

ASEBIO REPORT 2016

News and trends from the Spanish Biotech Sector and company guide



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Edited by Spanish Bioindustry Association (ASEBIO)

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The Spanish biotechnology sector in 2016





1.

The Spanish biotechnology sector in 2016



EXECUTIVE SUMMARY

During 2015 the Spanish economy as a whole saw a continuation of the improvements initiated back in 2014, with growth close to levels not seen since the eve of preceding the financial crisis of 2009.

In this increasingly positive macroeconomic context, biotechnology companies have also consolidated their own path to recovery, with a second year of growth in the total number of companies engaged in biotechnology related activities, which has increased by around 8.7%. The total number has come close matching to the historic highs witnessed during 2011 and 2012, when there were around 3,000 such companies, meaning that just over 2 of every 1,000 companies with employees were engaged in biotechnology activities in 2015.

This growth in the number of companies has also been reflected in terms of economic activity, with increases of around 3% in both turnover and value added, which means that biotechnology activities now account for 4% of GDP in terms of value added.

In dynamic terms, the value added of dedicated biotechnology companies has headed the growth rankings in 2015, reaching nearly 20%, while the increase in nominal GDP growth was 3.7%.

The statistics also include, for the first time, the results for the total economic impact of companies active in biotechnology as a proportion of the whole Spanish economy, be it directly, indirectly or induced - an indicator which in 2015 accounted for 8.6% of Spain's GDP and over 930,000 jobs.

The specific contribution of dedicated biotechnology companies reached 8.2 billion euros and 130,000 jobs, around 0.8% of the national total - generating around 3 billion euros in revenue for the public administration. In terms of the whole biotechnology sector, i.e. companies declaring biotechnology activities, either as main or sole activity, second line of business or a tool for production, the biotechnology industry is the direct employer of 182,000 people, having grown by 2.4% in 2015; nevertheless, even after factoring in the growth seen over 2014, the increase did not manage to make up for the sharp fall registered in 2013, as the total number of jobs in the sector failed to reach the numbers seen previously.

1.1. METHODOLOGY

As with other recent reports, the methodology on which the information contained in this section is based on the random sampling method used by the Spanish Statistical Office

(INE) for its Survey on Innovation in Companies.

On this occasion, we have further developed the analysis using our own sample of biotechnology companies, from which we have obtained basic accounting records, balance sheets and profit and loss accounts, in order to establish a series of average ratios to further detail the numbers in the INE dataset.

More specifically, a sample of around 70 companies has been used to derive a series of ratios that allow us to collect information comparable to that found in other types of activity; such as Gross Value Added, employee remuneration, gross operating surplus, gross fixed capital formation. Values that have allowed us to carry out a similar study of biotechnology activities *vis-a-vis* other types of activity - and also to carry out an analysis of the overall economic impact that these activities have on the Spanish economy as a whole.

Using the established methodologies for this type of study, it has been possible to establish direct impact in terms of income generation (GDP), employment and tax revenues, as well as the indirect impact from purchases of goods and services by companies engaged in biotechnology activities, and also induced impact, which is derived from both direct salaries and indirect salaries in the sector.



1.2. ANALYSING THE MAIN INDICATORS

As seen on Chart 1, over 2015 there was a change in the falling trend in the total number of companies engaged in biotechnology activities, which had decreased during the previous two years. This time the total rose by around 240 companies, almost reaching the record highs from 2011-2012.

If we compare these numbers to the overall totals for companies with employees in Spain, which in 2015 stood at around 1,447,000, we must conclude that currently two out of every 1,000 companies are engaged in biotechnology related activities, a ratio which has improved slightly after falling for two years

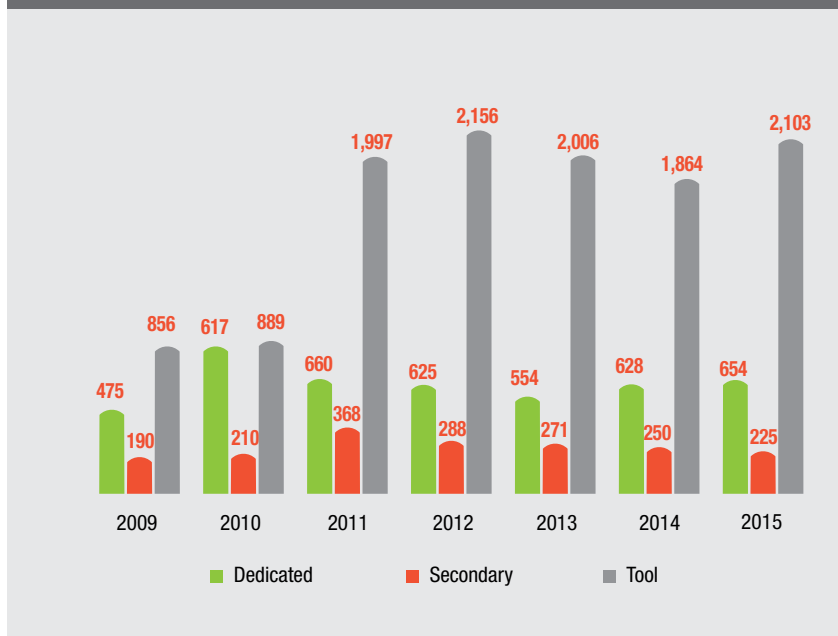
A detailed look at this aspect of business demographics reveals that the biggest increases in relative terms involved companies employing less than 250 employees that use biotechnology as a tool of production, with 13.2% growth compared to the overall average of 8.7%. On the other hand, the number of enterprises for which biotechnology is a secondary line of business continued to fall, with a decrease of over 10%. The number of dedicated biotechnology companies, meanwhile, rose by over 13% during 2013-2014 and more than 4% over 2014-2015.

This increase in the number of companies is reflected in the total number of people employed by the sector, which has risen by 4,183, as the 1,081 jobs lost among companies with over 250 employees were made up for by an increase of over 5,200 jobs among SMEs.

The total volume of business also experienced a small increase during 2015, with turnovers growing by just under 3%, as the rapid growth of up to 10% seen over the past few years started to tail off.

Once more, the dynamics of turnovers across the sector reveal significant differences

CHART 1. EVOLUTION OF THE NUMBER OF COMPANIES ENGAGED IN BIOTECHNOLOGY



Source: INE. 2015 Survey on Innovation in Companies.

between segments, with increases of almost 8% for those companies whose primary/exclusive activity involves biotechnology (dedicated biotechnology enterprises) and slight decreases in turnovers among companies using biotechnology as a tool of production.

The data for R&D activities shown on Table 1 suggests a certain increase in activities, as the number of staff hired for R&D activities grew faster than total employment in companies.

Internal spending on R&D rose faster than turnovers, indicating increasing efforts for innovation by enterprises engaged in biotechnology related activities. The increase in R&D spending is particularly marked in terms of capital investment, with increases of over 48%.

Regarding the sources financing for this R&D spending, most funds from outside the EU have shrunk, although the decreases were made up for by Spanish funds, which increased across the board, with the exception of funding from the public administration.



TABLE 1. MAIN RESULTS FOR BIOTECHNOLOGY SECTION OF 2015 SURVEY ON INNOVATION IN COMPANIES

MAIN VARIABLES	UNDER 250 EMPLOYEES	OVER 250 EMPLOYEES	TOTAL 2015	TOTAL 2014	VARIATION	GROWTH RATE
Companies active in biotechnology	2,886	95	2,981	2,742	239	8.72%
Dedicated biotechnology companies	635	19	654	628	26	4.17%
Companies using biotechnology as a second line of business	202	23	225	250	-26	-10.23%
Companies using biotechnology as a tool of production	2,049	54	2,103	1,864	239	12.80%
Companies active in biotechnology R&D	1,010	69	1,078	1,079	-1	-0.07%
Total jobs	74,931	107,226	182,156	177,973	4,183	2.35%
Turnover (millions of euros) ⁽¹⁾	14,111	96,769	110,880	107,788	3,092	2.87%
Number of biotechnology R&D staff	7,849	2,342	10,191	9,795	396	4.04%
A) Total by role						
Researchers	4,469	1,305	5,774	5,573	201	3.61%
Technicians and assistants	3,380	1,037	4,417	4,222	195	4.62%
B) Number of women						
Researchers	4,199	1,326	5,525	5,298	227	4.28%
Technicians and assistants	2,320	695	3,015	2,925	89	3.05%
Technicians and assistants	1,879	631	2,511	2,373	138	5.80%
Internal expenditure on R&D (thousands of euros)	441,736	136,435	578,171	533,826	44,346	8.31%
A) Type of expenditure						
<i>Operating expenses</i>	387,035	130,565	517,601	492,955	24,645	5.00%
- Salaries for researchers	158,420	55,335	213,755	203,439	10,316	5.07%
- Salaries for technicians and assistants	74,027	24,413	98,440	96,850	1,590	1.64%
- Other operating expenses	154,588	50,818	205,406	192,666	12,740	6.61%
<i>Capital expenditure</i>	54,701	5,870	60,570	40,870	19,700	48.20%
- Land and buildings	22,554	54.3	22,609	7,521	15,087	200.59%
- Equipment and devices	30,685	5,483	36,169	32,078	4,090	12.75%
- Specialised R&D software	1,461	332	1,793	1,271	522.6	41.13%
B) Sources of funding						
<i>Funding from Spain</i>	379,550	108,064	487,615	432,869	54,745	12.65%
- Own funds	249,391	81,068	330,459	319,046	11,413	3.58%
- Companies	32,831	12,630	45,462	39,254	6,208	15.82%
- Public funding	53,162	13,028	66,189	70,063	-3,874	-5.53%
- Universities	25,148	0	25,148	156	24,992	16061.83%
- Private non-profit institutions	19,019	1,338	20,357	4,351	16,006	367.85%
<i>Funding from overseas</i>	62,186	28,371	90,556	100,956	-10,400	-10.30%
- EU programmes	18,782	2,150	20,932	20,070	862	4.30%
- Other overseas funding	43,403	26,221	69,624	80,886	-11,262	-13.92%

(1) Figures for 2015 have been estimated by ASEBIO from the employment figures.



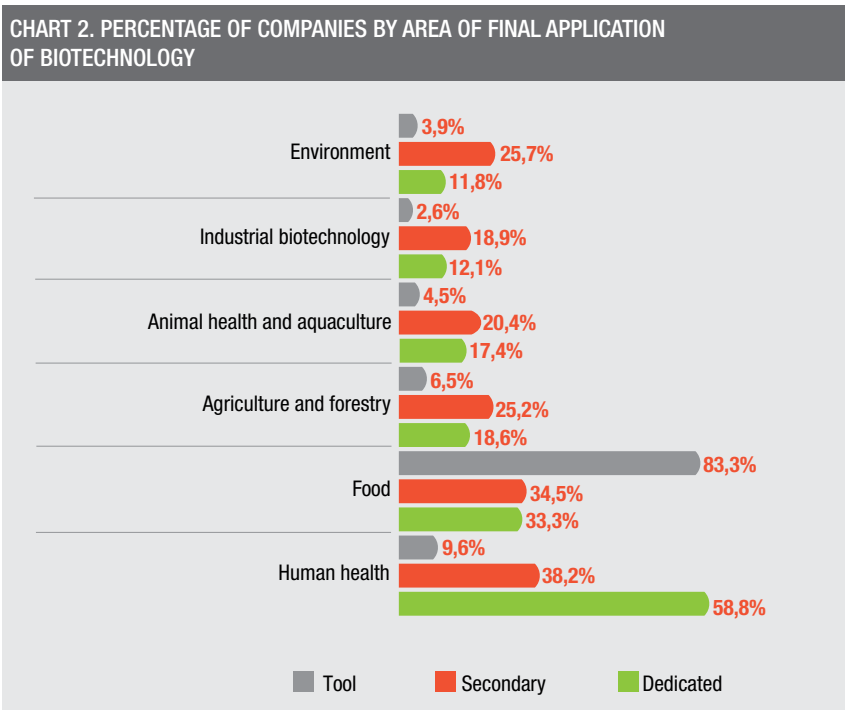
	DEDICATED			SECONDARY			TOOL			TOTAL IN 2015	TOTAL IN 2014
	VALUE IN 2014	VALUE IN 2015	% OVER TOTAL IN 2015	VALUE IN 2014	VALUE IN 2015	% OVER TOTAL IN 2015	VALUE IN 2014	VALUE IN 2015	% OVER TOTAL IN 2015		
Units active in biotechnology	628	654	21.94%	250	225	7.54%	1,864	2,103	70.52%	2,981	2,742
Units active in biotechnology R&D	519	526	48.79%	179	173	16.05%	381	379	35.16%	1,078	1,079
Number of jobs in biotechnology	6,911	7,255	34.56%	2,142	1,891	9.01%	9,522	11,847	56.43%	20,993	18,575
Expenditure in biotechnology (thousands of euros)	549,621	589,852	63.27%	114,103	111,483	11.96%	221,354	230,955	24.77%	932,290	885,078
Internal R&D expenditure in biotechnology (thousands of euros)	364,396	392,202	67.83%	71,517	77,155	13.34%	97,913	108,814	18.82%	578,171	533,826
Turnover (thousands of euros) ⁽¹⁾	7,591,397	8,180,667	7.38%	55,566,647	58,259,050	52.54%	44,629,922	44,440,199	40.08%	110,879,916	107,787,966
Total employment	27,578	29,773	16.34%	49,854	52,270	28.69%	100,541	100,114	54.96%	182,156	177,973

(1) Turnover figures for companies using biotechnology as a second line or tool in 2015 have been estimated by ASEBIO using the employment figures.

The distribution of the principal sector indicators for the different types of biotechnology activity set out in Table 2 shows that the lead in R&D activities of dedicated biotechnology companies over other types of enterprise remains unchanged, this is reflected by the fact that while they only make up 22% of units engaged in biotechnology, dedicated biotechnology companies account for almost 50% of units carrying out R&D and over 63% of total spending on biotechnology.

If we compare the latest data to that for 2014, it is apparent that there was a certain increase in the percentage of R&D attributed to companies using biotechnology as a tool for production, with increases in total biotechnology-related spending and staff numbers.

Overall, compared to 2014 there were improvements in all the indicators for dedicated biotechnology companies, while the figures



Source: INE. 2015 Survey on Innovation in Companies.



for companies in which biotechnology is a secondary line of business show a certain lack of momentum across all areas except for internal spending on R&D, turnovers and jobs. These last two indicators experienced small decreases compared to 2014 among companies using biotechnology as a tool for production.

The various types of biotechnology enterprise are unevenly distributed in terms of area of final application, with companies using biotechnology as a tool of production being mainly concentrated in the food sector (83.3%) and a large number of dedicated biotechnology companies specialising in the human health area, accounting for nearly 60% of companies in the field.

Companies engaged in biotechnology activities as a secondary line of business show a more homogenous distribution; 38.2% work in the human health area, while 18.9% are active in the industrial biotechnology area.

Comparing to 2014, the biggest changes in terms of the application of biotechnology enterprises is to be found among those applying

biotechnology to a secondary activity. Such companies have been increasingly active in the food chain area (agriculture, food and animal health) while there was a fall in applications in the human health area, which was reflected across all types of biotechnology enterprise.

Among dedicated biotechnology enterprises and those companies using biotechnology as a tool of production the pattern is starker still, as the tallies fell across all areas, with the exception of companies working in the food sector.

One of the most significant findings in the 2015 innovation survey was the sharp rise in internal spending on R&D among biotechnology companies, which increased by over 8% overall to €578 million, €10 million more than in 2010 - a record number for this indicator.

All three types of biotechnology enterprise have contributed to this increase, though the greatest relative progress came among companies using biotechnology as a tool for production, with spending increases of over 11%, compared to the 7.6% and 7.9%,

respectively, recorded by dedicated biotechnology companies and those for whom biotechnology is a secondary line of business.

1.3. ECONOMIC EVOLUTION

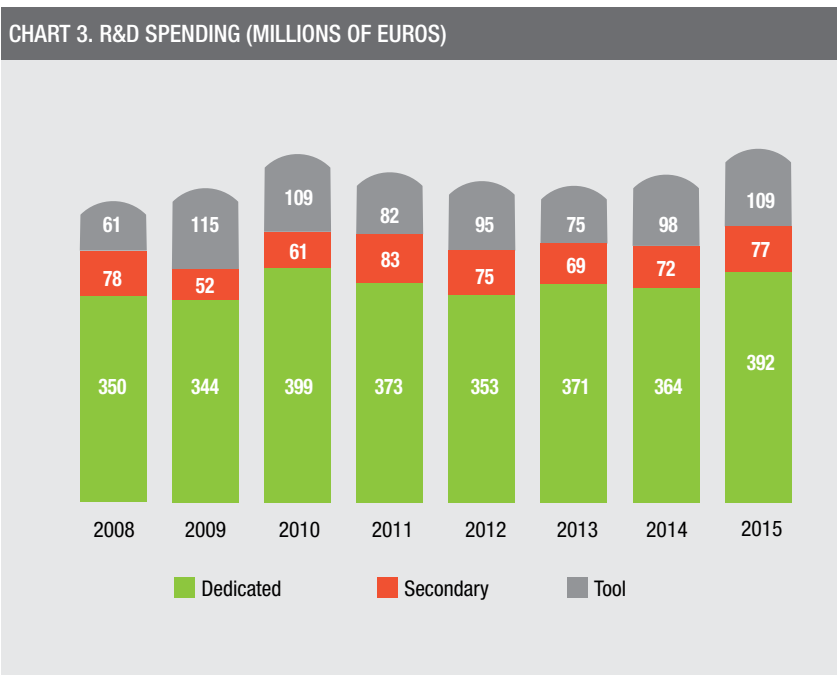
As mentioned at the start of this section, for the new edition of our report on the trends and current status of the biotechnology sector in Spain, we have been working on redefining the key economic factors for the sector in order to make them more comparable to other activities included in INE data for the various branches of economic activity in Spain.

In this manner and using the figures for total production (turnover) included in our innovation survey and set out in the tables above, we have estimated the purchasing totals required for production (intermediate consumption) from the average ratios set out in the direct survey of biotechnology enterprises to - by using differences - work out the in total added value for enterprises engaged in biotechnology activities.

Also in this manner, and using the data on average salaries from the same direct survey, we established the total remuneration for staff through the rise in the total number of people employed according to the INE innovation survey. Finally, by working out the difference with total value added, we have estimated gross operating surplus for such biotechnology enterprises.

The basic results of these estimates can be found in Table 3.

As can be ascertained from the table above, during 2015, the almost €111 billion invoiced by biotechnology related companies required the purchase of about €67 billion in intermediate consumption, making the resulting added value around €43 billion, of which €6.7 billion were allocated to the salaries of 182,156 employees, leaving a surplus of over €36 billion.



Source: INE. 2015 Survey on Innovation in Companies.



TABLE 3. MAIN INDICATORS FOR BIOTECHNOLOGY COMPANIES (MILLIONS OF EUROS AND NUMBER OF JOBS)

	2015	2014	2013	2012	2011	2010
Production	110,880	107,788	95,152	80,313	76,069	60,122
Dedicated	8,181	7,591	7,111	8,802	7,945	8,343
Secondary	58,259	55,567	62,494	38,387	45,360	35,125
Tool	44,440	44,630	25,547	33,124	22,764	16,653
Intermediate consumption	67,528	65,680	54,877	49,112	44,064	33,233
Dedicated	6,119	5,866	5,352	6,313	5,507	5,750
Secondary	31,538	29,481	32,776	20,415	23,958	18,035
Tool	29,871	30,333	16,749	22,384	14,599	9,448
Gross Value Added	43,352	42,108	40,275	31,201	32,005	26,889
Dedicated	2,061	1,725	1,759	2,489	2,438	2,593
Secondary	26,721	26,086	29,718	17,973	21,402	17,090
Tool	14,570	14,297	8,798	10,739	8,165	7,205
Compensation of employees	6,754	6,460	6,278	7,490	7,353	6,160
Dedicated	1,250	1,064	1,199	1,520	1,391	1,750
Secondary	1,853	1,711	1,879	1,736	1,958	1,669
Tool	3,650	3,685	3,199	4,234	4,004	2,741
Gross operating surplus & net taxes	36,598	35,648	33,997	23,711	24,652	20,728
Dedicated	811	661	560	969	1,047	844
Secondary	24,868	24,374	27,839	16,237	19,444	15,420
Tool	10,919	10,612	5,599	6,505	4,161	4,464
Employment	182,156	177,973	172,939	202,976	202,250	163,526
Dedicated	29,773	27,578	29,621	34,827	33,183	35,917
Secondary	52,270	49,854	54,538	49,848	56,056	45,938
Tool	100,114	100,541	88,781	118,301	113,011	81,671

Source: Own data.

As Table 4 shows, biotechnology companies are, on average, significantly more productive (productivity per employee) than the average for the rest of the economy, and that is particularly true among enterprises for whom biotechnology is a secondary line of business and with just above average salaries.

Their requirements for goods and services are higher, however, making the average added value generated by each unit (% added value over production) lower than average.

Finally, the distribution of income generation (% of salaries incomes and other incomes over added value) clearly leans towards salary incomes in dedicated biotechnology companies; while among those companies using biotechnology as a secondary line of business the opposite is true, reflecting a greater need for capital and lower intensity in labour input.

In dynamic terms, value added created by enterprises engaged in biotechnology has continued to grow systemically to reach 4% of Spain's GDP, mostly (2.5%) attributed to companies for whom biotechnology is a

secondary line of business; for companies using biotechnology as a tool of production and dedicated biotechnology companies, meanwhile, it continued at 1.4% and 0.2% respectively.

TABLE 4. MAIN COMPARATIVE MACROECONOMIC RATIOS

	DEDICATED	SECONDARY	TOOL	TOTAL BIOTECHNOLOGY	TOTAL ECONOMY
Production in% of GDP	0.8%	5.4%	4.1%	10.3%	190%
Output per employee (€/person)	274,764	1,114,590	443,898	608,707	110,586
Salary per employee (€/person)	41,991	35,460	36,462	37,078	31,969
% added value as a proportion of production	25.2%	45.9%	32.8%	39.1%	47.8%
% unearned income	39.4%	93.1%	74.9%	84.4%	43.3%
% salary income	60.6%	6.9%	25.1%	15.6%	56.7%

Source: Own data.



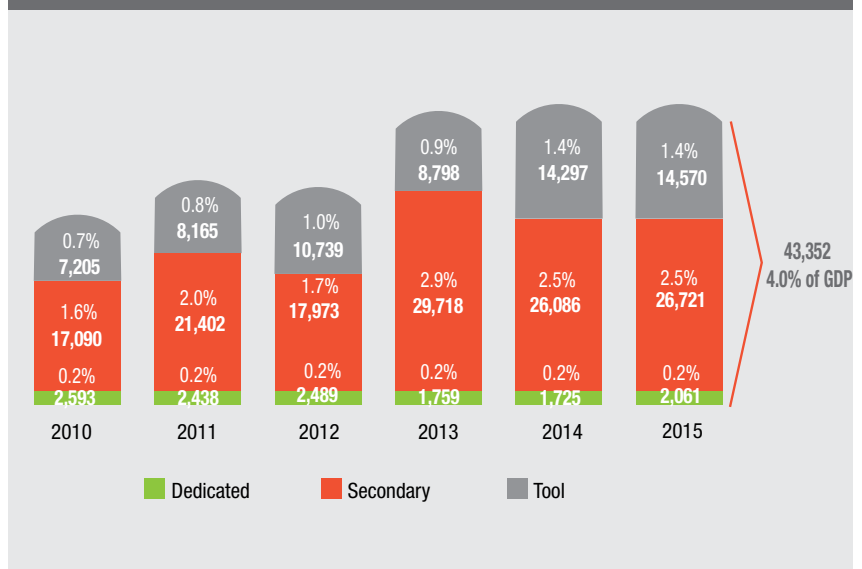
It is those dedicated biotechnology companies which over 2015 grew most in terms of value added compared to other economic areas, as Chart 5 shows; on the other hand, both companies for whom biotechnology is a secondary line of business and those using it as a tool of production had growth rates slightly below the average.

This contrasts with previous years (2010-2014) when average growth rates for the economy as a whole dipped into negative territory; then user companies (where biotechnology is a secondary line of business or tool) grew by annual averages of over 10%.

In terms of employment, biotechnology related activities have experienced a similar evolution to the rest of the economy over the 'reactivation period' (2014-2015) with average annual growth rates of 2.6%, compared to 2.1% for the Spanish economy as a whole. It should be noted that the sector is still to fully recover from the sharp falls of 2013.

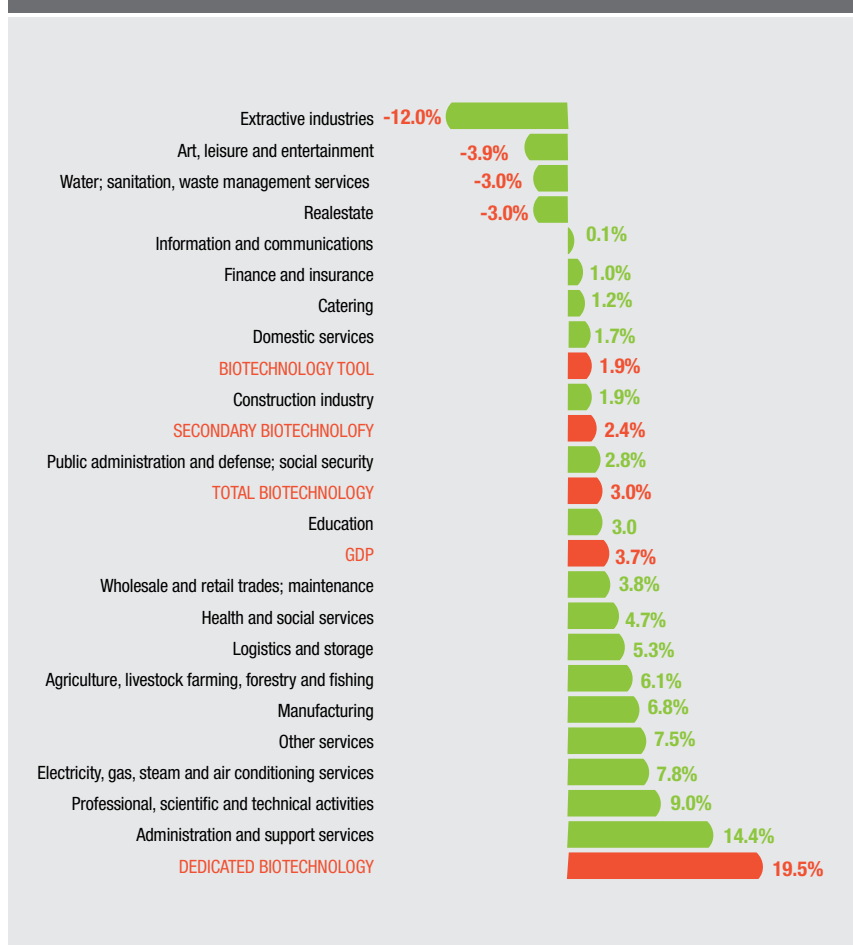


CHART 4. ADDED VALUE IN MILLIONS OF EUROS AND AS PERCENTAGE OF GDP

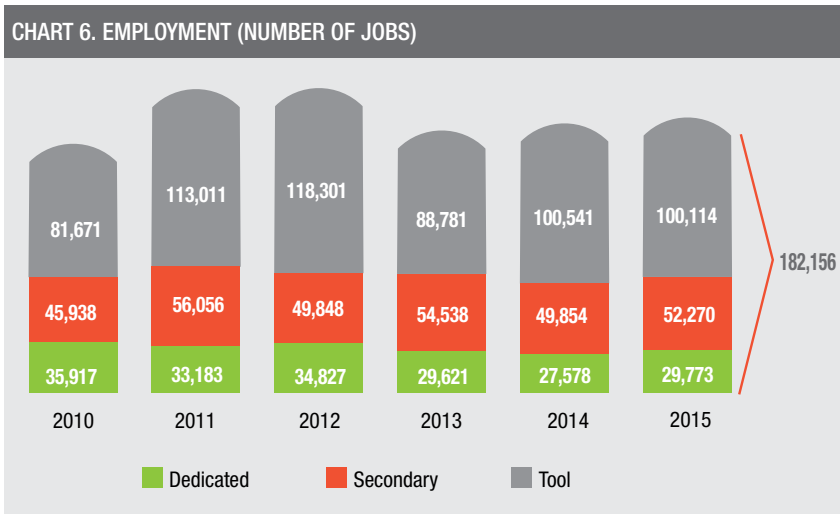


Source: Own data.

CHART 5. GROWTH RATE FOR VALUE ADDED BY BRANCH OF ACTIVITY IN 2015



Source: INE and own data.



Source: INE.

1.4. ECONOMIC IMPACT OF BIOTECHNOLOGY ENTERPRISES

The availability of more detailed information on the activities of biotechnology related companies has allowed us to carry out an analysis of the economic impact of such

activities, one which goes beyond their direct contribution to production, value added and jobs.

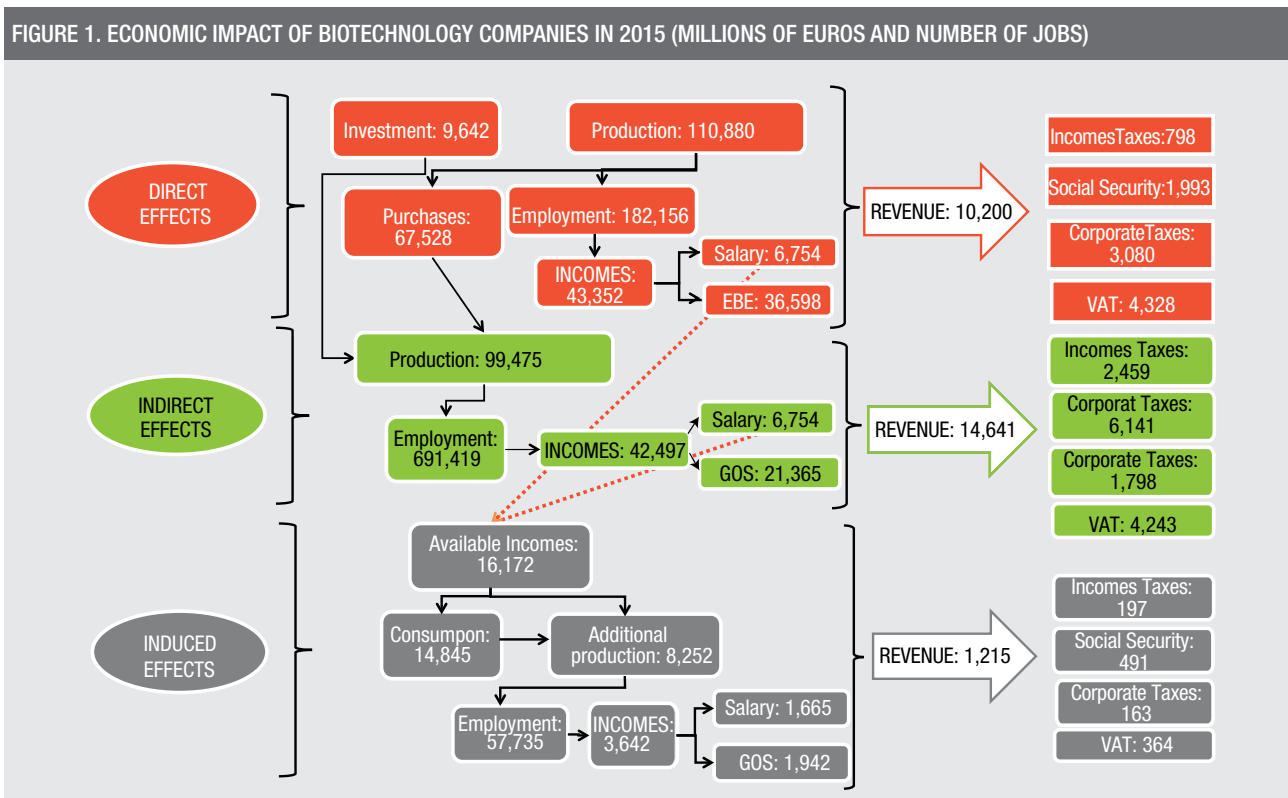
Indeed, companies engaged in biotechnology related activities acquire goods and services from other companies, in both running costs

and investment, thereby inducing an increase in the growth of those providers, which in turn acquire products from third parties and also contribute to increasing economic activity, jobs and a whole chain of other indirect effects.

Salaries paid by biotechnology related companies, furthermore, as well the incomes of indirectly employed staff, bring about an increase in private spending, leading to additional growth in the economic activity, known as induced (or knock-on) effect.

Finally, all income transactions and those transactions concerning the acquisition of goods and services produced by the activity of biotechnology related companies are subject to a series of taxes, which contribute to increasing the revenues for the public administration; this being known as the fiscal impact.

The estimate of that impact has been reached using the standard methodology based on input-output tables, as Figure 1 illustrates.



Source: Own data.



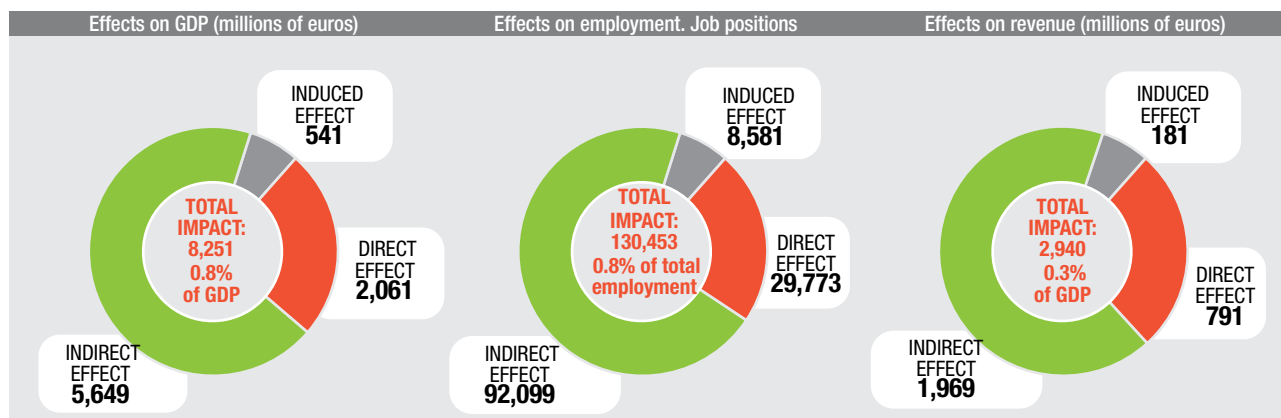
In aggregate terms, biotechnology companies contributed almost €90 billion, through direct, indirect and induced channels, to Spain's GDP in 2015, around 0.8% of total GDP.

Just over 930,000 jobs (5.4% of the total) are the direct or indirect result of activities carried out by such companies. The Public Administration, meanwhile, raised around €26 billion, the equivalent of 2.5% of GDP.

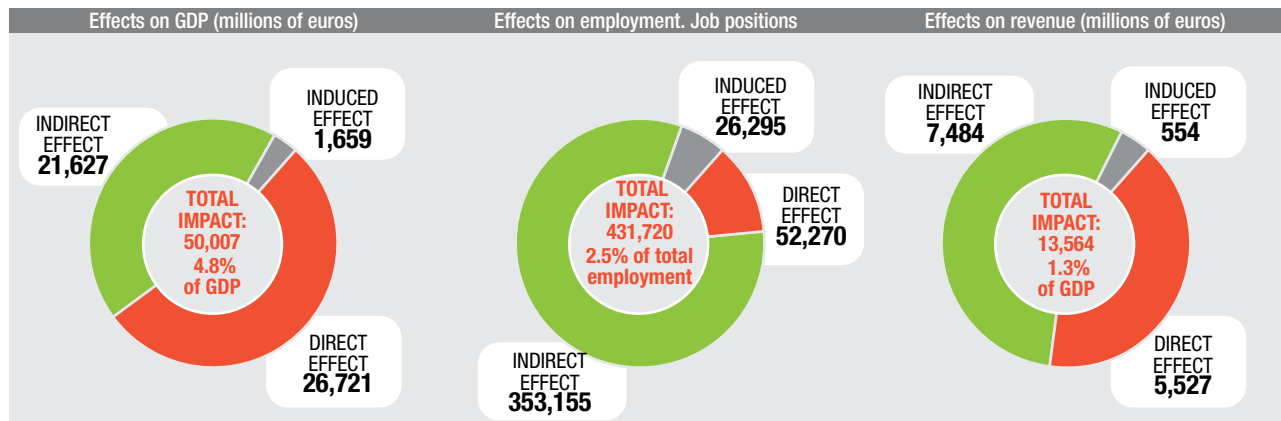
As Chart 7 shows, dedicated biotechnology companies contribute around 0.8% of national GDP and employment, a total of €8.2 billion in revenues and a total of 130,453 jobs, contributing almost €3 billion in revenues for the Public Administration.

CHART 7. ECONOMIC IMPACT OF BIOTECHNOLOGY COMPANIES.

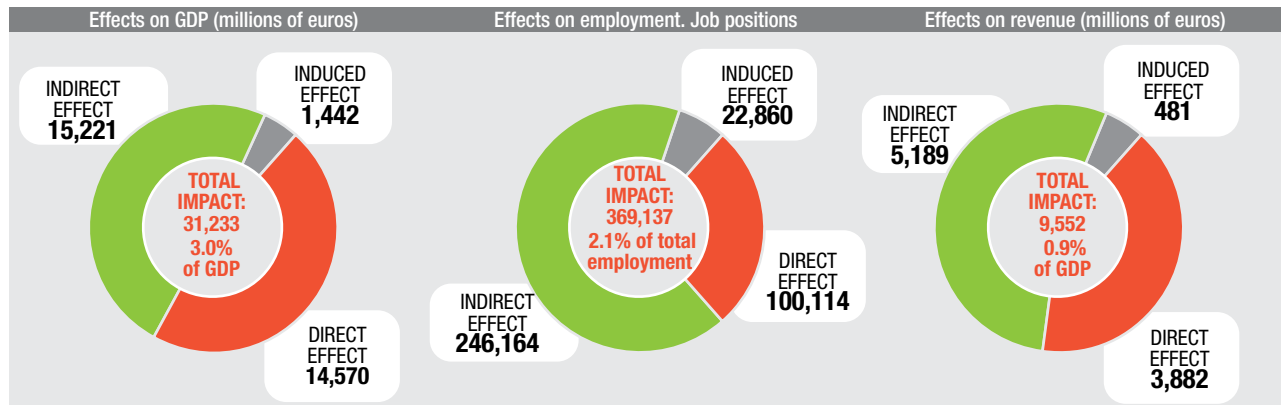
BIOTECH



SECONDARY



TOOL



Source: Own data.



1.5. ANALYSIS: AUTONOMOUS COMMUNITIES

As mentioned in previous reports, this section must start by noting that because the methodology used to collect the sample of the innovation survey for enterprises was designed for the country as a whole, the INE underlines that the representativeness of the sample may not be adequate and non-aggregate data for autonomous communities should be interpreted with due caution.

Having clarified that, Chart 8 shows the distribution by autonomous community of the companies engaged on biotechnology activities as a percentage of the national total.

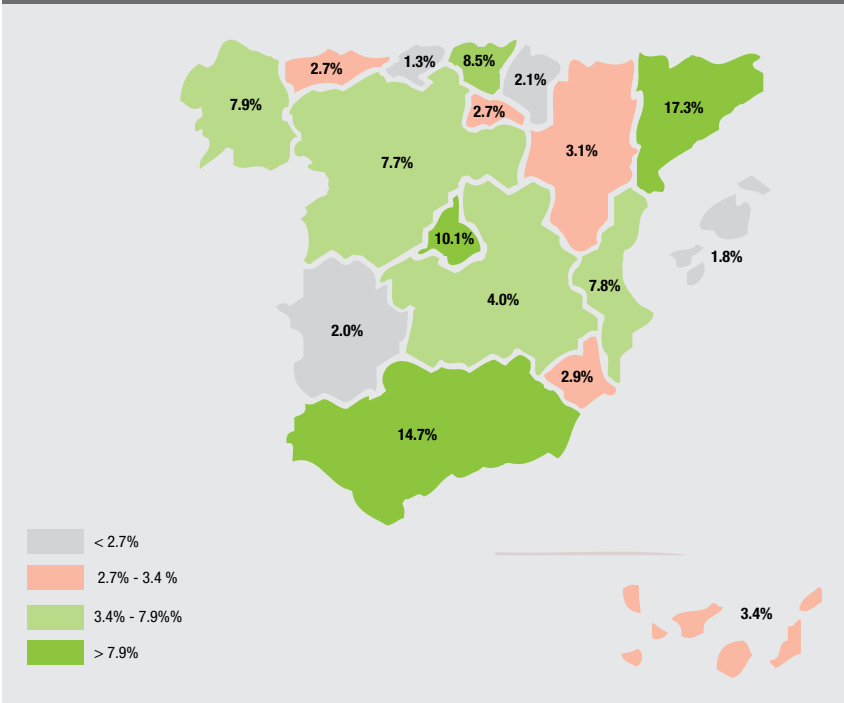
Those communities with the highest levels of economic activity are logically also the ones showing the largest percentages of biotechnology companies, Catalonia is in the lead, with 17.3% of the total, followed by Andalusia (14.7%), Madrid (10.1%) and the Basque Country (8.5%).

If we focus on units using biotechnology as a main line of business, Chart 9 shows the distribution by autonomous community, which, as we can see, is quite similar to that of the previous report, with some notable differences.

Therefore, for instance, the percentage of companies based in the catalane autonomous community has risen sharply, to over 27%. Madrid also rose by a full six points, to just over 16% of the total.

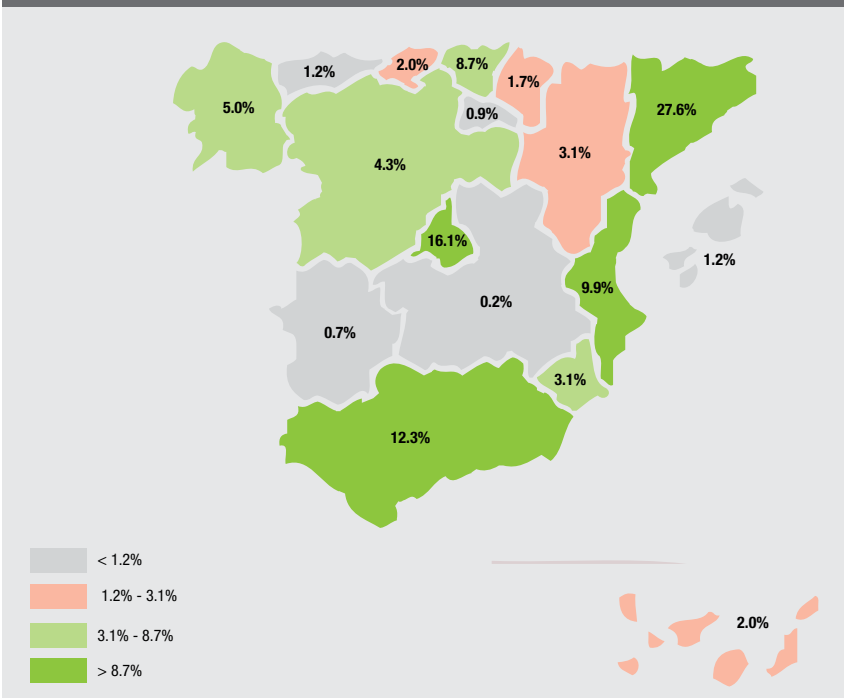
Conversely, there were falls in the percentages for Castile-La Mancha, whose share fell to 0.2% of the total, Castile-Leon, which fell from 7.9% to 4.3% and Galicia, whose share fell from 7.9% for all companies, to 5% for dedicated biotechnology companies.

CHART 8. BIOTECHNOLOGY USER COMPANIES BY AUTONOMOUS COMMUNITY



Source: INE. 2015 Survey on Innovation in Companies.

CHART 9. DEDICATED BIOTECHNOLOGY ENTERPRISES BY AUTONOMOUS COMMUNITY



Source: INE. 2015 Survey on Innovation in Companies and own data.



2

Companies launched in 2016





2.

Companies launched in 2016



A total of 43 biotechnology companies were registered as having been launched in 2016. All those enterprises, along with a description of the area of activity, are listed on Table 5.

When analysing enterprise creation by autonomous communities, it is Andalusia that saw the creation of the largest single number, at 10 new companies, followed by Catalonia

with nine, The Basque Country with five and Madrid with four.

TABLE 5. DEDICATED BIOTECHNOLOGY COMPANIES LAUNCHED IN 2016

COMPANY NAME	AUTONOMOUS COMMUNITY	ACTIVITY
Abvance Biotech	Madrid	Development of drugs based on antibodies selectively directed at key proteins.
Aguettant Ibérica	Catalonia	Pharmaceutical company specialised in the development, production and commercialisation of drugs essential for hospitals and a leader in the development on innovative intravenous drugs.
Albajuna Therapeutics	Catalonia	Established to develop monoclonal antibodies to neutralize HIV.
Algades	Andalusia	Consultancy and integral management for microalgae production projects.
Aora Health	Madrid	Development and commercialisation of nutraceutical products.
Asparia Glycomics	Basque Country	Development of glyco analysis solutions for clinical diagnostics and quality control in biopharmaceutical production using molecular characterisation technology.
Asturian Biotechnology	Asturias	Animal in vitro fertilisation (IVF).
Biodiagsan	Galicia	Diagnostics for animal health and food safety.
Bioinsectics	Navarre	Development, production and commercialisation of bioinsecticides.
Biopina Biotecnología Industrial	Community of Valencia	Research and development of biotechnology based products for the treatment of natural stone (such as marble) and improvement of characteristics (e.g. toughness, mechanical resistance, colour).
Bioprognos	Catalonia	Disease detection based on biomarkers through the development of Multiple Biomarkers Disease Activity Algorithms (MBDAAs) to replace diagnosis and confirmatory diagnostic - thereby reducing the number of biopsies patients must undergo.
DNActive	Andalusia	Analysis, diagnostics, prevention and treatment in sports, genetic and nutritional medicine.
Ecobium Biotech	Catalonia	Research, development and commercialisation of biostimulant products plants.
Empromar	Galicia	Analysis of toxins and tracking of mussel production rafts.
Enersos I	Castile-La Mancha	Research and experimental biotechnology development.
EverSens	Navarre	Design, development and manufacturing of non-invasive clinical diagnostics systems based on biomarkers.
Gistem Research	Asturias	Development of biological products based on uterine stem cells.
Green Farm Tcnologies	Community of Valencia	R&D for the development of indoor grow systems.



TABLE 5. DEDICATED BIOTECHNOLOGY COMPANIES LAUNCHED IN 2016 (CONT.)		
COMPANY NAME	AUTONOMOUS COMMUNITY	ACTIVITY
Green Research	Community of Valencia	Technological development for agriculture and the environment.
Ibersens Innova	Castile-La Mancha	Biosensors to measure stress using hormones. Tools for the routine analysis of biomarkers for animal stress.
Idomics Biotech	Basque Country	Application of omic technologies in sports, health and food.
Innoprick	Basque Country	Development and commercialisation of a medical device and platform to test for allergies using skin tests.
Inymel Biomédica	Andalusia	Production of Melatonin injectables for clinical use.
Kiroldna	Basque Country	Development of genetic and sports tests.
Laboratorios Edyma	Cantabria	Production and enhancement of in vitro plant culture. Prevention and control of Legionella.
Lentistem Biotech	Andalusia	Development of new gene therapy based treatments for rare diseases and cancer.
Metabo Stem	Catalonia	This biopharmaceutical company employs METABOSTEM technology to develop oncology drugs specifically designed for the metabolic characteristics of cancer stem cells.
Microviable Therapeutics	Asturias	Solutions in the field of human intestinal microbiota.
Mideloy	Madrid	Diagnostic detection tests based on the detection of metabolites and / or nucleotides (DNA, RNA).
Moirai Biodesign	Catalonia	Design of a new generation of RNA based cancer therapies and diagnostics using 'Plug and Play Biodevice' technology.
Natural Extract Oleum	Andalusia	Functional derivatives of olive oil.
Nerve Biomed	Andalusia	Biomaterials to be used in regenerative medicine for nerve tissue.
Nostrum Biodiscovery	Catalonia	Computational chemistry tools to accelerate, rationalise and optimise small molecule design during early discovery.
Patia Diabetes	Basque Country	Design and production of diagnostic kits for gestational diabetes.
Pronacera Therapeutics	Andalusia	Services for the improvement of current extracorporeal photopheresis procedures for autoimmune diseases, the development of treatments for lysosomal diseases and clinical analysis.
Pump it Nanotech	Catalonia	Nanotechnology and design of bubble removal technology in microfluidic devices for all gravity conditions.
Qrem	Catalonia	Development of Qrem system, a one-step automatic device based on cutting edge technology for obtaining autologous cytokines-rich serum from a sample of whole blood.
Regemat 3D	Andalusia	Pioneering regenerative medicine based on the use of 3D printing technology in regenerative therapy.
Resonantia Laboratorio	Andalusia	Metabolomics and advanced analysis for the food, environmental and materials sector.
Rexgenero	Andalusia	Cell therapy with clinical stage products for serious diseases.
Saluвет innova	Madrid	Production of ELISA and IFAT antigens from protozoans causing neosporosis, toxoplasmosis and besnoitiosis in ruminants. SALUVET-innova specialises in parasitic and venereal diseases. Water analysis for the detection of Cryptosporidium spp. and Giardia spp. among other parasitic agents.
Spiral Therapeutics	Catalonia	SPIRAL THERAPEUTICS is focused on finalising preclinical work for the development of pharmaceutical products.
StemVital	Cantabria	Collection, processing and cryopreservation of stem cells from blood and umbilical cord tissue. Detection of aneuploidy during prenatal stage. Diagnostic of metabolic disorders in newborns.

Source: ASEBIO



3

Business activities





3.

Business activities



3.1. ALLIANCES AND BUSINESS DEVELOPMENT

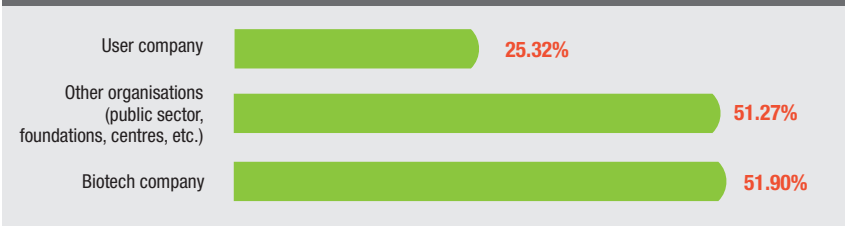
This section covers business development activities by ASEBIO members. It includes all alliances and/or collaborations in the biotechnology area, for instance co-marketing, co-development, or product/market exchange launched in 2016.

During 2016 a total of 158 alliances were registered. 51.9% of such alliances (Chart 10) involved a partnership with another biotechnology company, organisation or other entity, 51.27% involved another type of organisation, such as a public body, foundation or technology centre, while in 25.32% of cases it involved a biotechnology user company.

Over 50% of all alliances involved Spanish companies or organisations (Chart 11), 22.78% were European, 12.03% American and almost 7% were Asian. Chart 12 shows the percentage of alliances for the various objectives. 54.43% were for R&D, 41.14% for clinical developments or field trials, 15.82% involved marketing or distribution agreements, 10.76% production agreements, and 6.96% involved regulation or industrial property rights.

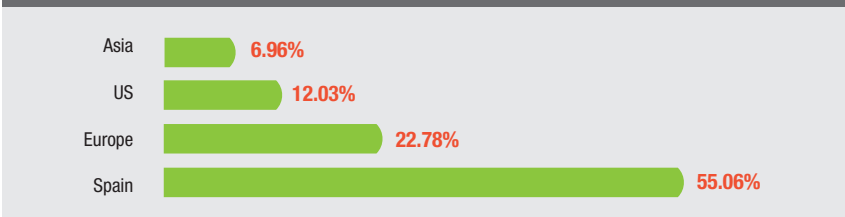
Chart 13 shows the results of the ASEBIO members survey on obstacles for alliances, with this being the fourth year the survey takes place.

CHART 10. ALLIANCES IN THE SPANISH BIOTECHNOLOGY SECTOR IN 2016 BY PROFILE OF PARTNER



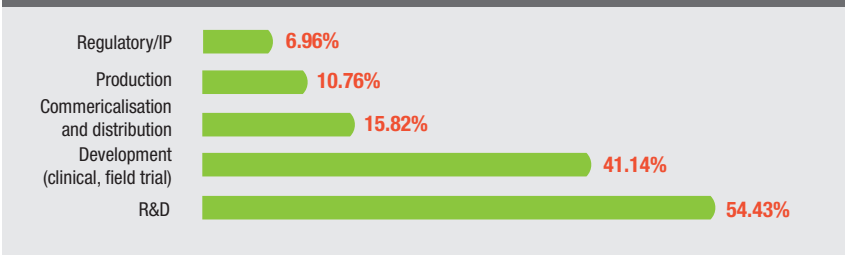
Source: ASEBIO.

CHART 11. ALLIANCES IN THE SPANISH BIOTECHNOLOGY SECTOR IN 2016 BY LOCATION OF PARTNER



Source: ASEBIO.

CHART 12. ALLIANCES IN THE SPANISH BIOTECHNOLOGY SECTOR IN 2016 BY OBJECTIVE OF THE ALLIANCE



Source: ASEBIO.



CHART 13. BARRIERS TO ALLIANCES ENCOUNTERED BY RESPONDENTS



Source: ASEBIO.

successful alliance, as over 67% of respondents state that they have never experienced such issues. 61.76% answered that the partner was never the one to cancel the process.

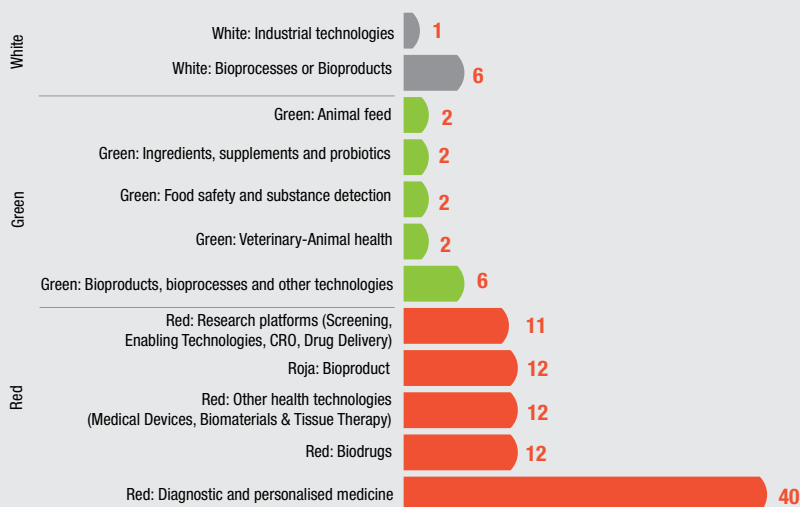
Unattractive economic conditions were the main obstacle enterprises encountered when attempting to establish an alliance.

35% of respondents stated that they had come up against this barrier frequently, while 38% stated that they sometimes did so.

50% of respondents stated that incompatibilities in corporate culture proved to be an obstacle sometimes, while 14.71% had experienced it frequently.

Differences in expectations or strategic focus was an obstacle that 55.88% of respondents have identified sometimes, while 14.71% had frequently come up against it.

CHART 14. PRODUCTS AND SERVICES LAUNCHED TO MARKET BY ASEBIO MEMBERS IN 2016



3.2. PRODUCT LAUNCHES

In 2016 a total of 108 products or services were launched to market by ASEBIO members.

Table 6 shows the complete list of products and services with a description. Chart 14 shows the distribution according to type of biotechnology.





TABLE 6. PRODUCTS AND SERVICES LAUNCHED TO MARKET BY ASEBIO MEMBERS IN 2016

ENTITY	NAME AND DESCRIPTION
ABT	Nickel NTA Magnetic Agarose Beads (5%) for small-scale purification of histidine-tagged proteins.
ABT	PREPACKED COLUMNS SEPADEXTRAN™ 25 MEDIUM SC, hydrated gel filtration columns designed for rapid and efficient removal of small molecules (salts, dyes, ammonia ...).
Alternative Gene Expression	CrisBio: innovative technology platform production of recombinant proteins using Baculovirus and insect pupae as a host.
AMGEN	Repatha® biodrug is for the treatment of High LDL Cholesterol in high-risk patients.
AMGEN	KYPROLIS Treatment option for people who have already received 1 or more previous treatments for relapsed multiple myeloma.
BBD BioPhenix -Biobide	Zebrafish based method to detect the capability of a compound to inhibit angiogenesis as part of efficacy pharmacology studies.
BBD BioPhenix -Biobide	Melanin quantification assay to evaluate whitening capabilities of cosmetic product using zebrafish embryo model.
BBD BioPhenix -Biobide	Efficacy assay using zebrafish model to evaluate antioxidant capabilities of cosmetic products.
BBD BioPhenix -Biobide	Ecotox assay: Fish Embryo Acute Toxicity (FET) Test (Danio rerio).
BBD BioPhenix -Biobide	Ecotox assay: Fish, Early-life Stage Toxicity Test (Danio rerio).
BBD BioPhenix -Biobide	Ecotox assay: Fish, Acute Toxicity Test.
BBD BioPhenix -Biobide	Ecotox assay: Daphnia sp. Acute Immobilisation Test.
BBD BioPhenix -Biobide	Ecotox assay: Freshwater Alga and Cyanobacteria, Growth Inhibition Test.
Bicosome	Bicomide S Control: sebum control, acne control.
Bicosome	Bicocalm skin: anti-irritation skin balm.
Bicosome	Bico Youth CC: Anti Aging Vitamin C Serum.
Biochemize	Chemical and microbiology analysis services.
Biochemize	Platform for microbial hydroxylation of chemical structures.
Biochemize	Platform for enzymatic Enzymatic Carbon–Carbon Bond Formation in chemical structures.
Biogen	Flixabi: Remicade biosimilar for Crohn's disease, rheumatoid arthritis, psoriasis, ulcerative colitis, ankylosing spondylitis and psoriatic arthritis.
Biogen	Benepali: Etanercept biosimilar for rheumatoid arthritis, psoriatic arthritis, non-radiographic axial spondyloarthritis and plaque psoriasis.
Biogenetics	CanID: technology for genealogical identification of animals and pets.
Bioibérica	Nucleoforce Poultry Plus, designed exclusively for use in broilers and layers, adapted to the nucleotides needs of these animals.
Bioibérica	Nucleoforce Swine has a specific nucleotide profile that, when applied directly or mixed in with the sow's feed, allows the suckling pigs to incorporate nucleotides through the mother's milk to maintain the immune system and the intestinal mucosa. The product has a minimum concentration of available nucleotides of 90%.
Bioibérica	Atopivet®: is a veterinary product for dogs with atopic dermatitis, which helps to re-establish and maintain the integrity of the epidermal barrier.
Bioibérica	Hialsorb Cold: cream based on chondroitin sulfate, hyaluronic acid and menthol reduces joint pain and relieves inflammation.
Bioibérica	Articolágeno®: innovative food supplement based on collagen, magnesium, vitamin C and Mobilee® for joints, muscles and bones.
Biokit	Turbidimetric CRP-Ultrasensitive Test: for use in automated clinical chemistry systems for the precise measuring of C-sensitive protein (Ultrasensitive CRP).
Biokit	Chemiluminescence vWF:CB Test: Von Willebrand Collagen Binding Assay.
Biokit	Chemiluminescence HSV-2 IgG: Fully automated chemiluminescent two-step immunoassay for qualitative measurement of IgG antibodies to Herpes Simplex Virus type 1 in human serum or plasma.
Biokit	Chemiluminescence HSV-1 IgG test: for qualitative detection of IgG antibodies to Herpes Simplex Virus type 1 in human serum or plasma.
Biokit	Chemiluminescence VZV IgM test: for the qualitative determination of specific IgM antibodies to varicella-zoster virus (VZV) in human serum or plasma samples.



TABLE 6. PRODUCTS AND SERVICES LAUNCHED TO MARKET BY ASEBIO MEMBERS IN 2016 (CONT.)

ENTITY	NAME AND DESCRIPTION
Biokit	Chemiluminescence VZV IgG test: for the quantitative determination of specific IgG antibodies to varicella-zoster virus (VZV) in human serum or plasma samples.
Biokit	Chemiluminescence HTLV-I/II test: for qualitative detection of antibodies to HTLV-I and HTLV-II in human serum or plasma.
Biokit	Chemiluminescence HBeAg test: for the qualitative determination of the hepatitis B e-antigen (HBeAg) in human serum and plasma.
Biokit	Chemiluminescence anti-HBe test: for the quantitative determination of Anti-HBe concentration in human serum and plasma.
Biokit	Chemiluminescence HIV combo test: HIV assay for the simultaneous identification of antigens and antibodies for HIV 1 and 2 (HIV I/II Ag/Ab).
Biomedal	New kits using non-invasive test to monitor adherence to gluten-free diet through the detection of gluten immunogenic peptides.
Biorizon Biotech	Extraction process of antioxidants from microalgae and macroalgae for use in skin products.
Biorizon Biotech	Gama Microtech: range of products developed using enzymatic catalysis of the Spirulina microalgae.
BTI Biotechnology Institute	Clinical Support Bti Apnia: system of diagnosis and treatment for sleep apnoea and snoring.
BTI Biotechnology Institute	Transepithelial Unit: non-rotating transepithelial pillar for dental implants.
BTI Biotechnology Institute	Single-use eye surgery kit (KMU18): for ophthalmological surgery. Combines autologous membrane rich in growth factors and collyrium Endoret PRGF post-surgery treatment.
Canvax Biotech	HigherPurity™ Food DNA Purification Kit: for a reliable, easy and high-quality purification of Total DNA from food samples
Canvax Biotech	WideUSE™ Plasmid Midi/Maxiprep Kit: for a fast, simple and efficient routinary isolation of high quality plasmid preparations in Midiprep/Maxiprep format.
Canvax Biotech	AgaPure™ Agarose LE (Standard Agarose): High quality Molecular Biology Grade Agaroses.
CELGENE	OTEZLA® (apremilast) immunomodulatory treatment for plaque psoriasis and psoriatic arthritis.
DIOMUNE	Provides services including animal models, pharmacokinetic studies and toxicity testing (among others).
ENZYMLOGIC	GPCR Binding Kinetics Platform: disruptive technology platform to evaluate the kinetic profile of GPCRs.
Era7 Bioinformatics	Microbiome analysis services employing PacBio CCS, MG7 technology and DB7 database to sequence and analyse all regions of the gene.
Gendiag - Ferrer inCode	Lipid inCode® is an in vitro diagnostic service that allows, through the complete analysis of seven genes, the genetic diagnosis of the molecular causes behind familial hypercholesterolemia.
GENOMICA	NEDxA: automated IVD for HPV genotyping test.
GENOMICA	CLART® HPV2 lyophilized: for the detection and genotyping of different types of human Papillomavirus. With lyophilized amplification tubes.
GENOMICA	CLART® CMA ALK · ROS1: detection and genetic identification of major chromosomal translocations in ALK and ROS1 genes associated with response to therapy in patients with lung cancer.
GENOMICA	CLART® CMA EGFR LB: liquid biopsy based test for detection and genetic identification of point mutations, insertions and deletions in the egfr gene pathway associated to non-small cell lung cancer.
GENOMICA	CLART® CMA BRAF · MEK1 · AKT1: detection and differentiation 6-point mutations associated with response to therapy in patients with melanoma.
Grupo Farmasierra	Alflorex®: probiotic proven to reduce the most severe symptoms of Irritable Bowel Syndrome including pain, abdominal distention, flatulence, constipation and diarrhea.
Grupo Farmasierra	Cremigel Piernas Cansadas TRATADERM® with moisturising agents and plant based active ingredients (red vine extract, hamamelis and Ginkgo Biloba) y crystallised menthol.
HEALTH IN CODE	LIMS: Genetics Laboratory Management System.
HEALTH IN CODE	Genetic diagnostic services for hereditary cardiovascular diseases.
HEALTH IN CODE	Genetic diagnostic services for dyslipidemia and early atherosclerosis.
HEALTH IN CODE	Genetic diagnostic services for inherited oncological diseases.
HEALTH IN CODE	Genetic diagnostic services for genetic muscle diseases.
Histocell	Reoxcare: advanced wound dressing with antioxidant properties for the treatment of hard-to-heal skin wounds.
Iden Biotechnology	Development biopesticides programme to identify microbial source as the basis for the development of insecticides, nematocides, fungicides and herbicides using biotechnology processes.
IRYCIS	Programme to guarantee correct dosage of radiotherapy to be received by patient in High-Dose Rate Brachytherapy.
IRYCIS	Protected composition and methodology for skin regeneration.
IRYCIS	Multiple sclerosis diagnostic using IgM bands.
IRYCIS	Diagnostic panel to identify hereditary hearing loss.



TABLE 6. PRODUCTS AND SERVICES LAUNCHED TO MARKET BY ASEBIO MEMBERS IN 2016 (CONT.)

ENTITY	NAME AND DESCRIPTION
Laboratorio LETI	LetiSR probioclean micellar water, makeup remover: cleans, soothes and moisturizes. Contains Lactobacillus Ferment, ferment probiotic with moisturizing properties.
Laboratorios Rubió	Testogel is a colourless and clear hydroalcoholic gel containing 1% testosterone for the treatment of male hypogonadism.
Life Length	Launch of TAT® 3.5 (Telomere Analysis Technology®) for the measurement of telomeres. ISO 15189 and CLIA (Clinical Laboratory Improvement Amendments) accredited.
Made of Genes	Personal genomics platform.
MSD	KEYTRUDA® (pembrolizumab) anti-PD-1 Immunotherapy for the treatment of advanced melanoma (unresectable or metastatic) as a first line treatment in adults.
MSD	Spain launch ZERBAXA® (ceftolozane and tazobactam), new antibiotic for the treatment of complicated intra-abdominal infections and urinary tract infections in adults.
NanoMyP®	Tiss®-Link: nanofiber membrane for direct covalent immobilisation of biomolecules.
NanoMyP®	Tiss®-Streptavidin: high amount of covalently attached streptavidin for direct immobilisation of biotiny-labeled-biomolecules.
Noray Bioinformatics	Implementation services.
Noray Bioinformatics	NorXplore: group of sophisticated mathematica tools for data exploration, mining, predictive modeling, and visualization.
Noray Bioinformatics	NorayDocs: software to facilitate communication between researchers, evaluation committee members and committee coordinators.
Promega Biotech Ibérica	T Cell Activation Bioassay (NFAT): genetically engineered Jurkat T cell line that expresses a luciferase reporter (TCR/CD3 Effector Cells) driven by either an NFAT-response element (NFAT-RE) or an IL-2 promoter.
Promega Biotech Ibérica	PCR Optimization Kit: contains a portfolio of preformulated, high-quality buffers (A–H) that together cover a spectrum of PCR performance capabilities for endpoint, multiplex, real-time, GC-rich and inhibitor-resistant amplifications.
Promega Biotech Ibérica	Maxwell® RSC Cultured Cells DNA Kit: automated DNA purification from mammalian and bacterial cultured cells using Maxwell® RSC Instrument.
Promega Biotech Ibérica	Maxwell® RSC Tissue DNA Kit: automated DNA extraction from tissue and using Maxwell® RSC Instrument.
Promega Biotech Ibérica	Maxwell® RSC Buccal Swab DNA Kit: automated extraction of DNA from buccal swabs using the Maxwell® RSC Instrument.
Promega Biotech Ibérica	Maxwell® RSC Stabilized Saliva DNA Kit: for automated DNA extraction from stabilized saliva samples using the Maxwell® RSC Instrument.
Promega Biotech Ibérica	GenePrint® 24 System: 24-Locus STR system to generate a multilocus human DNA profile from a variety of human-derived biological sources.
Promega Biotech Ibérica	NanoBRET™ TE Intracellular HDAC Assay: the NanoBRET™ Target Engagement (TE) Assay measures compound binding at select target HDAC proteins in intact cells. The assay uses bioluminescence resonance energy transfer to directly measure compound binding affinity as well as compound-target residence time.
Promega Biotech Ibérica	Glucose Uptake-Glo™ Assay: a homogeneous bioluminescence, non-radioactive method for measuring glucose uptake in cells, based on the detection of 2-deoxyglucose-6-phosphate (2DG6P).
Promega Biotech Ibérica	PowerPlex® 18D System: 18D System is a multiplex STR system for use in database and paternity testing. This system is optimized for direct amplification of samples on FTA®.
Promega Biotech Ibérica	PowerPlex® Fusion System: Co-Amplification and Fluorescent Detection of 24 Loci. Delivers more information and high success rates from demanding forensic, paternity and relationship-testing cases.
Promega Biotech Ibérica	Maxwell® RSC PureFood GMO and Authentication Kit: easy and automated method for efficient purification of DNA used in PCR-based testing for Genetically Modified Organism, DNA sequences and PCR based food and ingredient authentication.
Promega Biotech Ibérica	MTase-Glo™ Methyltransferase Assay: bioluminescence-based assay that can be used to monitor the activities of methyltransferases (MTases) and their modulation by small molecules in many applications, including high-throughput screening.
Promega Biotech Ibérica	PD-1/PD-L1 Blockade Bioassay: immune inhibitory receptor expressed on activated T cells and B cells that plays a critical role in regulating immune responses to tumor antigens and autoantigens.
Promega Biotech Ibérica	ReliaPrep™ miRNA Cell and Tissue Miniprep System: isolates total RNA including microRNA (miRNA) and other small non-coding RNA (sncRNA) subspecies from a variety of cell and tissue types within 40 minutes.
Roche Farma	Available in Spain: Erivedge® (VISMODEGIB) - first drug for advanced basal cell carcinoma.
Roche Farma	Launched Molecular Information Unit with the objective of providing molecular information from tumour genome analysis and the identification of selective potential treatments, which have already been approved, or those under clinical development, as well as clinical trials.
Roche Farma	Available in Spain: Avastin® (Bevacizumab), first biologic for advanced cervical cancer.
Roche Farma	Cotellic® (Cobimetinib) combined with Zelboraf® for advanced melanoma.



TABLE 6. PRODUCTS AND SERVICES LAUNCHED TO MARKET BY ASEBIO MEMBERS IN 2016 (CONT.)

ENTITY	NAME AND DESCRIPTION
Sanofi	Toujeo® (insulin glargine [from recombinant DNA] injection pen, 300 U/ml), latest generation basal insulin for the treatment of diabetes mellitus types 1 and 2.
Sartorius	FlexAct® BT: Single use Bag Tester solution at point of use.
Sartorius	SARTOFLOW® Smart: modular and flexible small scale benchtop crossflow system optimized for ultrafiltration and diafiltration applications used in many downstream processes, such as purification of vaccines, monoclonal antibodies and recombinant proteins.
SECUGEN	"In house" test to detect the presence of CFH and CFI autoantibodies in patients with complement pathway deregulation.
StemTek Therapeutics	Cell2Sphere Kit: 3D cell culture kit for cancer stem cell research, drug development and personalised medicine.
Sygnis	SunScript™ One Step RT-qPCR: detect expressed genes in single step process.
Vytrus Biotech	Centella reversa, anti-aging: cosmetic ingredients rejuvenate signs of ageing.
Vytrus Biotech	Capilia longa, cosmetic ingredient to increase capillary density and reduce hair loss.
Vytrus Biotech	Phyto Peptidic Fractions™ (PPF) shows revolutionary properties for skin regeneration.

Source: ASEBIO

3.3. STRATEGIC PRIORITIES

This section explores the priorities of member companies and organisations for 2017 and how they have changed since last year.

For the first time since 2008, internationalisation is no longer the main priority for the

entities participating in the survey. This year it is product launches that top the list, while internationalisation slips to second.

Expanding operations to other areas of business and refocusing product development are the two priorities which have changed the most since last year, with the former rising

three places, from ninth in 2016 to seventh this year. Refocusing product development, meanwhile, fell from tenth to 13th position.

Acquiring another company and reducing operations are considered to be the lowest priority objectives by the entities participating in this survey.

TABLE 7. STRATEGIC PRIORITIES AMONG BIOTECHNOLOGY COMPANIES IN 2017

2017 RANKING	PRIORITY	RELEVANCE 2017	2016 RANKING	CHANGE COMPARED TO 2016
1	Launch of products to market	3.20	3	▲ 2
2	Internationalisation	2.94	1	▼ -1
3	Acquiring knowledge and/or technology	2.61	2	▼ -1
4	Initiating clinical phases/field trials/dose scaling	2.12	4	/=/ 0
5	Alliances with user companies (pharma, food)	2.10	5	/=/ 0
6	Expanding into other business areas	1.84	9	▲ 3
7	Licensing out technology	1.67	6	▼ -1
8	Contracts or alliances with public institutions	1.65	7	▼ -1
9	Alliances with dedicated biotechnology companies	1.63	8	▼ -1
10	Hiring overseas professionals	1.35	11	▲ 1
11	Setting up joint venture	1.16	13	▲ 2
12	Refocusing R&D activities	1.10	12	/=/ 0
13	Refocusing product development	1.08	10	▼ -3
14	Licensing in technology	0.86	14	/=/ 0
15	Outsourcing production	0.71	15	/=/ 0
16	Merging with another company	0.51	16	/=/ 0
17	Acquiring another company	0.35	18	▲ 1
18	Reducing operations	0.29	17	▼ -1

Source: ASEBIO.



4

Industrial property rights and knowledge generation





4.

Industrial property rights and knowledge generation



The data used for this Technology Watch Report was gathered following a methodology designed by Clarke, Modet & Co and Madrid Science Park and is based on OECD definitions for the biotechnology sector. This methodology has been specifically designed for this use and is continuously improved by building upon the experience from studies on Industrial Property Rights conducted in previous years.

This report has been compiled using data sourced from Thomson Reuters. Other public databases used for data contrasting purposes include: the Spanish Trademark and Patent Office (SPTO), the European Patent Office (EPO), the United States Patent and Trademark Office (USPTO), Japan Patent Office (JPO) and the World Intellectual Property Organization (WIPO). Data from all of the institutions above is based on patent publications.

PATENT APPLICATIONS PUBLISHED AND PATENTS GRANTED

A total of 813 biotechnology sector patents were published in Spain during 2016 (data sourced from published Spanish patents for bio sector, PCT, EP, US and JP, prioritising Spanish or Spanish agent and Spanish client), a small decrease of 11% compared to 2015, like last year it is a similar number to that of 2013 (when 901 patents were published).

62% of patents published were patent applications and the remaining 38% were patents granted. Table 8 breaks the numbers down according to the patent protection obtained. Chart 15 shows that the largest percentage of published applications went through EPO and PCT, each accounting for 65% of the total, followed by applications to OEPM and USPTO.

The distribution has remained practically the same since 2013.

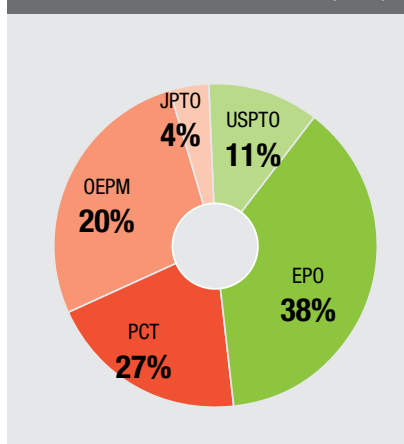
Chart 16 shows that the largest percentage of patents granted was, like the previous year, processed by the OEPM, with 46% of the total. Compared to 2015, the number of US patents granted fell slightly, from 12% in 2015 to 10% in 2016.

TABLE 8. NUMBER OF PATENT APPLICATIONS AND PATENTS GRANTED TO SPANISH BIOTECHNOLOGY ENTITIES (2016)

Patents published 2016	OEPM	EPO	USPTO	JPTO	PCT	TOTAL
Applications	103	190	53	21	135	502
Granted	143	117	31	20	(N/A)	311
TOTAL	318	307	84	41	62	813

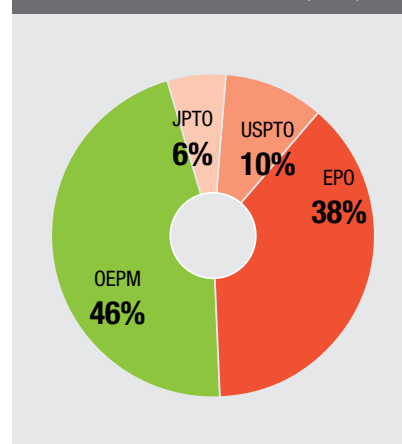
Source: Clarke & Modet – PCM.

CHART 15. PATENT APPLICATIONS (2016)



Source: Clarke & Modet – PCM.

CHART 16. PATENTS GRANTED (2016)



Source: Clarke & Modet – PCM.



4.1. PATENT OWNERSHIP IN 2016

During 2016 the business sector regained its position as the biggest agent in Spain, as it was in 2014. This year co-ownership was the most popular option, accounting for 36% of patents published, followed by the business sector (30%) and universities (19%). This trend in ownership is reflected both in the number of applications and patents granted (see Chart 17).

4.2. COMPANY PATENTS IN 2016

Over the course of 2016 a total of 125 biotechnology companies published 152 patent applications and had 111 patents granted, a decrease, as in 2015 a total of 152 companies published 184 patent applications and had 97 patents granted.

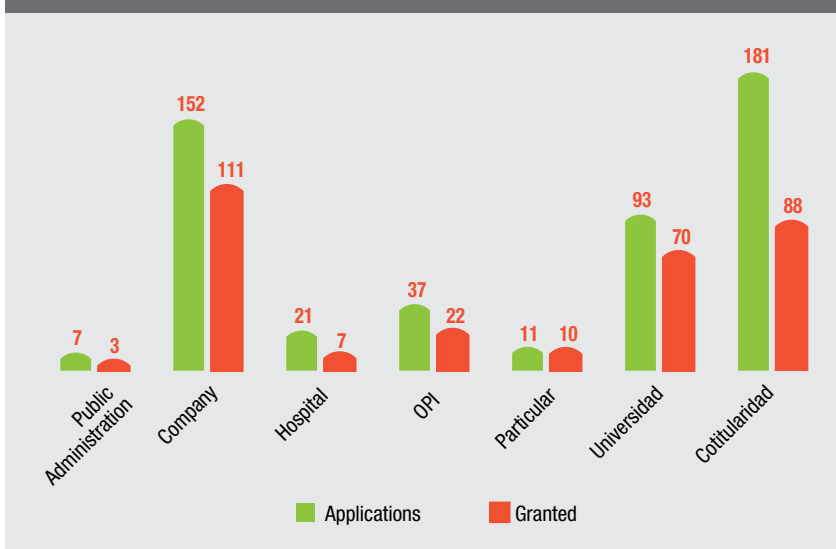
Like in 2015, Grifols published the largest number of patents, followed by ABENGOA and Lipotec. Neol Biosolutions closed the gap with six patents published, while Repsol published five.

4.3. INDUSTRIAL PROPERTY IN THE SPANISH BIOTECHNOLOGY SECTOR: 2009-2016

According to data published over eight years, the number of patent publications in the biotechnology sector is following a clear growth trend, with 89% growth over the 2009-2016 period. This evolution reflects weaker growth in the sector, as cumulative growth was lower than during the 2009-2014 and 2009-2015 periods. Compared to 2015, there was a decrease of almost 10% in both applications published and patents granted. The decrease in publications follows continues the trend from 2014, though it is more marked in patent applications.

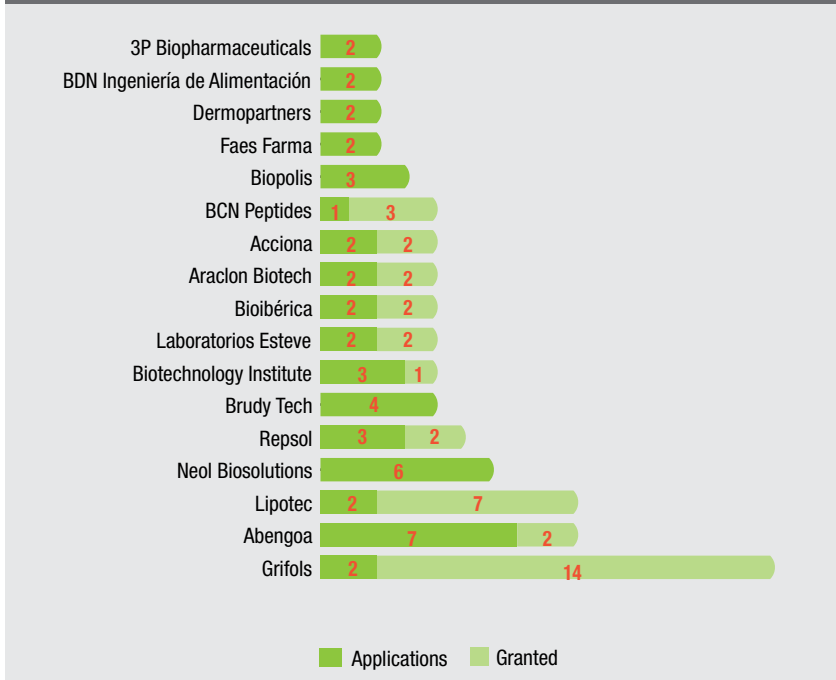
Chart 19 tracks the evolution of biotechnology sector patents published in Spain,

CHART 17. OWNERSHIP OF PATENT APPLICATIONS AND PATENTS GRANTED (2016)



Source: Clarke & Modet – PCM.

CHART 18. PATENT APPLICATIONS AND PATENTS GRANTED TO COMPANIES (2016)



Source: Clarke & Modet – PCM.

showing a slight decrease in the total number of publications during 2015 and 2016. The growth trends seen during 2012 and 2014 have not been repeated in 2016, except in terms of european patents, for which

the number of patents published has risen again. OEPM patents have fallen in terms of numbers, though again the decrease is partly made up for by the increase in european patents.



4.4. SCIENTIFIC OUTPUT – BIOTECHNOLOGY COMPANIES

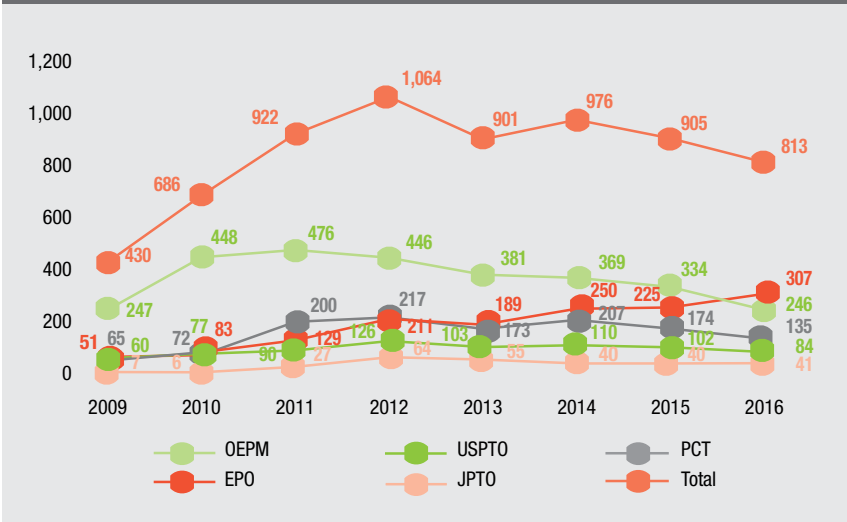
Every year, ASEBIO carries out a study of publications in high impact journals by Spanish biotechnology companies and international research laboratories based in Spain that are members of ASEBIO.

The study does not include press releases, conference posters, poster presentations, or publications by research centres or universities without links to studies for business projects.

Over the course of 2016 a total of 163 scientific papers were published by 32 biotechnology companies.

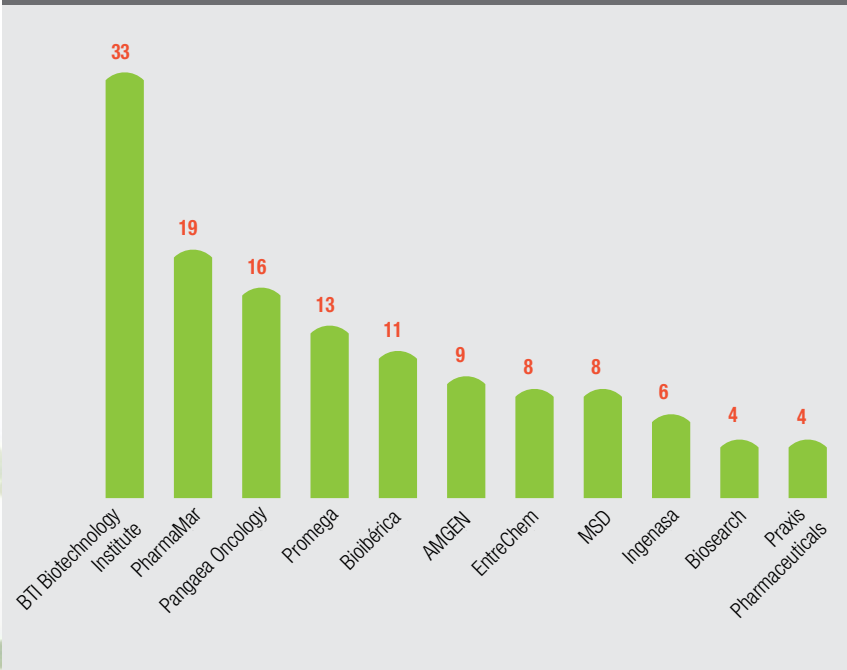
The companies with the largest number publications (Chart 20) included BTI Biotechnology Institute with 33 papers, Pharmamar with 19, Pangea Oncology at 16. These companies were followed by promega Biotech with 14 publications, Bioiberica at 11 and AMGEN with 9.

CHART 19. TRENDS IN PATENT PUBLICATIONS (2009-2016)

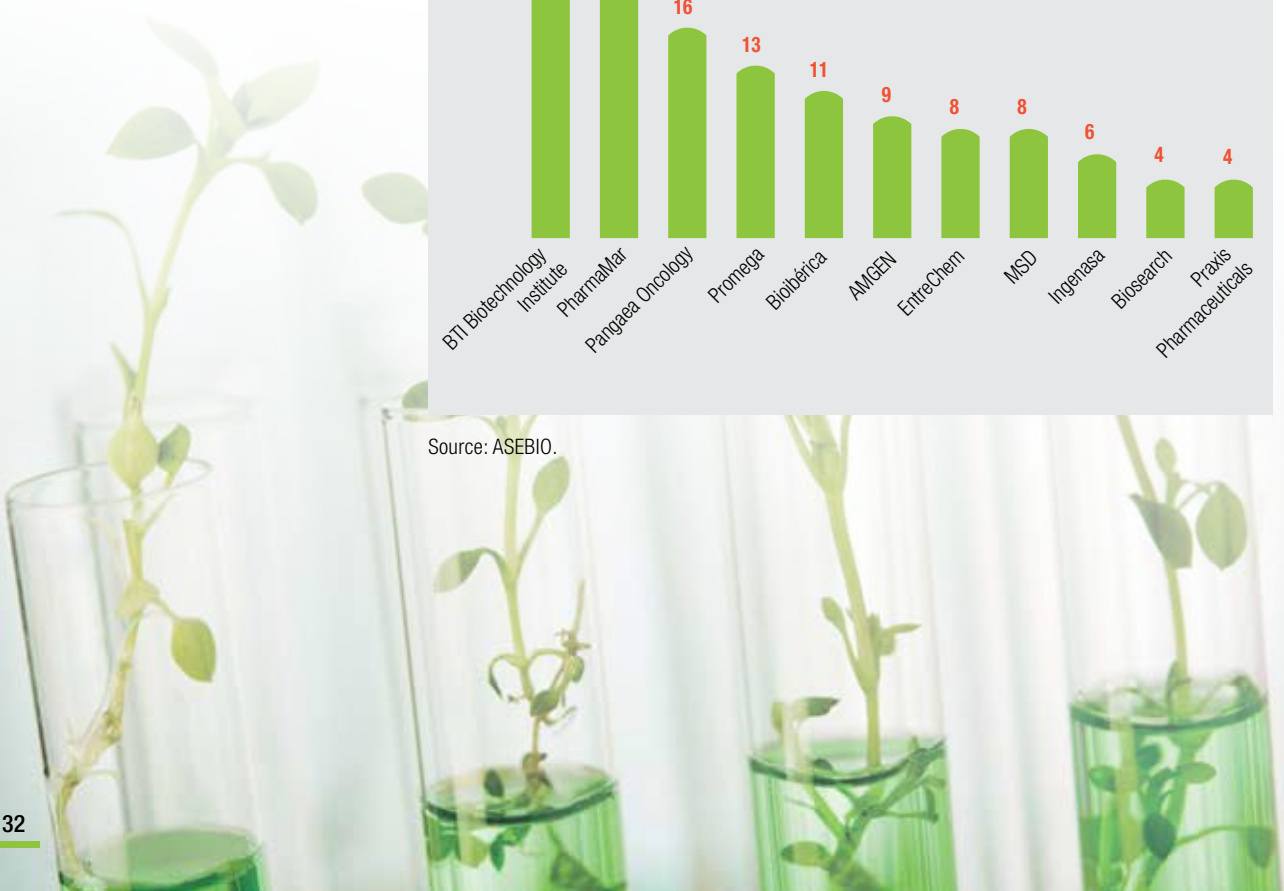


Source: Clarke & Modet – PCM.

CHART 20. NUMBER OF SCIENTIFIC PUBLICATIONS BY ASEBIO MEMBERS IN 2016



Source: ASEBIO.



Demonstration of new natural dyes from algae as substitution of synthetic dyes actually used by textile industries.



SEACOLORS project main aim was the demonstration and validation of obtaining natural dyes from a sustainable and renewable source, algae and their application in textile industry to replace synthetic dyes which are pollutant and harmful for the environment.

In order to achieve the proposed objectives, several phases were accomplished:

ALGAE with high yield of colorants were studied and selected:



EXTRACTION of pigment content was realized:



TEXTILE PROCESSES applied on natural fabrics employing the extract previously obtained:



RESULTS OF THE SEACOLORS PROJECT



PROCESS	FASTNESS	
	LAUDERING	RUBBING
DYEING*	3-4	4
PRINTING*	4	4-5

*Average results

ENVIRONMENTAL CONSIDERATIONS:

The obtained results can lead to a substitution in the use of synthetic chemicals (Dye-stuffs) by a natural and renewable source, that can turn dyeing into a more ecofriendly and economic procedure, specially regarding wastewater disposal, CO₂ generation (in the synthetic dyes production), energy and water consume.



5

Spanish biotechnology sector milestones in 2016





5.

Spanish biotechnology sector milestones in 2016

This section lists the most significant milestones among ASEBIO member companies in 2016.

January

Patent granted	AB Biotics	During 2016 patents were granted for I3.1 in the Philippines and China for AB Fortis in Chile and Guatemala, for AB Life in Russia, Japan, Indonesia and Peru and for AB Dentalac in Japan, China and the US.
Patent Granted	Biosearch Life	European patent granted for the use of probiotics to treat mastitis.
Product launch	Celgene	Launch of OTEZLA® (apremilast), the first PDE4 inhibitor for the treatment of psoriasis and psoriatic arthritis.
Study launch	Era7and Health in Code	Lauch of CARDIOBIOME project: development of bioinformatics platform integrated with the Electronic Health Record for human microbiome analysis.
Patent granted	Fina Biotech	Two new patents granted in the US and Canada patent family "bladder cancer diagnosis and/or prognosis method".
Product launch	Genomica	Product launch: CLART® CMA EGFR BL liquid biopsy in non microcytic lung cancer CLART® CMA BRAF MEK1 AKT1 Detection oncogene mutations associated melanoma, CLART® CMA ALK ROS Detection and genetic identification of major chromosomal translocations associated with response to therapy in patients with lung cancer.
Distribution agreement	Grifols	Acquired exclusive rights to commercialise and distribute MassBiologics vaccine for tetanus and diphtheria in the US.
Study launch	Grupo Praxis Pharmaceutical	Project launch: new therapeutic approaches for the treatment of cystic fibrosis based on small transmembrane transporter-class ion molecules.
Product launch	MSD	KEYTRUDA® (pembrolizumab), an anti-PD-1 Immunotherapy, is now available on the Spanish Health System for the treatment of advanced melanoma (unresectable or metastatic) in adults.
Product launch	NanoMyP®	LanzaTiss®-Link, a nanofiber membrane for direct covalent immobilisation of biomolecules and Tiss®-Streptavidin, High amount of covalently attached streptavidin for direct immobilisation of biotiny-labeled-biomolecules.
Study launch	Sistemas Genómicos	Joined new european project (Liqbiopsens): detection of KRAS and BRAF mutations in colorectal cancer using blood liquid biopsy.
Study launch	Spherium Biomed	Efficacy trial for SP12006 for the treatment of acute pain in patients with Temporomandibular Joint Disorders (TMJD).
Presentation of results	TiGenix	Announced positive results in ADMIRE-CD study for the treatment of Perianal Fistulizing in patients with Crohn's Disease.



5. SPANISH BIOTECHNOLOGY SECTOR MILESTONES IN 2016

February

Product launch	Amgen	Repatha® (evolocumab) is available through the Spanish Health System as the first biologic for hypercholesterolemia in patients who need additional lowering of LDL cholesterol in spite of taking a statin.
Study concluded	Centro de Genómica e Investigación Oncológica (GENYO) - Parque Tecnológico de la Salud (PTS)	Blood test for the identification of metastasis-initiating cells and evaluation of treatments as they are being applied (without having to wait for their effects).
Startup	Inkemia-IUCT	Launch of subsidiary: Inkemia Green Chemicals Inc. in the US.
Product approval	Novo Nordisk	Degludec insulin received approval in SPain. Innovative and long lasting (over 42 hours) basal insulin analogue.
Study launch	PharmaMar	Announced the start of an open-label multi-centre two-stage Phase II trial to evaluate the efficacy and safety of anti-tumour drug PM184 for advanced breast cancer.
Licensing agreement	PharmaMar	PharmaMar and Specialised Therapeutics Asia Sign Licensing and Marketing Agreement for APLIDIN® (plitidepsin) Covering Several Asian Countries.
Regulatory approval	Roche Farma	The FDA approved multiple sclerosis drug ocrelizumab for primary progressive form of the neurological disease (PPMS). The drug also received the FDA's NME Classification.
Study launch	Sistemas Genómicos	Joins Desiree Project: a web-based software ecosystem for the personalised, collaborative and multidisciplinary management of primary breast cancer, improving diagnostic and treatment.
Product launch	Sygnis	Global launch of SunScript™ One Step RT-qPCR Kit. The product allows both transcription and amplification of genomic DNA in a one-step reaction that can be measured in real time.
Product approval	TiGenix	Obtained license for commercial production of Cx601 for the treatment of complex perianal fistulas in Crohn's disease patients.
Study launch	VCN Bioscience	Independent Phase I dose escalation clinical trials with VCN-01 for patients with pancreatic cancer.

March

Product launch	Biogenetics	Launch of CanID, an innovative technique to identify using their DNA.
Study results	CIBER	Collaboration with other Spanish entities to develop laboratory-scale nanodevices for the controlled release of drugs in breast cancer therapies.
Research agreement	Iden Biotechnology	New collaboration with Bioceres to develop GM wheat resistant to low temperature.
Study launch	Inkemia-IUCT	Launch of Myo-DM1 project: development of food supplements to improve the quality of life of patients suffering from Myotonic Distrophy type 1 (DM1).
Study results	Lipopharma	Results for Phase I/IIa clinical study for Minerval in patients with advanced cancer.
Research agreement	mAbxience	Selected by the WHO and The Utrecht Centre of Excellence for Affordable Biotherapeutics for Public Health (UCAB) to lead the project aimed at developing Palivizumab biosimilar (Synagis®).
Regulatory approval	PharmaMar	Regulatory authorities in 6 countries have granted 10 new authorisations to sell Yondelis®, these are: Saudi Arabia, Moldova, Bangladesh, Brunei, Costa Rica and Kuwait.
Study results	Sylentis	Sylentis reports positive Phase II results with SYL1001 in treating ocular pain related to dry eye syndrome.
Product launch	Vytrus Biotech	Launched Phyto-Peptidic Fractions™: first generation active cosmetics able to maintain the skin's regenerative potential.

April

Study launch	Genmedica Therapeutics	Announced the start of a Phase Ib multiple ascending dose clinical trial in type 2 diabetes patients that do not respond adequately to metformin monotherapy.
Acquisition	Grupo Bionaturis	Acquisition of Zera Intein Protein Solutions, company specialised in the development of technologies for the production of peptides and recombinant proteins.
Regulatory approval	Merck	New liquid biopsy OncoBEAM® RAS CRC test has been granted CE Mark approval. It was developed by Sysmex Inostics in collaboration with Merck and will be commercialised by both companies.
Product launch	MSD	MSD launched ZERBAXA® (ceftolozane and tazobactam) in Spain, an antibiotic for the treatment of complicated intra-abdominal infections and urinary tract infections in adults.
Research agreement	Pangaea Oncology	Long term agreement to launch in the U.S.A and China a non-invasive test to detect genetic material in blood of cancer patients.
Regulatory approval	Roche Farma	FDA approved Gazyvaro® for certain people with previously treated follicular lymphoma.
Product launch	Sanofi	Launched Toujeo® Insulin glargine injection 300 units/ml - new generation basal insulin for the treatment of diabetes mellitus type 1 and 2 in adults.
Financing	Stat Diagnostica	Closed funding round for € 25 million.

May

Licensing agreement	Ability Pharmaceuticals	Licensing agreement with SciClone Pharmaceuticals for its ABTL0812 cancer drug - to be commercialised in China.
Research agreement	Almirall y Bicosome	Research, collaboration and sub-licensing agreement for the development of solutions in the skincare filed using the Bicosome® platform.
Study launch	Bioibérica	Trial (randomized, double-blind) to evaluate the Efficacy and Safety of new compound to improve memory in patients with mild severity Alzheimer's Disease.
Study launch	Canvax Biotech	Launch of FRIDASTEM project: accelerate small molecule drug discovery related to Cancer Stem Cells (CSC) proliferation, migration, invasion or metastasis.
Regulatory approval	Histocell	Reoxcare® obtains the CE mark for its commercialisation in Spain, Europe and countries that accept the CE marking, such as Hong Kong, Macau and Chile.
Anniversary	Lilly	On the 10 May the company marked 140 years in the pharmaceutical sector.
Study concluded	Palobiofarma	Concluded phase Ib clinical trial for new inhibitor - PDE-10 PBF-999.
Licensing agreement	Pangaea Oncology	Singing of licensing agreement with Cancer Research Technology to develop p21-activated kinase inhibitor drugs for cancer. Pangaea will assume responsibility for pre-clinical and clinical development.
Acquisition	Reig Jofre - Oryzon	Reig Jofre bought 100% of GynEC®-DX from Oryzon - a molecular diagnostic test for the early detection endometrial cancer.
Study launch	Sanofi	Cdifense™ is a Phase III trial to evaluate the safety, immunogenicity and efficacy of a toxoid vaccine for the prevention of primary symptomatic C. difficile infection (CDI).



5. SPANISH BIOTECHNOLOGY SECTOR MILESTONES IN 2016

June

Licensing agreement	Almirall	In-licensed (development and commercialisation) PAT-001 drug from Patagonia Pharmaceuticals. It is a new medicinal treatment containing isotretinoin for the treatment of congenital ichthyosis.
Study results	Bioibérica	Presentation of results from meta-analysis of two randomized Mobilee studies: stimulates the synthesis of hyaluronic acid, reduction of synovial effusion, joint pain / inflammation and increase in muscle mass and function.
Accreditation	Biosearch Life	Received authorization for registration of their probiotic strain <i>Lactobacillus fermentum</i> CECT5716 LC40. Registration allows the inclusion of LC40 in infant formula milk manufactured in China.
Study launch	Dreamgenics	Joined GCH-CLL project to work on techniques to predict chronic lymphocytic leukaemia outcome and treatment resistance.
Regulatory approval	Grifols	FDA Approved the use of the Procleix Zika Virus Assay from Hologic and Grifols to screen the U.S. Blood Supply under an IND Study Protocol.
Startup	Inkemia-IUCT	Set up new UK-based company for advanced and second generation biofuels.
Regulatory approval	Laboratorio LETI	European Commission authorises commercialisation of LetiFend, the first vaccination for canine leishmaniasis based on a recombinant protein.
Product launch	Laboratorios Rubió	Testogel is a colourless hydroalcoholic gel containing 1% testosterone for the treatment of male hypogonadism.
Startup	Neol Bio	Created "Neol Nutricional Products" for the production and commercialisation of its Omega-3 DHA (docosahexaenoic acid).
Study launch	PharmaMar	Announced the start of a multicenter, prospective, pivotal study to analyze the efficacy of the antitumoral compound of marine origin plitidepsin (Aplidin®) in patients with relapsed and refractory angioimmunoblastic T-cell lymphoma.
Product launch	Reig Jofre	Launched Forté Pharma, a new line of food supplements in Hong Kong and Macao.
Product launch	Roche Farma	Erivedge® (VISMODEGIB) has been authorised for sale in Spain for the treatment of It is the first advanced basal-cell carcinoma.
Study results	TiGenix	Announced Phase I/II Results of AlloCSC-01 in Acute Myocardial Infarction.
Licensing agreement	TiGenix	TiGenix and Takeda enter into licensing agreement for commercialisation (outside US) of Cx601 for the Treatment of Complex Perianal Fistulas in Patients with Crohn's Disease.

July

Financing	Atrys Health	Atrys Health was listed on the MAB stock exchange.
Research funding	Biohope	Received €3.8m from Horizon 2020 SME Instrument Phase 2 to develop diagnostic and personalised therapy technology for renal transplants.
Product launch	Grupo Farmasierra	Commercialisation in Spain of Alflorex®, a probiotic that has proven its efficacy in reducing the symptoms of Irritable Bowel Syndrome.
Approval revision commercialisation	Merck	Received EMA approval for the use of Cladribine tablets in the treatment of relapsing forms of multiple sclerosis.
Study launch	Minoryx Therapeutics	Initiated Phase I clinical trial in humans with MIN-102 compound.
Patent granted	Neuron Bio	The European Patent Office has granted a patent to Neuron Bio for a family of neuroprotective compounds with potential uses in the treatment of neurodegenerative disorders, particularly Alzheimer's disease.
Study launch	Oryzon	Oryzon Initiates Multiple Ascending Dose Cohorts In ORY-2001 Phase I clinical trial of its proprietary oral epigenetic drug in healthy subjects.
Study launch	Oryzon	Oryzon nominated ORY-3001, a specific LSD1 inhibitor, next drug candidate to enter preclinical development in non-oncological indications.
Research agreement	Som Biotech	Announced collaboration with Inorgen to develop new opportunities in Drug Repositioning in Rare Diseases in a number of therapeutic areas.
Accreditation	VidaCord	Granted international accreditation by the American Association of Blood Banks.



■ August

Study results	Grifols	Presented the results of the Phase I trial for ABvac40, by Araclon Biotech, for Alzheimer's disease. ABvac40 produced an immune response in more than 87% of patients who received the product during the trial.
Study concluded	Palobiofarma	Completed Phase Ia clinical trial with new adenosine A3 antagonist PBF-677.
Study launch	PharmaMar	Announced the start of Phase III ATLANTIS study evaluating the efficacy and safety of PM1183 (lurbinectedin) in combination with doxorubicin versus topotecan or the combination VCR in patients with small cell lung cancer (SCLC) after the failure of one prior platinum-containing line.

■ September

Study results	Almirall	Announced positive results from two Phase III trials of tildrakizumab, as a potential treatment for chronic moderate-to-severe plaque.
Acquisition	Bayer and Monsanto	Monsanto has agreed to a takeover offer by Bayer under which Bayer will buy Monsanto for \$128 per share in an all-cash deal.
Research agreement	Bioibérica	Signed a partnership agreement with the Institute for Bioengineering of Catalonia and the Barcelona Institute for Global Health to study the development of new compounds derived from heparin to combat malaria.
Study results	Esteve	First presentation of Phase II clinical studies with MR309 at the 16th World Congress on Pain demonstrate significant clinical benefits of a new analgesic in the treatment of patients with peripheral neuropathy of different aetiologies.
Product launch	Ferrer	Commercialisation of UTIPRO PLUS® for the control and prevention of urinary tract infections. The compound is based on Xyloglucan.
Research agreement	Ferrer	Created a consortium with the Institute for Bioengineering of Catalonia and the bioinformatics company Mind the Byte to study the development of new therapeutic molecules against cancer metastasis.
Study launch	HistoCell and Ferrer	First clinical trials for new cell therapy drug to treat spinal cord injuries of traumatic origin - in collaboration with HistoCell.
Study launch	Life Length	Participated in Horizon 2020 ONCOCHECK project: clinical trials for telomere technology Life Length TAT as a prognosis biomarker in the treatment of cancer.
Regulatory approval	PharmaMar	EMA accepted Marketing Authorization Application for Aplidin® (plitidepsin) in combination with dexamethasone for the treatment of relapsed/refractory multiple myeloma.



5. SPANISH BIOTECHNOLOGY SECTOR MILESTONES IN 2016

October

Product launch	Amgen	Announced Kyprolis® (carfilzomib) available in Spain for adults with relapsed multiple myeloma.
Distribution agreement	Bicosome	Announced agreement with Nano Tech Enterprise to commercialise its dermopharmaceutical ingredients and high-performance cosmetics in Africa and the Middle east.
Transparency agreement	Diomune	Signed transparency agreement with nearly 90 other public and private institutions on use of animals testing in science research in Spain. The objective being the 'opening up' of laboratories and technology companies, as well as demonstrating the working practices and management standards that must be complied with in the area of animal welfare. The agreement also aims to provide further information about the benefits of these activities for society.
Study results	FibroStatin	Announced development of treatment for drug resistant cancer and organ fibrosis using technology to inhibit cell epithelial-to-mesenchymal transition (EMT) an underlying cause in these disorders.
Study launch	Grupo Bionaturis	Launched research to translate its vaccine for leishmaniasis to humans.
Accreditation	Ingenasa	Registered two new tools: one for Porcine Tuberculosis control and management in wild boars and domestic pigs and a second tool to control the Porcine Epidemic Diarrhoea.
Financiación	Lilly	Lilly Global Health launches 5-year investment plan totalling \$90 million to meet weaknesses in the treatment of diabetes, cancer and tuberculosis.
Award	mAbxience	Received the Biosimilar Initiative of the Year prize at the "Global Generics & Biosimilars" awards ceremony organised by British publication "Generics Bulletin".
Expansion of capabilities / facilities	Merck	Opened expansion of its new biotechnology plant in Tres Cantos, Madrid, after €15 million investment.
Regulatory approval	MSD	Approved Keytruda® (pembrolizumab) as first line treatment for patients with metastatic non-small cell lung cancer (NSCLC).
Study results	PharmaMar	Announced positive results (showing antitumoral activity) of its Phase II study of lurbinectedin (PM1183) in patients with BRCA 1/2 – associated metastatic breast cancer.
Startup	PharmaMar	Announced launch of new subsidiary in Austria with the objective of bolstering the company's presence in Europe.
Award	Plant Response Biotech	Won award in the agriculture / green biotechnology category at the Europabio Awards 2016.
Study launch	Sanifit	Announced Initiation of first clinical trial of SNF472 in Patients with Calciphylaxis.
Study results	Sanofi	Regeneron Pharmaceuticals and Sanofi announced publication of positive results in Phase 3 studies evaluating dupilumab in patients with atopic dermatitis.
Study launch	Spherium Biomed	Added to pipeline: PeMTADIV (SP15008) a patented preclinical candidate for autoimmune diseases.
Distribution agreement	Vytrus Biotech	Signed agreement with Tech Enterprise to distribute its products in 15 African and Middle eastern countries.

**November**

Production agreement	3P Biopharmaceuticals	Signed a production partnership with Neovacs for the manufacture of interferon alpha (IFN α), a key component for a new therapy developed by Neovacs.
Study launch	Ability Pharmaceuticals	Announced the initiation of its first Phase 2 Clinical Trial with its novel targeted anticancer agent ABTL0812 to evaluate its efficacy and safety in combination with paclitaxel and carboplatin in 80 patients with advanced or recurrent endometrial cancer or squamous lung cancer.
Award	Algaenergy	The European Commission, through the Executive Agency for Small and Medium Enterprises (EASME), has selected AlgaEnergy as one of the SMEs with the greatest growth potential on the continent, within the framework of the Horizon 2020 European Strategic Development Program.
Regulatory approval	Amgen	The European Commission approved Parsabiv™ (etelcalcetide) for the treatment of secondary hyperparathyroidism in adults on hemodialysis.
Research agreement	Bioingenium and CZ Veterinaria	CZ Veterinary will invest in a new project to use Bioingenium technology for the production of new generation recombinant vaccines to improve the protection of animals against disease.
Study results	Biorizon Biotech	Presented results of trials to improve the quality of production for tropical pineapple using spirulina.
Product launch	CIBER	Development device capable of reproducing in vitro and by 3D bioprinting the complexity of different tumour types - in order to better understand how they work.
Acquisition	Laboratorios Kymos	Acquired Pharmaprogress, an Italian firm specialised in contract research and analysis services.
Regulatory approval	Merck	The European Medicines Agency validated the marketing authorization application for Avelumab for the treatment of metastatic merkel cell carcinoma.
Research agreement	Neol Bio	Signed a partnership agreement with the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) for the development of microorganisms able to produce fatty alcohols from lignocellulosic sugars.
Study results	Oryzon	Presents preliminary safety and efficacy clinical data of its investigational drug ORY-1001, a LSD1 selective inhibitor.
Research agreement	Pangaea Oncology	Collaboration with Echevarne for the development of liquid biopsy for cancer patients.
Study results	PharmaMar	PharmaMar presents new clinical data for Yondelis® from TAUL study in patients with metastatic or locally relapsed uterine leiomyosarcoma and TR1US study of advanced soft tissue sarcoma (STS) patients.
Product launch	Roche Farma	Avastin® (Bevacizumab) become available in Spain, as the first biodrug for advanced cervical cancer, while Cotelllic® (Cobimetinib), in combination with Zelboraf® was made available for advanced melanoma.
Product launch	StemTek Therapeutics	Launched Cell2Sphere kit: system that tests compounds on cancer stem cells, 3D cell culture drug development and personalised medicine.



December

Orphan drug designation	Ability Pharmaceuticals	Received FDA orphan drug designation in the US for ABTL0812, for the treatment of Pancreatic Cancer.
Study results	BCN Health	Cost-effectiveness analysis of insulin degludec compared with insulin glargine for the management of type 1 and type 2 diabetes mellitus - from the Spanish National Health System perspective.
Product launch	Biogen	Commercialises two biosimilars in Spain: Benepali and Flixabi, referencing etanercept, by Pfizer, and Remicade, by MSD, respectively.
Acquisition	Grifols	Closed acquisition of US firm Hologic's share of NAT donor screening unit.
Study concluded	Merck	Concludes CITY study on adherence to treatments to pollen allergies using subcutaneous immunotherapy.
Orphan drug designation	Minoryx Therapeutics	Granted Orphan Drug Designation by the EMA for MIN-102: treatment for X-linked Adrenoleukodystrophy (X-ALD), a rare and chronically debilitating, life threatening neurodegenerative disease.
Study launch	Nanoimmunotech	Lead SENS03 project: development of an ozonation treatment system for microcontaminants in water and its monitoring and control by optical biosensors based on gold nanoprisms.
Research agreement	N-Life Therapeutics	Collaboration with WAVE Life Sciences to explore cell-specific targeting of nucleic-acid therapeutics in the central nervous system.
Accreditation	Pevesa Biotech	Obtained organic production certificate for its rice isolate and hydrolysates.
Distribution agreement	PharmaMar	Pharmamar and Chugai Pharmaceutical entered into an agreement for PM1183 in Japan, for various types of tumor.
Study launch	Zeclinics	Participates in Horizon 2020's SME instrument programme with "ZeCardio" technology to develop a system of analysis of the cardiovascular effects of drugs in the early research stages.



6

Financial environment





6. Financial environment

6.1. PRIVATE CAPITAL EXPANSION

A total of 26 private capital increase operations involving over €63 million have been registered. Overall, the average capital injection per operation was €2.4 million. One of the biggest operations involved **Stat Diagnóstica** and reached a total of €25 million. If we did not include this operation, the average total per operation would have been just over €1.4 million.

Number of operations	26
Total volume	63,489,000.00 €
Average total per operation	2,441,884.62 €
Average total per operation (not including largest single operation)	1,480,346.15 €

6.2. EQUITY MARKETS

During 2016 two biotechnology companies were listed on the MaB equity market. In July 2016 **Atrys Health** was listed on the MaB after a €4.5 million capital increase as part of its IPO. **Pangaea Oncology**, a company specialised in molecular diagnostics and personalised cancer treatment R&D was listed on the MaB towards the end of 2016. Prior to listing, the company

successfully completed a €3.8 million capital increase.

This means that a total of seven biotechnology have now been listed on the MaB stock exchange.

Among companies currently listed on the MaB and the *Mercado Continuo* (Spanish stock market) there were six capital increases involving the issuing of shares worth a total of almost €17.5 million, meanwhile, capital increases involving debt-equity swaps totalled over three million euros.

6.3. CORPORATE OPERATIONS

Grifols, the Catalan multinational and global producer of plasma-derived protein therapies invested €25 million in **Progenika Biopharma**, meaning that it now owns 89.08% of its capital. It also bought 49% of US company, Interstate Blood Bank, in an €87.9 million operation.

Grupo Bionaturis acquired Zera Intein Protein Solutions (ZIP), a company created in 2015, which commercialised Zera® and Splittera, tools to facilitate the production and purification of biological products. The operation involved an exclusive worldwide licensing agreement for the final development and commercialisation of Splittera® ZIP technology in milestone based payments and sales

royalties. As a result of the €1.6 million operation, Inveready now owns over 5% of Bionaturis shares.

CRO **KYMOS Pharma Services** closed the sale of Italian company **Pharmaprogess**, which has GMP approval from the Italian Medicines Agency.

LipoTruePrimaderm, a company specialised in the manufacturing of ingredients and the commercialisation of cosmetic products acquired 51% of **Ascidea**, a computational biology and genomics company.

6.4. COMPLEMENTARY FUNDING

This section includes complementary funding of biotechnology companies through loans from regional entities offering financial tools such as loans or venture capital, as well as loans from ENISA, a state company controlled by the Ministry of Economy, Industry and Competitiveness, which participates in the funding of promising, innovative business projects.

A total of 33 operations worth €7.7 million were registered.

Number of operations	33
Total value	7,695,000.00



6.5. OTHER OPERATIONS

Towards the end of 2016 **Era7 Bioinformatics** successfully completed 100% of its crowdfunding campaign launched through **Capital Cell** for €600,000. The aim of this round was to finance its plan for expansion into the US and to bolster the integration and automation of its cloud based tools. **Bioprognos** raised €372,000, also through the Capital Cell platform.

Nostoc Biotech, a company specialised in agricultural biotechnology and a pioneer in the

production of biofertilisers using microorganisms from worm humus raised €230,000 from a crowdfunding campaign carried out through the Madrid Stock Exchange.

6.6. VENTURE CAPITAL

According to an analysis carried out by ASE-BIO, the five venture capital management firms specialised in the biotechnology sector (CRB, Caixa Capital Risc, Ysios Capital, Inveready and Clave Mayor) invested €23.5 million

across a number of investments in biotechnology companies over 2016. They also pledged a further €24 million in future investments.

Investment 2016	23,560,230.00 €
Pledged 2016	24,189,375.00 €





7

Internationalisation





7.

Internationalisation



7.1. SPANISH BIOTECHNOLOGY IN THE GLOBAL CONTEXT

Key Indicators on Biotechnology – OECD

In 2016 the OECD updated its 'Key indicators on Biotechnology' statistics, which compare a number of variables across OECD countries. Some statistics for significant countries such as the UK are not given in the study and data collection methods may vary from country to country. For this reason, it is recommended that OECD data and rankings be used with caution, given the lack of standardisation of the data. It is, nevertheless, a source of useful information that shows the trends of the sector in the international context.

Number of dedicated biotechnology companies: According to the study, in 2014 there were 628 dedicated biotechnology companies in Spain, putting Spain only behind France and the US but ahead of countries including Germany, Italy, Israel and South Korea. The most notable fact is that this means that Spain is growing again in terms of the number of companies, a trend which had stopped since 2013. In total the data shows there are 74 more companies than the previous year.

Biotechnology R&D expenditure: in 2014 Spain once again found itself in 8th position

in terms of total biotechnology R&D spending, behind Denmark. 38.3% of R&D investment in biotechnology (2014) in Spain is carried out by small and medium sized companies, a similar percentage to 2013 and still one of the highest among OECD countries, reflecting the large number of SMEs in the sector.

In countries with more mature biotechnology industries, such as the US, Denmark and Switzerland, the number barely reaches the 10% mark.

SCImago Country Rank

In 2015 Spain continued in 10th place in terms of scientific output (all areas) for the

period encompassing 1996-2015. If we only consider the data for 2015, Spain would be in 11th, immediately behind Australia but ahead of science powerhouses including the Netherlands, Russia, Switzerland and South Korea.

In areas related to biotechnology, ranking positions ranged from seventh for 'Agriculture and Biological Sciences'; tenth in Chemistry and Medicine; eleventh in 'Biochemistry, Genetics, Molecular Biology, Neuroscience, Immunology and Microbiology,' and twelfth in Pharmacology, Toxicology and Pharmaceutics.

TABLE 9. TOTAL SPENDING IN BIOTECHNOLOGY R&D (2014)

COUNTRY	MILLIONS OF USD	YEAR
United States	38,565.3	2014
France	3,267.9	2012
Switzerland	2,560.0	2012
South Korea	1,414.4	2014
Germany	1,344.0	2015
Japan	1,230.1	2010
Denmark	1,082.2	2013
Spain	801.4	2014
Belgium	660.8	2011
Italy	603.8	2014

Source: OCDE.



7.2. INTERNATIONAL INVESTMENT IN SPAIN

During 2016 biotechnology companies have continued to receive international funding in volumes hitherto not seen in the sector. It is particularly impressive that just over the first quarter of

2017 the amount of international investment has already been greater than during the whole of 2016, more than €70 million by June 2017.

Co-investment continues to be a popular option among large international funds and Spanish entities such as Ysios Capital and Caixa Capital Risc.

Most of these investment operations have involved ASEBIO members.

Below is a listing of the biggest operations of 2016 and 2017 (data at the time of publication).

TABLE 10. MAIN INVESTMENT AGREEMENTS INVOLVING SPANISH COMPANIES AND INTERNATIONAL INVESTORS

AELIX THERAPEUTICS

- Caixa Capital Risc
- Ysios Capital Partners
- Johnson & Johnson Innovation

SOM BIOTECH

- Inversores Internacionales

STAT DIAGNOSTICA

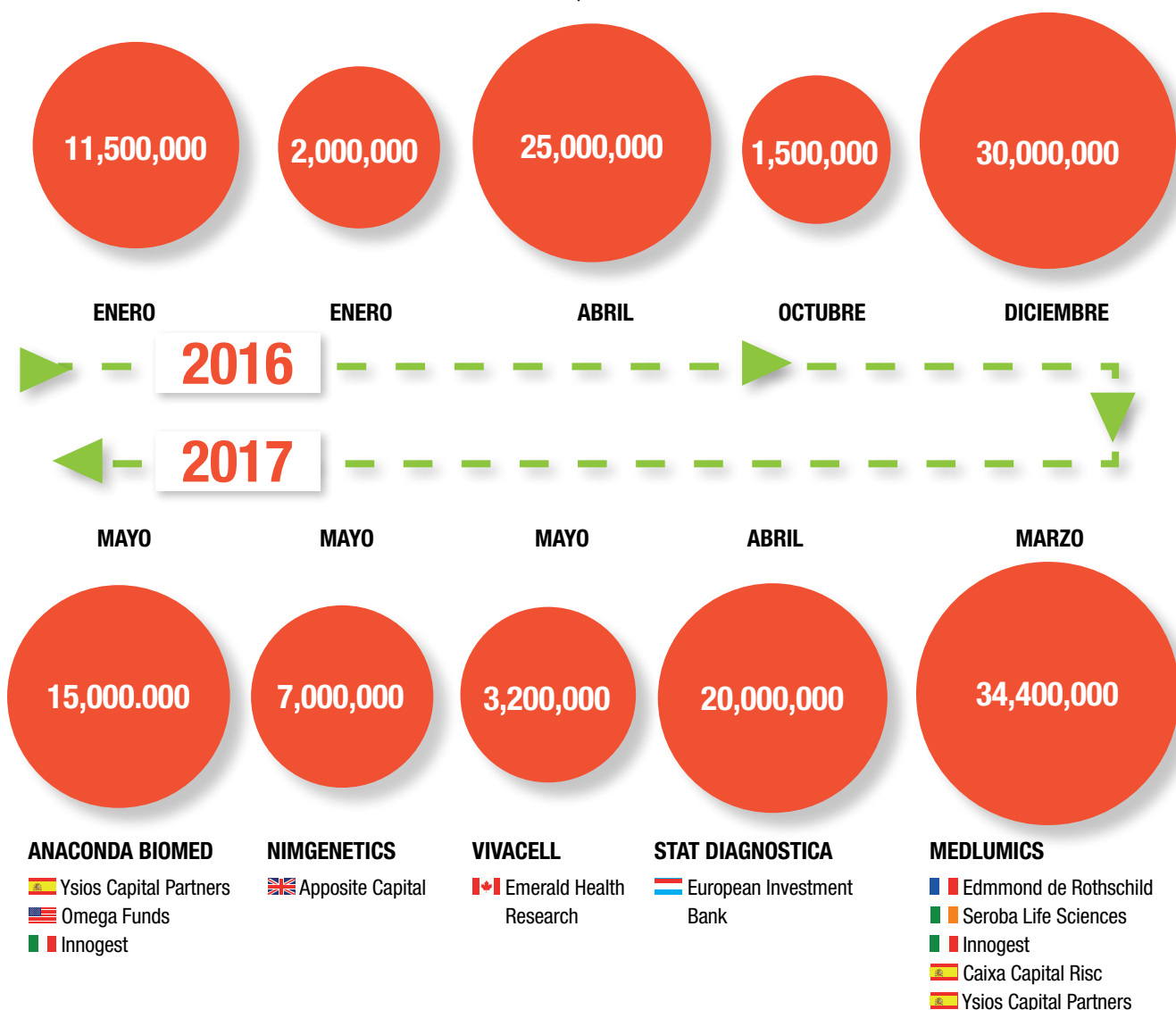
- Gilde Healthcare
- Siemens Venture Capital
- Kurma Partners
- Boehringer Ingelheim Venture Fund
- Axis
- Idinvest Partners
- Ysios Capital Partners
- Caixa Capital Risc

IPROTEOS

- Caixa Capital Risc
- Kinled Holding
- ASCIL Biopharm

PHARMAMAR

- Chugai Pharmaceuticals



Source: ASEBIO.



7.3. INTERNATIONALISATION SURVEY

This section looks at the conclusions from the internationalisation survey carried out among biotechnology companies in 2016. The survey, undertaken by ASEBIO, has now taken place for nine consecutive years.

A total of 80.88% of companies surveyed considered internationalisation to be 'essential' for their business activities, practically the same percentage as the previous year (79.3%). When we include those companies which consider internationalisation to be 'important' we can account for 100% of companies surveyed, the first time this has happened since the survey started.

The importance of internationalisation is also reflected in the number of companies which decided to internationalise their activities from the moment of launch, with the percentage climbing from 71.40% last year to 74.55% this year.

7.35% of companies has yet to set out on its internationalisation process. However, 40% of those companies state that internationalisation is a short-term objective which they have not chosen prioritise in order to consolidate their project in the Spanish market first or due to a lack of financial resources.

According to the internationalisation survey, 92.65% of respondents carried out some international activity during 2016, a similar percentage to 2015. Overseas activities by our members are shown on Table 11.

Participating in events and fairs	84.21%
Exporting products and services	70.18%
Alliances with overseas companies	64.91%
Investing in branding, communication and marketing	38.60%
Licensing out	36.81%
Expanding overseas	26.32%
Licensing in	22.81%

Source: ASEBIO.

68.42% of ASEBIO member companies now have a specialised international department, marking an increase from the 52% at the previous survey.

The markets most favoured by biotechnology firms are again those in which the sector has matured enough to provide greater business and investment opportunities, such as the European Union (92.45%) and North America (81.63%). Although the UK continues to be part of the EU, only 71.43% of respondents considered it to be a priority market, 20 points below the average for the EU as a whole.

In Asia, Japan is a priority for 50% of respondents, while South Korea loses ground as it goes from being a priority market for 35.71% of respondents to only 16.22%. The prioritisation of South American markets rose the most, particularly Brazil (39%), Mexico (35%), Colombia (30%) and the Southern Cone region of South America (27.5%). It should be noted that Israel continues to be a priority market for the sector (25.64%).

Lack of financial resources was again the main obstacle to internationalisation processes, according to 66.67% of respondents, 7 points less than a year ago.

We should note that this percentage has, however, steadily fallen every year: 73.85% (2015), 79% (2014), 85% (2013), 91% (2012) and 100% in 2009. Other barriers continue to include the lack of training, according to 35.1% of respondents, as well as language barriers (12.28%).

Finally, 94.65% of survey participants feel that the internationalisation process of the biotechnology sector will continue to gain momentum, while only 5.36% believe that internationalisation will remain the same or lose impetus.

7.4. OVERSEAS EXPANSION

37 ASEBIO member companies have an overseas presence, in total spanning 43 markets and 5 continents. The number of overseas subsidiaries has risen to 145, the US hosting the largest number, with 21 ASEBIO members present.

The geographical distribution remains practically identical to that of 2015, with most subsidiaries being in Europe (the EU and Switzerland account for 47% of the total) while South America accounts for 26%:

Europe	47%
South America	28%
US/Canada	18%
Asia/Oceania	8%

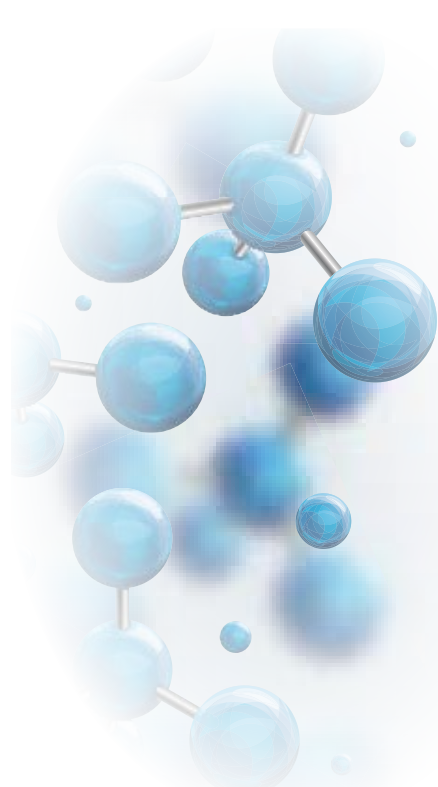




TABLE 12. LOCATION OF OVERSEAS SUBSIDIARIES OF ASEBIO MEMBERS

COUNTRY	NUMBER OF SUBSIDIARIES	COUNTRY	NUMBER OF SUBSIDIARIES
US	23	Denmark	1
United Kingdom	10	Turkey	1
Portugal	9	Honduras	1
Italy	8	Dominican Republic	1
Germany	8	Panama	1
Mexico	7	Paraguay	1
France	7	Guatemala	1
Brazil	6	El Salvador	1
Switzerland	5	Costa Rica	1
Belgium	5	Venezuela	1
Colombia	5	Ecuador	1
Chile	4	Uruguay	1
Sweden	4	Malta	1
Canada	3	South Korea	1
Poland	3	Czech Republic	1
China	3	UAE	1
Argentina	3	Slovakia	1
Holland	2	Australia	1
Austria	2	Japan	1
Peru	2	Malaysia	1
Bolivia	2	Thailand	1
Singapore	2	Monaco	1

Source: ASEBIO.

Below is the full list of dedicated biotechnology companies who are ASEBIO members and the countries in which they have a presence.

TABLE 13. ASEBIO BIOTECHNOLOGY MEMBER COMPANIES AND COUNTRIES WHERE THEY HAVE A DIRECT PRESENCE

2017	COUNTRY
ABT, AGAROSE BEADS TECHNOLOGIES	EE.UU.
Almirall	Canada, US, Mexico, Portugal, United Kingdom, France, Italy, Switzerland, Belgium, Holland, Germany, Denmark, Austria and Poland
Antares Consulting	Portugal, France, Switzerland, Belgium, Peru, Chile, Brazil and Bolivia
ASPHALION	Germany
Bioseed Capital	United Kingdom
Bioibérica	US, Italy, Poland and Brazil
BIONURE	US
BIOBIDE	US
BTI BIOTECHNOLOGY INSTITUTE	US, Mexico, Portugal, United Kingdom, Italy and Germany
CYTOGNOS	Holland
Era7 Information Technologies	US
Esteve	US, Mexico, Portugal, Italy, China, Sweden and Turkey



TABLE 13. ASEBIO BIOTECHNOLOGY MEMBER COMPANIES AND COUNTRIES WHERE THEY HAVE A DIRECT PRESENCE (CONT.)

2017	COUNTRY
Ferrer	US, Mexico, Portugal, France, Belgium, Germany, Peru, Chile, Brasil, Bolivia, Colombia, Honduras, Dominican Republic, Panama, Paraguay, Guatemala, El Salvador, Costa Rica, Venezuela, Ecuador, Uruguay and Argentina
Fibrostatin	US
GADEA BIOPHARMA	Malta
GENOMICA	China and Sweden
GRIFOLS	Canada, US, Mexico, Portugal, United Kingdom, France, Italy, Switzerland, Germany, Poland, Chile, Brazil, China, Sweden, Colombia, Argentina, Czech Republic, UAE, Slovakia, Australia, Japan, Malaysia, Singapore and Thailand
GRUPO NORAYBIO	France and Italy
INKEMIA IUCT GROUP	Brazil and Colombia
Insights in Life Sciences (iIS)	United Kingdom
Intelligent Pharma	Canada, US, United Kingdom and Germany
Inveready	US
KYMOS PHARMA SERVICES	Italy
Laboratorios LETI	US, Portugal and Germany
Lipopharma Therapeutics	US
MABXIENCE	Switzerland and Argentina
MeDiNova Investigación y Desarrollo	United Kingdom
NATAC BIOTECH	US and Chile
Neuron Bio	US
NIMGENETIS	Mexico and Brazil
Oryzon Genomics	US
Pharmamar	US, United Kingdom, France, Italy, Switzerland, Belgium, Germany and Austria
Pharmaphenix	US and South Korea
Praxis Pharmaceutical	Portugal, France and Colombia
RJ BIOTECH SERVICES	US, Portugal, United Kingdom, Belgium, Sweden, Singapore and Monaco
SANIFIT	US
Science & Innovation Link Office	Colombia
Sermes CRO	United Kingdom
SISTEMAS GENÓMICOS	Mexico
SOM Biotech	US

Source: ASEBIO.

7.5. INTERNATIONAL ALLIANCES

Over the course of 2016, ASEBIO has identified a total of 71 international alliances, compared to 54 in 2015, a 31% year-on-year increase.

The geographical distribution is similar to other years, with the focus being on other European countries (51% of the total), the US (27%), Asia (15%) and South America (7%).

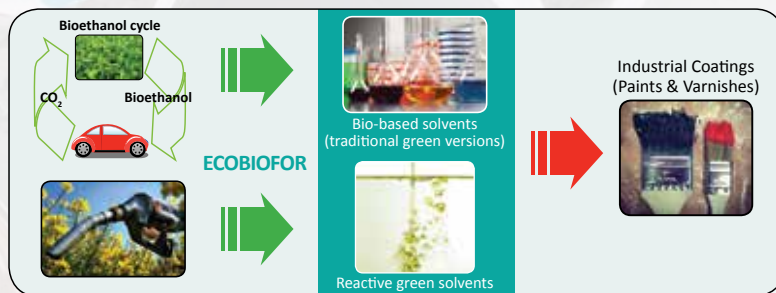
These figures include all formal agreements between any Spanish company or institution and international entities involving an explicit agreement for a shared objective of any nature (be it R&D, production, sales or other areas).

ECOBIOFOR project will boost the transition of European solvent, paints and coatings industry from petrochemicals to improved Bio-Based solvents from renewable building blocks.

THE MAIN OBJECTIVE of the project is to develop by greener chemical and biotech transformation processes novel bio-based solvents to be used in the Coatings Industry as a way to promote in Europe the transition towards sustainable production and consumption patterns.

THE PROJECT AIMS to prepare solvents for coatings with 3 characteristics:

- ✓ Bio-based (coming from renewable resources),
- ✓ Synthesized according to the principles of Green Chemistry,
- ✓ New formulations with lower VOC emissions.



ECOBIOFOR supports the large group of European SMEs working in the goal to shift conventional productive processes into new ones based on renewable resources. Moreover, the project profits from the impulse of coating SMEs, which are ready to introduce greener products in their own formulations.

The **ECOBIOFOR** consortium consists of **11 organizations** from **6 European countries**:

✓ **5 SME-associations** with 1349 members (1009 SMEs):



✓ **3 Other enterprises**: 1 Solvent Producer & 2 paint manufactures



✓ and **3 RTD performers**:



External Advisory Experts:



www.ecobiofor.eu

Paint Industry profits from Biotechnology!

ECOBIOFOR has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under Grant Agreement n° [605215]
Coordinator: **TECNALIA**, Sustainable Construction Division (www.tecnalia.com) Contact: ecobiofor@tecnalia.com

Valor

Valorisation of biorefinery by-products leading to closed loop systems with improved economic and environmental performance

Sustainable and economically viable integrated closed loop biorefineries – with improved economic and environmental benefits – are the result of knowledge transfer, biotechnologies and products delivered by the Valor-Plus project.

- Development of quality control procedures for the reliable and consistent recovery of minimally degraded hemicellulose and lignin fractions through a novel biorefining process
- Development of cutting edge biotechnological processes for the selective conversion of hemicellulose and lignin fractions as well as crude glycerol to high value product streams
- Demonstration of the profitability of sustainable and economically viable closed-loop integrated biorefineries for the valorisation of lignocellulose and glycerol via the production of high value product streams
- The final outcome is increased commercial competitiveness and profitability through improved efficiency of the processes and sustainable use of a wider range of biomass resources.



www.valorplus.eu

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no FP7-KBBE-2013-7-613802





A

Who is who?





A.

Who is Who? – Asebio Members

BUSINESS MEMBERS



3P BIOPHARMACEUTICALS, S.L.



AB BIOTICS S.A.



ABBVIE



ABILITY PHARMACEUTICALS, S.L.



ABT, AGAROSE BEAD TECHNOLOGIES



AC-GEN READING LIFE



ACKERMANN EXECUTIVE



AGRENVEC



AGROCODE BIOSCIENCE



ALEXION PHARMA SPAIN, S.L.



ALGAENERGY, S.A.



ALGENEX (ALTERNATIVE GENE EXPRESSION S.L.)



ALLINKY BIOPHARMA



ALMIRALL, S.A.



ALMUDENA GÓMEZ



AMADIX



AMGEN



ANAPHARM BIOANALYTICS



A. WHO IS WHO? – ASEBIO MEMBERS



ANTARES CONSULTING



APTATARGETS



APTUS BIOTECH



AQUILÓN CYL, S.L



ARACLON BIOTECH, S.L.



ARCHIVEL FARMA, S.L.



ARTINVET INNOVATIVE THERAPIES, S.L.



ASCIL BIOPHARM



ASPHALION



ATRYS



AYMING



BAYER CROPSCIENCE NV



BBD-BIO&TECH BIOECONOMIC DEVELOPMENT



BCN HEALTH



BEST MEDICAL DIET



BICOSOME



BIFROST HEALTH



BBD BIOPHENIX - BIOBIDE (GRUPO BNT)



BIOCHEMIZE, S.L.



BIOCROSS



BIOFABRI



BIOFINA DIAGNOSTICS



BIOGEN



BIOGENETICS



BIOHOPE



BIOIBÉRICA, S.A.



BIOINGENIUM, S.L.



BIOKIT RESEARCH & DEVELOPMENTS, S.L.U.



BIOMAR



BIOMARIN EUROPE LTD. SUCURSAL EN ESPAÑA



BIOMEDAL, S.L.



BIONANOPLUS, S.L.



BIONATURIS GROUP



BIONCOTECH THERAPEUTICS, S.L.



BIONET INGENIERÍA



BIONOS BIOTECH, S.L.



BIONURE



BIOPOLIS, S.L.



BIORAW



A. WHO IS WHO? – ASEBIO MEMBERS



BIORIZON BIOTECH, S.L.



BIOSEARCH, S.A.



BIOSERENITA



BIOTOOLS B&M LABS, S.A.



BOSQUES NATURALES, S.A.



BRISTOL MYERS SQUIBB



BTI BIOTECHNOLOGY INSTITUTE



CAIXA CAPITAL RISC



CAMELINA COMPANY ESPAÑA, S.L.



CANNAN RESEARCH & INVESTMENT



CANVAX BIOTECH, S.L.



CAPITAL CELL



CELGENE



CELGENE INSTITUTE OF TRANSLATIONAL RESEARCH EUROPE (CITRE)



CENTRO DE ESTUDIOS SUPERIORES DE LA INDUSTRIA FARMACÉUTICA



CRB INVERBIO, S.G.E.C.R.



CYTOGNOS, S.L.



DIOMUNE, S.L.



DREAMGENICS, S.L.



ECOCELTA GALICIA



ENTRECHEM, S.L.



ENZYMLOGIC



ERA7 INFORMATION TECHNOLOGIES



ESTEVE



EUROGENETICS



FERRER INTERNATIONAL



FERRER INCODE, S.L.



FIBROSTATIN, S.L.



GENDIAG



GENERA BIOTECH



GENMEDICA THERAPEUTICS



GENOMICA S.A.U



GILEAD SCIENCES, S.L.



Gómez-Acebo & Pombo

GÓMEZ-ACEBO & POMBO ABOGADOS, S.L.P.



GP-PHARM, S.A.



GRADOCELL, S.L.



GRIFOLS

GRI-CEL, S.A.



GRIFOLS ENGINEERING, S.A.

GRIFOLS

GRIFOLS, S.A.



GRUPO FARMASIERRA



HEALTH IN CODE



HISTOCELL, S.L.



HOFFMAN EITLE



IGEN BIOTECH, S.L.



IMMUNOSTEP, S.L.



INBIOMOTION, S.L.



INGENIATRICS



INKEMIA IUCT GROUP

INGENASA

INMUNOLOGÍA Y GENÉTICA APLICADA, S.A.
INGENASA



INNOQUA TOXICOLOGY CONSULTANTS, S.L.



INSIGHTS IN LIFE SCIENCES (ILS)



INSTITUTO DE MEDICINA GENÓMICA (IMEGEN)



INSTITUTO EMPRESARIAL DE BIOTECNOLOGÍA



INTEGROMICS, S.L.



INTELLIGENT PHARMA, S.L.



INVEREADY



INYCOM



IPROTEOS



KYMOS PHARMA SERVICES, S.L.



LABGENETICS, S.L.



LABORATORIOS LETI, S.L. UNIPERSONAL



LEAN GXP SUPPORT, S.L.



LIFE LENGTH



LIFESEQUENCING



LILLY



LIPOPHARMA THERAPEUTICS



LONZA BIOLOGICS PORRIÑO, S.L.



MABXIENCE



MADE OF GENES



MASTER DIAGNÓSTICA, S.L.



MEDINOVA INVESTIGACIÓN Y DESARROLLO, S.L.



MEDMESAFE



A. WHO IS WHO? – ASEBIO MEMBERS



MERCK S.L.



MSD



MILTENYI BIOTEC



MINORITYX THERAPEUTICS



MONSANTO AGRICULTURA ESPAÑA, S.L.



MYRIAD GENETICS ESPAÑA, S.L.U



N-LIFE THERAPEUTICS



NANOIMMUNOTECH



NANOTHERAPIX, S.L.



NANOVEX



NATAC BIOTECH, S.L.



NEOL BIOSOLUTIONS, S.A.



NEURAL THERAPIES



NEURON BIO



NEWBIOTECHNIC, S.A.



NIMGENETICS, GENÓMICA Y MEDICINA, S.L.



NORAY BIOINFORMATICS, S.L.U. - NORAYBIO



NORAY BIOSCIENCES GROUP (NORAY BG)



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ORYZON GENOMICS, S.A.



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PANGAEA ONCOLOGY



PAREXEL INTERNACIONAL



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A. WHO IS WHO? – ASEBIO MEMBERS



PROMEGA BIOTECH IBÉRICA, S.L.



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QGENOMICS



RAMAN HEALTH TECHNOLOGIES



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REIG JOFRE



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SANIFIT



SANOFI GENZYME



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STEMTEK THERAPEUTICS, S.L.



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TIGENIX SAU



VALORALIA I+D



VAXDYN



VCN BIOSCIENCES



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VETGENOMICS, S.L.



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VIDACORD, S.L.



VIVACELL BIOTECHNOLOGY ESPAÑA, S.L.



VIVE BIOTEC



VIVIA BIOTECH, S.L.



VIVOTECNIA RESEARCH, S.L.



VLP BIO



VYTRUS BIOTECH



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CONSEJERÍA DE INNOVACIÓN, CIENCIA Y EMPRESA

Agencia de Innovación y Desarrollo de Andalucía IDEA



Agencia Estatal. Consejo Superior de Investigaciones Científicas, CSIC



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marinabiotechnology.org

Banco Español de Algas



BioBasque, la Bioregión Vasca



Biocat



BIOIB (Cluster biotecnológico de las Islas Baleares)



BIOVAL



Centro de Investigación Médica en red (CIBER)



Centro Nacional de Investigaciones Oncológicas, CNIO



Centro Tecnológico LEITAT



Federación Española de Enfermedades Neuromusculares



Fundación Española para la Ciencia y la Tecnología



Fundación Imdea Alimentación



Fundación MEDINA (Centro de Excelencia en Investigación de Medicamentos Innovadores en Andalucía)



Fundación para la Investigación Biomédica de Andalucía Oriental (FIBAO)



Fundación para la Investigación Biomédica del Hospital Universitario



Fundación Parque Científico Tecnológico Agroalimentario Aula Dei (Fundación PCTAD)



Fundación Parque Tecnológico de Ciencias de la Salud de Granada (PTS)



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Fundación Pública Andaluza para la Investigación de Málaga en Biomedicina y Salud



Fundación Pública Andaluza Progreso y Salud



Fundación Vasca de Innovación e Investigación Sanitarias



GENMIC: Grupo de Investigación de Genética y Microbiología



Gobierno de La Rioja. Dirección General para la Innovación



Grupo de Investigación BioFarma de la Universidad de Santiago de Compostela



Institut de Recerca Biomèdica de Lleida (IRB Lleida)



Instituto de Biomedicina de Sevilla (IBiS)



Instituto de Investigación Biomédica (IRB Barcelona)



Instituto de Investigación Biomédica (IRB Barcelona)



Instituto de Investigación Sanitaria Hospital 12 de Octubre (I+12)



Instituto de Investigación Sanitaria La Fe



Instituto de Salud Carlos III



Instituto Maimónides de Investigación Biomédica de Córdoba (IMIBIC)



Instituto Ramón y Cajal de Investigación Sanitaria



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Sociedad Española de Neurociencia (SENC)



Sociedad Española de Oncología Médica



Universidad CEU San Pablo



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Universidad Francisco de Vitoria



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