



Ajuntament de  
Barcelona



# The most in- demanded jobs in the Biotechnology and Biomedicine Sector

REPORT

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*In collaboration with:*

**Deloitte.**



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# 01. Introduction to the sector

The biotechnology and biomedicine activities can be classified into five big areas:

- **Agriculture and food:** Plants, seeds, functional foods, etc.
- **Biopharmaceutical industry:** marketing, pre-clinical and clinical development, etc.
- **Production and Industrial Biotechnology:** Packaging, biomaterials, biomanufacturing, etc.
- **Biomedical research:** biomedical platforms, biomedical technologies, etc.
- **Support and business management services:** development efforts, marketing tasks, maintenance of laboratories, etc.

Currently, the contributions of biotechnology and biomedicine, such as biofuels, stem cells or telemedicine, represents one of the key drivers of economic and social progress. The current commitment of private companies to the research and development has a huge impact on the economy and results in a wide range of job opportunities both in the short-term and the long-term.

# 02. Current environment

## Global Trends:

The biotechnology and biomedicine remains a globally key sector in 2015 as it contributes in the development of other relevant economic sectors such as energy, the environment and the public health. In addition, it contributes in the job creation and the competitiveness of enterprises.

The EU fosters activities related to the sector through the Horizon 2020 program, which aims that the spending on research and development achieve 3% of European GDP in the year 2020. Furthermore, the European Union is committed to the development of bio-products market due to its potential for future growth and their involvement in European sustainability policies, as well as the expected career opportunities which represent about 300.000 jobs in Europe. Additionally, it is estimated that the industry will grow by 2.4% annually in Western European countries.

Globally, emerging countries such as China and India led sales in this sector in 2014. Even so, during 2014, the regions of Europe and America continued to hold the largest global market share with 30% and 45% respectively. The health division was the leader division of the biotechnology industry since 2014 representing almost 60% of the total market value of biotechnology worldwide.

## Trends in Spain:

The Spanish biotechnology and biomedical sector has remained a worldwide reference in 2015, despite the low investment in R+D+i (1,24%) that occurred in 2014 in comparison with other European countries such as France and United Kingdom.

Additionally, Spain is one of the most competitive countries globally in the fields of healthcare biotechnology, industrial bioprocesses and the pharmaceutical industry. Regarding biomedicine, it is important to highlight the advances in healing therapies that took place throughout 2015, the collaboration in research between universities and the business world and the new product development. As an example of these actions, is the launch of 141 new products to the market during 2014.

Moreover, national and multinational biotechnology companies have worked on developing biotech drugs during 2015.

On the other hand, conferences and events are an important mechanism for sharing information and knowledge among professionals as well as to promote the sector internationally. In this regard, the Congress of the Spanish Federation of biotechnologists has established itself as one of the most relevant conferences and with a greater impact in Southern Europe.

Regarding funding and resources, the *Centro para el Desarrollo Tecnológico Industrial Español* supports the new research projects promoted by small and medium-sized biotech and biomedical companies that aim to increase their competitiveness and internationalization through innovation. Accordingly, the Spanish Government has launched a strategic program to develop the bio-economy market (bioproducts and biofuels) in Spain in order to boost economic activity and achieve a better position worldwide.

### Trends in Catalonia:

The biotechnology and biomedicine has continued to grow during 2015 due to the improvement in both biomedicine and biotechnology areas. The employment level remains stable, growing gradually due to the slight increase in hiring in the sector (biotechnology, pharmaceutical, medical technology, etc.). In this context, there is a significant improvement of private investment in business projects due to foreign investment and venture capital managers who are increasingly committed to this business sector.

Barcelona is well positioned, both in biotechnology (considered the biocluster backbone in Southern Europe) and in biomedicine due to the investigations done by Biomedical Research Park. Besides, the Barcelona City Council and the public organization *Biocat* made many efforts in order to promote the brand "Barcelona Biotech". Its main goal is to disclose the attractiveness and dynamism of the city to attract talent and international investment.

Furthermore, companies continue to claim the strategic importance of this sector in Catalonia. Consequently, they are promoting new initiatives such as the "B-Debate", which aims to promote international events of high scientific level to promote debate, collaboration and open exchange of ideas and knowledge between experts and institutions of recognized national and international prestige. Also, the increased collaboration between the Catalan universities and private companies in research is already helping to create new synergies and, consequently, to improve competitiveness in the sector.

Biotechnology and Biomedicine indicators	Sector contribution to GDP in Spain <sup>(1)</sup>	Employed population in Catalonia <sup>(2)</sup>	Number of companies in Catalonia <sup>(3)</sup>
	9% (2013)	27.918 (2013)	512 (2013)

(1) Latest report available from the biotechnology sector ASEBIO 2014, specialized association of the sector.

(2) Available data from 2013 Statistical Institute of Catalonia. IDESCAT

(3) Available data in the sectoral report BIOCAT 2013.

## 03. Key sectorial trends

	<p><b>Internationalization</b></p>	<p>The biotechnology and biomedicine market is becoming more competitive globally due to the generation of specific knowledge and the production of specialized products and services. For example, emerging countries such as India, are increasing their scientific production.</p> <p>Moreover, the importance of the internationalization is a proof of the need for funding and investment to develop its products. Therefore, participation in international industry events becomes a key instrument to identify potential customers and to enhance the whole process.</p> <p>In this context, preferred markets for Spanish companies are those where there are more business opportunities and investment, such as Europe and the United States.</p> <p>In addition, companies are developing strategic alliances worldwide in commercial and scientific field and 97 alliances of them where established during the 2014.</p>
	<p><b>Innovation and technology</b></p>	<p>Technological advances are still a industry trend in 2015 because of its impact on biomedical and biotechnology activities. It should be highlighted the impact of new technologies such as big data and 3D printing which facilitate the development of new products and services as well as improve the efficiency and quality of production processes.</p> <p>Big data has diverse implications in the biomedicine field. For example, data from patient clinical records are used to estimate incidence of epidemics and patterns to be able to respond with disease treatments. In addition, it enables better define patient profiles and improve the administration of the health system. Therefore, this technological innovation will lead to a reduction in process costs and improved diagnoses and treatments.</p> <p>On the other hand, it is noteworthy the growing incorporation of 3D printing in the research and production of biotechnological and biomedical sector, being a good example of this the 3D prostheses and organs impressions.</p> <p>Consequently, these technological innovations will involve the incorporation of ICT professionals in the sector, promoting its interdisciplinary.</p>
	<p><b>Bioeconomy</b></p>	<p>The European Union is promoting a sustainable economic model called "bio-economy", which is the set of activities aimed at obtaining products and services using as raw materials resources of biological origin. The development of the bio-economy is due to the need to respond to specific global challenges such as the increasing world population, increasing demand for food, depletion of natural resources and the impact of climate change.</p> <p>In this context, the biotechnology activity is considered as a central pillar in the development of the bio-economy in Spain. The main goal of the program is to increase the competitiveness of companies in the food sector through biotechnology advances in the field of biomaterials (bioplastics), industrial bioprocesses and bioenergy (biofuels such as biomass).</p> <p>Another aspect to consider is the increasing demand for professionals in the field of bio-economy over 2015 which is expected to still grow over the coming years.</p>

	<p><b>Emerging Markets: Biosimilar</b></p>	<p>The importance of bioimilar medicine, the generic equivalent in biotechnology, has increased in 2015.</p> <p>It is important to note the importance of biosimilar medicine, the generic equivalent in biotechnology, which will create synergies between the companies in order to develop these products and increase competition.</p> <p>On the other hand, the legal and scientific framework of these drugs is very recent and is still in the development stage.</p> <p>Regarding the Spanish biosimilars market, it is expected that patent biotech drugs will be released over the next five years. This can lead to an increased demand for professionals in the field of biomedicine and sectoral regulation.</p>
	<p><b>Transverse sector</b></p>	<p>Biotechnology has become an important tool to increase productivity and improve production processes in the industry. Also, new consumer habits and increased industrial production are causing more and more increased demand in industry services and products. There are three types of biotechnology based on their application: red biotechnology (applied to medicine), green biotechnology ( applied to agriculture and livestock) and white biotechnology ( applied to industrial processes).</p> <p>In this regard, it is noted as companies tend to cluster to collaborate and create synergies between the different fields of application of biotechnology. The convergence between pharmaceutical and biotechnology sectors to expand its product portfolio is seeking greater drugs customization development and thus be able to offer a more precise cure and lower side effects.</p>

## 04. Employment in the Biotechnology and the Biomedicine sector

The biotechnology and biomedical sector still created jobs during 2015. Although the number of hires is lower than the European average, the levels of recruitment professionals have started to rise slightly during 2015, especially in specialized and highly-qualified professionals. Anyway, it is expected that the demand for professionals will increase in coming years due to the new needs of the biotechnology and biomedical market (including pharmaceuticals) and the increasing specialization in different areas of each activity sector. In addition, new job opportunities will have a greater interdisciplinary according to sector development.

Analysis of employment in the Biotechnology and Biomedicine Sector	Current situation	Forecast Growth
		

 Recovery/Growth; 
  Maintenance; 
  Decrease

### 4.1. THE MOST REQUIRED HIGHLY-QUALIFIED JOBS

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
1	<a href="#">Clinical Research Manager</a>	The clinical research manager is the professional responsible for the clinical trials of a (bio) pharmaceutical company or CRO (Contract Research Organization). In general, this professional directs a team of several specialists in different fields (assistants, clinical trial monitors, etc.). This requires close collaboration with authorities, physicians/specialists or opinion leaders, and internal R&D departments.	<ul style="list-style-type: none"> <li>Education: a degree in either pharmacy or medicine is a must.</li> <li>Experience: at least ten years of experience in the pharmaceutical industry or in clinical research is required.</li> </ul>	Knowledge regarding specific techniques of strategic administration and business management are required to carry out these activities.
2	<a href="#">Medical Advisor</a>	The medical adviser provides the link between the market and fields of research. They work under the supervision of the managing physician and collaborate closely with the marketing and sales departments, designing the scientific contents of assigned products and providing support to the product manager.	<ul style="list-style-type: none"> <li>Education: a degree in either pharmacy or medicine is a must. Furthermore, training in marketing, preferably pharmaceuticals, is recommended.</li> <li>Experience: previous experience of between two and three years in the pharmaceutical industry is required.</li> </ul>	Valued skills are: <a href="#">networking</a> y <a href="#">concern for order and quality</a> .

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
3	<a href="#">Medical Representative</a>	The medical representative is the professional who works for a pharmaceutical company and promotes the pharmaceuticals assigned to him/her. The representative is assigned a territory and must pay regular visits to physicians in hospitals, clinics and, depending on the products assigned to him/her, also chemists and pharmacies in the area.	<ul style="list-style-type: none"> <li>Education: it is required to have a degree in a science field such as biology, medicine, chemistry, etc.</li> <li>Experience: a minimum of one year of previous work experience in the sales department of a pharmaceutical company is considered an advantage.</li> </ul>	Professionals are required to have scientific and technical knowledge related to the products they promote.
4	<a href="#">Biomedical engineer in robotics, diagnostic imaging and telemedicine</a>	The biomedical engineer is the professional who can work in three professional fields: the industrial field, the health field and the research field. Apart from design activities, they also manage projects and may oversee manufacturing, assessment, certification, marketing, maintenance, calibration, repair and training.	<ul style="list-style-type: none"> <li>Education: it is necessary to have a degree in either engineering or science field. A Master's degree in biomedical engineering is highly recommended.</li> <li>Experience: it is important to have at least two years of experience in any of the biomedical sector.</li> </ul>	Required skills: <a href="#">Planning and organization</a> , <a href="#">orientation towards achievement</a> , decision making, team management, <a href="#">leadership</a> and <a href="#">communication</a> .
5	<a href="#">European biotechnology partnership manager</a>	The European biotechnology partnership manager is the professional responsible for leading and coordinating projects framed within the European Commission in the area of research. Also, he/she is responsible for aiding in the preparation of the study synopsis and for ensuring that the work plan is being fulfilled within the parameters of quality, budget and timing outlined in the scientific report of the project.	<ul style="list-style-type: none"> <li>Education: it is necessary to have a degree in either business or science field. A PhD or other postgraduate degree in Biotechnology is recommended.</li> <li>Experience: a minimum of two years of experience in project management and one year of experience in international negotiation.</li> </ul>	A high level of English is essential. Furthermore, for some positions it is necessary to speak other languages.

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
6	<a href="#">Pharmaeconomics Manager</a>	The pharmaco-economic manager is the professional in charge of devising and implementing studies and protocols in the pharmaceutical industry. This professional is specialized in data collection to assess healthcare costs and results and pharmaco-economic analysis.	<ul style="list-style-type: none"> <li>• Education: it is necessary to have a degree in either business or science field. Moreover, knowledge of pharmaco-economics is essential.</li> <li>• Experience: three-year minimum previous experience in pharmaco-economic studies and in research methodologies is required.</li> </ul>	<p>It is convenient to attend courses and seminars of team management.</p> <p>It is appropriate to have knowledge of software platforms.</p> <p>These professionals must know the business model and the global market.</p>
7	<a href="#">Bioinformatics engineer</a>	The bioinformatics engineer is responsible for collecting, analysing and interpreting biological data via the development of programmes and the creation of platforms. In general, this engineer has knowledge regarding information technology, applied mathematics, statistics and molecular biology.	<ul style="list-style-type: none"> <li>• Education: it is necessary to have a degree in either science, engineering or mathematics. Bioinformatics courses are highly recommended.</li> <li>• Experience: it is important to have between two and three years of experience as a researcher at international bioinformatics centres.</li> </ul>	
8	<a href="#">Biotechnology Project Manager</a>	The biotechnology project manager is the professional responsible for planning, managing and executing an assigned project. She/he can develop internal projects within their organization or projects with external agents outside the organization, with the aim of generating a value, product, service or particular technology.	<ul style="list-style-type: none"> <li>• Education: it is necessary to have a degree in the health science field. It is also recommended to have a postgraduate or doctorate in biotechnology.</li> <li>• Experience: between three and five years of experience in research activities, project management, research groups and teams management is required.</li> </ul>	

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
9	<a href="#">Specialist in biofuels</a>	The specialist in biofuels is the professional who concentrates on the search for alternative energy sources, and develops and improves existing biofuels to generalize their use.	<ul style="list-style-type: none"> <li>Education: it is necessary to have a degree in either engineering or science field. Moreover, it is recommended to have a Master or Postgraduate in renewable energies.</li> <li>Experience: previous experience as an investigator in the study and development of biofuels is an advantage.</li> </ul>	<p>It is recommended that professionals have a general knowledge in commercial field.</p> <p>Skills such as: <a href="#">team work and cooperation</a>, <a href="#">communication</a> and <a href="#">initiative</a> are valued.</p>
10	<a href="#">Expert in Registrations</a>	This professional is in charge of preparing documentation necessary for the submission and approval of new products, thus taking responsibility for preparing registration dossiers, for delivering them to relevant regulatory agencies (the European Medicine Evaluation Agency [EMA] in Europe and the Spanish Agency of Medicines in Spain), and for monitoring the evaluation process.	<ul style="list-style-type: none"> <li>Education: it is necessary to have a degree in a science field. Specific postgraduate education in the pharmaceutical industry or in regulatory affairs is recommended.</li> <li>Experience: in general, at least two years' experience as a technician or assistant in the Records Department of a pharmaceutical laboratory is required.</li> </ul>	<p>The following skills are highly valued: <a href="#">analytical thought</a> and <a href="#">learning and use of knowledge</a>.</p>

#### 4.2. THE MOST REQUIRED LESS-QUALIFIED JOBS

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
1	<a href="#">Technician in biomanufacture</a>	The expert in biomanufacture is the professional responsible for the process of manufacturing a biosubstance. She/he supervise all operations of the process and control the different stages for manufacturing products.	<ul style="list-style-type: none"> <li>• Education: a professional training course in the field of Chemistry or Healthcare is required.</li> <li>• Experience: at least one year of experience in similar positions in molecular biology laboratories or the pharmaceutical industry is an advantage.</li> </ul>	A key component to carry out these tasks are the planning of scientific hypotheses and their testing by different research designs and techniques.  Skills such as <a href="#">concern for order and quality</a> and <a href="#">analytical thought</a> are highly valued.
2	<a href="#">Analysis Technician</a>	The analytical technician is the professional who is in charge of analysing raw materials or biological origin such as cells, biological tissues or fluids, new chemical or biological entities or raw materials or finished products, depending on the scientific department she/he operates in.	<ul style="list-style-type: none"> <li>• Education: a professional training course in the field of laboratory or environmental chemistry.</li> <li>• Experience: between one and five years of experience in an analytical method laboratory.</li> </ul>	

## 05. Conclusions and future prospects

### New opportunities



- The commitment to the implementation of actions related to the bioeconomy by the European Union within the Horizon 2020 program can favor the development of new scientific careers in the field of biofuels and bioproducts. On the other hand, this European program represents a new legal framework with new instruments and new actions in the field of biotechnology. In this context, it is expected that sector companies will demand experts in European regulation and in R+D+i.
- It is expected that the new emerging market for biosimilar medicines manufacturing will demand highly-qualified professionals specialized in the production processes in many industries such as the pharmaceutical or cosmetics.
- Technological innovations involve new habits and paradigms in biotechnology and biomedicine application. This will result in new job opportunities in the ICT field among others, as well as the demand for mixed profiles between "Bio" and ICT, such as an IT professional with knowledge in biology.

### The professionals in the Biotechnology and Biomedicine Sector



- The labor market in the biotechnology and biomedical sector requires professionals who have scientific and commercial knowledge and capabilities. Thus, experts in the sector with scientific training and additional training in marketing, project management, team management and negotiation are increasingly demanded.
- The growing internationalization of companies and scientific institutions, along with the variety of international events in the sector, force professionals to expand their language skills.
- There is a wide range of programs in the biotechnology and biomedicine fields, from degrees and masters to specialized courses. Therefore, it is expected that new industry trends will require professionals to acquire new skills and knowledge related to research, production, regulation and marketing.

## Alerts



- One of the main sector problems, despite less extent, is the difficult access to public funding and low investment in R+D+i. This makes it difficult for SMEs to internationalize and increase their competitiveness.
- Private institutions request greater coordination among research centers as to facilitate the production synergies flow in order to improve the efficiency and competitiveness of biomedical and biotechnology companies.
- Companies in the sector, to become more competitive, increasingly require talent retention strategies to avoid their trained professionals leave. The need to provide specific training plans related to new industry trends may become a key element that they will have to consider.

## Strengths



- The Catalan bioregion is an international biotechnical and biomedical reference point with leading infrastructure and professionals from around the world. Catalonia has six scientific and technological parks to carry out activities related to biotechnology, biomedicine and medical technologies.
- Catalonia concentrates roughly 22% of companies in the biotechnology and biomedical sector in Spain. It also focus 45% of leading pharmaceutical and hospital of international reference in research. They have a key role in the hospital sector as engines of innovation in pharmaceuticals and medical technologies.
- The increasing interaction between domestic and foreign companies is leading the establishment of agreements of technological or commercial cooperation as well as new sources of investment for projects.

**It is expected that the demand for professionals will increase in the coming years, due to the new needs in the biotechnology and biomedical market (including pharmaceuticals) and the increasing specialization in different areas in the sector.**

## o6. Articles y other reports consulted

**Sources:** Últimos datos disponibles. INE; IDESCAT; *Secretaría de Estado de Investigación, Desarrollo e Innovación Española*; report ASEBIO 2014; Industrial Annual Report 2014; European Commission. Press: Cinco Días; Expansión; Europapress; El Mundo; Huffington Post.

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Pascual, M. (2015). “Radiografía de la biotecnología: más patentes, menos facturación”. *Cinco Días*.

## o7. Sectorial complementary webography

- ✓ Asociación Española de Bioempresas.  
<http://www.asebio.com/en/index.cfm>
- ✓ Biocat – Bioregió de Catalunya  
<http://www.biocat.cat/>
- ✓ Spanish Biotechnology Society  
<http://www.sebiot.org/seccion.php?idSECCIONES=&idioma=I/>
- ✓ World Health Organization  
<http://www.who.int/en/>
- ✓ European Commission, Horizon 2020  
<http://ec.europa.eu/programmes/horizon2020/en/area/biotechnology>
- ✓ Secretaría de Estado de Investigación, Desarrollo y Innovación Española  
[http://www.idi.mineco.gob.es/portal/site/MICINN/?lang\\_chosen=en](http://www.idi.mineco.gob.es/portal/site/MICINN/?lang_chosen=en)

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T5 and T6 Can Jaumandreu  
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