



## **Investing in biotechnology**

This document explains why people increasingly need newer drugs, and why the emerging medical revolution, led by the biotechnology industry, is so important for the future of humanity.

## **The human genome**

For most of our history, doctors and researchers have struggled to treat human diseases with the only possibility to observe the symptoms without being able to analyse the cellular, genetic and molecular origin of these disorders.

We have fought a war against illness only partially armed. Our mortal enemy is disease and it does not fight fairly. It is unjust, indiscriminate, it is cruel and it offers no mercy.

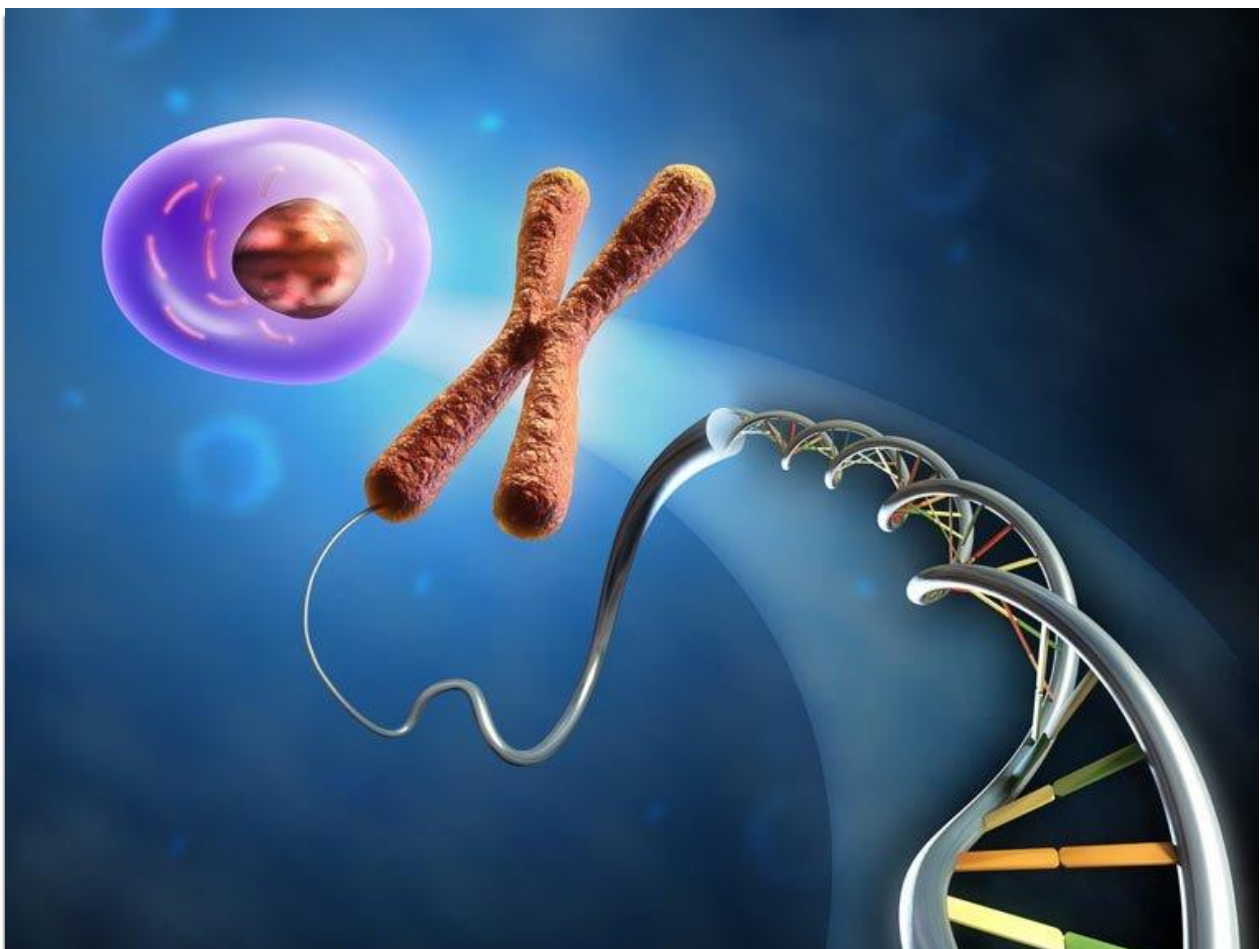
But now they have broken its code. They have mapped the human Genome. We can now look into disease's origin, we have knowledge of its weaponry, we are able to anticipate its moves, and now we plan its defeat.

The complete sequence of the entire human genome, announced in the spring of 2003, has marked the beginning of the most important era in the human's history.

We have gone through the industrial revolution, beginning of deep changes for humanity, to the biotechnological revolution, that will radically characterize this century.

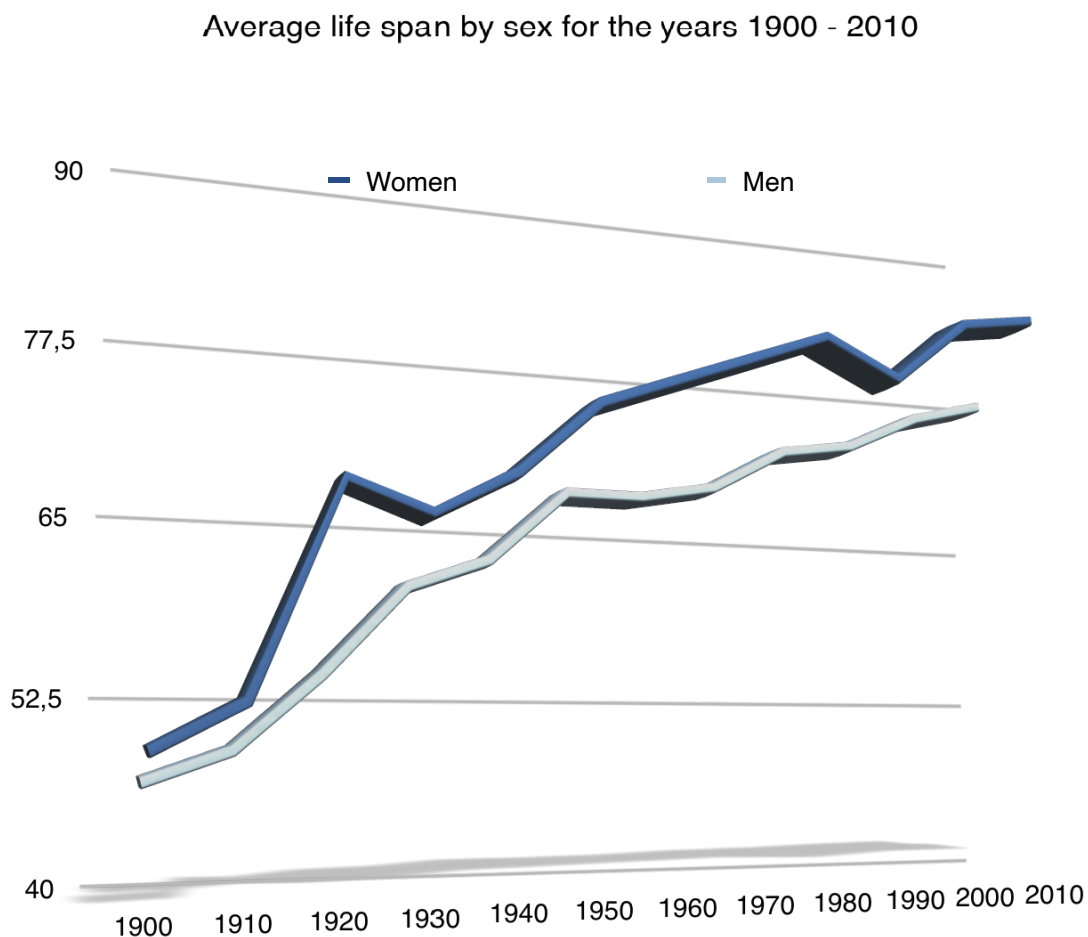
The DNA map will supply all the necessary information to pass from the simple understanding of the life mechanisms, to the possibility to control it. Today we know that all the diseases depend on biological processes that are hard to heal with the classic drugs of chemical derivation. Otherwise, if we understand the genetic origin of a pathology like for example a cancer or diabetes, doctors will be able to invert the process.

Computer science and genetics are creating a new and powerful technology. Computers are used more and more to organize the genes, to decipher them, to record their information, to manage them and to exploit them, placing therefore the foundations of a completely new era in the world-wide history: the biotechnological era!



## Average life span is increasing

In the past century the average life span has increased remarkably thanks to better nutrition and increased hygiene. In the last 25 years improved diagnosis, allowing quicker identification of disease, contributed to a jump in life expectancy.



Source: National Center of Health Statistics, population of reference: Residents of the USA

A longer life should not be seen as a problem for society, but as a resource of men and women who physically feel better than their ancestors. Thanks to new diagnostic technologies and revolutionary cures that simply didn't exist twenty years ago, people age better.

This means that biotechnology helps to prevent premature aging with new and more efficient drugs.

## New and even more efficient drugs

These new bio-drugs, on the market today, are already improving the quality of life of millions of people all over the world. Hundreds of products are in the final phases of development and will soon be approved by the "Food and Drug Administration" (FDA) and by the European authorities (EMA), allowing better cures for diseases like multiple sclerosis, cancer or diabetes.

Thanks to the mapping of the human Genome, researchers are able to develop new drugs more rapidly. Today there are cures for more or less 25% of all known diseases but only a small part of them can guarantee the complete recovery. More than 300 biotech-drugs are already on the market and have generated sales of more than US\$ 140 billion in 2013. But the list of the diseases is still long and this is why today there are more than 4400 biotechnological molecules in various phases of development.

The growing demand for new medicines will guarantee the success of the investment in this field. Wall Street is realizing this and today the value of biotech companies is getting closer to the market capitalization of some big pharmaceutical multinationals. But in order to invest in the right way, it is necessary to have the support of analysts and expert advisors, who are able to select the companies which are believed to have the biggest success.

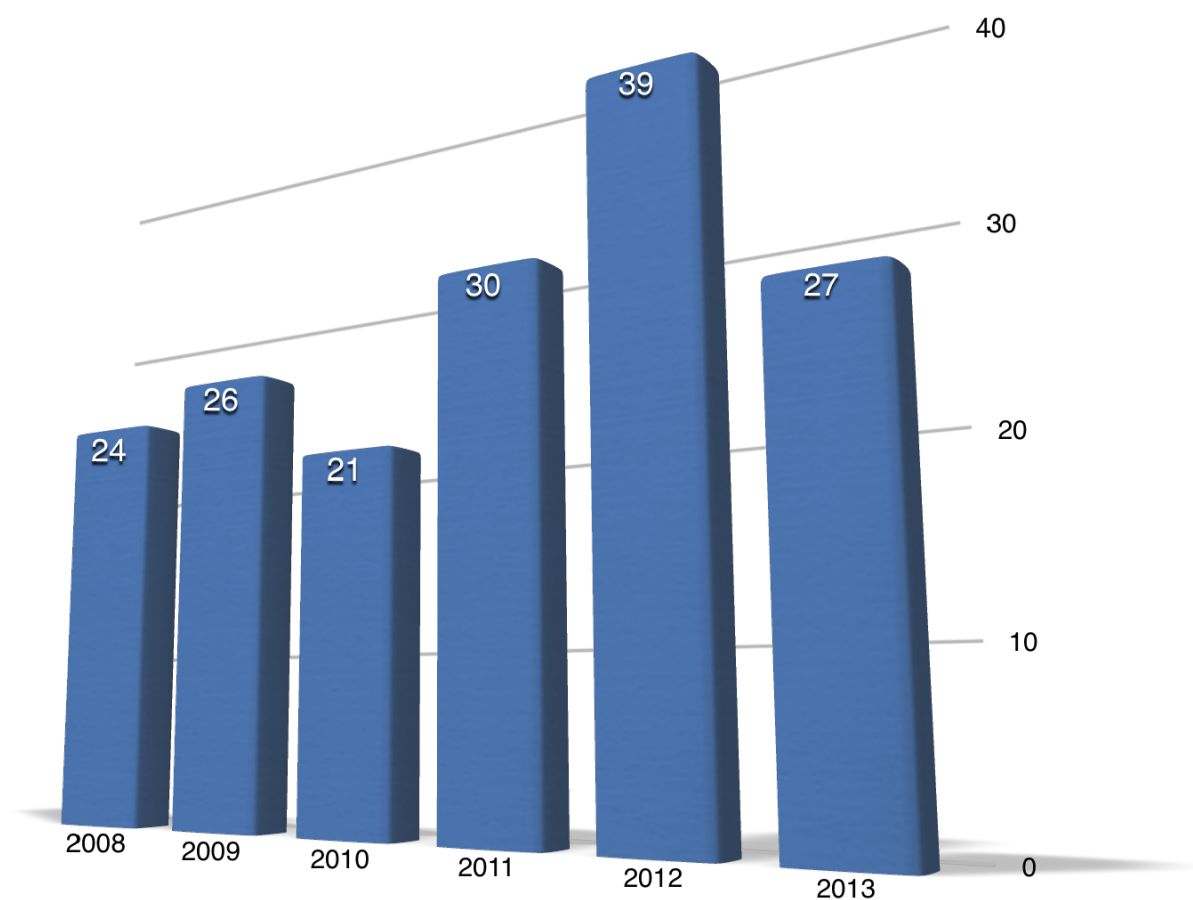
Some biotech facts to consider:	
Listed biotech companies	616
Average age of the companies	21 years
Employees	178.850 persons
Biotech drugs on the market	more than 300
Biotech drugs in development	4408

## Biotechnology triumphs over big pharma

In the past most of the drugs were developed by chemical-pharmaceutical industry (big pharma), but today it is the biotechnology sector which is on the forefront of medical innovation.

During the year 2013 the FDA approved 27 new biotech drugs, including 8 new oncology drugs and 1 extraordinary new hepatitis C treatment.

N. of new drug approvals (2008-2013)



## Sales are rising

In 1989 total sales of the biotechnology industry were just US\$ 2,7 billion. In 2013 sales of drugs in the biotechnology industry rose to over US\$ 98 billion (excluding biotech drugs acquired by big pharma) and could reach more than US\$ 150 billion over the next five years.

Growth biotechnology sector 2011 - 2012 (US\$ billion)			
	2013	2012	% change
Revenues	98,8	89,7	10%
R&D investments	29,1	25,4	14%
R&D in % of revenues	29%	28%	1%
Market capitalization	792	479	65%
Net income	4,3	5,1	37%

## Research & Development, driver of growth

R&D investments are growing at a rate of 14% and have reached US\$ 29 billion.

Biotech companies spend around 29% of revenues in R&D, big pharma invests only 15% of revenues.

## The best selling biotech drugs

There are already more than 300 biotech drugs on the market and many more are in development. Biotech drugs have greater profit margins than traditional drugs, therefore it is not difficult to see that manufacturers of these newer drugs are bound to become the biggest pharmaceutical companies in the world.

Best selling drugs (year 2014)				
N.	NAME	COMPANY	INDICATION(S)	SALES (US\$ billion)
1	Humira(adalimumab) *	AbbVie (Cambridge Antibody Technology)	RA; juvenile rheumatoid arthritis; Crohn's disease; PA; psoriasis; ankylosing spondylitis	12,543
2	Sovaldi (sofosbuvir) *	Gilead Sciences	Chronic hepatitis C infection; component of combination antiviral therapy	10,283
3	Remicade(infliximab) *	Johnson & Johnson (Centocor), Merck & Co.	RA; Crohn's disease; psoriasis; ulcerative colitis; ankylosing spondylitis; Behçet syndrome; PA	9,240
4	Rituxan (rituximab) *	Biogen Idec, Roche (Genentech)	Non-Hodgkin's lymphoma; RA; chronic leukocytic leukemia /small cell lymphocytic lymphoma; antineutrophil cytoplasmic antibodies associated vasculitis	8,678
5	Enbrel(etanercept) *	Amgen, Pfizer	RA; psoriasis; ankylosing spondylitis; PA; juvenile rheumatoid arthritis	8,538
6	Lantus	Sanofi	Diabetes	7,279
7	Avastin(bevacizumab) *	Roche (Genentech)	Colorectal cancer; non–small cell lung cancer; renal cell cancer; brain cancer (malignant glioma; anaplastic astrocytoma, glioblastoma multiforme)	6,957
8	Herceptin(trastuzumab) *	Roche (Genentech)	Breast cancer; gastric cancer	6,793
9	Advair	GlaxoSmithKline	Asthma and chronic obstructive pulmonary disease (COPD)	6,431
10	Crestor	AstraZeneca, Shionogi	Reduction of cholesterol	5,869
Source: Genetic Engineering & Biotechnology News				

(\*)= 7 out of 10 are biotechnological drugs.



## Facts and figures

- since 1982, hundreds of millions of people all over the world have been helped with more than 300 biotech drugs and vaccines;
- there are more than 4400 biotech drugs in different phases of development regarding diseases like cancer, Alzheimer, heart disease, diabetes, multiple sclerosis, AIDS and arthritis;
- it takes US\$ 1 billion and 10 years of study to achieve drug approval after the discovery of one new molecule;
- biotechnology produces hundreds of diagnostic tests to guarantee that the blood used for transfusions is secure, limiting therefore the risk for the population to contract AIDS, B or C hepatitis or other pathologies;
- biotechnological filters allow us to purify water and air from toxic and dangerous materials without using chemical additives;
- dna fingerprinting, a biotech process, has substantially improved criminal investigation and has allowed police forces to find and arrest people who commit severe criminal acts;
- biotechnology, with R&D investments of 29 billion US\$ in 2013, is one of the most research-intensive industries in the world;
- revenues of the biotechnology sector increased from US\$ 2,7 billion in 1989 to US\$ 99 billion in 2013.





“I think there is a  
world market for  
maybe four or five  
computers”

Thomas Watson,  
President of IBM, 1943

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