

CRG Strategic Plan

2017 – 2021

Integrative Biology

Centre for Genomic Regulation

EXECUTIVE SUMMARY

In a relatively short period since its foundation in 2002, the Centre for Genomic Regulation (CRG) has generated important scientific insights in our understanding of the organization, deployment and evolution of genetic information, the internal workings of cells, their differentiation and reprogramming, their collective organization to form tissues and their alterations in disease, including cancer. The CRG has reached considerable international recognition as a centre of excellence in bioinformatics, molecular and cell biology, biomedical research and as an institute for advanced training at all levels of the scientific career, aided by its non-tenured system, high turnover of junior faculty and a flexible and efficient administration.

The CRG contemplates **Integrative Biology** at the heart of its scientific programme for the next five years. Addressing the complexity of biological systems and, more specifically, of humans requires, more than ever before, concerted integrative approaches and biomedical interdisciplinary science. To do so the CRG will foster the following scientific and technological areas.

Digital Biology: The CRG is an excellent position to contribute to the integration of large biological datasets and to the quantitative, predictive modelling of complex biological networks spanning from the cell to the organ, which offer unprecedented opportunities to understand living systems and eventually engineer them through synthetic biology approaches, and treat human diseases. To profit from our expertise additional focused efforts will be needed to blur barriers between scientific areas and programmes. These efforts will include strategic hiring of group leaders able to bridge across disciplines, enhancing scientific interactions across the institute, developing integrative methods of research and data analysis.

Biomedical research: A strong track record in medical genomics, the integration into the CRG of the National Centre for Genomic Analysis (CNAG), and the hosting of the mirror European Genome-Phenome Archive (EGA) has put the CRG in an excellent position to make strategic contributions in the emerging area of disease heterogeneity and personalized medicine. The breadth of CRG expertise on molecular mechanisms, cellular processes and systems biology can also be instrumental to understand disease mechanisms and to develop novel approaches in regenerative medicine. However, realization of this potential will require: a) strengthening links with clinical research hospitals, b) hiring of group leaders with a medical background and interest in human genetics and disease who will hold dual appointments with a hospital, and c) training of medical doctors in basic research (e.g. by consolidating and expanding our pioneering PhD programme medical doctors, MDs).

Technological platforms: Keeping technological services at the forefront of advances in data integration, “omics” technologies, high resolution microscopy, single cell analyses and tissue engineering will be crucial to address some fundamental problems in which the CRG can make unique contributions. These could span



from defining pivotal steps in cell organization, differentiation, reprogramming or tumoral transformation to describing the human microbiome in different organs and its interaction with the host, or the molecular circuits responsible for building a complex organ. Such initiatives will also allow the CRG to provide state-of-the-art services to the scientific community outside of the CRG and to industry, which in turn will help to sustain these platforms.

To foster Interdisciplinary Biology, the CRG Strategic Plan (2017-2021) will develop **eight strategic priorities** that will open new scientific horizons, provide novel translational opportunities for the CRG science and help fulfilling its triple mission of generating knowledge, training the next generation of scientists and adding value to society.

1) ENSURE RESPONSIBLE RESEARCH AND INNOVATION

The CRG strategy plan will embrace the key aspects of Responsible Research and Innovation (RRI): research integrity, open science, gender, transparency, science governance and public engagement. We will promote training on research integrity, developing high quality research standards, and good practices on experimental data management. We will continue focusing on gender equality to reach at least 30% of women scientists in our faculty.

2) FOSTER CORE FACILITIES

We will ensure that our researchers have access to state of the art scientific services and facilities with international visibility and reputation. Specific priorities will include improving communication and quality procedures, develop a sustainability and development plan, provide new services and high level training, and boost international visibility.

3) ATTRACT AND NURTURE NEW SCIENCE LEADERS

We want to **attract and nurture new science leaders** by recruiting our young scientists from a variety of backgrounds and providing them with solid interdisciplinary training spanning mathematical modelling, bioinformatics, biophysics and molecular biology. We will reinforce our advanced training through tailored workshops for Masters and PhD students, postdoctoral fellows and technicians, as well as our international courses.

4) COLLABORATE CREATIVELY

A third major area of strong efforts for the CRG will be strengthening our national and international **collaborations**. We will:

1. Foster collaborations with hospitals and companies.
2. Contribute to increase the science competitiveness in Catalonia, Spain and Europe.
3. Foster the CRG international exposure and support science in developing countries.



Expanding and strengthening our pioneering network with other centres of excellence in Europe (EU-LIFE, www.eu-life.eu) will enhance collaboration, mobility and talent, and allow influencing policy-making at the local, national and European levels. We also aim at supporting science in developing countries through exchange collaborative schemes and training opportunities.

5) TRIGGER INNOVATION CREATING VALUE FOR SOCIETY

Without diverting from its commitment to create fundamental knowledge, the CRG will heavily intensify its efforts in triggering a cultural shift towards innovation and commercialization to transfer scientific discoveries into new products, technologies and approaches that generate value for health and society in general.

The CRG aims to become a reference centre in technology transfer. This will not only provide commercialization value for our discoveries but – even more importantly – will also foster a culture of innovation through scouting for the transfer potential of basic discoveries, chaperoning meaningful links with industry and providing training opportunities for our young scientists in business creation and management.

6) ENGAGE, LISTEN, EDUCATE AND RESPOND TO THE PUBLIC

A fourth major area of strong efforts for the CRG will be strengthening our **outreach programme**, engaging with the public and having an impact on society.

Importantly, the CRG will intensify its efforts to engage in an intense dialogue with society by being proactively receptive to public needs and preoccupations and by providing enticing, accessible information about science approaches and results, as well as realistic prospects for their potential societal impact, e.g. for novel therapies. Focused efforts will be made to foster curiosity and appreciation for the beauty of nature and the power of the scientific method among high school students and their teachers.

7) DIVERSIFY FUNDING SOURCES AND DEVELOP A FUNDRAISING STRATEGY

Over the last years, the CRG has been very successful in raising competitive funds at local, national and international level. We will now define a strategy and action plan to start fundraising activities to leverage private donations and sponsors, and set-up an endowment funds.

8) PROMOTE EFFICIENT, EFFECTIVE AND SUSTAINABLE MANAGEMENT

Achieving the goals of interdisciplinary science, talent attraction, translation and outreach will critically depend upon excellent and efficient administration support, good governance, meaningful HR policies and a robust financial plan to ensure the institute's sustainability and development.