

Barcelona Science Park

The Barcelona Science Park (PCB, *Parc Científic de Barcelona*) is a cornerstone of the innovation system developed by the University of Barcelona (UB, *Universitat de Barcelona*), with the support of the Bosch and Gimpera Foundation (FBG, *Fundació Bosch i Gimpera*) and the *Caixa Catalunya*, which hosts research groups from both the public and private sectors and offers a wide range of technological facilities.

The coming together of public research Centers and private enterprise makes the PCB a pioneering point of reference in promoting the transfer of knowledge and technology, and also facilitates the setting up of new technology-based companies.

Situated on the Diagonal Campus, the Barcelona Science Park hosts twenty companies, four research Centers, and the CIDEM-PCB Biocubator, all of which work in emerging research areas of chemistry, pharmacy, biotechnology and nanobioengineering. These research activities are located in a 20,000 m² laboratory building, which is also home modern platforms to R+D+I.

The PCB also brings together numerous research Centers from a wide range of areas in the experimental, human and social sciences.

The aims of the PCB are:

- To create a context which optimises collaboration between public research groups and business R+D+I

units, thereby boosting technological innovation through basic research.

- To play an active role in the technology market by increasing the transfer of knowledge and technology to companies and public institutions
- To promote the setting up of new technology-based companies
- To support PCB researchers by providing them with the most powerful biotechnology platforms, and to make these services available to other external public research groups, companies and organisations.
- To foster R+D+I activities in diverse multidisciplinary fields in order to facilitate response to emerging economic cycles

1. Public research at the Barcelona Science Park

The research carried out at the Barcelona Science Park is multidisciplinary and covers an array of areas in experimental, human and social sciences. The result is the convergence, in a single setting, of a critical mass of human resources in areas linked to production sectors of special relevance, thus contributing to greater economic and social cohesion in the new knowledge-based economy.

Among the scientific areas to which the Park is devoted, special mention should be made of the biomedical research carried out by the Institute of Biomedical Research of Barcelona (IRBB-PCB), the Laboratory for Nanobioengineering Research, and companies and spin-offs from the biotechnology, pharmaceutical and fine chemistry sectors.

The shared aim of all the public research groups in the PCB is to promote the transfer of knowledge and technology, making a wide range of knowledge available to society via, for example, the sub-contracting of research and/or services, the development of mixed research units, the commercialisation of patents or the setting up of technology-based companies (spin-offs).

1.1 Institute of Biomedical Research of Barcelona

Research Programmes:

- Structural and Computational Biology Programme
- Chemistry and Molecular Pharmacology
- Molecular Medicine Programme
- Cell and Developmental Biology Programme



Figure 1. PCB modular building.

1.2 Laboratory of Nanobioengineering Research (UB-UPC)

Research Programmes:

- Cellular and molecular nanotechnology
- Engineering of tissues and cell cultures
- Characterization of tissues and /or cell cultures
- Design of devices for the manipulation and processing of cells and molecules on a chip(biochip/lab-on-a-chip)
- Acquisition and treatment of biomedical signals and images

1.3 Center for Research in Theoretical Chemistry

Research areas:

- Chemical and biochemical reactivity
- Quantum simulation of biological processes
- Science of surfaces
- Interfacial and colloidal systems
- Macromolecules
- Design of new materials, etc.

1.4 Multidisciplinary groups

Research areas:

- Globalisation
- Bioethics
- Meteorology and climate
- Public Law
- Language and Computing
- Nutrition, etc.

2. Companies, business R+D+I units and spin-offs

The Barcelona Science Park is home to several companies and spin-offs, all of which are linked to the priority research lines of the Park. These companies benefit from a setting with maximum research activity and a modern infrastructure of support services.

The centralising of public research Centers and companies from the pharmaceutical, biotechnology and fine chemistry sectors within the PCB brings basic research and the discovery of new drugs closer together, thus fostering a synergistic relationship between the two poles. Such combined efforts often lead to the setting up of mixed research units.

2.1 Companies and spin-Offs

Advanced In Vitro Cell Technologies (Advancell)
 Almirall Prodesfarma
 Esteve
 Grupo Uriach
 Kymos Pharma Services
 Medichem
 Merck Farma y Química . Bioresearch Laboratory (LBI)
 Prous Science . Prous Institute for Collaborative Research (ICBR)

2.2 Companies occupying office space

Applera Hispania
 Biolab
 Bruker
 Diopma
 e-sense
 Haltiform
 Meteosim
 Sani-red
 Thera, Center for Language and Computation

2.3 Mixed units developed within the PCB

Almirall Prodesfarma– Barcelona Science Park
 Pharma Mar– Barcelona Science Park

3. Entrepreneurial spirit and transfer of knowledge

3.1 Bioincubation

The main aim of the CIDEM-PCB Bioincubator is to facilitate the creation of new biotech companies, by providing scientific and technological support infrastructure, business management and financial assistance.

The maximum length of stay in the Bioincubator is three years, during which time the companies receive financial support from the Center for Innovation and Business Development (CIDEM, Center d'Innovació i Desenvolupament Empresarial) and the PCB. This initiative has been promoted through the CIDEM, which belongs to the Autonomous Government of Catalonia (Generalitat de Catalunya), and by the University of Barcelona, through the Barcelona Science Park and the Center for Innovation (FBG).

3.2 Companies located at the CIDEM-PCB Bioincubator

- CrystaX Pharmaceuticals
- Enantia
- Era-Plantech
- Estralim
- Oleoyl-Estrone Developments OED
- Oryzon Genomics

3.3 The Center for Innovation

The Center for Innovation is part of the Bosch i Gimpera Foundation (FBG) and aims to promote the transfer of knowledge and technology from all areas of the University of Barcelona to the business sector. Its activity ranges from providing technological services and research projects to offering support in the creation of spin-offs. It also fosters an entrepreneurial spirit through specific programmes which oversee and follow-up the work of research groups.

In collaboration with the Patents Center of the UB, the Center for Innovation is also responsible for promoting the commercialization of the patents developed by the university's research groups.

4. Technological facilities

Occupying an area of 5,000 m², the technological facilities available in the Barcelona Science Park include powerful infrastructure and specialized services which provide support to researchers in the Center. In addition, these facilities are also available to external institutions and companies.

Types of service:

- independent access to equipment
- consultancy service
- sub-contracting of services

4.1 Scientific and Technical Services of the UB

The Scientific and Technical Services (SCT) were set up by the University of Barcelona to provide research support. These services are staffed by specialized personnel and have a modern infrastructure of high-tech apparatus. Occupying 6,000m², the SCT have three sites: the Modular Building of the Barcelona Science Park, a Central Building located close to the experimental science faculties of the UB, and the School of Medicine –near the facilities of the Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS).

4.2 Units located in the PCB

- Nuclear Magnetic Resonance (NMR) Unit
- Unit for Separation Techniques
- Confocal Microscopy and Cellular Micromanipulation Unit
- Flow Cytometry Unit
- Unit for *in situ* Molecular Recognition Techniques
- Genomics Unit
- Peptide Synthesis Unit
- SCT Quality Control Unit

4.3 Biotechnology Platforms SCT-PCB

A joint initiative between the Barcelona Science Park and the SCT, the Biotechnology platforms are equipped with state-of-the-art scientific instrumentation and carry out R+D activities in areas linked to the development of specific techniques. These Platforms provide custom-designed research services, a consultancy service, and co-development of specific techniques; independent access to equipment can also be arranged.

Platforms located in the PCB:

- Transcriptomics Platform
- Proteomics Platform
- Biocomputing Platform (Genoma España)
- Combinatorial Chemistry Platform
- Fine Chemistry Platform
- NMR Platform for Biomolecules
- Nanotechnology Platform
- X-Ray Diffraction Platform



Figure 2. Combinatorial Chemistry Platform.

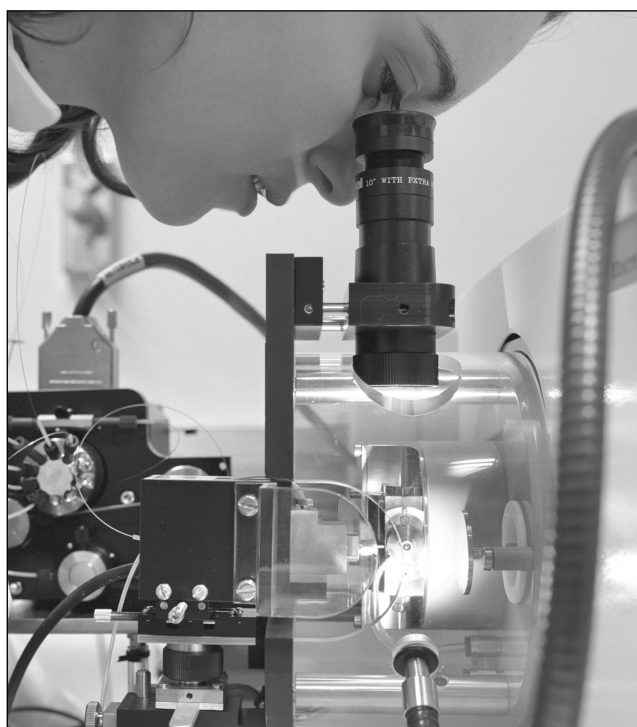


Figure 3. Proteomics Platform.

5. Scientific Services of the PCB

The Services of the PCB provide support to research managed by the Barcelona Science Park.

These Services Include:

- Animal Research Center (ARC)
- Core Scientific Services (SCC-PCB): Culture rooms, centrifuge rooms, dark rooms, cold rooms, etc.
- Radioactivity Unit (IR-PCB)
- Unit for Experimental Toxicology and Ecotoxicology (UTOX-PCB)
- Special Reactions Service (SRE-PCB)

6. Brief history of the Barcelona Science Park

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| <p>1994 The Board of Governors of the UB approves the provision of space for the creation of a science park.</p> <p>1997 Creation of the Barcelona Science Park Foundation by the UB, the FBG and the Caixa Catalunya. Collaboration agreement between the Autonomous Government of Catalonia, the UB and UPC to promote the Barcelona Science and Technology Park.</p> <p>1998 The Central Government joins the agreement to set up the Barcelona Science and Technology Park. Work begins on the Modular Building and renovation of Tower D.</p> <p>1999 The first office space for multidisciplinary research is made available for the new head offices of the FBG and its Innovation Center. Installation of the 800 MHz NMR Spectrometer.</p> <p>2000 Incorporation of the Scientific and Technical Services of the UB into the Modular Building.</p> | <p>2001 Attended by 1,500 people, the Inaugural Scientific Symposium of the Barcelona Science Park is held to mark the completion of construction and the start-up of the Biomedical Division. Incorporation of the first companies and spin-offs from the industrial pharmaceutical and fine chemistry sectors.</p> <p>2002 Public research groups working in biomedicine move to the Institute of Biomedical Research of Barcelona, located in the Modular Building. The Scientific Support Services of the PCB and the Biotechnological Platforms begin operating. The CIDEM-PCB Bioincubator is opened.</p> <p>2003 The Barcelona Biomedical Alliance is established (ABB). The research groups that belong to the IBMB of the CSIC join the IRBB-PCB. The Park works full capacity.</p> |
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PCB – Annual report 2002

Research activities in the PCB

With the incorporation of all the University of Barcelona (UB) groups and the new ICREA (Institució Catalana de Recerca i Estudis Avançats, Catalan Institute of Research and Advanced Studies) researchers, 2002 was the first year of full research activity of the PCB. This implied the full operation of all the scientific services as well as the start of the series of seminars entitled “**Park Seminars**”. The opening conference, on 17 January, 2003, was given by Dr. Jaume Piulats, Director General of Merck, and was attended by the Rector of the UB, Joan Tugores. The series of seminars was designed to include one or two sessions per week and attendance was very high. This series was sponsored by the Caixa Catalunya bank.

In addition, and related to the promotional activities directed at research, the summer of 2002 saw the start of the programme “**Spend the Summer at the Park**”. This programme, aimed at students in the last two years of their degree, was designed to offer them the opportunity to carry out research over the summer (July, August and September) in groups working in their field of interest. In 2002, the programme included 38 students (from a total of 51 applications) and was received with great enthusiasm both on the part of lecturers and students.

We also wish to mention that the PCB participated in several projects of the VI Framework Programme of the European Union, both as an institution as through the researchers from Centers located in the Park.

Activities were the following:

- The PCB was one of the 20 institutions (Centro Na-

cional de Biotecnología (Madrid), Institut Pasteur (Paris), Institut Karolinska (Stockholm), Genopôle-Evry (Paris), Aventis Farma (Germany)... that participated in a European project for the training of graduate researchers in biotechnology and pharmaceutical research, ENAEBIP (European Network for Advanced Education in Biotechnology and Industrial Pharmacy). The Park participated by organizing practical courses and workshops in proteomics, nanobiotechnology, NMR, scientific communication and company founding (given by the FBG).

- Through the Center de Referència en Bioenginyeria de Catalunya (CREBEC, Catalan Reference Center for Bioengineering), the PCB participated in several initiatives in the field of nanotechnology. We give special mention to the Network of Excellence (Xarxa d'Excel·lència) (Nano2life), which is the first step towards a Virtual European Institute of Nanobiotechnology.
- Theoretical chemistry project (Dr. Carme Rovira, Ramon i Cajal Researcher of the PCB, Center for Research on Theoretical Chemistry)
- An extended version of this report is available in www.pcb.ub.es

Modular building

Institute of Biomedical Research of Barcelona (IRBB-PCB)

Approved by the Board of Trustees on 27 February, 2001, and directed by Dr. Joan Guinovart, with the scientific assessment of Dr. Joan Massagué, the Institute of Biomedical

Research of Barcelona (IRBB-PCB) gave priority to the following objectives in 2002:

- Fitting out laboratories and setup of research infrastructure provided by the PCB.
- Relocation of UB research groups in the PCB.
- Normalization of research activities in new laboratories.
- Promotion of groups (hiring researchers and support staff).
- Applications to public calls for collaboration grants with research groups.
- Incorporation of ICREA researchers.

These objectives were achieved progressively during the first six months of 2002 and by the last three months of the year all the groups were fully operational.

875 m² of fully equipped laboratory space was assigned to the CSIC. These laboratories were fitted out during 2002 and these research groups are to join the PCB in the second half of 2003.

An indicator of the commitment of the DURSI to the promotion of the IRBB-PCB is the UB-DURSI agreement, which brought about an investment of 1M for 2002.

This financial support was devoted basically to:

- Partially cover the costs of the first ICREA researchers and UB investigators.
- Contract laboratory support technicians.
- Cover post-doctoral grants.
- Cover ordinary operational costs of the IRBB-PCB.

The IRBB-PCB is included in the framework of Centers and institutes included in the III Research Plan of Catalonia, and brings together groups of excellence from the UB, CSIC and ICREA programme, all of which are devoted to fields linked to basic biomedicine.

The IRBB-PCB is organised around four programmes, which provide an ideal setting for the attainment of optimum results. It has a dynamic structure that allows it to adapt to the evolution of the field of study, thereby ensuring that its activity is at the cutting edge of biomedical research.

In 2002, the programmes were as follows:

- **Cell and Developmental Biology Programme**
Gene expression. Developmental molecular biology. Cellular biology, functional genomics and proteomics of cell and embryonic development. Tissue regeneration.
 - Developmental neurobiology and neuronal regeneration
- **Structural and Computational Biology Programme**
Structural analysis of macromolecular interactions. X-ray, NMR and electronic microscopy platforms. Macromolecular biophysics. Structural biology and bioinformatics of molecular modelling.
 - Molecular recognition
 - Protein NMR

- **Molecular Medicine Programme**

Molecular bases of metabolic and genetic diseases. Study of diagnostic or therapeutic targets. Functional genomics and proteomics of pathologies.

- Macrophage biology: regulation of gene expression
- Metabolic engineering and diabetes therapy
- Molecular pathology and therapy in heterogenic and polygenic diseases
- Molecular pathology and therapy in heterogenic and multigenic diseases
- Signal transduction: interaction between nuclear hormone receptors and pathways of mitogen-activated protein kinases (mapks)

- **Chemistry and Molecular Pharmacology Programme**

Design and synthesis of small molecules and macromolecules, with special emphasis on two aspects of combinatorial chemistry: the building of libraries and the optimisation of the production of synthetic compounds. Biotechnologies for molecular selection directed at therapeutic targets as well as at establishing the relationship between drugs and their targets.

- Design, synthesis and structure of peptides and proteins: molecular recognition
- Peptidomimetics and bioactive heterocycles (BIOSYNER)
- Combinatorial Chemistry for the development of new compounds
- Research unit on asymmetric synthesis (URSA)

Catalan Reference Center for Bioengineering, (CREBEC). Laboratory of Nanobioengineering

The Laboratory of Nanobioengineering, made up of researchers from the UB and UPC, was set up as the result of a collaboration agreement signed on 8 January, 2002, between the rectors of the same universities, with the aim to promote interdisciplinary research in nanobioengineering. The main research lines are as follows: cellular and molecular nanotechnology, the engineering of tissues and cell cultures, characterization of tissues and/or cell cultures, the design of devices for the manipulation and processing of cells and molecules on-a-chip, and the acquisition and treatment of biomedical signals and images.

During 2002, Dr. Chris Hills signed a contract with the laboratory, through the MCYT Ramon i Cajal Programme. With this new incorporation, the laboratory now has four researchers who have been contracted through the Ministry and who are involved in several national and European Projects.

On 31 May, 2002, the Laboratory of Nanobioengineering participated in the French/Spanish meeting on nano-sciences and nano-technologies organised by the French Ministry of Research. With the aim to promote European research into Nanbiotechnology, the Laboratory also organised an Executive Meeting of the European Network of Excellence: Nano2life, which was held in the PCB on 5 and 6 May, 2003.

Located in the Park since its setup and managed by the

FBG, the laboratory is a key element of the Center de Referència en Bioenginyeria de Catalunya (CREBEC, Catalan Reference Center for Bioengineering), which was approved by the Generalitat de Catalunya in March 2003. This Center aims to coordinate the activities linked to multidisciplinary research in biomedical engineering carried out in Catalonia, and is part of the recently approved "Special Action for the Development of Nanoscience and Nanotechnology in Catalonia", promoted by the DURSI (DOGC nº 3867 del 17/04/2003).

Among the objectives of the CREBEC is the promotion of the Laboratory of Nanobioengineering of the PCB, which aims to become a pioneering biomedical research Center at nanometric level.

Companies

At the closing date of this report, the companies located in the Modular Building of the PCB were as follows:

- Advancell
- Almirall Prodesfarma
- Grupo Uriach*
- Kymos Pharma Services
- Medichem
- Merck Farma i Química
- Proteomika
- Prous Science
- Applied Biosystems
- Bruker

The only new incorporation in 2002 was the **Grupo Uriach**, which occupies 50 m² of office space in the Modular Building. This company is Spain's oldest pharmaceutical laboratory and is a leader among pharmaceutical companies and one receptive to the most important technological changes that will come with the new century. In February, 2002, Grupo Uriach opened a new work Center in Palau-solità i Plegamans (a Catalan town). Thus, as a result of a new strategic plan, which aims to strengthen the Drug Discovery Unit, the company started a new period of expansion and development in research into new molecules. As a result of this strategy, a large part of the drug discovery work is carried out via several collaborative projects with prestigious university research groups and public and private Centers. In this regard, the Grupo Uriach has set up an R+D unit in the PCB, which enables a satellite team of researchers to collaborate closely with the scientific projects that are being developed in coordination with the PCB's front line research.

Specifically, the Grupo Uriach has established collaborative contracts with the IRBB-PCB research groups led by Drs. Miquel Pons and Fernando Albericio, who are members of the UB Department of Organic Chemistry. These agreements are aimed at the development of research into new therapeutic targets of interest with respect to asthma and the application of advanced technology (high-field NMR) to synthesize active molecules. Ongoing collaboration has also been established with the Molecular Recognition Group of the IRBB-PCB, led by Dr. Modest Orozco, and aimed at us-

ing advanced models of molecular modelling in the structural design of new molecules and drug/receptor interactions. Technicians of the Grupo Uriach also made periodic use of the PCB's scientific and technical services.

Mixed units and joint ventures

2002 has been a key year for establishing joint projects between PCB research groups, both public and private. Among the most successful initiatives was the setup of mixed units (between companies and research groups or technology platforms of the PCB) and strategic agreements between several companies.

We give special mention to the setup of a mixed unit for a laboratory of Combinatorial Chemistry, a joint initiative between Almirall Prodesfarma (APF) and the PCB. In its 100 m², the two institutions carry out research into the synthesis of new compounds of interest to APF, through combinatorial chemistry techniques. Under the scientific coordination of Dr. Fernando Albericio of the IRBB-PCB, the researchers from this laboratory perform many activities for the Combinatorial Platform of the PCB. In 2002, two of the laboratory researchers were contracted by the PCB through the MCYT Torres Quevedo Programme for doctors (Dr. Pilar Fornés and Dr. Natàlia de la Figuera).

Along the same lines, a mixed laboratory between *Pharma Mar* and the PCB was also set up in 2002. This unit develops research projects jointly with *Pharma Mar*.

Similarly, as a result of the synergy that has arisen from their location on the same site, several companies in the PCB established a series of strategic agreements. In addition, a number of companies signed agreements with prestigious external companies from the pharmaceutical, biotechnology and fine chemistry sectors.

Joint Ventures of the companies located in the PCB

30/05/2003 – The biotechnology company *CrystaX* signs an agreement with *Esteve* to resolve the tridimensional structure of a neuronal receptor. This receptor is a therapeutic target for drugs aimed at neurological diseases, which are currently being developed by *Esteve*.

14/05/2003 – The pharmaceutical company *Grupo Uriach* and the biotechnology company *Oryzon Genomics* sign a collaboration agreement which will allow the *Grupo Uriach* to use genomic analysis tools in animal experiments in its studies on new therapies for inflammatory diseases. The application of this technology plays a key role in the discovery, validation and development of new drugs and uses, among others, techniques with DNA chips and bioinformatic analysis to predict the response to and toxicity of candidate drugs.

30/04/2003 – DiverDrugs i Advancell amplien el seu acord per al co-desenvolupament de nous compostos neuroprotectors Advanced In Vitro Cell

Technologies (Advancell) i DiverDrugs han fet públic avui l'extensió del seu acord per completar conjuntament les primeres fases dels desenvolupament preclínic del programa de noves molècules neuroprotectores de DiverDrugs que tenen potencials aplicacions en malalties com Alzheimer, Parkinson o Huntington. L'ampliació de l'acord incorpora un nou candidat, el DD1012, al primer compost inclòs en el programa, el DD612.

16/12/2002 – *Oryzon Genomics* and *eBiointel* sign a strategic collaboration agreement for the development of a new bioinformatic platform, named *ORYMOLD*, which will allow the storage and analysis of data related to genomic processes.

15/11/2002 – The companies *Medplant Genetics* and *Advancell* announce an agreement for the development and commercialisation of the first platform in Spain that integrates cellular models "in vitro" with analysis of changes in genetic expression. The platform, called the Toxicogenomic Platform "in vitro", aims to predict hepatic, renal or cardiac toxicity of new drugs and is aimed at the pharmaceutical and biotechnology sectors.

21/12/2002 – *Advancell* and *DiverDrugs* agree to develop DiverDrug's leading neuroprotector compound, DD612. *DiverDrugs* will be responsible for completing the characterisation of the mechanism of action of the compound and the preliminary chemical and pharmaceutical development, while *Advancell* will carry out the strategic and global management of the work plan, including the search for pharmaceutical partners to complete clinical development. In addition, *Advancell* will perform basic tests on toxicity, metabolism and distribution *in vitro* in its facilities in the PCB and will outsource some of the services necessary in order to complete the basic information package that this co-development aspires to produce.

31/10/2002 – *Oryzon Genomics* signs a strategic collaboration agreement with the Institut de Recerca i Tecnologia Agroalimentària (IRTA, Agroalimentary Research and Technology Institute), which will involve a joint research programme aimed at developing new plant varieties. The agreement includes leading edge technology for the drawing-up of genetic maps and for the development of new plant varieties with added value, and joint promotional projects.

The CIDEM-PCB bioincubator

In June 2002, the Generalitat de Catalunya and the UB opened the first bioincubator in Spain. This facility is located

in the PCB and its the main goal is to provide scientific and technological support infrastructure for new business projects in the biotechnology sector that have arisen from an academic or business context (*spin-offs*). This initiative was promoted through the Center d'Innovació i Desenvolupament Empresarial (CIDEM, Center for Innovation and Business Development), which belongs to the Department of Industry, Commerce and Tourism of the Generalitat de Catalunya, and by the UB, through the PCB and the FBG.

The location of these Centers in the Park offers considerable advantages to initial-stage biotechnological companies that join the CIDEM-PCB Bioincubator. In this regard, they save on the cost of their first premises, and also on costs of acquisition and access to equipment, since the users of this facility have access to the centralized research support services of the PCB.

With a capacity for seven biotechnological companies, in its first stage the **Bioincubator** occupies approximately 500 m², distributed between seven laboratories of 50-75 m² and 4-6 offices of 10-15 m². The maximum time that a company can be included in the project is three years, during which it receives financial support from the CIDEM and the PCB.

At present the following companies are included in the Bioincubator:

- CrystaX Pharmaceuticals
- Oryzon genomics
- Oleoyl-Estrone Developments (OED)
- ERA Plantech
- Estralim
- Enantia

CrystaX Pharmaceuticals is a state-of-the-art technology company that focuses on the discovery and development of new drugs. Founded by two researchers from the Universitat Politècnica de Catalunya (UPC, Technical University of Catalonia) and the Consejo Superior de Investigaciones Científicas (CSIC, Spanish Council for Scientific Research), CrystaX is currently working on the development of anti-cancer drugs through the use of x-ray diffraction, which allows an enormous reduction in the time required for research.

Oryzon genomics arose from the UB and the CSIC, and is the first Spanish company devoted to the application of genomic techniques in plants. With the objective to increase the annual production and quality of rice to satisfy present day needs, this company has developed a new technique, using DNA chips, to generate complete groups of genetic mutations in rice in a short time, which is achieved through modifying the genetic code. The results obtained can be extrapolated to other cereals consumed by humans.

Oleoyl-Estrone Developments (OED) is a new company that arose as a spin-off from the UB with the assistance of the technology springboard of the same university. OED directs its research effort towards drugs for the treatment of obesity and associated diseases. Together with a North American fi-

nancing company specialized in the pharmaceutical and biotechnological industry, OED has founded a new enterprise, Manhattan Pharmaceuticals, which has its head offices in New York. This company aims to promote the development and international commercialisation of a new drug against obesity based on Oleoyl Estrone.

ERA Plantech is a biotechnology company that arose from the CSIC and is devoted to the production of peptides and proteins of therapeutic or industrial interest in transgenic plants. The company uses original and exclusive technology (ZERA) (Zein Endoplasmic Reticulum Accumulation), which allows the production of recombinant proteins through their deposition on protein bodies of plant cells. This technology has been successfully applied to produce calcitonin in tobacco plants. At present, ERA Plantech aims to validate and optimise ZERA technology to ensure its viability and competitiveness to produce a wide range of peptides and proteins.

Estralim was founded in 2002 by **Oleoyl-Estrone Developments** and by Josep Sancho, professor of the UB Department of Microbiology. This company develops procedures for the removal of unwanted steroids from food and arose from the discovery of the natural hormone oleoyl-estrone (OE), which plays a key role in the regulation of body weight. The observation that part of this hormone present in animals is ingested through food, especially milk and dairy products, has led Estralim to develop methods that remove OE and that allow the production of dairy products that are not contra-indicated for individuals with weight problems and/or hypercholesterolemia.

Enantia is a company of recent creation devoted to the synthesis and development of chemical processes for the preparation of chiral active pharmaceutical ingredients (APIs) in enantiomerically pure form. The products and services available include the development of original synthetic processes for the preparation of chiral active pharmaceutical ingredients or intermediates in enantiomerically pure form. Furthermore, Enantia also offers a catalogue of original enantiomerically pure chiral products and libraries of compounds that incorporate enantiomerically pure "building-blocks" for pharmacological screening. Enantia provides consultancy and technology transfer services in all stages of development of a chemical process for manufacturing a pharmaceutical ingredient, among others.

Scientific services of the Park

2002 was a key year in that it marked the full operation of the diverse Scientific Services of the PCB. Of these, we highlight the following:

Core scientific services (SCC-PCB)

The Core Scientific Services provide centralized installations with modern research support equipment and experienced personnel. These services became progressively opera-

tional throughout 2002, with the arrival of research groups to the Modular Building.

During the first six months of 2002, at least one of the rooms of each facility became operational (dark rooms, spectroscopy room, cold chambers, centrifuge rooms, freezer room, cryoconservation tanks and climatic chamber (37°C). May 2002 marked the start-up of the service for the collection, cleaning/sterilization and return of material of the distinct laboratories.

Regarding the Cell Culture Rooms located in the basement, during the first half of 2002 construction work was completed (more than 150m² of white room installations) and these rooms were then fitted out and validated. Furthermore, specific operational procedures were established for the management of waste products, use of equipment, maintenance and cleaning of the installations, assignation of work space, equipment maintenance plan and registers and documentation in general. In November, this facility, designed for 18 people, was opened to users.

To facilitate the use of equipment by UB researchers and to deal with applications from potential users from other companies or Centers, regulations for the use of these services by external users was put on the PCB web site during the second half of the year.

Throughout 2002, attention was focused on establishing a management system for the SCC-PCB equipment and installations, with the aim to extend this system to other scientific services (SEA-PCB and IR-PCB). By the year-end, a computer programme had been chosen to build this system and previsions were made for 2003 for the human and economic resources necessary for its design, organization and setup.

The actions defined for the SCC-PCB for 2003, in general terms, were as follows:

- Operational setup of the Cell Culture Facility on the ground floor.
- Adaptation of facilities to the needs of new public research groups (not private).
- Application of a Quality Management system for equipment.
- Continuous improvement of the service offered (application of quality regulations, adaptation of equipment and resources to users' needs).

Animal Research Center (SEA-PCB)

After completing the construction work in the last three months of 2001, the facilities and apparatus of the SEA-PCB were tested, marking 2002 as the year in which the diverse activities performed in this Center were consolidated and the start of customer service. Similarly, during this year a large part of the equipment for most of the SEA-PCB services was acquired and the fine-tuning of the Transgenesis Unit was performed. During the last three months of the year, the first microinjections were done to generate the first request for an animal with transgenic overexpression. In addi-

tion, the equipment for the cryopreservation laboratory, located in the transgenesis unit, was purchased.

A large part of the studies carried out in the SEA-PCB during 2002, were short-term and involved a large number of incoming and outgoing animals, but did not imply an increase in the occupation of the animal house. With the entry of Genetically Modified Organisms (GMO) at the end of the year, long-term experimental procedures were started. Consequently, in 2003 an increase in occupancy is expected for breeding and maintenance of this kind of animals.

The animals housed in the SEA-PCB were basically rodents (7 mouse rooms, 1 rat room and 1 guinea pig room), the rat being the most used animal. Of the total number of mice, GMOs accounted for 15 %. In addition, aquatic species, *Xenopus*, were also kept in these facilities.

Of the private companies located in the PCB, the main users of the SEA-PCB were Merck and Almirall Prodesfarma. The use of the facilities by IRBB-PCB researchers was gradual (specially during the last three months of 2002). External companies also began to use the facilities for animal experimentation.

All the procedural documents given to users were assessed by the Animal Welfare Committee of the PCB. In December 2002, the Generalitat de Catalunya authorized all the procedures presented by the PCB.

During 2002, several analytical microbiological controls of surfaces and air quality were conducted. These controls showed that there was no increase in microbiological agents that could be a health risk. Similarly, in the health monitoring of animals, no pathogen described in the FELASA recommendations was detected.

During 2002 the first questionnaires were given to users of this service. Analysis of the responses showed a global mark of 3.72 and average of all the questions of 3.83 (out of a maximum of 4).

Having completed several courses approved by the Generalitat de Catalunya and after one year of operational activity, the SEA-PCB staff is now fully trained in all the professional categories within the field of animal research. We highlight that users expressed a satisfaction rating with personnel of 4.05 out of 5.

For 2003, the SEA-PCB aims to:

- achieve international accreditation as a Center for animal experimentation (international AAALAC)
- organize a public presentation of the SEA-PCB for professionals from this sector
- increase the offer of services (GMO generation, cryopreservation of embryos, surgical procedures, obtain *Xenopus* embryos)
- start a line of research related to improving animal welfare.

Radioactivity Unit (IR-PCB)

At the beginning of 2002, all the facilities and annex systems that make up the IR-PCB were fully equipped and prepared for research activities involving radioactive material. However, before the start of activity, to obtain the official authoriza-

tions, the installations had first to be inspected to test compliance with technical requirements. This inspection was carried out on 16 January, 2002, by the Dept. of Industry of the Generalitat de Catalunya. The outcome of this inspection was favourable for the start-up of the IR-PCB. Final notification of the authorization for the beginning of activities was sent on 27 February, 2002.

To grant authorization for the start-up of activities in the IR-PCB, it was necessary to draw up a specific service contract between the PCB and each research group wishing to use this unit. During 2002, these contacts were formalized as UB research groups and private companies began to move into the PCB facilities. By the end of the year, most groups using the IR-PCB had signed these contracts, which were pending approval by the authorities.

In addition to research groups working in the PCB, a year contract was established with the company Pharmamar, which, in collaboration with the Combinatorial Chemistry Research Group for the Development of New Compounds, led by Dr. Fernando Albericio, was granted use of the IR-PCB facilities and equipment. Furthermore, this unit also provided its service periodically to external research groups, mostly from the UB.

A total of approximately 53 people from distinct research groups used the IR-PCB in 2002. Most of these individuals (41) underwent dosimetric controls for external radiation through TLD dosimeters provided by the Center for Dosimetry, S.L. The results of these tests indicated that these users had not absorbed radiation during this period.

Notwithstanding, all those who worked in the IR-PCB facilities during 2002 had medical check-ups in the medical services of a number of health insurance companies, depending on their contract. Each individual that handles radioactive material in the IR-PCB is under the responsibility of another member of his/her group who is a qualified Supervisor or Operator of radioactive material in the IR-PCB. During this period a total of 9 Supervisors and 8 Operator licenses were given. This is still an insufficient number if one considers the total number of people using the IR-PCB and in the future the number of licenses will be increased through Supervisor Courses organised by the PCB.

With respect to the radioactive material in liquid form, the IR-PCB managed all the purchases, acquisition or transport from other radioactivity installations of the material used during 2002. Furthermore, the materials stored were maintained at lower levels than those authorized.

Finally, radioactive waste generated by the activities carried out in the IR-PCB is kept in a special store. Waste with a short period of disintegration, such as P-32, P-33 and S-35, is maintained in the store until its activity reaches limits permitted by legislation to then be disposed of with normal waste; while waste from isotopes with a longer period of disintegration is kept in the store until its removal by ENRESA.

Experimental Toxicology and Ecotoxicology Unit (UTOX-PCB)

In 2002 the UTOX-PCB consolidated technical and organisational aspects, thereby completing its infrastructure, fine

tuning new techniques and progressing with the development of its quality plan. The unit is now fully operational.

In addition to classic toxicological studies, the UTOX-PCB offers a wide range of techniques, which, because they are new or provide added value from the technological point of view, define a clearly differential offer with respect to other Toxicology Units in Spain. Among these services are:

- Frog Embryo Teratogenesis Assay-Xenopus (FETAX)
- Local Lymphatic nodules assay (LLNA)
- Comet Test
- Identification of species in processed food
- Environmental field studies

In accordance with the objective of the PCB to foster synergies between groups and companies and promote interrelations between external research Centers and companies, the UTOX-PCB is currently carrying out collaboration projects and drawing up study proposals, with the following, among others:

- Companies in the Park
 - Almirall Prodesfarma
 - Merck
 - Advancell
 - Proteomika
- Research groups of the Park
 - Combinatorial Chemistry
 - Design, synthesis and structure of new proteins
- Park units or services
 - Animal Research Center (SEA-PCB)
 - Core Scientific Services
- External Companies
 - Biotecnal
 - Fardi
 - Reig Jofré
 - Mologen
 - Aurum
 - Uniland

As technical auditor of the UTOX-PCB, the Park signed a contract with the Entidad Nacional de Acreditación (ENAC, National Accreditation Agency) with respect to leading services offered by this unit. The first audit to be undertaken under this contact will be carried out at the beginning of July, 2003.

With respect to the research financed by public funds, the members of this unit currently participate in two consultancy agencies, they are partners in a project application to the VIth Framework Programme of the European Union, will present another application to the same programme and are currently working on a possible participation in a project financed by the European Center for the Validation of Alternative Methods.

Furthermore, the members of the UTOX-PCB participated in the teaching of doctoral courses, thesis committees and

congresses. These activities included three conferences, five oral presentations in congresses, a published article, four articles in revision and four in preparation.

The UTOX-PCB also collaborated periodically in the research activities of several UB groups (Departments of Microbiology, Animal Physiology, Cellular Biology and Animal Biology – Vertebrates).

Special Reactions Service (SRE-PCB)

To support and facilitate the development of R+D+I projects in the pharmaceutical sector and in fine chemistry, the PCB set up a Special Reactions Service.

The general objectives of this new service, which is aimed both at internal and external users and works on a self-service basis, are as follows:

- To provide researchers in the PCB or external institutions and companies with laboratories in which they can perform experiments that involve a high risk or serious inconvenience to people working in the Park.
- To facilitate the development of R+D+I projects of research groups and companies working in the PCB or possible users from external Centers or companies that require these facilities.
- To ensure the appropriate maintenance of the facilities and equipment available to users.

This service has three laboratories:

- Laboratory for Toxic Products and hazardous reactions.
- Hydrogenation Laboratory
- Hydrofluoric Acid Laboratory.

The creation and operational setup of these laboratories began in September 2002, after which, the activities focussed on:

- Adapting the installations to house the distinct laboratories.
- Forecasting the use that will be made of the service and purchasing the equipment and material necessary.
- Establishing regulations for the use of the service and corresponding charges.
- Ensuring the maintenance of the service and coordinating its use by researchers.
- Drawing up operation procedures for the service and studying the charges applied for its use.

The laboratory for toxic products and hazardous reactions became operational in February 2003.

Research support technology platforms

The biotechnology platforms are research support units for biotechnology, biomedicine and fine chemistry. Located in the PCB, these units comprise state-of-the-art equipment and highly specialized technicians and provide the scientific community, both public and private, with cutting edge technological services. The services of these platforms are offered at a local, regional, and national level.

The objective is to provide a quality service to users from all the institutions that make up the UB Group, other universities, and public research Centers and companies, both internal and external.

The platforms are organized to offer:

- Specific periodic services.
- Consultancy service in the application of techniques.
- Rental of areas and equipment for use on a self-service basis.
- Development and optimisation of techniques in order to improve the applications of the equipment available.
- Support for scientific projects.
- Joint research projects in collaboration with the user.

At the time of this report, the Park had set up the following platforms, some of which are managed jointly with the UB Scientific and Technical Services:

- Transcriptomics Platform
- Proteomics Platform
- Biomolecular NMR Platform
- Combinatorial Chemistry Platform
- Fine Chemistry Platform
- Nanotechnology Platform
- X-ray Platform

The Transcriptomics and Proteomics Platforms became fully operational during 2002. Both are headed by scientists contracted by the PCB through the MCYT Torres Quevedo Programme (Dr. Lidia Sevilla and Dr. Eliandre de Oliveira, respectively). Similarly, Dr. Jesús Garcia, from the Biomolecular NMR Platform, was contracted through the MCYT Ramon y Cajal Programme.

Consolidated since 2001, the Combinatorial and Fine Chemistry Platforms became fully operational in 2002.

The equipment to complete the Nanotechnology and X-ray Platforms was purchased through a loan granted by the MCYT in 2002. At the closing date of this report, the Nanotechnology Platform had started its activities under the leadership of Dr. Elena Martínez while the X-ray Platform was pending installation of the latest equipment acquired.

Department of Quality Assurance and Environmental Health and Safety

At the start of 2002 the Department of Quality Assurance and Environmental Health and Safety (QSMA) was consolidated with the incorporation of a head of department and a part-time accident prevention officer.

The main activities of this department during 2002 were:

1. Regarding Quality:

- Drawing-up and approval of work procedures for the scientific services of the PCB promoted at the beginning of 2002.
- The beginning of 2003 marked the drawing-up of the main procedures in management areas of the

Park: Purchasing, Maintenance, QSMA, Administration and Organization, Computer Systems and Communications, etc.

2. Regarding Safety

- Drawing-up and application of an Emergency Plan for the Modular Building. First evacuation drill in May 2003.
- Initial risk assessment of all work areas of PCB staff.
- Follow-up and coordination with each group or company of the risk assessment of work areas.
- Training of new researchers through a twice-yearly course on laboratory safety. 130 researchers had completed this course at the closing date of this report.
- Specific sign posting and provision of safety equipment for common use.

3 Regarding the Environment

- Collection of standard waste.
- Collection of non-standard waste that is not generated by laboratories. This group includes cardboard, glass, toners and batteries.
- Optimisation of the collection and later management of laboratory waste.
- Promotion of the campaign to save water and light in areas of shared use.

All the measures taken by this department can be consulted at www.pcb.ub.es/qsma. This web page also provides information on current legislation on the sector and technical information of interest.

Tower D and the Florensa Building

During 2002 the following groups, companies and services set up offices in Tower D and the Florensa Building:

TOWER D

- Fundació Bosch i Gimpera
- Euroregional Photovoltaic Systems Group
- Linguistic Advice Service
- Center for the Evaluation and Prospects of Research and Innovation
- Patent Center of the University of Barcelona
- Center for Research in Welfare Economics
- Center for Social and Educational Research
- Center for Research in Theoretical Chemistry
- Food Studies Group
- Climatology Group
- Meteorology Group
- Conservation Biology Group
- Climate Research Group
- Logic, Language and Cognition Research Group
- Nutritional Research group
- Institute of Public Law

- Observatory of Bioethics and Law
- Sani-Red

FLORENSA BUILDING

- Research Center on Citizenship and Civil Society
- Center of Studies on Changes in Culture and Education
- Film-History Research Center
- Center for the Design and Optimisation of Processes and Materials
- Computer Linguistics Center
- Center for Languages and Computation
- Research Center on Regional, International and Risk Economics
- University Center on Sociolinguistics and Communication
- Division I, Human and Social Sciences of the UB
- Family and Kinship Research Group
- Research Group on Computational Linguistics
- Research Group on Ageing
- Inland Waters Research Group
- HOMINID – Study Group on Human Origins
- Barcelona Institute of Economics
- Intercultural Ethics Observatory
- Globalisation Observatory
- Medamerica Network

In 2002, the Observatory of Tibet and Central Asia, one of the multidisciplinary groups of the Park, provisionally worked from an annex of the Modular Building.

The PCB continued its relationship with the Research Center on Women's Studies, located in the Faculty of Philosophy.

Similarly, the PCB continued its efforts to promote and provide equipment to the documentation Centers located in the Library Building of the UB:

- Documentation Center for Plant Biodiversity (CeDocBiV)
- Sabater Pi Collection

The decision to incorporate groups into the PCB is taken on the basis of the development of research activities and the transfer of this scientific activity to society and to the business sector. The activity and continuity of research groups, Centers and institutes in the Park, depends on favourable periodic assessment of their research. On the one hand, groups must provide yearly information on the activities carried out in order to ensure that the level of research excellence; a requirement for Centers with analogue characteristics located in the PCB. In this way, the standards of the PCB will not fall below those of others Centers worldwide. In addition, extensions require a formal, independent, external evaluation of the activities.

In the meeting of the Advisory Council of the PCB held on 9 April, 2002, the research groups located in Tower D and the Florensa Building were informed of the evaluation that would be done that year.

On completion of this annual report, the first evaluation of the users of the PCB had been finished. The methodology followed was:

- Scientific development of groups. Analysis of the inputs and outputs according to the Curriculum Vitae included in the database of the Vice-rectorate of Research of the UB of all the members holding a Ph.D. This database may be complemented by personnel from all kinds of public or private organisations that operate from the PCB.
- Evaluation of a report that lays out the transfer activities undertaken, the activities that have given value added through the presence of the groups in the PCB, the importance in the sector and other merits considered relevant.

Documentation Centers

Documentation Center for Plant Biodiversity

October 1 marked the opening of the Documentation Center on Plant Biodiversity (CeDocBiV). The act included the participation of Walter G. Berendsohn, Professor of the Botanischer Garten und Botanisches Museum Berlin-Dahlem (Freie Universität Berlin), who gave a conference entitled "Biological collections: an essential component of the global biodiversity information infrastructure".

The opening was presided by Antoni Juárez, UB Vice-Rector of Research and second Vice-President of the PCB, and was attended by Màrius Rubiralta, Director of the PCB, Josep Vigo, Director of the Research Center on Plant Biodiversity, Julià Molero, Director of the CeDocBiV, and Dolors Lamarca, Director of the UB Library.

The CeDocBiV is part of the UB Research Center on Plant Biodiversity (CERBIV) and holds the documentation that its researchers produce. The CeDocBiV aims to promote research on plant biodiversity and its applications by facilitating access of researchers, companies and society at large to its documentation, by either direct or virtual means.

The CeDocBiV occupies 300 m² in the PCB, which include the BCN Herbarium, a sample preparation facility and work area equipped with technical equipment. The BCN Herbarium, the third largest in Spain, is the result of the joining of the Herbarium of Division III with that of the UB Faculty of Pharmacy. The Herbarium holds approximately 300,000 specimens, mainly from the Iberian Peninsula and other Mediterranean areas, which are grouped into five documentation sections (cormophytes, lichens, fungi, algae and bryophytes).

The CeDocBiV also includes data bases which have produced several documental units related with biology and taxa distribution, plant mapping, cytogenetics, ethnobotany, phytocenology and bibliography related to plant biodiversity.

In addition to consultation of the reference collections in the CeDocBiV, the Center also offers a specimen lending and exchange service with other herbaria, an advisory service on plant identification, information on the distribution of plant species and communities and specialised courses.

The Jordi Sabater Pi Collection

In 2002 the Sabater Pi Collection, which is of great interest to scientists and academics in anthropology, ethology and history, and the general public, was extended. This collection is composed of books and journals on topics related to ethology, drawings and paintings of naturalistic subjects, most of which were done by Jordi Sabater Pi himself. The collection also includes a professional epistolary and a series of objects from Africa which show the culture and lifestyle of the people, and the animals there. The collection is housed in the library of the Faculty of History and Geography of the UB, in space managed by the PCB.

February 20, 2003, marked the presentation of the book "Primates. Origin, Evolution and Behaviour" published by the PCB in honour of the ethologist Jordi Sabater Pi. The event was attended by Jordi Sabater Pi, Màrius Rubiralta, Director General of the PCB, Joaquim J. Veà, professor of the Department of Psychiatry and Psychology of the UB and

Jordi Serrallonga, Director of HOMINID-Study Group on Human Origins. During the presentation the Special Center for Primate Research of the UB was also presented. This Center promotes research in fields such as primate palaeontology, physical anthropology, biomechanics, and the evolution and molecular reconstruction of primates, among others.

"Primates. Origin, Evolution and Behaviour" includes contributions from prestigious names in anthropology, archaeology and biology, such as J. Desmond Clark, Jonathan Kingdon, Owen Lovejoy, Frank E. Poirier, Philip V. Tobias and Juichi Yamagiwa. These presentations were given in 1997 in an event organised by the UB Vice-rectorate for Research in honour of Sabater Pi. The publication of the book was coordinated by Joaquim J. Veà, and Jordi Serrallonga and also by Josep Maria Fullola, from the Department of Prehistory, Ancient History and Archaeology, Daniel Turbón, from the Department of Animal Biology, and David Serrat, from the Department of Geodynamics and Geophysics, all of the UB.

