specific properties. The research focuses on the interactions between intercellular signalling systems and the cytoskeleton and how this contributes to the spatial organisation and information processing ability of cells and groups of cells. There is an emphasis on strong genetic systems (yeast and *Drosophila*) and those amenable to biochemistry (*Xenopus* and mammalian cell lines). The work uses multidimensional phenotypes grounded in genomics and proteomics and integrates interdisciplinary approaches, such as computer modelling of morphogenesis. The specific interests of the groups include protein sorting and secretion (Malhotra), microtubule dynamics and chromosome segregation (Vernos and Mendoza), cytoskeleton-dependent RNA transport (Maurer), cell migration and their assembly into a tissue (Solon and Malhotra), and lipid and protein homeostasis (Carvalho).



## 27 Marie Curie Fellows and 19 EMBO Fellows in the last five years

**Bioinformatics and Genomics** The objectives of this programme are the implementation of computational and experimental approaches to understand the encoding of biological information in the sequence of genomes and its relationship to human health. Research lines include investigating the signals involved in gene specification in genomic sequences (Guigo); the development of new tools for analysing protein and RNA sequences (Notredame); comparative genomics approaches for studying complex biological systems of clinical relevance (Gabaldon); the prediction and analysis of protein-RNA interactions (Tartaglia); population genetics and evolutionary theory applied to computational studies of genomic information (Kondrashov); the role of genomic and epigenomic variation (Ossowski and Estivill), and non-coding RNAs (Estivill) in genetic diseases and cancer.

**Systems Biology** The aim of this programme is to achieve a global, dynamic and quantitative understanding of biological systems, developing models that capture biological complexity and have predictive value. Common to all these groups is the integration of quantitative measurements with computer modelling of the systems analysed. Research lines include work on signal transduction in cancer and modelling of small organisms (Serrano), the relationship between genotype and phenotype and the impact of genetic noise (Lehner), modelling and analysis of organogenesis (Sharpe), comparative analysis of developmental systems in insects (Jaeger); quantitative analysis of sensory systems and behaviour (Louis); and behavioural and integrative neuroscience in mouse models of disease (Dierssen). Since 2006, the Systems Biology programme has hosted the EMBL-CRG Systems Biology Research Unit, in partnership with the European Molecular Biology Laboratory.





*3 out of 4 postdoctoral  
researchers are from abroad*



## CORE FACILITIES

The cutting-edge CRG Core Facilities offer the latest technologies, are continuously exploring new and emerging technologies, and are central to the training programme at the institute. The six current units are Genomics, Proteomics, Advanced Light Microscopy, Biomolecular Screening & Protein Technologies, FACS, and Bioinformatics, but there is also a Histology Service and a Storage and Computing Unit that are only accessible to internal users. The CRG also offers access to the modern animal house at the PRBB.

The **Advanced Light Microscopy Unit** covers the whole spectrum of advanced microscopy applications with a recent focus on super-resolution microscopy.

The **Genomics Unit** contains facilities for generating and analysing Microarrays and Next-generation Sequencing, featuring state-of-the-art instruments for high-throughput genetic analysis and functional genomics, as well as de novo sequencing.

The **Proteomics Unit** focuses on latest-generation technology mass spectrometry for hypothesis-free as well as targeted proteomics. Applications include the identification of proteins and post-translational modifications, biomarker analysis, and quantitative proteomics using label-free quantification, isobaric tags for relative and absolute quantitation (iTRAQ), and stable isotope labelling with amino acids in cell culture (SILAC).

The **FACS Unit** with its six analysers and two sorters is one of the most comprehensive in Spain and the largest Becton Dickinson site in the country.

The **Biomolecular Screening & Protein Technology Unit** supports high-end robotic platforms and accessory equipment for medium to high-throughput RNA interference assays, chemical screenings, image-based high-content screening, protein and cell engineering and biophysical characterisation of proteins and nucleic acids.

The **Bioinformatics Unit** offers training, scientific user support, application development and custom-designed data analysis pipelines to researchers and the other core facilities.

# The faces of our science

To learn more about the groups and  
core facilities at the CRG:

[www.crg.eu/research](http://www.crg.eu/research)

[www.crg.eu/core\\_facilities](http://www.crg.eu/core_facilities)



## LIST OF RESEARCH GROUPS & CORE FACILITIES

### RESEARCH GROUPS

#### Bioinformatics and Genomics Programme

Computational Biology of RNA Processing  
Group leader: Roderic Guigó

Genomics and Disease  
Group leader: Xavier Estivill

Comparative Bioinformatics  
Group leader: Cedric Notredame

Comparative Genomics  
Group leader: Toni Gabaldón

Evolutionary Genomics  
Group leader: Fyodor Kondrashov

Gene Function and Evolution  
Group leader: Gian Gaetano Tartaglia

Genomic and Epigenomic Variation in Disease  
Group leader: Stephan Ossowski

EGA  
Attached team leader: Arcadi Navarro

#### Cell and Developmental Biology Programme

Intracellular Compartmentation  
Group leader: Vivek Malhotra

Microtubule Function and Cell Division  
Group leader: Isabelle Vernos

Coordination of Cytokinesis with Chromosome Segregation  
Group leader: Manuel Mendoza

Biomechanics of Morphogenesis  
Group leader: Jerome Solon

Organelle Biogenesis and Homeostasis  
Group leader: Pedro Carvalho

Cytoskeleton dependent RNA distribution mechanisms.  
Group leader: Sebastian Maurer

#### Gene Regulation, Stem Cells and Cancer Programme

Regulation of Alternative pre-mRNA Splicing during Cell Differentiation, Development and Disease  
Group leader: Juan Valcárcel

Haematopoietic Stem Cell Biology and Differentiation  
Group leader: Thomas Graf

Chromatin and Gene Expression  
Group leader: Miguel Beato

Reprogramming and Regeneration  
Group leader: Maria Pia Cosma

Epigenetic Events in Cancer  
Group leader: Luciano Di Croce

Regulation of Protein Synthesis in Eukaryotes  
Group leader: Fátima Gebauer

Gene Function  
Group leader: Susana de la Luna

Mechanisms of Cancer and Ageing  
Group leader: Bill Keyes

Genome Architecture  
Group leader: Guillaume Filion

Structural Genomics  
Group leader: Marc Marti-Renom

#### Systems Biology Programme

Multicellular Systems Biology  
Group leader: James Sharpe

Design of Biological Systems  
Group leader: Luis Serrano

Genetic Systems  
Group leader: Ben Lehner

Sensory Systems and Behaviour  
Group leader: Matthieu Louis

Comparative Analysis of Developmental Systems  
Group leader: Johannes Jaeger

Cellular & Systems Neurobiology  
Group leader: Mara Dierssen

#### CORE FACILITIES

(Director: Mònica Morales)

Advanced Light Microscopy  
Unit leader: Timo Zimmermann

Bioinformatics  
Acting unit leader: Jean-François Taly

Genomics  
Unit leader: Heinz Himmelbauer

Proteomics  
Unit leader: Eduard Sabidó

Biomolecular Screening & Protein Technologies  
Unit leader: Carlo Carolis

FACS  
Unit leader: Òscar Fornas

## THE CRG POSTDOCTORAL PROGRAMME

### SCIENTIFIC TRAINING AND CAREER DEVELOPMENT

The CRG offers integrated training covering training-through-research (scientific project with the supervision of the Principal Investigator), as well as hands-on and theoretical courses, regular conferences and seminars with top guest speakers, data and journal clubs and annual retreats to empower postdoctoral fellows with new skills and competences. Taking advantage of the highly interdisciplinary nature of the CRG, fellows will benefit from training in various fields that will allow them to develop groundbreaking research projects at the frontiers of different scientific disciplines. The Courses@CRG series offered to the scientific community covers a wide range of topics, from practical scientific to technological courses. Career development and complementary skills are provided through the successful INTERVALS Programme open to PRBB residents. This training, including a range of skills such as scientific and grant writing, publication in high-ranking journals and presentation skills, will enhance the future career progress and improve the employability of postdocs.

### POSTDOCTORAL COMMUNITY

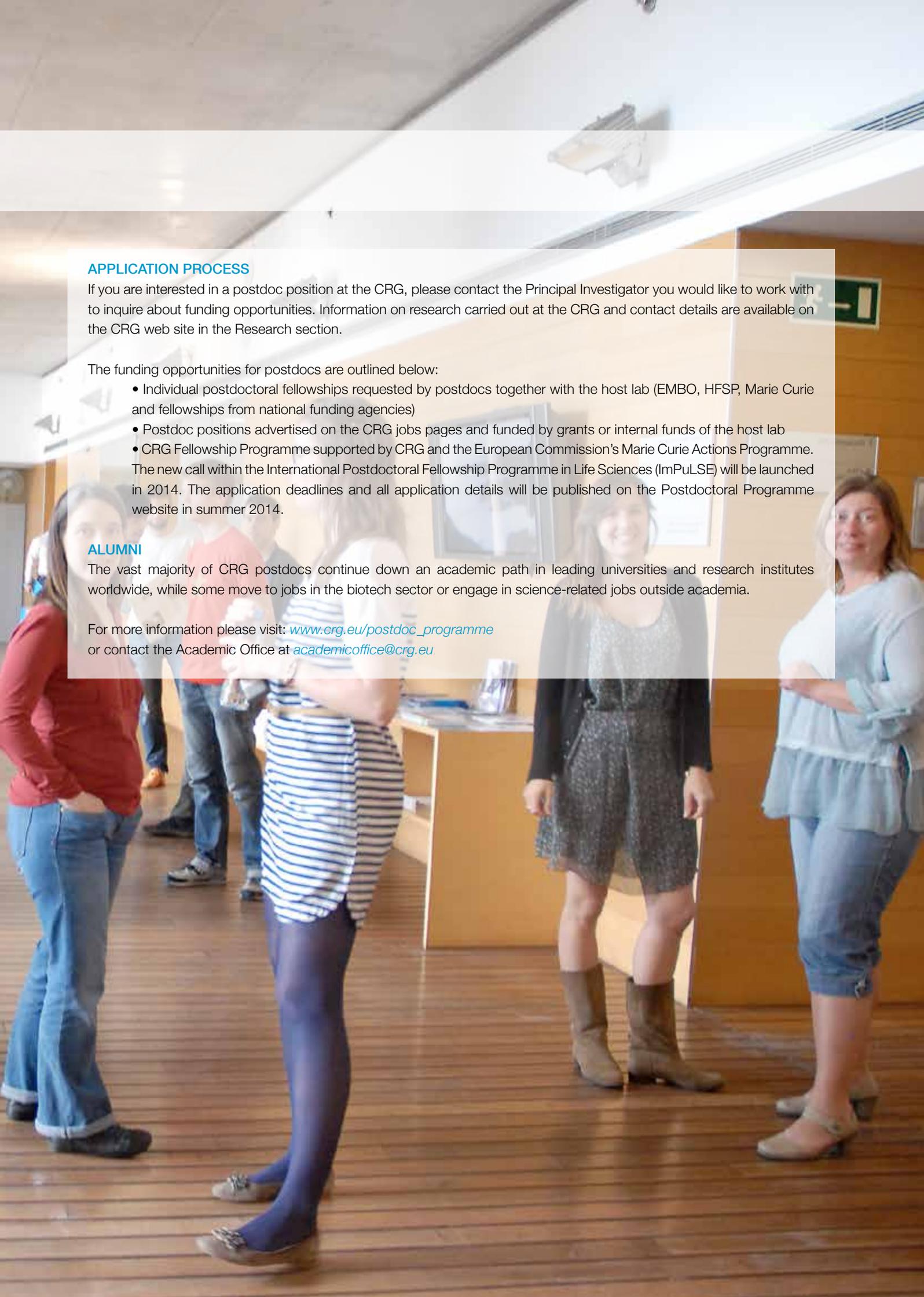
The diverse and international postdoc community at the CRG is made up of around 100 members. Activities for the postdocs at the CRG include an annual retreat and symposium, mock interviews as training for future job applications, and additional events promoted and organised together with the PhD community, such as the Career Fair. Fellows are also encouraged to take part in the wide range of outreach activities organised by the CRG through the dedicated outreach programme which promotes the new scientific vocations and facilitates dialogue with the general public. PRBB residents are also offered a number of social activities on campus such as a beach volleyball tournament, drama group, choir, yoga and capoeira classes. Happy hours at the CRG bring the entire community together and facilitate informal exchanges.

### EMPLOYMENT CONDITIONS AND BENEFITS

Fellows receive a competitive salary, as well as a travel allowance and relocation services for international fellows, including support for visa formalities, accommodation and finding local amenities. The CRG also offers Spanish and Catalan classes to help integrate foreign postdocs into life in Barcelona. The maximum length of a postdoctoral stay at CRG is five years.

CRG has received the "HR Excellence in Research" award from the European Commission. This is in recognition of the institute's commitment to developing and implementing an HR Strategy for Researchers, designed to bring the CRG practices and procedures in line with the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. The CRG has adopted an action plan (2013-2015) to promote and enhance recruitment policies and working conditions, provide a positive working environment (including gender balance action) and support talent through the provision of comprehensive training and career development.

*Very diverse postdoc community  
with over 100 members*



## APPLICATION PROCESS

If you are interested in a postdoc position at the CRG, please contact the Principal Investigator you would like to work with to inquire about funding opportunities. Information on research carried out at the CRG and contact details are available on the CRG web site in the Research section.

The funding opportunities for postdocs are outlined below:

- Individual postdoctoral fellowships requested by postdocs together with the host lab (EMBO, HFSP, Marie Curie and fellowships from national funding agencies)
- Postdoc positions advertised on the CRG jobs pages and funded by grants or internal funds of the host lab
- CRG Fellowship Programme supported by CRG and the European Commission's Marie Curie Actions Programme. The new call within the International Postdoctoral Fellowship Programme in Life Sciences (ImPuLSE) will be launched in 2014. The application deadlines and all application details will be published on the Postdoctoral Programme website in summer 2014.

## ALUMNI

The vast majority of CRG postdocs continue down an academic path in leading universities and research institutes worldwide, while some move to jobs in the biotech sector or engage in science-related jobs outside academia.

For more information please visit: [www.crg.eu/postdoc\\_programme](http://www.crg.eu/postdoc_programme)  
or contact the Academic Office at [academicoffice@crg.eu](mailto:academicoffice@crg.eu)

## WHAT OUR POSTDOCTORAL RESEARCHERS SAY



"I remember coming for my interview at the CRG and being very impressed both by the quality of the research and by how young and dynamic the researchers were, ranging from technicians to PIs. I still think these are the key assets of this evolving community. At the time I started my postdoc I had decided to change topic from my PhD and start entering a fairly new field. I was quite worried about it, but since day one I have received a huge amount of support and stimulating input from the entire community at the CRG. Research is intrinsically challenging, but the CRG is a place that motivates you not to give up and aim to achieve better and better results. The atmosphere is strikingly multicultural and the approach to scientific problem solving is a truly multidisciplinary one. In addition to great support for your research, the CRG also offers the postdocs a number of events, seminars and retreats where it is possible to meet great speakers or, for example, discuss career choices. "

*Nationality: Italian*

*Benedetta Bolognesi, INTERPOD Postdoctoral Fellow, currently at Gian G. Tartaglia and Ben Lehner's labs, and a Postdoctoral Community rep at the CRG.*



"I am originally from Mexico, I did my PhD in the US and a 2-year postdoc in Germany. After all this traveling, I find being a postdoc at the CRG a very stimulating and exciting experience! The advantages of living in a vibrant city (Barcelona) and working on the seafront are not matched by many other places. On top of that, the group leaders at the CRG perform cutting-edge research using state-of-the-art facilities in microscopy, genomics, proteomics and bioinformatics. Collaboration is at the heart of the CRG, for instance, my research project is financed by a collaborative fellowship that promotes novel research lines among group leaders. Thus, innovation, commitment to avant-garde research and location make the CRG a unique and culturally diverse place to work. The CRG commitment is not only towards research, but also towards career development and excellence in Human Resources. There are many courses offered to postdocs on developing presentations, writing and management skills, science communication and effective collaborations. Many of these are also offered at EMBL, MIT, Harvard and Cambridge University! In summary, at the CRG I have really learned to collaborate in an interdisciplinary research group, to understand the common language of mathematical tools, to develop my career skills and to grow as a scientist in an open multicultural research environment. Besides, Barcelona is also a family-friendly city! I couldn't ask for more!"

*Nationality: Mexican*

*Juan J. Fraire-Zamora, INTERPOD Postdoctoral Fellow, currently at Jerome Solon and Johannes Jäger's labs.*

“I come from a slightly different background to the typical scientist at the CRG, having majored in ecology at university and focused on vision and navigation in insects during my PhD. After completing my doctorate I wanted to broaden my experience in terms of science, scientific institutions and lifestyle. The CRG perfectly fulfils this desire. While I still work on the sensory systems and orientation mechanisms of animals, I do so using cutting-edge genetic techniques and first-class technology that not only open up a world of experimental possibilities, but also further my development and skills as a scientist. And all of this set in one of the most diverse and engaging cities in the world.”



*Nationality: Australian*  
*Sam Reid, Postdoctoral Researcher currently at Matthieu Louis's lab, and representative of the Postdoctoral Community at the CRG.*

“Many postdocs get their positions because the lab wants their existing skills instead of providing them with additional scientific training. But at the CRG is it impossible not to improve your skills: the heterogeneity of the resident scientists (physicians, engineers, biologists) and of the research interests is so high that you are forced to open your mind to a lot of different points of view about your research and science in general. The number of workshops and seminars for improving technical and communication skills as well as the high-level of the guest speakers at the CRG form, in my opinion, the best environment for the development of an independent career”



*Nationality: Italian*  
*Daniela Sanges, Senior Postdoctoral Researcher currently at Pia Cosma's lab.*

*41 different nationalities  
currently represented*

## WHAT OUR ALUMNI SAY

“When I joined the CRG I was excited to be in an international research environment with state-of-the-art facilities, at the beach! I enjoyed coming to work every morning, seeing the sea through the 5th floor windows, and going to the lab. Being at the CRG I started establishing the things my lab is currently working on, long non-coding RNA and enhancers, so my time there was very important for my career.”

*Nationality: Danish*

*Ulf Andersson Ørom, Junior Group Leader, Long non-coding RNA Research Group, Max Planck Institute for Molecular Genetics, Berlin, Germany*



“There is a relaxed, pleasantly non-competitive sense of communal pride at the CRG –achievements are celebrated, not trumpeted– and I enjoyed my postdoctoral time there enormously. The quality and range of invited speakers is superb, and Barcelona is a vibrant city, both scientifically and culturally, and surprisingly affordable –even on a postdoctoral salary. If you are looking for scientific excellence but also a high quality of life, the CRG is your place.”

*Nationality: German*

*Tobias Warnecke, Group Leader, Molecular Systems Group, MRC Clinical Sciences Centre and Imperial College, London, UK.*



“I started at the CRG in 2002 and, probably, I was one of the first pre-doctoral fellows to cross their “virtual doors”. I say virtual because at that time the current building, which opened in 2006, did not yet exist. The CRG began life as a revolutionary alternative to the normal operation of research centres and soon attracted a large number of important scientists, becoming the reference that it is today. For me it was great to participate in the growth of its structure, not only of the scientific excellence, but also of the enriched social environment. After my PhD, I was again fortunate to stay in the CRG until 2012 as a postdoc. Those were, in total, 10 amazing years where I learned, among other things, that doing science can become also a way of understanding the world, even without wearing a lab coat.”

*Nationality: Spanish*

*Ignasi Sahún, Head of the Laboratory Animal Applied Research Platform (PRAAL), at Barcelona Science Park (PCB) and Co-Founder of ZeClinics, Barcelona, Spain.*



## LIVING IN BARCELONA

With a population of 1.6 million in the city itself and a further 4 million in the suburbs, Barcelona is the second largest city in Spain, and probably the most cosmopolitan and most exciting. It is located in the north-eastern region of the Iberian peninsula, lying between the glittering Mediterranean to the east and the Collserola Mountains to the west. There are two official languages in Barcelona: Catalan and Spanish. Barcelona's residents enjoy a dynamic city, which figures among the top European places in quality of life rankings and is number 4 in the European Smart City ranking, has spectacular cuisine, contemporary and rich culture, history and tradition, exceptional architecture and balmy weather almost all year round.

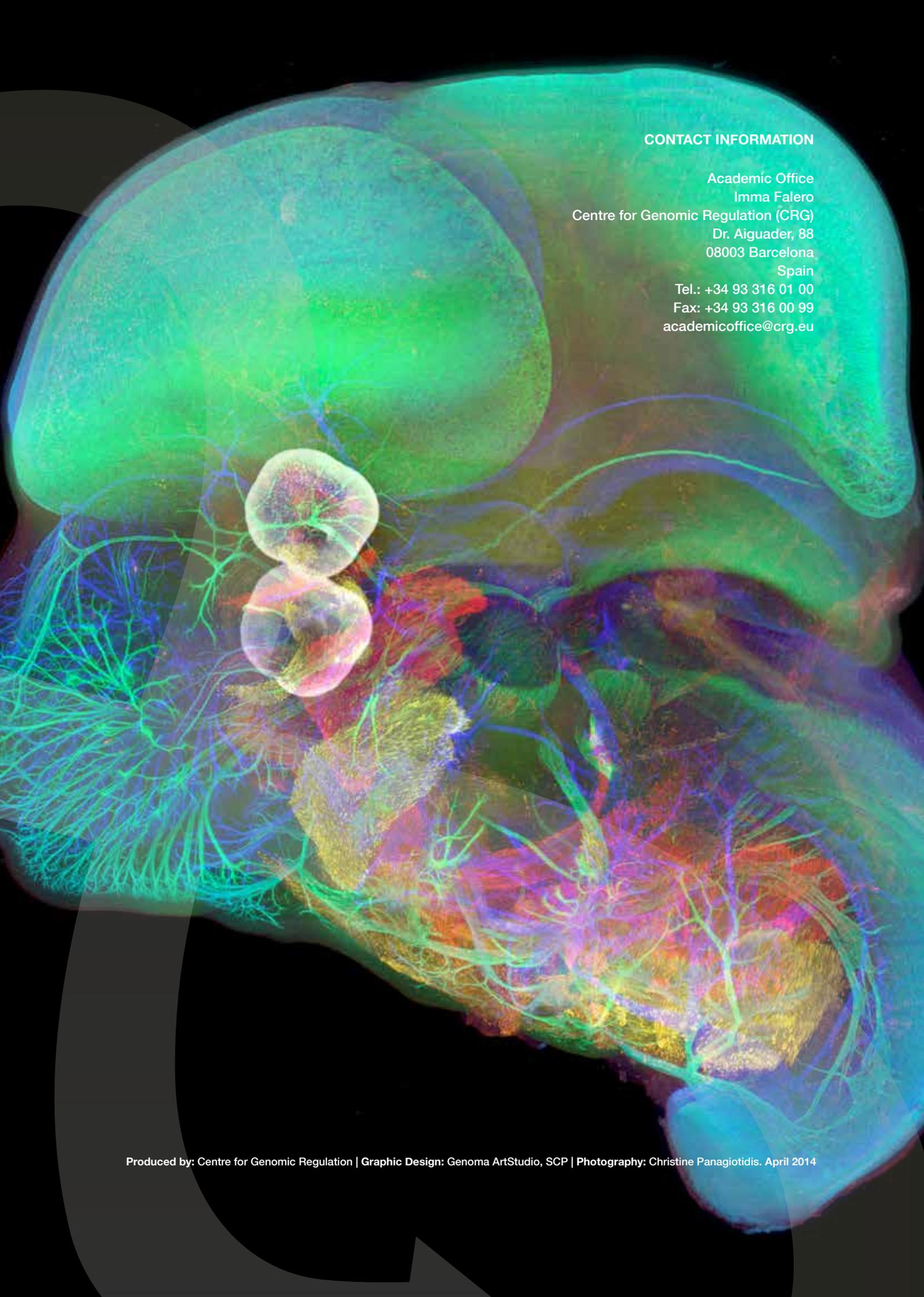
From a scientific point of view, Barcelona and its surroundings constitute the principal and most prominent biocluster in the Southern European Bioregion. The BioRegion of Catalonia is the cluster for biotechnology, biomedicine and medical technology in Catalonia. It is made up of 520 companies, 440 research groups and 54 research centres, 10 universities which offer life sciences studies, and 15 hospitals with noteworthy research activity. It also includes innovation and technology-transfer support structures and networks. The organisation Biocat boosts and promotes the cluster. The city also hosts a wide range of cutting-edge technological platforms and scientific core facilities, including ALBA, a new synchrotron light facility, and the Barcelona Supercomputing Center, home to the MareNostrum supercomputer.

The Centre for Genomic Regulation (CRG) is part of Barcelona Biomedical Research Park (PRBB), one of the scientific parks in the city, which is physically connected to the Hospital del Mar. The PRBB groups together different institutions, including the Experimental and Health Sciences Department of Pompeu Fabra University, the Hospital del Mar Medical Research Institute, the Centre of Regenerative Medicine in Barcelona, the Centre for Research in Environmental Epidemiology, the Institute of Evolutionary Biology, and the Pasqual Maragall Foundation for Research in Alzheimer, creating a critical mass of biomedical research.









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