



Biotechnology in Madrid

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This report has been
made by Jaime Aguilar

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Executive Summary

The agency for economic development of the City council, "Madrid Emprende" (Madrid undertakes), is devoted to promote the image of the city as a major Biotechnological Cluster developing and boosting the interests and efforts of other neuralgic centers of scientific and business exchanges.

On the back of economic progress achieved over recent years, Madrid is in a very favorable position to provide companies and scientists worldwide, with outstanding professional opportunities and a better quality of life than can be enjoyed in the other major European capitals.

The multiple applications of Biotechnology configure an industry with companies of very diverse corporate purposes. Thus, it is necessary to identify and to distinguish those organizations which are specifically dedicated to biotechnology, from those which combine other activities with this one as their secondary line of business, or even to differentiate them from the users of these techniques or from the suppliers of equipment, products or services.

At present, Madrid gathers one third of the "Companies fully dedicated to Biotechnology" (ECDB). These account for almost two thirds of the national turnover.

On the other hand, the Madrid ECDB's generate 80% of the national private investment in R&D, whereas the "Companies partially dedicated to biotechnology" (EPDB) contribute 50% of the investment in R&D to their classification group.

Between ECDB and EPDB, Madrid has 1,000 professionals dedicated full time to biotechnology and representing 50% of the national branch. In order to ascertain the relevance of biotechnology within our environment, there should be added the 13,000 strong personnel working in the pharmaceutical industry and a further 2,000 in biomedical instrumentation and sanitary devices.

Out of the activities in which the biotechnology companies can be classified, vaccine and diagnosis companies hold the largest share, with almost a third of the total, while almost another third work in the area of biopharmacy.

The annual growth rate estimated for the period 2004-2015 predicts a solid average growth of over 16%, mainly in materials processing, agriculture, human health and the environment.

The city boasts 15 public and private universities educating 230,000 undergraduate university students and 5,000 candidates to a doctor's degree. There are also more than 50 academic research centers. Within the Madrid population, 288,800 people are dedicated to high-tech industries, representing 10.7% of the total workforce.

Home to the main national research institutes and with more than 20 centers for the transfer of technology, Madrid makes the most of its scientific wealth, estimated at 27.3% of Spanish scientists, and generates more than 31% of Spanish scientific publications.

Madrid is intent on becoming the crossroad of clusters in Spain and thereby to drive the efforts, interests and endeavors shared within the worldwide debate. This report proposes to display the structural and current features of Biotechnology, as well as to further develop the task of spreading information about agents and local institutions and to disclose the advantages any company can enjoy when settling in Madrid.

Introduction

This report aims to present the structural and current features of the Biotechnology sector in Madrid, as well as its participants, activities, lines of research, and results, with the purpose of promoting Madrid as a first-rate Cluster within the framework of worldwide biotechnology.

Furthermore, The Agency for Economic Development “Madrid Emprende” is intent on providing information about the advantages and incentives this city offers to foreign companies with the purpose of attracting relevant investors, companies and scientists to Madrid.

The city of Madrid is conscious that knowledge and technological innovation are playing an essential role in the development of all industrial, economic and social activities. We are experiencing a scientific and technological revolution, with globalization acting to promote and accelerate the implementation of new technologies. Among the latter, there can be no doubt that Biotechnology, with its great potential of economic benefits for industry, holds promises of a qualitative transformation of the production processes and a greater quality of healthcare for patients, while promoting care of the environment.

The Organization for Economic Cooperation and Development, OECD, defines Biotechnology as “the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.”

Although it may seem to be a recently created industry, Biotechnology has been used by mankind since the dawn of history, in tasks such as the preparation of bread and alcoholic beverages, or the improvement of the yield and resistance of cultures against plagues and adverse climatology, as well as for the selection and improvement of domestic animal breeds. Since the 70’s, Biotechnology has experienced impressive growth thanks to the advances that have taken place in the field of molecular biology.

At present, Biotechnology has to be understood as a horizontal “industry” impinging on a great variety of industries and nourished by multiple disciplines (for example: biology, biochemistry, genetics, virology, agronomy, engineering, chemistry, medicine and veterinary medicine among others). It is important to emphasize that all specializations of biotechnology can now be found in Madrid.

Biotechnology generates products with a high added value, produces improvements in productivity and generates a powerful momentum in a large number of economic, social and environmental areas. It can be used to correct imbalances in the environment, or as a catalyst for a high-level economy generating highly qualified employment. The city of Madrid wants to set its stakes on the development of this industry, through a policy of attraction of investments in this area, in order to achieve that the city of Madrid becomes a major biotechnological pole at international level.

Overview of the industry

The economy of the Community of Madrid grew in the second quarter of the year 2006 faster than most of the developed regions of Europe, reaching a year-on-year rate of 4.2%. The growth prospects for the City of Madrid point to a year-on-year rate of 4% in 2006.

Madrid has doubled, in real and compounded terms, the European economic growth during the period 1996-2003. In this period, the growth of the Madrid GDP, 34.4%, has exceeded by five points the nationwide Spanish GDP growth of 29.5%, and by seventeen points the 17% growth of the European GDP.

With a population of 6 million, the area of influence of Madrid offers competitive advantages for a variety of reasons: it is the economic capital and accordingly concentrates the main decision making. It is also a large financial and services center, as well as an industrial region with a wealth of human and economic resources. Furthermore, it has modern infrastructures and telecommunication networks, as well as a high concentration of higher education centers and research institutes.

An example of its young human potential is shown by its 230,000 university students (20% of them coming from outside the metropolitan area of Madrid) and its scientific potential of approximately 40,000 professionals devoted to R&D in the region. Furthermore, from the end of the 90's the level of investment in research and development, as well as in education, has been very high, strengthening the foundations of a solid completely integrated infrastructure in the field of European research.

The Biotechnology industry in Madrid enjoys a privileged geographic situation at the center of the Iberian Peninsula, acting as a bridge between Europe, America and Africa.

All consulted sources basically agree on the number of companies making up the industry, which provides us with a very approximate idea of reality.

Besides, they basically agree in classifying the business groups according to the importance or use of biotechnology for their earnings accounts.

Thus, the Biotechnology industry is defined on the basis of a breakdown of the different companies which participate in the industry, according to their vocation. Thus we can differentiate:

Companies completely dedicated to Biotechnology (ECDBs)

They are those devoting over 80% of their activity to biotechnology, or with more than 50% of their total turnover attributed to biotechnology. These organizations have a clear stake in R&D&I investment in Biotechnology in Spain, and compete for tenders of Biotechnology research projects in Spain. This group includes 117 companies.

Companies partially dedicated to Biotechnology (EPDBs)

These organizations develop some of their main lines of business in Biotechnology, but these do not attain 80% of the total activity of the company. They do achieve a part of their turnover from Biotechnology, and also have a clear stake in R&D&I investment, bidding for tenders of Biotechnology research projects in Spain. This group comprises 136 companies.

Companies using Biotechnology (EUBs)

These organizations have some of their main lines of business based on biotechnology, and therefore a part of their turnover is related to Biotechnology. This group includes 86 companies.

Companies providing services to the biotechnological industry (ESIBs)

This group includes consultants, consulting offices, bio-IT companies, vendor companies for biotechnological products and other ancillary services, which do not carry out Biotechnology R&D&I in Spain. They add up to 175 companies.

According to the data of the Genoma España Foundation, a foundation for the development of genomic and proteomic research, within the nationwide industry Madrid is the autonomous community that, for different reasons, is setting the highest stakes on biotechnological applications, in which 140 companies are now involved.

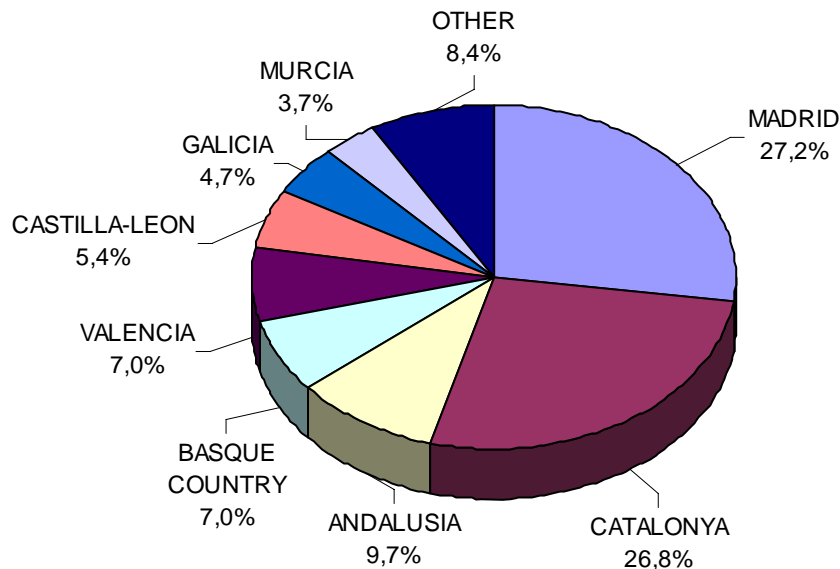
TYPE	IN MADRID	IN SPAIN	% ON NATIONAL
ECDB	37	117	31,6%
EPDV	32	136	23,5%
EUB	35	86	40,7%
ESIB	36	175	20,6%
TOTAL	140	514	27,2%

Source: Genoma España

According to estimates by Biomadrid in February 2006, the Biotechnology and Biomedicine industry of the Community of Madrid is made up of: the pharmaceutical industry with approximately 170 companies employing 13,000 people, the companies dedicated partially or exclusively to biotechnology, including approximately 72 companies (and of which 35 are exclusively dedicated to biotechnology) and employing about 1,000 people, and the health subsector of biomedical instruments and healthcare devices, comprising approximately 150 companies which employ 2,000 people.

Out of the total of these 400 companies, more than 90% are SMEs, according to the EC definition. The annual overall turnover of these subsectors is about 4 billion euros.

The following diagram shows its distribution in Spain:



Source: Genoma España

Within a radius of 60 kms around the city, the biotechnological and biomedical industry is concentrated mainly in five great geographic areas. On the one hand, most of the public research centers, as well as the universities and businesses are located within the city limits of Madrid. On the other hand, many technology-based companies and research centers have their main premises around the axis of the M-607 motorway. Finally, other companies have chosen the areas located to the north of the city, around the A-1 motorway, on the Henares corridor, the A-2 motorway and to the southwest of the city.

The area of influence of the city of Madrid is a leader in biotechnological and biomedical academic research, in terms of the number of researchers and the qualification of its scientists. Let us remember that Spain occupies the eleventh place in the world and seventh European in scientific publications of biomedical sciences and health, and that within Spain, 31.1% of the total of Spanish scientific publications in this field originates in Madrid. It is noteworthy that investment in R&D at the academic research centers in these fields represents 400 million euros per year.

Among other data, Madrid stands for:

- 27% of the national biotechnological companies.
- 31% of the companies completely dedicated to biotechnology.

- 62% of the nationwide turnover of the ECDBs.
- 79% of the private investment in national R&D of the ECDBs.
- 50% of the employment with ECDBs.
- 47% of the private investment in R&D of the EPDBs.
- 45% of the employment with EPDBs.
- 17% of the national investments in venture capital.
- 2.4 billion euros in R&D (1.82% of its GDP in the 2005).
- 40,000 workers in R&D.
- 15 universities and more than 50 academic research centers
- 230,000 university students every year.
- 2,000 doctorate students.
- 80% of the business sector investment in R&D.
- 27.3% of the Spanish scientists, who generate more than 31% of Spanish scientific publications.
- More than 20 centers for the transfer of technology.
- 288,800 people employed in high-tech industries (10.7% of the workforce).
- The number of companies has grown by 40% in 6 years.

The Madrid biotechnology companies can be classified according to the type of activity they exercise:

Activity Sector	% of the ECDB	% of the EPDB
Diagnosis and Vaccines	29,7%	18,8%
Biopharmacy	29,7%	50%
Technological Development and Services	18,9%	15,6%
Agrobiotechnology and Biofactories	8,1%	3,1%
Marketing and Distribution	8,1%	6,3%
Food and Food Bioprocesses	5,4%	6,3%

Source: Genoma España

R&D&I Investment Biotechnology

As far as R&D activities are concerned, the subsector of the pharmaceutical industry has the largest commitment to R&D activities (about €160 million per year) with a workforce of 900 people (in EPDB), although the sector of new companies dedicated exclusively to biotechnology is undoubtedly the one which has experienced greater growth in recent years. It now employs 350 people (in ECDB), and commits €40 million per year to R&D activities.

The subsector of biomedical instrumentation and health devices shows a great external dependence on technology (less than 20% of the technology input is produced in our country), and it is estimated that in the Community of Madrid only 30-40 people work in R&D activities, with a budget of about €5 million per year.

The public subsidization for R&D&I and infrastructures in Biotechnology, independently of its origin, has grown at an annual average rate of 22.6% to reach 230 million in 2003. But during the same period, business investment in R&D&I increased at a higher rate of 32.3%.

To date, the Spanish public researchers in Biotechnology are materializing this effort through a gradual increase of scientific publications and a low number of patent applications and approvals. Our community contributes with 0.47% to the applications for European patents. This is a slightly lower level than its contribution to worldwide scientific production.

However, research driven by, and in cooperation with, the industry (OPI-Business) has shown a clear pattern of growth between the years 2000 and 2003, when in economic terms it grew 150%.

Internationally, our main resources are a highly qualified staff and the availability of public funding. Both resources are a good leverage for developing the productive biotechnological sector in Madrid.

Turnover of the ECDBs was 150 million euros in 2003. It is also necessary to stress that this turnover has been growing at very high rates, at a rate exceeding 32% for the period 2000-2003.

The investment in R&D in 2003 even exceeded the turnover of these ECDB, reaching 176 million euros. This figure reflects the commitment and the future projection of the sector. The growth of investment in R&D exceeded 180% during the same period 2000-2003.

In general terms, the investment in R&D carried out by the companies dedicated completely to Biotechnology represents 7% of its turnover.

The acceptance of Biotechnology in Spain

Spanish citizens are the most optimistic, among all the EU-15, in their attitudes towards biotechnology and its applications. On the other hand, the Spanish market values medical and environmental applications more positively than food and agricultural applications.

On the basis of data from the euro-barometer, several scales have been constructed which try to measure the level of agreement, among the citizens of the UE-15, towards promoting the biotechnological applications in their three branches of activity: medicine,

transgenic animals and food / agriculture. In all three categories, Spaniards have shown the highest level of agreement among all Europeans.

Trends and Outlook

In 2003, there were 102 companies in Spain whose activity was completely dedicated to Biotechnology. They invoiced 300 million euros and employed 1500 people, which implied an annual average growth of 50% during the period 2000-2003.

In 2004, there were already in Madrid 367 registered companies whose activity was in one way or other directed to the use of biotechnological applications for the development or improvement of new products.

In 2005, the companies with activities in biotechnology, i.e. those completely dedicated to biotechnology, those partially dedicated or the user or service providing companies in the biotechnological industry, amounted to 514 organizations within the Spanish territory.

When these results (along with other key indicators of the innovation system) are extrapolated to the international framework and we analyze the momentum and positioning of the resources and results, we can see that Spain is the country with the greatest momentum, with an average growth of 25%, which is much higher than in the rest of analyzed countries.

On the other hand, the size of Biotechnology in Spain, in relative terms, is still just one fourth of the United States industry, which shows there is still a large potential for growth. In fact, the value of biotechnological products in the next 12 years will grow at an estimated compounded rate of 14%.

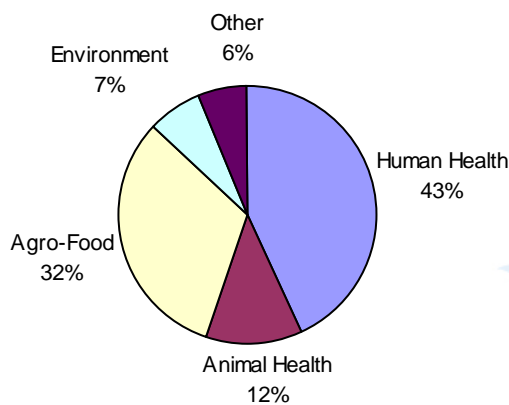
The output of the direct biotechnological activity, understood as the completely dedicated and partially dedicated companies, plus the public activity, represents 0.2% of the Spanish GDP. Since the industry relates to a vast range of technologies which penetrate into very different sectors, if we consider the indirect effect and the induced effect of the income it generates, the activity doubles to 0.4% of GDP and generates 26,000 jobs.

The trend by activity sectors

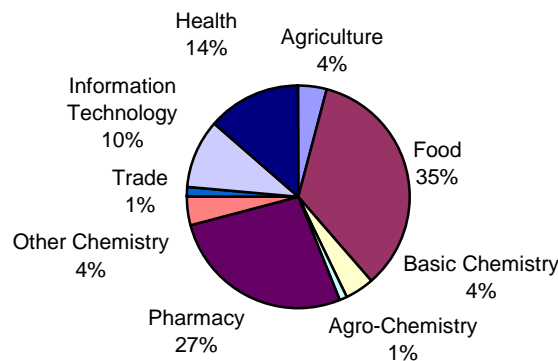
The Spanish biotechnology industry is very diverse, and this is why the different types of classification used are crucial for understanding its basic features.

The companies belong to a wide array of economic activities, according to the National Classification of Economic Activities (CNAE): agriculture, food, textiles, leather, paper, chemistry, rubber and plastics, non-metallic minerals, machinery and equipment, medical and surgical equipment and instruments, water sewage, construction, trade, IT, R&D, other activities, healthcare activities, or public sanitation.

Grouping these sectors together, we can say that the Spanish biotechnology operates predominantly in the sectors of human health (43% of the companies), agro-food (32%), veterinary (12%), and the environment (7%).

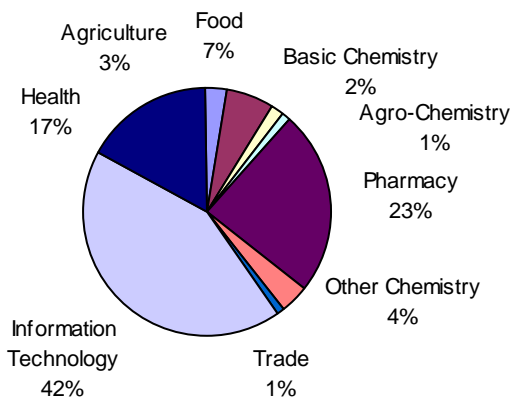


Number of companies
Source: Genoma España



Employees by activity
Source: Genoma España

The distribution of employees by activity sector shows that the highest number of jobs is located in the food (35%), pharmacy (27%), healthcare (14%), IT (10%), and chemistry (9%) sectors.



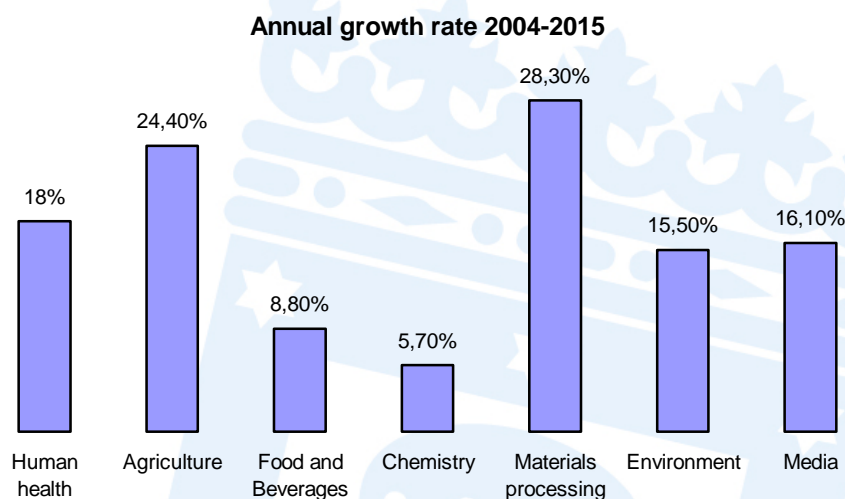
Source: Genoma España

However, if we focus on the distribution of the number of researchers by activity sector, the leader is IT (42%), followed by the pharmaceutical 23%, healthcare (17%), food (7%), and chemistry sectors (7%).

Although the economic relevance is relatively still very low, its effects spread to sectors representing 20% of GDP.

The biotechnological economy brings greater value added to its productive processes, due to the high level of specialization of its tasks and to the technical and innovative features governing all of its activity. This provides for a technical coefficient ¹ of 0.42 well below the 0.5 coefficient for the economy as a whole.

The estimated annual growth rate for the period 2004-2015 in Europe anticipates strong growth in processing of materials (28%), agriculture (24%), human health (18%) and the environment (15,5%). The Biotechnology sector in Europe will grow at an average annual rate of 16%.



Source: Genoma España

Madrid: Crossroad of Clusters

Madrid was the first recipient of public subsidies in R&D&I and infrastructures in Biotechnology, with more than 144 million euros during the period 2000-2003. This amount represents 24.63% of the national total.

The BioRegion of Madrid, of all the autonomous communities (CC.AA.s), is the one committing more funds to the R&D plans in Biotechnology, with more than 14.75 million euros.

The Madrid BioRegion is of all the CC.AA.s, the one obtaining most funds from the National Plan for R&D in Biotechnology, with more than 102.26 million euros.

The BioRegion of Madrid obtains 44.4% of the funds allocated to Spain in Biotechnology by the Fifth Framework Program (period 2000-2003), with more than 27.37 million euros.

¹ The technical coefficient is the instrument that analyzes the impact and describes the requirements a branch of the economy has for products of other branches in order to obtain one product unit.

Integrating public aids or incentives

The advantages offered by the city of Madrid gravitate around the following main themes:

- Tax incentives to R&D and IT. The tax rebates for R&D and IT are among the highest of OECD countries. The tax rebate for R&D varies between 30% and 70% of the cost of the project. In the case of IT projects the applicable rebate fluctuates between 10% and 15%.
- A wide array of measures and public aids directed to the participation of companies in R&D&I activities. Assistance to the companies in negotiations with investors and in managing and extending the aids they receive.
- Promotion of self-employment and the beginning of *start-ups* in innovating sectors.
- Channeling of aids contributed by *business angels*.
- Regional aid schemes of an integral nature, aimed at attracting foreign capitals. Support and counsel for the participation of the region's companies in international projects and programs.
- Assistance for the creating of companies.
- Long-term incentives aimed at attracting capital and locating companies with a potential to boost the creation of cluster structures.
- Success stories for the attraction of capital and the participation in initiatives and the multiplier effect of the aids themselves.
- Conditions of equality for foreign investors in access to the aids and incentives.

Support measures for technology transfer

- Patents and trademarks service window
- Streamlining procedures and minimizing red tape

Clusters Policy

Clusters are geographic concentrations of companies and interconnected public institutions acting in a certain field. It is in this role where the City council of Madrid attains the greatest prominence in the task of attracting companies, laboratories, professionals, etc... to create the most suitable climate for the development of the cluster.

The features contributing to the success of Madrid as a crossroad of clusters are based on:

- The concentration in Madrid of financial and venture capital companies. The role of agencies or public investment corporations.

- The measures of an integral nature in the tax sphere, the creation of employment and companies (incubators), activities of encounter and promotion and incentives for the attraction of companies and capital to the cluster.
- The phenomenon of scientific and business concentration.
- Measures to attract high level personnel in the international sphere.
- Presence of the main multinational companies.
- High concentration of research centers and governmental agencies.
- The existence of a critical mass.
- The endowment with state-of the art and last generation facilities.
- Typical synergies from business cooperation and strategic alliances.
- Generation of value added to the goods and products.
- The quality of the ancillary services provided to the companies.

Support to research institutes

The creation of a critical mass and infrastructures of the highest worldwide level is a cornerstone for the first stages of the R&D&I programs, when the State, the Community and the City council contribute to their construction.

Bio-incubators

- Support and integral counsel to the biocompanies in their first stages.
- Solidity of the mechanisms for evaluation of the business plans.
- Business services tailored to the needs of the companies or potential biocompanies.
- Aids for the location of these companies in surroundings favorable to innovation and research.
- Access to the facilities of the bioincubators.
- Caretaking of the incubator from the development of the business plan up to its implementation, smoothing the transition until it reaches its own autonomy.
- Aid in the process of growth and maturity. Relocation to surroundings with long-term stability.

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Institutions

Madrid enjoys a long tradition as far as University research in health sciences is concerned. It should be enough to recall that in Madrid, the Nobel prize laureates in medicine, professors Santiago Ramon y Cajal (1906) and Severo Ochoa (1959) carried out their most important work. In addition, the Committee for the Extension of Studies and Scientific Researches, a forerunner of the Higher Council for Scientific Research (CSIC), was founded in Madrid in 1907. Nowadays, many scientists of recognized international prestige work with organizations and research groups in Madrid.

Some of the more representative public academic and research centers working in biotechnology and biomedicine in Madrid are the following:

Scientific societies

- [Spanish Association for Human Genetics](#)
- [Spanish Association for Toxicology](#)
- [Grupo de trabajo sobre transgénesis en mamíferos \(SEBBM\)](#) (Working group on transgenesis in mammals)
- [Royal Spanish Society of Natural History](#)
- [Spanish Society of Cellular Biology](#)
- [Spanish Society of Development Biology](#)
- [Spanish Society of Biochemistry and Molecular Biology](#)
- [Spanish Society of Biotechnology](#)
- [National Thematic network of BioIT](#)
- [Spanish Society of In Vitro Culture of Plant Tissues](#)
- [Spanish Society of Ethology](#)
- [Spanish Society of Immunology](#)
- [Spanish Society of Microbiology](#)
- [Spanish Society of Microscopy - SME](#)
- [Spanish Society of Genic Therapy](#)
- [Spanish Society of Virology](#)
- [Spanish Society of Genetics – SEG](#)
- [Spanish platform of Nanomedicine - Nanomed Spain](#)

Research centers of the CSIC

The Higher Council of Scientific Research (CSIC) is the main actor in national basic research: It alone accounts for 20% of the Spanish scientific production and 0.55% of worldwide scientific publications. It also accounts for 20% of the Spanish scientific production and 0.55% of worldwide scientific publications.

Nearly half of its 125 institutes are located in Madrid, where it also has its headquarters. Beside libraries and laboratories, the CSIC has museums, oceanographic ships, natural parks and reserves, experimental farms, astronomical observatories, and

manages one of the Spanish bases in the Antarctic and the polar ship Hespérides. More than 12,000 people work for CSIC, from permanent scientists to technicians, administration staff and researchers, and almost 2,000 doctorate students work on their theses at different institutes of the CSIC.

The main centers of the CSIC in Madrid are:

- [Consejo Superior de Investigaciones Científicas - CSIC](#) (High Council for Scientific Research)
- [Center of Molecular Biology "Severo Ochoa"](#)
- [Biological research center](#)
- [Research and development center](#)
- [National center of Biotechnology](#)
- [Institute of Molecular and Cellular Biology of Plants "E. Primo Yúfera"](#)
- [Institute of Vegetal Biochemistry and Photosynthesis](#)
- [Institute of Biomedical Investigations "Alberto Sols"](#)
- [Institute of Neurobiology "Ramon and Cajal"](#)
- [Institute of Pharmacology and Toxicology](#)
- [Institute of Industrial Fermentations](#)
- [Institute of Medical Chemistry](#)

Network of Public Hospitals and Other Public Centers of Medical Research

- [National center of Cardiovascular Research](#)
- [Spanish National Cancer Research Center \(CNIO\)](#)
- [Research Center for Cancer \(CiC\)](#)
- [CIEMAT - Power, Environmental and Technological Research center](#)
- [Hospital 12 de Octubre](#)
- [Hospital Clínico of Madrid](#)
- [Hospital Clínica Puerta Hierro](#)
- [University Hospital Gregorio Marañón](#)
- [University Hospital La Paz](#)
- [University hospital Ramon and Cajal](#)
- [University Hospital La Princesa](#)
- [Institute of Health Carlos III](#)
- [Madrid institute of Rural, Agrarian and Food R&D](#) (IMIDRA).
- [National institute of Agrarian Research](#) (INIA).
- [Center of Astrobiology](#) (INTA)

Public Universities

The two first have a greater vocation for research in Biotechnology and Biomedicine.

- [Universidad Autónoma de Madrid](#)
- [Universidad Complutense de Madrid](#)
- [University of Alcala de Henares](#)
- [Polytechnical university of Madrid](#)
- [Universidad Rey Juan Carlos](#)
- [Universidad Nacional de Educación a Distancia](#)

Private Universities

- [Antonio de Lebrija](#)
- [Universidad Europea de Madrid](#)
- [Pontificia de Comillas](#)
- [Pontificia de Salamanca en Madrid](#)
- [San Pablo CEU](#)

Other institutions

- [Madrid](#)
- [Spanish Association of Bioenterprises \(ASEBIO\)](#)
- [Association of Biotechnological Companies of the Community of Madrid](#)
- [Official Association of Biologists of Spain](#)
- [Foundation Juan March](#)
- [Foundation Jiménez Díaz](#)
- [Spanish Foundation for Science and Technology - FECYT](#)
- [The Spanish Olympic Games of Biology](#)

Other interesting links

- [Boletín Oficial del Estado](#) (Spanish State Gazette)
- [Boletín Oficial de la Comunidad de Madrid](#) (Madrid Official Journal)
- [Boletín Oficial del Ayuntamiento de Madrid](#) (Madrid City Council Official Journal)
- [Ministry of Education and Science](#)
- [Ministry of Health and Consumption - MSC](#)
- [Spanish Office of Patents and Trademarks](#)
- Sessions of the Senate on "genetic Manipulation with aims of food production" ([433](#), [459](#), [470](#), [489](#), [504](#), [509](#), [516](#), [530](#))

European Union

- [Biotechnology-European Commission](#)
- [European Federation of Biotechnology](#)
- [European Association for Biotechnology](#)

Offices for the Transfer of Research Results (OTRI)

These are interface units of the scientific environment entrusted with managing, within the area of R&D, the University – Business relations, created as a mechanism promoting the transfer of knowledge between the research centers and the companies, as well as a greater integration of the National system of Innovation. Their general mission is to promote, within the universities, the generation of the knowledge that can suit the needs of the business environment and to facilitate their transfer.

The network of Offices for the Transfer of Research Results of the Spanish universities (OTRI NETWORK)

The network assumes as its basic mission the boosting and spreading of the role of universities as essential elements within the innovation system. At the present time it has 58 offices.

The Office for Technological Transfer of the CSIC (OTT)

It promotes the connection between researchers and the business world, looks for possible subsidies, helps protecting research results, cooperates in the transfer of results and in the creation of technology-based companies.

Programs for the support of technology transfer

- Program for the Promotion of the Transference of Research Results ([PETRI](#))
- Program [Torres Quevedo](#)
- Search engine for subsidies and aids ([ayudas.net](#))

madrid

Legal Framework

On the 15 of December we learnt that the Spanish Parliament (Congress) had endorsed the project of law on biomedical investigation, which will authorize the therapeutic cloning or nuclear transfer for obtaining mother cells, and will now follow its parliamentary procedures.

The legal framework regulating the biotechnology sector is made up of EU law, international ethical guidelines and Spanish law on this matter.

Spanish law

- Spanish Constitution.
- Law 42/1988, of 28 of December, of 1988, on the donation and use of embryos and human fetuses or their cells, tissues or organs.
- Law 9/2003, of 25 of April, establishing the legal framework for the confined use, voluntary liberation and marketing of genetically modified organisms.
- Royal Decree 178/2004, of 30 of January, approving the general Regulation for the development and execution of Law 9/2003, of 25 of April, establishing the legal regime for the confined use, voluntary liberation and marketing of genetically modified organisms.
- Law 14/2006, of 26 of May, on techniques of assisted human reproduction.
- Criminal Code 1995.
- Order of 21 September 2000, regulating the automated files for genetic identification DNA-Humanitas, human remains and DNA-Veritas, biological vestiges and comparison samples, at the Main directorate of the Police.

UE Law

- Council Directive 90/219/EEC of 23 April 1990 on the contained use of genetically modified micro-organisms.
- Council Directive 98/81/EC of 26 October 1998 amending Directive 90/219/EEC on the contained use of genetically modified micro-organisms.
- Council Directive 90/220/EEC of 23 April 1990 on the deliberate release into the environment of genetically modified organisms.
- Commission Directive 94/15/EC of 15 April 1994 adapting to technical progress for the first time Council Directive 90/220/EEC on the deliberate release into the environment of genetically modified organisms.
- Directive 97/35/CE of the Commission of June 18, 1997. By which the Directive 90/220/CEE is adapted for the second time to technical progress. Of the Council on the intentional release of genetically engineered organisms to the environment
- Commission Directive 1999/10/EC of 8 March 1999 providing for derogations from the provisions of Article 7 of Council Directive 79/112/EEC as regards the labeling of foodstuffs.
- Regulation (EC) No 258/97 of the European Parliament and of the Council of 27 January 1997 concerning novel foods and novel food ingredients.

- Resolution of 16 March 1989 of the European Parliament on the ethical and legal problems of genetic engineering.
- European Parliament resolution on cloning (Official Journal of the European Communities) of 12 March 1997.
- European Parliament resolution on human cloning (Official Journal of the European Communities) of 15 March 1997.
- Council Regulation (EC) No 1139/98 of 26 May 1998 concerning the compulsory indication of the labeling of certain foodstuffs produced from genetically modified organisms of particulars other than those provided for in Directive 79/112/EEC.
- Council Decision 90/395/EEC adopting a specific Research Programmed in the field of Health: Human Genome Analysis.
- Council Decision 92/2/8 on Biotechnology.
- Convention for Protection of Human Rights and Dignity of the Human Being with Regard to the Application of Biology and Biomedicine: the Council of Europe (1996).
- Universal Declaration on the Human Genome and Human Rights, UNESCO (1998).
- Resolutions 1995/82 and 1993/91 of the Commission on Human rights of the UN (1995).
- Resolution on Bioethics, of the Conference of Heads of State and Government of the Organization of African Unity (1996).
- Vienna Declaration and Program for Action of the World-Conference on Human rights (1995).
- Statement on the Principled Conduct of Genetics Research , of the Organization of the Human Genome. (1996).
- Universal Declaration of Human Rights of the Future Generations (1994).
- Bilbao Declaration on the law concerning the Human Genome Project (1993).

International ethical guidelines

- Nuremberg Code (International Court of Nuremberg) Published in 1946 as an answer to the atrocities committed by the Nazi researching doctors.
- Helsinki Declaration of the World Medical Association. Recommendations to direct doctors in the research with human beings. Adopted in 1964 and several times reviewed. Last review, year 2004.
- Principles of Medical Ethics. Detailed in the text of Resolution 37/194 adopted by the General Assembly of the United Nations in 1982.

Biotechnology Companies Established In The City Of Madrid

abbott laboratories, s.a..	integromics
adf tecnogen, s.l	international pharmaceutical
algenex	immunology
alk-abello s.a.	isagro españa
aventis farma, s.a..	isomed s.l.
azucarera ebro, s.l.	juste saqf
bioaurum consulting	kytos biosystems
bioenvision	laboratorios andromeda
biogen cientifica, s.l.	laboratorios farmacéuticos rovi
biogen idec iberia, s.l.	lactest
bionova científica, s.l.	merck sharp and dome de españa
biotools biotechnological & medical laboratories, s.a..	millipore iberica
blueline advanced services, s.a.	mologen molecular medicines, s.l.
bristol myers sucursal en españa, s.a.	monsanto agricultura españa
btsa biotecnologías aplicadas	najeti, s.a.
cepa schwarz pharma s.l.	natural biotech
cepsa - cesquisa	ncr españa
chromacell	norel, s.a
circagen	nucliber
control microbiologico	oculab
cross road biotech s.l.	partner line s.a.
cultek, s.l.	phyllum
digna biotech s.l	plant bioproducts
dow agrosciences iberica s.a.	repsol ypf quimica
estructuras analíticas, s.l.	roche farma
eurobosques, s.a.	schering españa
farmalider s.a.	secugen
fernández-vega, propiedad industrial	serono españa
genetica molecular laboratorio, s.l.	shionogi quillicaps
gentek consulting group.	suan pharma
gomensoro, s.a.	tedec – meiji farma
grupo empresarial ence, s.a.	tolsa
grupo sufi	unilever españa
industrias agrobiologicas	vaelsys
iniciati pharma.com	vitalia consulting
inmunologia y genetica aplicada	vitro, s.a.
	vivotecnia