

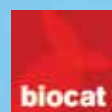


The biotechnology sector in Barcelona



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Table of contents

01.	Barcelona, the Mediterranean's innovation hub	05
02.	10 reasons to invest in Barcelona	06
03.	The biotechnology sector in Barcelona and Catalonia	08
04.	The top 10 strong points of Barcelona and Catalonia's biotechnology and biomedical sectors	
	01. The presence of large domestic pharmaceutical companies and major international groups	10
	02. Entrepreneurship and innovation in biotech and medical technology companies	12
	03. Network of leading hospitals engaged in research	14
	04. Benchmark training and research centres in the life sciences field	16
	05. Barcelona Science Park (PCB): where research and innovation meet, and the country's first bio-incubator	18
	06. Barcelona's Biomedical Research Park (PRBB), a centre for leading research groups	19
	07. Autonomous University of Barcelona's Research Park (PRUAB): research institutes and a bio-incubator	20
	08. Large hospital research centres: IDIBAPS IDIBELL and VHIR	22
	09. Biocat, promoting the Bioregion of Catalonia	23
	10. Active government support for the biotechnology world	24
05.	Links	26



01

Barcelona, the Mediterranean's innovation hub



Barcelona, located in North-Eastern Spain and on the shores of the Mediterranean, is one of the largest cities in Europe and the centre of a vast metropolitan region of more than 160 towns with a total population of about 5 million people. It is the economic, cultural and administrative capital of Catalonia and the principal emerging area of economic activity in Southern Europe, with 17 million people and 800,000 businesses. The Euro-Mediterranean region, including the Balearic Islands, Valencia, Aragon and South Eastern France, is primarily specialising in new strategically competitive international sectors, whilst consolidating its position internationally as one of Europe's major regions.

We can find the basis of economic growth in metropolises with a polycentric and economically diversified business structure that facilitates and helps incubate new ideas, products and companies.

Taking into account the distribution of gross value added across business activities, Catalonia is Spain's top autonomous region in the industrial sector, accounting for 25.2% of the total market. In terms of

services, it is positioned second regarding national gross value added generated (19.5% of total). Catalonia accounts for 28.2% of all Spain's companies in industries with high and medium high-tech and knowledge-based services.

Moreover, the rate of entrepreneurial activity in Catalonia in 2010 was 5.5%, higher than the Spanish and European averages, according to the Global Entrepreneurship Monitor (GEM) 2010.

Barcelona's international economic activities are mainly driven by the Trade Fair, the Port, Airport, the Zona Franca Consortium, Barcelona's Tourism Consortium, Barcelona City Council and its new technological innovation districts. As such, and given the importance of innovation in fostering competitiveness, productivity and the internationalisation of companies, the biotechnology sector is one of the key sectors for Barcelona and Catalonia.

Catalonia's bio cluster is one the most dynamic in Spain, which overall happens to be one of the most active areas in southern Europe in this field. And it is especially active in clinical research and the human health care field, with **90 research**

centres and more than 400 consolidated research groups engaged in the field of life sciences; excelling in areas such as **oncology, bio nano-medicine and cardiovascular disease**. Catalonia also boasts trained specialists that are highly prepared for the future. Of the twelve universities located on Catalan territory, five offer bioscience studies and over 24,000 students have already undergone training here.

22% of Spain's biotech companies are located in Catalonia; while 45% of Spain's pharmaceutical companies are based in Catalonia, including the largest in the sector, which happen to all be Catalan firms: Almirall, Esteve Ferrer, Grifols, Lacer and Uriach. The Spanish pharmaceutical sector is Europe's seventh biggest in terms of production volume.

In the last five years, according to the 2011 Biocat Report, **over 450 Catalan companies** (biotechnology, pharmaceutical, medical technology innovators and service sectors) have experienced fluctuating growth rates between 15% and 30%, which, given the current economic downturn, shows the potential of the sector.

10 reasons to invest in the biotechnology sector Catalan

Barcelona offers a variety of characteristics that make it an attractive place to live, work and do business. The biotechnology and biomedical sector is one of the most dynamic, offering some of the best investment opportunities.

01. Strategic Geographical Location

Two hours by road from France and one day by road from the major European cities. The gateway to southern Europe, Barcelona boasts a major port, airport, free trade zone, logistics parks, an international trade fair and a city centre all within a radius of five kilometres

02. Extensive transport infrastructure

With its network of highways connected with Europe, Barcelona has the fastest growing European airport, Spain's top port and the largest container port in the Mediterranean; a comprehensive metro and bus network, and a high-speed train infrastructure that is due to connect directly to the TGV and European network in 2013.

03. Barcelona, center of a large, dynamic and diverse economic area

The city of Barcelona and its metropolitan area have a total population of 5 million people. This city is the capital of Catalonia, one of the most dynamic regions of Spain, with 7.5 million inhabitants, located in the heart of the Mediterranean, a large economic area with 18 million inhabitants. Barcelona accounts for 30% of Catalonia's GDP and has a growth rate of 1, 7% GDP per year (2008). It is Europe's sixth biggest urban agglomeration and its fifth largest in terms of industry density. Catalonia has nearly 7,000 businesses working in innovation related activities, most of which are located in Barcelona and its surrounding area.

04. Successful foreign investment and recognized international positioning

Sixth best city for business in Europe*, Barcelona has the most foreign investment in Catalonia, which in 2010 was 3.999 billion, or 36% of all production investment received by Spain. There are more than 3,400 foreign companies established in Catalonia, 90% of whom are located in the Barcelona area, which has established itself as a centre for multinationals' European divisions. Its quality of life and human capital are among the most valued aspects of Barcelona by foreign companies already set up in the city and in various other international rankings.

05. Leading position in the Spanish and European biopharmaceutical market

Catalonia is home to 22% of all biotech companies in Spain and 45% of its pharmaceutical companies; the largest in the sector –all Catalanian- are: Almirall, Esteve Ferrer, Grifols, Lacer and Uriach. The Spanish pharmaceutical sector is ranked seventh in Europe in terms of production volume. Catalonia also boasts 40% of Spain's medical technology companies, responsible for 50% of all turnover in the sector (7.400 bn € in 2008), with 3% of this invested in R&D.

06. Skilled professionals prepared for the future

Catalonia has more than 25,000 researchers (7% of the working population) based in 900 research centres, and of these there are 430 dedicated to the area of life sciences and, on the other hand, 90 research centres dedicating around 50% of their work to the life sciences area. Ten of Catalonia's twelve universities –eight of these located in the metropolitan area around Barcelona- offer bioscience studies: 155 courses taught with 24,000 students (Biocat 2009 report). Two of Barcelona's top four business schools -ESADE and IESE- are among the world's best 25. In addition, Barcelona has 34 international schools.

07. Excellent quality of life

For the 14th year running, Barcelona boasts Europe's best quality of life for employees*. It has a mild climate, sun, beaches, culture, splendid leisure time and arts programmes, a network of 4,500 educational institutions, modern and accessible health system. It is easy to get around on the public transport system and boasts beautiful parks that surround the city.

08. Consolidated science parks and growth projects

The city of Barcelona has six biotechnology-related science and technology parks (Parc Científic Barcelona, Parc de Recerca Biomèdica de Barcelona, Parc Barcelona Nord, Parc de Recerca i Innovació de la UPC, Parc de Recerca de la UPF and 22@ Barcelona), in addition to those in the surrounding environment: Biopol (Hospitalet), Parc Tecnològic del Vallès and the Parc de Recerca de la UAB (Cerdanyola) and the newly created Parc de l'Alba (in the ALBA Synchrotron environment, also in Cerdanyola) and Orbital 40 (Terrassa). Lleida, Girona, Tarragona, Reus, Manresa also have science parks with activities related to the sector.

09. Unique research facilities

The Mare Nostrum Supercomputer (Barcelona Supercomputing Center BSC), the National Centre for Genome Analysis (CNAG) and ALBA Synchrotron-CELLS are three of Europe's benchmark research facilities that are located in Barcelona and its surrounds. BSC, supported by the Governments of Catalonia and Spain, is currently developing the PRACE project, which is designed to provide Barcelona with one of the most powerful supercomputers in Europe in 2012, and this should help develop and enhance both scientific research centres and companies' investigation.

10. Unique public-private cooperation

Barcelona City Council and the Government of Catalonia are committed to creating a favourable business environment, with the success of traditional local public-private partnerships being a key to the transformation of Barcelona to date.

*According to Cushman & Wakefield, European Cities Monitor 2011.

The biotechnology sector in Barcelona and Catalonia



Biotechnology is a key sector in order to transform the region's current economic model into a system based on the knowledge economy. The recession that began in 2008 has shown the importance of this particular sector, especially given the fact that traditional industries have suffered badly from the severe downturn. In 2010, the US biotechnology ranked second in terms of investment volume -behind the software industry- with nearly \$ 4 billion (3% more than in 2009) and over 450 transactions closed. Emerging economies such as China or Brazil are also investing in these sectors, with particular emphasis on the industrial and agricultural applications of biotechnology.

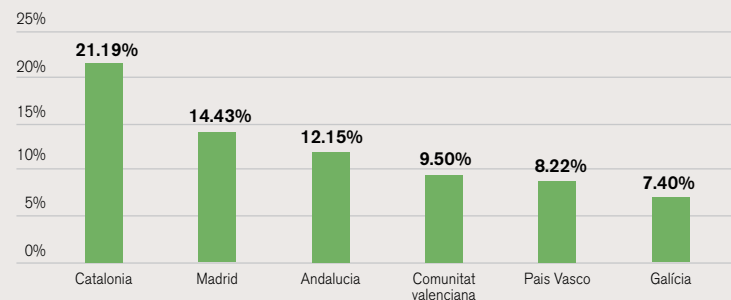
Catalonia's bio cluster is the most dynamic in Spain, a country which also happens to be one of the most active areas of southern Europe in this field. It has more than **450 sector related companies** (biotechnology, pharmaceutical, medical innovation technology and

services for the sector), with growth rates fluctuating between 15% and 30% over the last 5 years, and its **90 research centres** and over **400 research groups** excel in areas such as **oncology, cardiovascular disease or bio nano medicine**.

Number of biotechnology companies in Spain

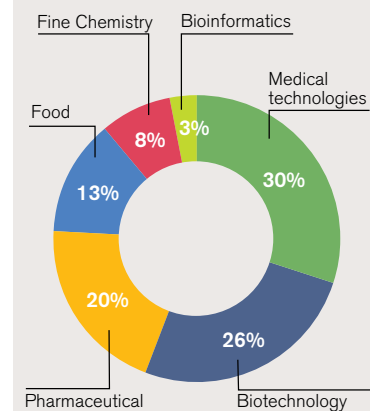
Companies fully engaged in biotechnology	399
Companies partly involved in biotechnology	161
Companies that use biotechnology	535
Total biotechnology companies	1,095

Geographical distribution of biotechnology companies across Spain



Source: Asebio 2010

Type of Company in Catalonia's BioRegió



We have, therefore, a sector that has huge potential for Barcelona and Catalonia, and that has strong points and resources associated with its industry, research institutions and government support – all factors that foster innovation and development.

This document aims to set out the underlying features of the current and future biotechnology sector in Catalonia and Barcelona under **10 strategic reasons** why:

- 01** The presence of large domestic pharmaceutical companies and major international groups
- 02** Entrepreneurship and innovation in biotech and medical technology companies
- 03** Network of leading hospitals engaged in research
- 04** Benchmark training and research centres in the life sciences field
- 05** Barcelona Science Park (PCB): where research and innovation meet, and the country's first bio-incubator
- 06** Barcelona's Biomedical Research Park (PRBB), a centre for leading research groups
- 07** Autonomous University of Barcelona's Research Park (PRUAB): research institutes and a bio-incubator
- 08** Large hospital research centres: IDIBAPS IDIBELL and VHIR
- 09** Biocat, promoting the Bioregion of Catalonia
- 10** Active government support for the biotechnology world

10 principal strengths of Barcelona and Catalonia's biotechnology and biomedical sectors

01.

THE PRESENCE OF LARGE DOMESTIC PHARMACEUTICAL COMPANIES AND MAJOR INTERNATIONAL GROUPS

Biotechnology plays a leading role in the pharmaceutical sector, even to the extent that we talk about a convergence of the two sectors.

The presence of drugs in today's markets that have a biotech origin is increasing significantly, bringing out new drugs that are more specific and effective with fewer side effects.

The Spanish pharmaceutical industry is mainly concentrated in Catalonia, where 45% of the sector's laboratories are located, along with 50% of production and 80% of companies working in the fine chemicals sector.

In fact, Catalonia is the country-of-origin of Spain's top six pharmaceutical companies: Almirall, Esteve, Ferrer, Grifols, Lacer and Uriach. In 2008, these companies' spending on R&D stood at 381 million euros. This tradition, and their dynamic nature, has attracted major foreign investments: the Catalan region has about 70 pharmaceutical companies and is home to five of the world's top ten biopharmaceutical companies: Amgen, Novartis, Pfizer, Roche and Sanofi-Aventis.

The agrofoods business sector, with strong roots in Catalonia and with a huge growth potential, is also one of the main users of biotechnology, mainly in order to create more profitable crops or plants that provide the best quality products.



The world's main pharmaceutical groups' profits, 2009 (in billions of \$)

01 Pfizer	\$45,448
02 Sanofi-Aventis	\$40,871
03 Novartis	\$38,455
04 GlaxoSmithKline	\$36,746
05 AstraZeneca	\$31,905
06 Merck & Co.	\$26,929
07 Johnson & Johnson	\$22,520
08 Eli Lilly & Co.	\$20,629
09 Bristol-Myers Squibb	\$18,808
10 Abbott Laboratories	\$16,486
11 Takeda Chem. Ind.	\$14,204

The world's main pharmaceutical groups' profits, 2009 (in billions of \$)

01 Roche/Genentech	\$36,017
02 Amgen	\$14,642
03 Novo Nordisk	\$9,566
04 Merck Serono	\$7,454
05 Baxter BioScience	\$5,573

In bold type those with activity in Catalonia

Source:

IB09: Biocat report on the state of the biotechnology, biomedicine and medical technologies sector in Catalonia 2009* (www.biocat.cat/publicacions/informe).

2010 Top 10 Biopharmaceutical Companies Report, Contract Pharma (www.contractpharma.com/articles/2010/07/2010-top-20-pharmaceutical-companies-report).

10 principal strengths of Barcelona and Catalonia's biotechnology and biomedical sectors

02. ENTREPRENEURSHIP AND INNOVATION IN BIOTECH AND MEDICAL TECHNOLOGY COMPANIES

The 480 companies that currently make up the Catalan biotechnology sector (91 entirely dedicated to biotechnology) were all set up after the year 2000.



In the last five years, biotechnology has grown between 15% and 30%. AB Biotics (functional foods), Advancell (nanomedicine), Archivel Farma (therapeutic vaccine against tuberculosis), Bioglance (industrial biotechnology), Bioingenium (bioremediation), ERA Biotech (cell technology), Immunovative developments (drugs for inflammatory immune disorders), Neurotech Pharma (multiple sclerosis), Omnia molecular (anti-infectives) and Oryzon (biomarkers) are just some examples.

What lies behind the growth of the biotechnology sector is talent and skilled human capital, and strong collaborative bonds between academia and business. Catalonia has 12 universities with 177,000 degree

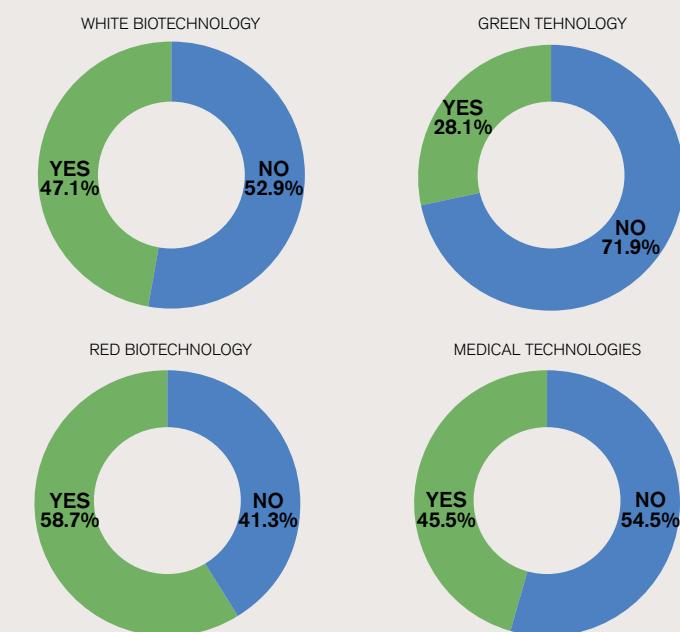
and masters students, accounting for 12.5% of the whole Spanish university system (2009-10 data). Some 43,500 students were enrolled on postgraduate studies during this period. Regarding business schools, which is often an indicator associated with entrepreneurship, Barcelona boasts two of the top twenty schools in the world: IESE and ESADE (according to the Financial Times 2011). In addition, in 2008 Barcelona was the third European city attracting most international MBA students, only beaten by Paris and London, according to the aforesaid newspaper.

Catalonia accounts for one fifth (20.98%) of all Spain's biotech companies, according to the latest report by Asebio (Association

of Biotechnology Companies in Spain). According to the Biocat Report 2011, in Catalonia there are 480 companies involved in Catalonia's biotech sector, of which 91 are principally engaged in biotechnology related business, 71 are pharmaceuticals, 106 are medical technology companies, 29 are in fine chemicals (a major sector for the development of active ingredients), 45 are foodstuffs companies, 9 from the biocomputing area, and the rest are providing support services. Of those companies in the R+D area, 58.7% are working on red biotechnology (health); 47.1% in white biotechnology (industrial); and 28.1% in green technology (agrofoodstuffs), and 45.5% in medical technologies.



Sub-sectors of activity of the companies of the Bioregion Industries of R&D



Source: Report Biocat 2011

03. NETWORK OF LEADING HOSPITALS ENGAGED IN RESEARCH

In Catalonia, there is a unique form of interaction between hospitals, universities, research centres and industry in general, covering all areas from basic to clinical research. Catalonia stands out in the field of clinical research and human health research. It has a network of 215 hospitals, 13 of which are developing outstanding research. Amongst them, six are amongst Spain's top science research producers.



Hospital Clínic of Barcelona

The Barcelona area has a large network of teaching hospitals too, among them Hospital Clínic Provincial de Barcelona, Hospital de Bellvitge, Hospital de la Vall d'Hebron, Hospital de la Santa Creu i Sant Pau, Hospital de Sant Joan de Déu, Hospital del Mar and Hospital Germans Trias i Pujol, all carrying out world leading research, ranging from basic research to advanced diagnostic and clinical research.

One example is a Hospital Clínic research centre, the Centre for International Health Research (CRESIB), which leads the worldwide development of a vaccine against malaria, thanks to sponsorship by the Bill and Melinda Gates Foundation.

Barcelona and Catalonia enjoy an outstanding tradition in quality clinical trials. This region enjoys competitive advantages in this field because of the quality research that can be

undertaken here, because of safety and research effectiveness in terms of patient selection and its competitive pricing structure. Over the last 10 years, the Catalan public health system has increased its research trials by 95%, making Catalonia the leading region in Spain in terms of percentage points (52.4%), mainly in phase II and III trials.

The private and public sectors work closely together. There are numerous cases of collaboration, and these days hospitals themselves are starting their own entrepreneurial projects. Catalonia has seen a number of companies that have set up and become highly successful across various therapeutic areas. There is a sub-sector of services companies of about 30 CRO (contract research organizations) that contribute to the development and maturity of this sector in Catalonia.



CIBEK, a patronage initiative in Barcelona

04. BENCHMARK TRAINING AND RESEARCH CENTRES IN THE LIFE SCIENCES FIELD

Catalonia has 430 research groups and 90 recognized research centres that are developing activities in the life sciences field.



In Catalonia, training in life sciences and healthcare in general has increased considerably in recent years, both at universities and business schools in order to meet the needs of a sector that is emerging as a major economic driver for the country. Ten of Catalonia's twelve universities teach studies related to this area, although the University of Barcelona (UB), the Autonomous University of Barcelona (UAB) and the Polytechnic University of Catalonia (UPC) account for almost 60% of the training given in this field. The number of students enrolled on these courses is nearly 25,000.

Bioscience research is carried out at 10 universities, with 25,000 researchers generating 25% of all Spain's scientific output and 57% of its biomedicine publications*. One important figure that shows

the degree of research specialization in Catalonia is the fact that over 60% of centres do research on human health, and over 70% of all researchers working in the field of genomic science in Spain do so in research centres in Catalonia.

Barcelona Supercomputing Center (BSC)

Located in the emblematic Torre Girona building in Barcelona, the BSC-CNS (Barcelona Supercomputing Center) is Spain's National Supercomputing Center that plays host to the *Mare Nostrum* supercomputer, one of the most powerful in Europe.

Centre for Regenerative Medicine in Barcelona (CMR)

CMR is located in the Barcelona Biomedical Research Park (PRBB) and principally researches human embryonic stem cells to understand their basic development

mechanisms and work on applications for these cells in the treatment of degenerative diseases.

Centre for International Health Research (CRESIB)

CRESIB researches issues related to the new international health challenges we face in the twenty-first century. Since May 2010, CRESIB has been part of the Barcelona Global Health Institute (ISGLOBAL).

National Centre for Genome Analysis (CNAG)

This centre is dedicated to the study of sequencing, analysis and interpretation of information contained in organisms' genomes. 10 years after the publication of the first human genome sequence after decades of research, CNAG can now sequence in just a day.

Centre for Genomic Regulation (CRG)

One of the main areas of excellence that Barcelona boasts is research related to this centre. At CRG they carry out basic research in biomedicine, especially in the areas of genomics and proteomics. Its researchers and group leaders are recruited and evaluated internationally, ensuring the highest scientific levels.

Catalonian Institute of Bioengineering (IBEC)

IBEC carries out research into bioengineering all the way from its most

basic level up to medical applications; it has become an international benchmark in this field. Its location in the Barcelona Science Park (PCB) means it can keep up with this highly dynamic area of life sciences.

Catalan Institute of Cardiovascular Sciences (ICCC)

ICCC is located in the Hospital de la Santa Creu i Sant Pau in Barcelona, and it conducts research on cardiovascular and heart disease, competing at the highest international level. The centre has been highly successful at transferring research into therapeutic developments and diagnostics.

Institute of Biomedical Research (IRB)

Founded in 2005 and located in Barcelona's Science Park (PCB), IRB is dedicated to basic and applied biomedical research. Highly dynamic and working to the highest international levels of excellence, some of its main achievements have been in the area of cancer research.

Institute for AIDS Research (IrsiCaixa)

It works to develop knowledge, prevention and treatment of HIV infection and AIDS, with the ultimate goal of eradicating this disease. Located in the University Hospital Germans Trias i Pujol in Badalona, it conducts research in partnership with Barcelona's Hospital Clínic.

ALBA Synchrotron

Alba is a new generation synchrotron located near the Autonomous University of Barcelona. The synchrotron and the nearby new Parc de l'Alba facilities have been equipped to host researchers from around the world that use X-ray analysis on their samples.

Vall d'Hebron Institute of Oncology (VHIO)

Recent years have seen key findings emerge on the molecular basis of cancer, and this has led to new and better treatments for this disease. VHIO is working along similar research lines, providing a common space for scientists and doctors working on basic science and clinical research.

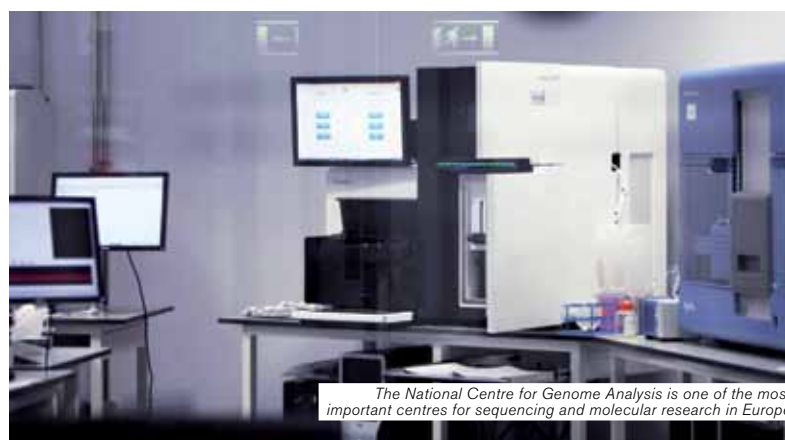
The growth and development of the biotechnology industry in Catalonia is possible because there is an adequate supply of science and technology parks suitable for business incubation during their early stages of creation. Of Catalonia's 17 parks, 13 are actively involved in biotechnology and biomedicine. In addition to providing science and technology facilities, offices and laboratories, these parks provide a meeting point for research, innovation and companies, as well as a competitive environment, and support services to help grow business projects while also providing access to experts in intellectual property and investors.

*recent bibliometrics data, 2006.

10 principal strengths of Barcelona and Catalonia's biotechnology and biomedical sectors

05. BARCELONA SCIENCE PARK (PCB): WHERE RESEARCH AND INNOVATION MEET, AND THE COUNTRY'S FIRST BIO-INCUBATOR

Science parks are catalysts for regional economic development and facilitate the creation and growth of new technology-based companies, promoting knowledge transfer from universities to industry.



The National Centre for Genome Analysis is one of the most important centres for sequencing and molecular research in Europe

Barcelona Science Park (PCB) is a recognised successful model. This is the largest business incubator in Catalonia and it produced the first Catalan biotechnology company in 2009; the Park also plays host the latest science facility to be opened in our country, the National Centre for Genome Analysis (CNAG), which together creates an innovation area that currently occupies 60,000 m². PCB houses 75 companies, 9 technology platforms, 36 technical units, 4 research institutes and 70 research groups. It also organizes more than 120 activities a year in order to promote a culture and vocation for science, which involves close to 6,000 people.

Founded by the University of Barcelona in 1997, this was the first science park to open in Spain. These days it is regarded as a benchmark for the international promotion of innovation with over 2,200 employees. It is a model

for the creation and growth of biotech SMEs and has contributed hugely to a new innovation-based economy.

One of its main values is its own internal triple helix model (public administration, business and university), which is a key to competitiveness in this sector with public and private research and technology platforms. Within this same space we find companies, technology platforms and research groups which enjoy full access to a wide range of science and technology support services.

Setting up the National Centre for Genome Analysis (CNAG) within the Barcelona Science Park (PCB) –which happens to be Catalonia and Spain's newest facility– reflects the excellent results achieved so far and its role as a driving force in this area.

06. BARCELONA BIOMEDICAL RESEARCH PARK (PRBB), A CENTRE FOR LEADING RESEARCH GROUPS

The Barcelona Biomedical Research Park (PRBB) occupies 55,000 m² on the city's shoreline overlooking beaches and next to Hospital del Mar in the 22@ area. Here we find scientific experts, some working on molecular analysis, others in terms of the population perspective. PRBB has become one of the leading biomedical research centres in southern Europe.

Created in 2002 by the UPF, the Autonomous Regional Government of Catalonia and Barcelona City Council, its expansion process ended in late 2005 and now employs over 1,300 people, the majority of these foreigners (covering 50 different nationalities).

The scientific activities of research groups that are working here are grouped under the areas of biomedical computing and the biology of systems, epigenetics and gene regulation, cell biology and its development, pharmacology, pathophysiology and clinical human genetics and evolutionary biology, epidemiology and public health.

The Park has also produced business initiatives like the start-up qGenomics and Chemotargets based on science initiatives.



Barcelona Biomedical Research Park (PRBB)

Barcelona Biomedical Research Park (PRBB) has **8 institutes and independent research centres that have achieved excellence in their fields**, all focused on different aspects of biomedicine.

- Municipal Institute of Medical Research (IMIM)
- Centre for Genomic Regulation (CRG)
- Institute of Advanced Technology (IAT)
- Centre for Regenerative Medicine in Barcelona (CMR)
- Centre for Research in Environmental Epidemiology (CREAL)
- Pompeu Fabra University's Department of Experimental and Health Sciences (CEXS-UPF)
- Pasqual Maragall Foundation (FPM)
- IBE - Institute of Evolutionary Biology (CSIC-UPF)

PRBB also offers four technology service platforms, including the Catalanian Anti-Doping Laboratory (IMIM).

07. AUTONOMOUS UNIVERSITY OF BARCELONA'S RESEARCH PARK (PRUAB): RESEARCH INSTITUTES AND A BIO-INCUBATOR

The Autonomous University of Barcelona's Research Park (PRUAB) is one of Catalonia and Spain's most important business, industry and knowledge generators.



Autonomous University of Barcelona's Research Park (PRUAB)

The UAB Research Park was set up in late 2007 by three leading research institutions: the UAB, the Council for Scientific Research (CSIC) and the Institute for Research and Technology (IRTA) in order to foster, promote and improve the transfer of knowledge and technology between universities and companies.

In addition to the UAB's own departments and research groups, the Park has numerous centres and institutes located on its Bellaterra Campus and at the Torre Marimon Farm (Caldes de Montbui). They all carry out research in five main themes: Biotechnology and Biomedicine, Health and Animal Production, Processing of Food

and Food Safety, Health and Behavioural Sciences, Social Sciences and Humanities and Science and Technology.

Currently, the UAB Research Park has 30 research centres and institutes and more than 4,000 researchers. In 2006 it registered 60 patents and generated funds worth 68 million euros.

PRUAB has 14 small and medium sized companies located there in various life sciences activities.

PRUAB Research Centres and Institutes working in fields related to biotechnology and biomedicine include:

- CBATEG: Centre for Animal Biotechnology and Gene Therapy
- CRAG: Agrogenomics Research Centre
- IBB: Institute of Biotechnology and Biomedicine
- INc: Institute of Neuroscience
- LP CSIC-UAB: CSIC-UAB Laboratory of Proteomics
- ALBA Synchrotron
- Centre for Research in Nanoscience and Nanotechnology (CIN2)



The UAB Research Park's technology transfer services, and its scientific and technical services are available to researchers at the UAB, CSIC and IRTA related centres and institutes as well as other centres and institutes that make up the

UAB Research Park, besides the university's own research groups. Companies located in the Park and those that have come about from Park-related projects like start-ups or spin-offs can also make the most of these services.



ALBA Synchrotron

10 principal strengths of Barcelona and Catalonia's biotechnology and biomedical sectors

08. LARGE HOSPITAL RESEARCH CENTRES: IDIBAPS, IDIBELL AND VHIR

Catalonia's university hospitals have a long tradition bringing together excellence in health care, training and basic and related research. This can be seen by the fact that Barcelona's principal hospitals all have their own research institutes.

In Barcelona and its surrounds there are six hospital research institutes, five of which - Vall d'Hebron Research Institute (VHIR), Bellvitge Biomedical Research Institute (IDIBELL), Health Sciences Research Institute of the "Germans Trias i Pujol" Foundation (IGTP), August Pi i Sunyer Biomedical Research Institute (IDIBAPS) and Sant Pau Biomedical Research Institute (IIB Sant Pau)— are certified as medical research institutes by the Ministry of Science and Innovation, a quality stamp awarded by the Instituto de Salud Carlos III, a



Research Institute of the Hospital del Mar

state support agency for research that provides accreditation for institutes and networks and focuses research on set objectives, a mission that only one other hospital in Spain, the Virgen del Rocío de Sevilla, has.

Research institutes in Barcelona's hospital system

August Pi i Sunyer Biomedical Research Institute (IDIBAPS)
IDIBAPS' research focuses on six main investigation lines and it aims to integrate quality clinical research with high quality basic research through its 60-or-so research teams.

Bellvitge Biomedical Research Institute (IDIBELL)
IDIBELL is a stem cell medical research centre, including the participation of the University Hospital of Bellvitge, the Catalan Institute of Oncology, the University of Barcelona and the Institute of Diagnostic Imaging. The Institute is part of Hospitalet's Biopol'H health care research park.

Vall d'Hebron Research Institute (VHIR)
VHIR is a biomedical research centre working in the fields of diagnostics,

therapeutics and the treatment of problems related to healthcare issues. Besides this, the Institute is highly committed to supporting entrepreneurial business ventures that arise from their research programmes.

The Sant Pau Biomedical Research Institute (IIB Sant Pau)

The Sant Pau Institute for Biomedical Research carries out medical research into basic, clinical, and epidemiological health care issues, and their investigation lines come together in 10 of the highest quality research entities. Occupying 6,000 m² of space, the shared research facilities play host to more than 400 basic scientists and clinicians grouped in 7 areas of research.

Municipal Institute of Medical Research (IMIM)

The Research Institute of the Hospital del Mar forms a part of the Pompeu Fabra University (UPF) and boasts 350 researchers. Their research is divided into five programme areas: cancer, epidemiology and public health, inflammation and cardiovascular processes, neuroscience and biomedical computing.

09. BIOCAT, PROMOTING THE BIOREGION OF CATALONIA

Biocat is an entity that coordinates and promotes innovation into biotechnology, biomedicine and medical technology in Catalonia. Its mission is to promote and energize stakeholders operating in this sector and develop related initiatives in order to create the right environment for a powerful research system to flourish. Other objectives include helping to create active knowledge transfers and an entrepreneurial business network so that this sector can become an economic driver for the country and also so that it contributes to the overall welfare of society.

Created in 2006 thanks to the Government of Catalonia and Barcelona City Council, Biocat's foundation governance structure includes extensive representation from the biomedical and biotechnology sector, as well as the Administration, universities, research companies and support organizations.

Biocat promotes collaboration between biocluster stakeholders and a variety of other entities both inside and outside of Catalonia, at the national and international level. It offers flexible and innovative solutions to challenges facing the sector, always pursuing the highest quality and efficiency. The Biocat action plan has a clear customer focus, reflecting a strong commitment to its goals and people in general.

Its action plan is divided into five strategic priorities:

- Consolidation of Catalonia's biocluster
- Promoting business competitiveness
- Internationalization
- Training and attracting talent
- Generating a positive social perception of biotechnology

To achieve its goals in the above stated five priority areas, it has designed tailor made programmes that address the needs and specificities of the sector, offering a range of services that run from training programmes to the publishing of industry reports, organizing sector meetings and providing support in the internationalization process, and even personalized advice for companies, project start-ups or the design of sector relevant strategic initiatives.

Biocat, along with the City Council, drives the city's international promotion as a place for biotechnology companies to set up via the Barcelona Biotech brand and it also establishes partnerships with counterpart institutions and stakeholders in the main international markets of interest to promote exchanges and cooperation between sector members.

More information from www.biocat.cat



Over 600 representatives of Catalonia's biotech sector meet every year for the Biocat Forum

10. ACTIVE GOVERNMENT SUPPORT FOR THE BIOTECHNOLOGY WORLD

Over the last 20 years, Public Administrations in Catalonia, Spain and Europe have made serious commitments to promoting science and technology, by investing in universities, research centres, talent, entrepreneurship, science parks and technology platforms



The HQ of the Economic, Business and Employment Area and Barcelona Activa in Barcelona's 22@ area

Barcelona City Council has been promoting innovation in biotechnology via a series of action plans: through its development agency, Barcelona Activa, via initiatives created by its innovation district, 22@Barcelona, and through its employment support programmes at Porta 22, besides the coordinated actions of its management at the Council's Department of Economics, Business and Employment. These are aimed at highlighting the value of science and Catalan innovation while promoting the creation and growth of companies involved in biotechnology, biomedicine and medical technology.

Investment in biotechnology, whether it comes from the Spanish Government, the Autonomous Regional Government or the European administrations, has grown at a

significant rate with incentives for research, training and recruitment.

In Catalonia, spending on internal R&D has grown at around 12% on average per year, rising from 2.107 bn € in 2004 to 3.286 bn € in 2008, which represents 1.61% of GDP (data published in 2010). The Autonomous Regional Government finances the sector via its Department of Economics and Knowledge, the Department of Business Enterprise and Employment, and the Health and Education Departments. For example, there are a number of programmes regarding financing options: AGAUR programmes (Agency for the Management of University and Research Grants), the SGR call for consolidated research groups, or ACCIÓ programmes (Catalan trade and development agency that offers

businesses a number of financing alternatives like risk capital lines, loans, guarantees, share swap loans, subsidies and tax incentives for R&D...). In 2009 ACCIÓ spent up to 6.7 million euros on this sector: a million euros on research centre projects, 4.1 million in grants for R&D in pharmaceutical, biotech and medical technology companies and the rest on support structures (2009).

The Catalan government also supports investment in Catalonia via its Invest in Catalonia agency, which offers services to companies with solid and stable investment projects. These services include help and assistance at different levels and advice on incentives and financing, or re-investment, or capital expansions, etc..



Meanwhile, the Catalan Institute of Finance has placed 27 million euros in venture capital funds that invest exclusively or partially in this sector.

At the state level, we have grants like Neotec, Profit, Torres Quevedo, Cenit, Consolidar and Ciber, the financing of Genoma España and subsidies from ICEX to business associations in the sector. One of the latest programmes is the sub-programme Severo Ochoa that is designed to encourage research excellence in Spanish State university departments or institutes, foundations, and centres, institutes and public agencies.

As regards talent, one highly notable example of support measures is the Autonomous Regional Government of Catalonia's ICREA programme, which has hired 250 researchers in

different areas, with 31% of these working in the field of life sciences and health sciences.

Within each community, council, university, hospital, etc., we can find institutions and development agencies (in Catalonia, ACCIÓ and Barcelona Activa), evaluation, technology transfer and entrepreneurship entities (like OTRI, evaluation structures of research done in hospitals and universities, and technology springboards, etc..) that are developing the consolidation of knowledge in biosciences. These are promoting the sector –along with the coordinated support and promotional zeal of the biocluster management team (Biocat)-, so as to create a true driver of the economy and an opportunity to make the quality of life of society better.

Links

22@Barcelona
www.22barcelona.com

ACC10-Generalitat de Catalunya
(Catalan Government)
www.acc10.cat

Management Agency of University and
Research Grants (AGAUR)
www.gencat.cat/agaur

Department of Economics, Business
and Employment – Barcelona City
Council
www.bcn.cat/barcelonabusiness

Asebio
www.asebio.com

Barcelona Activa
www.barcelonactiva.cat

Barcelona Supercomputing
Center (BSC)
www.bsc.es

Biocat
www.biocat.cat

Catalonia Bio
www.cataloniabio.org

Centre for Biomedical Research
Esther Koplowitz (CIBEK)
www.cibek.org

Research Center for Nanoscience and
Nanotechnology (CINC2)
www.cin2.es

Centre for Animal Biotechnology and
Gene Therapy (CBATEG)
www.cbateg.net (under construction)

Centre for Regenerative Medicine in
Barcelona (CMRB)
www.cmrbarcelona.eu

Centre for Research in Agricultural
Genomics
www.cragenomica.es

Centre for Research in Environmental
Epidemiology (CREAL)
www.creal.cat

Barcelona Centre for International
Health Research (CRESIB)
www.cresib.cat

Centre for Genomic Regulation (CRG)
www.crg.es

National Centre for Genome
Analysis (CNAG)
www.cnag.cat

Higher Research Council (CSIC)
www.dicat.csic.es

ESADE Business School
www.esade.edu

Genoma España
www.gen-es.org

Hospital Clínic i Provincial de
Barcelona
www.hospitalclinic.org

Hospital de la Santa Creu i
Sant Pau
www.santpau.es

Hospital de la Vall d'Hebron
www.vhebron.net

Hospital de Sant Joan de Déu
www.hsjsbcn.org

Hospital del Mar (IMAS)
www.parcdesalutmar.cat/hospitals/
hospital-del-mar

Hospital Universitari de Bellvitge
www.bellvitgehospital.cat

Hospital Universitari Germans
Trias i Pujol
www.gencat.cat/ics/germanstrias

IESE Business School
www.iese.edu

Catalan Institute for Research and
Advanced Studies (ICREA)
www.icrea.cat

Catalan Institute of Cardiovascular
Sciences (ICCC)
www.iccc.cat

Catalan Institute of Finance
www.icfinances.com

Institute of High Technology
(IAT)
www.crccorp.es

Bellvitge Biomedical Research
Institute (IDIBELL)
www.idibell.cat

Biomedical Research Institute
at Sant Pau Hospital (Sant Pau
IIB)
www.iibsantpau.cat

Vall d'Hebron Institute of Oncology
(VHIO)
www.vhio.net

Institute for Bioengineering of
Catalonia (IBEC)
www.ibebarcelona.eu

Barcelona Institute of Molecular
Biology (IBMB)
www.ibmb.csic.es

Institute of Biotechnology and
Biomedicine (IBB)
http://ibb.uab.es

Institute of Neuroscience
http://inc.uab.cat

Barcelona Institute for Biomedical
Research (IRB)
www.irbbarcelona.org

The AIDS Research Institute
(IrsiCaixa)
www.irsicaixa.org

Institute for Research and
Technology (IRTA)
www.irta.es

Global Health Institute of Barcelona
(ISGLOBAL)
www.isglobal.es

August Pi i Sunyer Institute of
Biomedical Research (IDIBAPS)
www.idibaps.org

Institut Municipal d'Investigació
Mèdica (IMIM)
www.imim.es

Carlos III Health Institute
www.isciii.es

Laboratory of Proteomics CSIC-UAB
(LPCSIK-UAB)
http://proteomica.uab.cat

Barcelona Science Park (PCB)
www.pcb.uab.edu

Parc de l'Alba
www.parcdelalba.com

Barcelona Biomedical Research
Park (PRBB)
www.prbb.org

UAB Research Park (PRUAB)
http://parc.uab.es

ALBA Synchrotron
www.cells.es

Vall d'Hebron Research Institute
(VHIR)
www.ir.vhebron.net





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