

PLAN



Action Plan 2010-2013

**Biology and
Biomedicine**

EXECUTIVE SUMMARY



N.B.: If you require any further information about the specific content of any particular Area 2 Centre or Institute's Strategic Plan, please ask for it by sending an e-mail to: pe2010-13@csic.es. Thank you

CONTENTS

1	General Information	4
2	Critical Analysis of the Area	7
3	Analysis of the Area's 2006-2009 Strategic Plan	10
4	Objectives for 2010-2013	10
5	Research Strategy and Proposed Actions	11

2 Biology and Biomedicine Area

1. GENERAL INFORMATION

Description of the area

The CSIC's Biology and Biomedicine Area groups together all the Institutes and Centres whose purpose is the study of the functioning of living creatures on all levels of organisation –molecular, cellular and organism– and their utilisation and modification to obtain products or services of interest to humanity, to protect the environment, and to deepen our understanding of the processes whereby human illnesses originate.

Short history

(covering the period 2006-2009)

Four new research institutes were created during the period 2006 to 2009:

- Centro Andaluz de Biología Molecular y Medicina Regenerativa (Andalusian Centre for Molecular Biology and Regenerative Medicine, CABIMER)
- Centro Internacional de Medicina Respiratoria Avanzada (International Centre for Advanced Respiratory Medicine, CIMERA)
- Instituto de Biomedicina de Sevilla (Seville Biomedicine Institute, IBIS)
- Instituto de Biomedicina y Biotecnología de Cantabria (Cantabria Institute of Biomedicine and Biotechnology, IBBTEC)

These institutes contribute to widening the geographical distribution of the CSIC's scientific network and cover some of the deficiencies recognised in the Area's priority lines, such as the need to establish translational research.

The CSIC-IRTA-UAB consortium's Centre de Recerca Agrigenómica (CRAG-IRTA) has also received a boost and given new premises.

Mission and Vision

Mission

The Biology and Biomedicine Area's research institutes seek to fulfil the mission

of the CSIC, and support its strategic position as an institution among other public science and technology bodies, by producing scientific and technical knowledge on biology and biomedicine topics. This activity basically involves performing high quality basic and technological research, training researchers and technologists, and providing scientific and technical advice and support to other sectors of the Spanish science and technology system, together with knowledge transfer to industry and the services sector. Its tasks also include managing scientific infrastructure and bringing science closer to the public.

Fulfilling this mission requires that the Area's institutes are specialised, multidisciplinary and have sufficient human resources and infrastructure, and well connected to national and international science, so as to be able to tackle ambitious projects or respond to complex problems in their area of competence.

Vision

The vision of the Biology and Biomedicine area is to make its research institutes key structural components in Spanish and international research activity. In this regard, the Area needs to make its institutes reference centres for research that are recognised by their international counterparts in the various different areas of specialisation making up the field of Biology and Biomedicine. To pursue this vision, the Area must: 1) Strengthen its position in the fields of genomics, structural biology, proteomics, bioinformatics, image analysis, development of experimental models and high performance approximations. Given the area's multidisciplinary and variety of research lines, a strategy is needed which redistributes research lines, channels efforts to enable joint projects to be undertaken, and specialises the activity of the various institutes in order to encourage interactions between groups in different disciplines. 2) Anticipate the future of research in biology by backing novel concepts in the field of biological research, such as systems biology, molecular medicine, bioremediation and synthetic biology, promoting initiatives in progress in these fields, and encouraging interactions between the Area and the worlds of medicine, physics, chemistry, engineering and mathematics.

Institutes and Centres that comprise the Area

1. Andalusia Centre for Development Biology (CABD)
2. Andalusian Centre for Molecular Biology and Regenerative Medicine (CABIMER)
3. Severo Ochoa Molecular Biology Centre (CBMSO)
4. Cardiovascular Research Centre (CIC)

Executive Summary

5. Centre for Biological Research (CIB)
6. International Centre for Advanced Respiratory Medicine (CIMERA)
7. National Biotechnology Centre (CNB)
8. CSIC-IRTA-UAB Consortium of Agrigenomic research centre (CRAGIR-TA)
9. Barcelona Molecular Biology Institute (IBMB)
10. Salamanca Molecular and Cellular Cancer Biology Institute (IBMCC)
11. Primo Yufera Molecular and Cellular Plant Biology Institute (IBMCP)
12. Molecular Biology and Genetics Institute (IBGM)
13. Seville Biomedicine Institute (IBIS)
14. Valencia Biomedicine Institute (IBV)
15. Plant Biochemistry and Photosynthesis Institute (IBVF)
16. Cajal Institute (IC)
17. Alberto Sols Biomedical Research Institute (IIBM)
18. Barcelona Biomedical Research Institute (IIBB)
19. Cantabria Institute of Biomedicine and Biotechnology (IBBTEC)
20. Biochemical Microbiology Institute (IMB)
21. Neurosciences Institute (IN)
22. López Neyra Parasitology and Biomedicine Institute (IPBLN)
23. Biophysics Unit (UB)

2.CRITICAL ANALYSIS OF THE AREA

SWOT ANALYSIS

Weaknesses

- Limited scientific leadership in the management of many institutes.
- Lack of internal scientific coherence in the institutes.
- Insufficient interaction between research groups.
- Fragmentation of research groups.
- Inflexible administration.
- Shortage of technicians, research support personnel and administrative staff.

Threats

- Growing competition at national level from other research centres with more flexible and competitive models of management.
- Loss of groups of excellence to new, more competitive institutes.
- Drop in public resources for R&D during the period as a result of the economic situation.
- Drop in R&D investment by the private sector due to the economic situation.
- Difficulty accessing EU funds and drop in EU funding.

Strengths

- Ability and dedication of the Area's researchers.
- Strict quality criteria applied to the selection of new staff.
- Capacity to train young researchers.
- Outstanding presence in the European Research Area.

Opportunities

- The more dynamic and efficient organisation of the Area's institutes resulting from the CSIC's transformation into an Agency.
- Participation in technology platforms and the management of large

Executive Summary

facilities being driven by ministries and the governments of the autonomous regions.

- Establishing clear and structured associations with the CIBER and health-care research institutes.
- Participation in new emerging fields related to the Area's research.
- Collaboration with other Areas through participation in strategic axes and multidisciplinary projects.

HORIZONTAL ANALYSIS OF THE RESEARCH LINES

The majority of the Area's centres and institutes are of recognised national and international prestige. This prestige is due to a large extent to the work of specific groups in each centre or institute, there being large inequalities between researchers. Very few centres stand out as a whole, largely due to their thematic dispersion, as this prevents them from forming sufficient critical mass, or due to their not having the tools with which to bolster the work of the weaker groups. It is worth noting that institutes with a clear focus, such as the CNB, or monothematic institutes such as IN or CABD, are those which were given the best rating by the evaluating committee. In order to improve their performance, centres should aspire to be more dynamic, based on the mobility of researchers between the various centres, a habit that is almost non-existent at the present, and by establishing training programmes to encourage controlled recruitment of young, competitive and committed personnel. More interaction between the Area's centres and those of other Areas with thematic affinities would enhance competitiveness and give greater international visibility to the CSIC as a whole. This would be particularly desirable in the case of centres with clear thematic proximity, while still aspiring to find distinctive characteristics within the CSIC. CONSOLIDER or CIBER programmes, along with these thematic axes of the CSIC or the intramural frontier projects, constitute suitable instruments with which to achieve the necessary interactions.

THEMATIC FIELDS

The research carried out within the CSIC's Biology Area encompasses the following thematic fields:

1. Structural Biology and Biophysics
2. Molecular and Cellular Biology of Cancer
3. Developmental Biology

Executive Summary

4. Molecular and Cellular Biology of Plants
5. Genetics and Molecular Biology of Model Organisms
6. Microbiology, Parasitology and Virology
7. Immunology
8. Neurobiology and Neuroscience
9. Molecular and Cellular Bases of Pathophysiology
10. Genome Function and Dynamics
11. Cellular Signalling
12. Biotechnology and Bioremediation
13. Pharmacology and Biochemical Therapy
14. Metabolism and Bioenergetics
15. Functional Genomics and Computational Biology

3. ANALYSIS OF THE AREA'S 2006-2009 STRATEGIC PLAN

Quantitative: The majority of the Area's Institutes have met the quantitative targets set in their strategic plans.

Qualitative: The central goal of the previous four-year period was to "Increase the scientific quality and international visibility of the Institutes in the Biology and Biomedicine Areas." The need arose to increase the Area's financial resources, optimise and increase the workforce and optimise its facilities and infrastructures, including the upgrading of equipment and construction of buildings to house new centres. In terms of increasing the Area's strengths, the position overall is positive, however, some of the Area's general weaknesses have yet to be resolved satisfactorily.

4. OBJECTIVES 2010-2013

GENERAL OBJECTIVES

The Area's general objectives are directed towards increasing the strengths and minimising the weaknesses detected by the Committee of International Experts, with the dual aims of

- Bolstering and refocusing the existing research institutes to raise their quality and make them more competitive internationally.
- Creating new research institutes and expanding or splitting up some of those that exist and which are clearly overloaded, so as to correct the deficiencies recognised in the present and future Area's priority lines, and to contribute to implementing a strong scientific network with a broad geographical reach in Spain.

SPECIFIC OBJECTIVES

a) *Improving the quality of research. To this end it should:*

- Strengthen the position of the institutes' directors.
- Establish scientific committees for all the institutes.
- Improve the criteria for the recruitment of scientists.
- Support researchers and competitive and productive centres and

stimulate those that have lesser output.

- Maintain and bolster the institution's own funds in order to start up newly created research groups during the early years of their development.
- Give greater internal coherence to the Area's institutes.

b) Promoting multidisciplinary, without resulting in dispersion

- Develop technology platforms
- Encourage groups with shared interests at different institutes to interact more effectively.
- Establish agreements for cooperation and the exchange of services.
- Encourage the organisation of large-scale projects
- Recruit specialist technical personnel.
- Stimulate collaboration between the different institutes in the Area and between Areas.

c) Administrative and management flexibility.

d) Producing and attracting resources.

- Promote participation in larger-scale projects
- Avoid lost opportunities for the acquisition of infrastructure, development of technology platforms or the management of large facilities.
- Bolster technology transfer.

5. RESEARCH STRATEGY AND ENVISAGED ACTIONS

Building Strengths

1. The Area's greatest strength is the research capability of the majority of its members. Optimising and strengthening the most competitive research lines and sub-lines in each Institute, providing them with adequate space in which to conduct their work, equipping them with qualified technical and scientific personnel and the facilities and equipment in which to perform their research under optimal conditions. These actions will enhance the overall quality of the

Executive Summary

institutes, making them more attractive places for outstanding scientists from Spain or abroad to work.

2. Encouraging scientific cohesion and collaboration between different lines within each institute to obtain better utilisation of current and future resources, and to reduce the excessive multidisciplinary of some institutes. Alternatively, some of the institutes could be split to create new ones that are more tightly focused and make better use of resources.

3. Facilitate and support periodic evaluation and monitoring of the institute's research lines by external Scientific Advisory Committees, so as to contribute to decision-making by directors in relation to the strengthening or weakening of lines and sub-lines, the rational distribution of space and personnel assigned to each research line, and the possible development of new research lines to promote an enhancement of the quality of the institutes.

4. Support and strengthen initiatives aimed at improving the establishment of emerging high quality groups in each institute, at both the economic level, and that of space and personnel.

5. Bolster the institutes' general services so that they function efficiently and provide key support for the performance of quality research. Additionally, to promote the creation of new services that provide state-of-the-art technology and equip them with qualified personnel with guarantees of optimal functioning by means of prior training.

6. Promote and expand the establishment of administrative support offices in the institutes for the development and maintenance of European projects and research networks, by hiring qualified staff with a good command of English. These offices will undoubtedly alleviate the administrative and bureaucratic burden on the scientific personnel, which currently represents a drag on their competitiveness.

7. Increase the quality of the training given to young researchers at the doctoral stage, supporting thesis preparation in productive laboratories that offer a high likelihood of publication of their research, encouraging the internationalisation of Doctorate Programmes.

8. Increasing the quality of research at institutes accompanied by **knowledge transfer to businesses** and society in general, may increase the importance of supporting initiatives to obtain finance from private funds (companies, foundations), through the presence of qualified personnel with training in public relations in the institutes.

9. **Increasing the number of spin-offs from institutes**, provided that their research and services are consistent with each institute's scientific objectives.

10. **New centres and institutes**

The protocols for the creation of new institutes in a number of Spain's autonomous regions are currently at various stages of study. Additionally, the construction of the buildings that will enable the expansion of some of the Area's institutes (IC, IBM) and creation of others (IMMPA) has been approved or work is underway.

CSIC