

## Belgium

Adapted from speech made by Mr C. de Wispelaere

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## 1.1. BELGIUM

*Adapted from speech made by Mr C. de Wispelaere*

In 1980 the state of Belgium agreed to a substantial devolution of power to the two regions of French and Dutch speaking peoples. This move was to have profound consequences on all aspects of Belgian administration, including science and industrial policy.

National and Regional funds are administered separately, but despite the potential for conflict, pragmatic administrators make the system work.

Biotechnology has long been regarded as a strategic technology, and as such has received strong support from both state and regions. In practical terms the regions have placed greater emphasis on industrial biotechnology, while the state has emphasised fundamental or precompetitive research and international collaboration programmes of both academic and industrial nature.

### ***The Role of the State***

Belgium has a highly developed university system and a distinguished record of achievement in the life sciences. In 1984 the state made available funds of US\$125 million for life science research of which US\$50 million was designated for biology and biotechnology.

Funds are administered by a number of bodies:

- *The Ministry of Education* which funds the day to day running of the universities.
- *The Belgian Science Policy Office* which carries out three different initiatives
  - concerted actions Centres of excellence are identified and supported with grants over a six year period.
  - impulse programmes fund applied research tools such as microbial culture collections and strategic studies aimed to optimise the performance of Belgian biotechnology.

- interuniversity attraction poles for high technology aim to further increase the efficiency of university biotechnology by 'networking'.
- *The National Fund for Scientific Research (NFWO IFURS)* financed by the Ministry of Education provides grants for research.
- *The Institute for the Encouragement of Scientific Research in Industry and Agriculture (IWONL IIRSA)* is funded by the Ministries of Economic Affairs and Agriculture. It provides grants for applied research.
- *The Regional Authorities* also allocate funds to university research in biotechnology.

### ***Some Prominent Research Groups in the Areas of Agriculture and Medicine***

#### AGRICULTURE

Professors Van Montagu and Schell from Rijksuniversiteit Gent are active in plant molecular genetics and Agrobacterium.

Professor Briquet at the Université Catholique de Louvain is renowned for his work on cytoplasmic male sterility.

Professors Bernier, Université de l'Etat à Liège, and Jacobs, Vrije Universiteit Brussel, work in the area of molecular physiology of plants.

Professors Boxus and Semal, Faculté des Sciences Agronomiques de Gembloux, are known for excellence in micropropagation.

#### MEDICINE AND HEALTH

Excellence is found in many centres. Those with broad based competence include:

The Institute of Molecular and Cellular Pathology (ICP), associated with the Catholic University of Louvain, was founded in 1975 by Nobel laureate Christian de Duve.

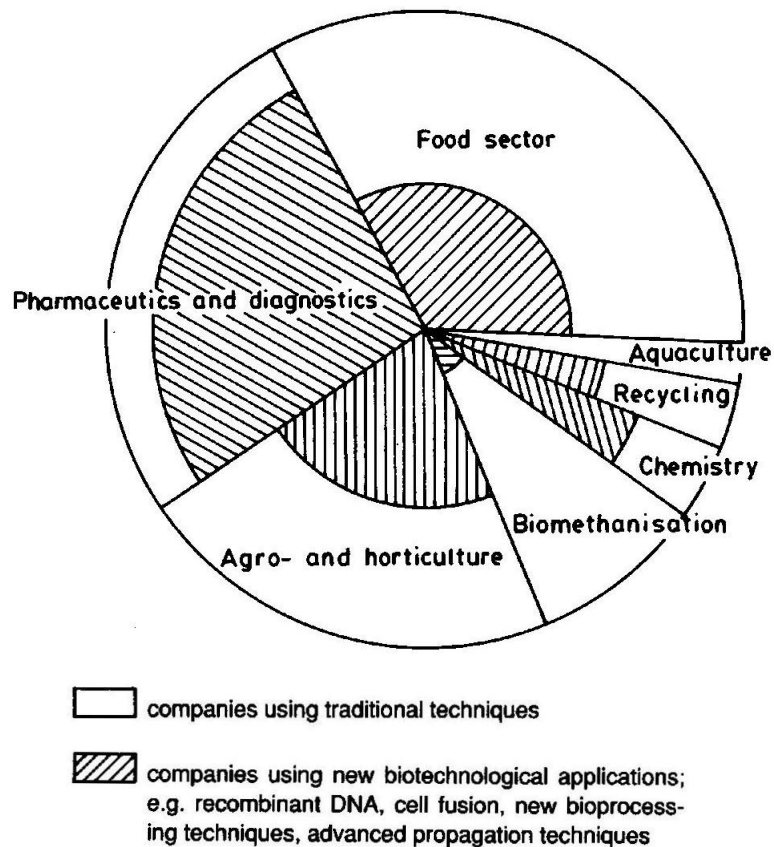


Fig. 1. Sectorial distribution of Belgian companies.

The Institute of Molecular Biology, at the Free University of Brussels (VUB/ULB) carries out basic research in prokaryote and eukaryote genetic manipulation, developmental biology and immunology.

The REGA institute of the Catholic University of Louvain, founded by Professor de Somer is a centre for applied research in medical microbiology and immunology. Excellent work in lymphokines, cytokines and interferons has been carried out.

Smaller centres of excellence include:

Professor Ghuysen's group at the State University of Liège, which studies the molecular basis of enzyme activity.

Professor Fiers at the University of Ghent elucidated the complete primary structure of a gene in 1972. He is now active in the cloning and expression of interferons and lymphokines.

Professor Collen of the Catholic University, Louvain isolated Tissue Plasminogen Activator, TPA, currently at the focus of attention as a treatment for heart attack and thrombosis.

Professor Martial's group at Liège has studied the expression of genes for prolactin, growth hormone and placental lactogen.

Many other excellent teams exist, suffice it to say that the quality of precompetitive research in Belgium is high. Twenty six Belgian research teams participate in the European Commission's Biotechnology Action Programme, BAP.

In the industrial sector, involvement in biotechnology is keen, although Belgian firms are active predominantly in traditional biotechnologies in the food, pharmaceutical and agricultural areas. Involvement in the new biotechnologies of gene manipulation and advanced bioprocessing is concentrated in the pharmaceutical industry, although exceptions such as Plant Genetic Systems have achieved world renown.

### *Biotechnology in Flanders*

Flanders is the Flemish (or Dutch) speaking part of Belgium. Flemish policy concentrates on the stimulation of contact between industrial and institutional laboratories with a view to augmenting regional competitiveness. Co-operation models such as Limited Research Partnerships are implemented when appropriate.

Third Industrial Revolution in Flanders, DIRV, is the title of the regional action plan for high technology, designed to stimulate businessmen looking for new technologies and markets and foreign investors looking for high tech locations for production sites. Biotechnology is identified as one of the strategic technologies.

Nearly 60 companies in Flanders are in some way exploiting biotechnology. The whole spectrum of biotechnological applications is covered, but there is an emphasis on food and agricultural activities (2/3 of Belgian agro-food companies are in Flanders).

	Flanders	Belgium
Food industry	19	26
Diagnostics and therapeutics	7	31
Agriculture and horticulture	13	21
Environment	10	18
Chemistry	2	10
Aquaculture	1	2
Engineering	9	12
Total	60	120

*Agro-food* applications include refinements of traditional fermentations of milk products, beer, bread, meat products and sugar.

CEBOBA is a research centre founded by the agriculturalists association, AVEVE and the Artois brewery. Adding value to starch and lignocellulose substrates is the focus of activity.

Amylurn in Aalst is studying the fermentation of starch and sugars, and with Plant Genetic Systems, PGS, participates in a Limited Research Partnership on protein engineering of saccharide enzymes.

Plant Genetic Systems merits further attention as the 'Jewel in the Crown' of Belgian biotechnology. Founded in 1982 as a joint venture funded by: Tienen Sugar Refinery, Radar, Hilleshög (a Volvo subsidiary) and the Regional Investment Company of Flanders. PGS has attracted attention in the international press for its achievements in developing herbicide resistant plants by gene manipulation. Further work includes new developments in Plant Engineering, Microbial Engineering and Protein Engineering. Close links with Professor Marc van Montagu in the university of Gent and Professor Shoshana Wodak in the University of Brussels assure excellence in genetics and computer aided protein design.

*Medical Sector* developments are underrepresented in Flanders with only 25% of the Belgian biomedical companies. Those companies have however been active in exploiting the advances of the regional universities.

Special emphasis has been placed on the development of diagnostics and the production of biological substances. Two companies illustrate the situation in Flanders:

Innogenetics was established in 1985 to develop and market diagnostic and therapeutic products for the human and animal health care market using recombinant DNA, cell culture, monoclonal antibodies and other advanced biotechnologies. The company has its own R&D competence and a number of collaborative ventures both in Belgium and abroad.

Biogent was established in 1982 as a division of Biogen US. It operates in dose association with Professor Fiers at the Laboratory of Molecular Biology. rDNA technology is used to develop products for cancer treatment, immunological anomalies, viral infections, cardiovascular and other diseases.

### ***Biotechnology in Wallonia***

The Walloon region (French speaking) has aimed to establish itself as a pole of excellence, essentially orientated towards the outside world. Several measures have been taken to expedite this aim:

*Direct support to universities* for applied industrially orientated research. Examples include development of a vaccine against swine plague, development of antibiotics by protein engineering and the improvement of plant species by *in vitro* culture.

*Support to and co-operation with industry.* Essentially to support innovation for example by making available 'Technology Innovation Consultants' (in French – Responsable d'Innovation Technologique) and by funding sectorial analyses so as to tailor a competitive strategy. In 1982 the Walloon Regional Investment Company launched a holding company, *Companie de Développement de l'Agro-industrie et des Biotechnologies*.

*Intra and extraregional actions.* Operation Athena is designed to alert companies to the possibilities of new technology. It aims to: inform, incite, support, fund and communicate. Launched in 1982 this venture is increasingly successful and has produced a journal; 'Athena' a meeting programme; 'Journées Athena' and a annual award for innovation, the 'Golden Owl'.

Co-operation is strongly directed to foreign partners, including companies in the USA, Japan, Europe, Latin America and elsewhere.

Number of University Labs		Number of Enterprises	
42	Agriculture/Sylv.	6	
24	Agro-Food	8	
15	Chemistry	5	
113	Health Care	19	
12	Environment/Energy	4	
6	Equipment	2	
10	Others	9	

Fig. 2. Biotechnology in Wallonia

### The Biotechnology Scene in Wallonia

Fifty companies and more than 250 French speaking university laboratories are active in biotechnology. The large university contribution emphasise that prospects for industrial/university collaboration are by no means exhausted. More than half of the active companies were satisfied with their university partners. Universities have gone to great lengths to present a hospitable infrastructure by creating science parks, pilot laboratories and R&D interfaces.

Particular regional strengths include: *in vitro* plant multiplication (6 companies), vaccines, therapeutics and diagnostics (9 companies), environmental applications (6 companies) and extraction and purification of natural products (5 companies). Notable new companies include:

- Phytotec, a joint venture of Native Plant Institute, USA, and the Belgian company, Société Européenne de Sémences, devoted to plant development.
- IRE-Celltarg, is involved in the use of monoclonal antibodies as targeting agents for cytotoxic agents, such as radio-isotopes.

Partners in this project include, the Liposome Company, USA, and the Institut des Radioéléments (IRE) of the Catholic University of Louvain.

- IRE-Medgenix, manufactures *in vitro* diagnostic agents and involves partners, IRE and Bioassay Ltd.

In addition Wallonia is host to many Belgian and foreign multinational companies including: Monsanto, Smith Kline Rit, Hybritech, NPI, Sanofi, Noorden, Lederle-Cyanamid etc. The Walloon authorities have stated that per capita investment in biotechnology is the highest in the world.