

Yesterday, today, tomorrow



The «Aéropole» in 1990

Yesterday, that was in 1994, ULB made a report, took a bet and accepted a challenge.

The report showed that the institutional development of Belgium was going to give more and more competence, power and means to the different regions and that, as a consequence, ULB had to have a presence in the Walloon Region. There was also an opportunity up for the taking : Hainaut became eligible for European aid for economic development (Objective 1), biotechnology was recognised as one of the principal areas of industrial development of the 21st century, ULB had a long tradition of excellence in molecular biology and lastly, Charleroi, as well as being the most populous city in Wallonia, had almost no university structures.

The wager of ULB was to suggest the implantation of a molecular biology research centre in the 'Aéropole of Charleroi-Gosselies' which was almost deserted at that time.

The challenge to be met was, beyond the institutional schizophrenia which gave the 'Communauté française' the competence in basic research and the Regions competence in applied research, beyond the natural political desire for immediate economic results, to pursue in an implantation in the Walloon Region, research of excellence, competitive on an international scale, with the moral obli-

gation to develop beneficial applications (which explains the orientations in the areas of health care) useful for economic development.

It's in this spirit that the Institut de Biologie et de Médecine Moléculaires (IBMM) was set up in 1999.

Today, ten years later, the wager has been won. The site groups together three university laboratories : IBMM, Institut d'Immunologie Médicale (IMI), the Laboratoire de Biotechnologie Végétale; a public research centre (Immune Health); and seven SMEs – university spin-offs : Henogen, Euroscreen, Aliwen, Delphi Genetics, DNAVision, BVTransgenics Services and Bone Therapeutics. The site is in itself an economic agent.

Tomorrow, the objective is, first of all, to continue pursuing scientific development and its biotechnological applications. The university laboratories maintain their tradition of excellence and, in the context of the European Structural Funds (ESF), a multimodal imaging centre will be installed in collaboration with the Université de Mons. This will enable functional molecular imaging *in vitro*, a tool indispensable for the identification of therapeutic molecular targets.

The development capacities of the existing spin-offs and the creation of new will be increased by the support of incubators: new accommodation will be built by the Intercommunale

Igretec, as the present building is already saturated, and, in addition, human resources for « coaching » will be at the disposal of researchers for the extension of their research to economic development.

Lastly, a new alliance of teaching and training is starting up, under the Technology Campus project : a master's degree specialising in molecular physiopathology, to be organised only on the Charleroi site, and continuous training for professionals – people working in university and industrial laboratories, teachers in Hautes Ecoles and unemployed people.

A new name was necessary for two reasons: firstly, to underline the multiple partnerships : between universities (ULB-UMH), between universities and Hautes Ecoles (Technology Campus), between universities and public institutions (Walloon Region, the Province of Hainaut, Igretec) and private partners (GSK, UCB, spin-offs) and, secondly, as a reminder that Charleroi is an important city, neighbour of the capital of Europe and with an airport : the Biopark Charleroi Brussels South meets the objectives.

Jean-Louis Vanherweghem
Chairman of the Board
Université Libre de Bruxelles



The «Aéropole»... 15 years later

Biopark Charleroi Brussels South... at a glance

Ten years after inaugurating the Institut de Biologie et de Médecine Moléculaires (IBMM), the Université Libre de Bruxelles (ULB) started up the Biopark Charleroi Brussels South.



From the university laboratory to the spin-offs, all the players are today united to form the Biopark Charleroi Brussels South. In all, that means over 500 researchers active in the biotechnology sector, distributed throughout ULB institutes and laboratories, research centres and spin-offs.

Their assets ? Scientific excellence recognised notably by major publications, international prizes or the coordination of important programmes ; Close interaction between university laboratories, companies and hospitals ; State-of-the-art equipment and technology platforms ; Innovative services and products ; and, especially, close interaction between players in research, development, innovation, incubation and training.

Research ? That's of course the Institut de Biologie et de Médecine Moléculaires, IBMM.

Stemming from the ULB Faculties of Science and Medicine, its 200 or so researchers discover and elucidate the molecular mechanisms governing the biology of living beings and thus contributing to the progress of medicine facing illnesses such as AIDS, cancer, allergies, sleeping sickness, etc. It's also the Institut d'Immunologie Médicale, IMI. Arising from an innovative public-private partnership of ULB, GlaxoSmithKline Biologicals and the Walloon Region, this institute of the faculty of medicine concentrates its projects around four key themes, favouring an inter-discipli-

nary approach : vaccine adjuvants, immunology in new-born infants, organ transplantation and immunological biomarkers.

Another Biopark player dedicated to immune-related health areas : Immune Health (previously BioVallée). A public research centre, Immune Health is the first integrated centre of vaccinology in the Walloon Region ; it fulfills two complementary missions : the measurement of immune responses and the carrying out of clinical investigations.

Over 500 people

They will soon be joined by a brand new multimodal imaging centre which will provide industry and academic laboratories with a unique interface integrating advanced microscope technologies and methods and in vivo imaging by magnetic resonance imaging (MRI) and PetScan.

In parallel with the development of the university laboratories – the Laboratory of Biotechnologie Végétale of the ULB Faculty of Science was set up in the spring of 2006 – the number of spin-offs continues to increase : first of all Henogen, then Aliwen, Euroscreen, Delphi Genetics, DNAVision, BV Transgenic Services and Bone Therapeutics.

The Biopark also has a development unit to encourage conversion of discoveries to industrial innovation ; and, new in 2009, a training unit has been set up; at the same time, ULB is planning to set up a incubation

unit. On the horizon on the site in 2010 is a new course of the ULB Faculty of Science : a master's degree in biochemistry and molecular and cell biology, specialising in molecular physiopathology. The ULB Faculty of Applied Science also has plans for a training programme in the Biopark Charleroi Brussels South, closely linked to the multimodal imaging centre.

Today, the Biopark Charleroi Brussels South has over 500 personnel, mainly university graduates from all over the world and people with diplomas from the Hautes Ecoles of the region. They interact closely, carrying out their missions of research, development, incubation, innovation, production, training and education.

The Biopark Charleroi
Brussels South in one
click :

<http://www.biopark.be>



Vaccination

IBMM hands over to Immune Health

Today vaccination plays a key role in human health. Research initiated at the Institut de Biologie et de Médecine Moléculaires (IBMM) and extended today to Immune Health has opened promising perspectives... An illustration, in the Charleroi Brussels South Biopark, research is nourished by the meeting of university laboratories, research centres and enterprises.

As we know, the principal goal of vaccines is to induce the production by the organism of antibodies which play a protective role against numerous pathogens. Antibodies are secreted by certain white blood cells – B lymphocytes – which are helped in this task by another family of blood cells – T lymphocytes.

If the protective role of antibodies is well-known, the mechanisms regulating their production in man has not yet been entirely elucidated. In particular, the mechanisms of the interaction between T lymphocytes (helpers) and B lymphocytes (which actually produce the antibodies) has not been completely identified. The IBMM Animal Physiology Laboratory has managed to clarify the interaction between T and B lymphocytes, thus opening interesting perspectives in vaccination*.

Under the management of Fabienne Andris, a qualified FNRS researcher, researchers in the ULB Faculty of Science developed a test for the cooperation between T and B lymphocytes : thanks to this experimental model, they managed to identify a population of T lymphocytes particularly capable of inducing the production of antibodies by B lymphocytes. A technological innovation, the researchers also succeeded in inducing the differentiation of T lymphocytes into powerful activators of antibody production *in vitro*. They showed that interleukin 6 (a hormone of the immune system) plays an important role

in the differentiation of T lymphocytes *in vitro*, an observation confirmed later *in vivo* in animals.

Complementarity

One question is still open however : where has it reached in man ?

To answer this question, the IBMM laboratory looked to its neighbour, the public research centre Immune Health : the researchers are now trying to confirm in man the observations made *in vitro* and *in vivo* on animal models.

Through this research a complementarity emerged between the different players in the Biopark Charleroi Brussels South and encouraged them to interact further. It's the same researcher – Fouad Eddahri – who participated in the work at IBMM and who is now doing research in Immune Health, with the support of the First post-doc programme of the Walloon Region.

In the long-term, this research should provide the pharmaceutical industry with new molecular targets enabling the development of new components of vaccines, with the aim to stimulate the production of antibodies.

* Research published in the journal *Blood* of 12 February 2009



Biopark Training

New in the Biopark Charleroi Brussels South : a training unit – Biopark Training (Formation) – has been set up.

Research, development and training, the three summits of a golden triangle, all three indispensable for the setting up of innovative activities in a region. Although research and development are certainly present in the Biopark Charleroi Brussels South ; up to now the third summit, training, has been missing. This is no longer the case, the unit Biopark Training (Formation) was set up in January 2009, with the help of the European Social Fund, ESF (the European Union and the Walloon Region). A young team – a director, two trainers and a secretary – with lots of concrete projects already in mind, nourished by their expertise in biomedical sciences and related technology platforms.

The training provided by Biopark Training (Formation) concerns biotechnology applied to the health sector and is divided into three areas.

The first is destined to all workers in life sciences (technicians, technologists, project managers, PhD students and doctors,...) in order to provide innovative technological training, specialised and of short duration. The subjects are especially selected on the basis of the requirements of the industries in the sector, entirely compliant with the recent training philosophy of the competitiveness cluster BioWin.

The second is aimed at job seekers with little or no qualifications. Biopark Training (Formation) is also collaborating with FOREM Formation in order to define a programme adapted to the unemployed and the requirements of potential employers.

Finally, the third area concerns the continuous training of teachers of the Hautes Ecoles which train people as laboratory technicians and engineers in the life sciences. With the aim to ensure better compatibility between initial

training and the expectations of companies which are in constant evolution, this training focuses on three points : theoretical modules describing the latest developments in a specific discipline, demonstrations of certain state-of-the-art techniques and help with the setting up of specific practical work. Set up in 2009 as a pilot project with certain Hautes Ecoles in Hainaut, this training will later be open to teachers in all Hautes Ecoles of the Communauté française.

Technology Campus

The training should start up partly on the Technology Campus, the immediate neighbour on the Aéroport de Charleroi, which will unite in 2011 all the players involved in training 16 to 65 year-olds for careers in industry. ULB – via Biopark Training (Formation) – is the university partner of the Technology Campus where a « Biotech Academy » will be set up. This installation is a unique opportunity to develop synergies and to enrich the education and training possibilities linked to the biomedical sciences, for the benefit of all or, to quote the slogan of the Technology Campus : « Dare, innovate and decompartmentalise ».

In September 2010, the ULB Faculty of Science is going to organise on the site a new master's degree : A master in biochemistry and molecular and cell biology, specialising in molecular physiopathology. This is a course it wants to develop in close collaboration with the Hautes Ecoles of the region. Another training possibility is also being studied : piloted by the ULB Faculty of Applied Science, it is closely linked to the new multimodal imaging centre of the Biopark Charleroi Brussels South.

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Training

Managed by : Arnaud Termonia

The new director of Biopark Training (Formation) is 'old'. An engineer in agronomy, Arnaud Termonia started his professional career as training manager in a private company (Development Centre for Chromatography and Mass Spectrometry). He did his PhD at the Institut de Biologie et de Médecine Moléculaires, IBMM, and then joined the non-profit making organisation (asbl) BioVallée (now Immune Health) where he managed the genomics department. Arnaud Termonia is also co-founder, with Jean-Pol Detiffe and other researchers in genomics, of the spin-off DNAVision where he was initially in charge of scientific management. This means he knows the different facets of the Biopark well, even if, in the last three years, he worked in a Flemish subsidiary of Sanoma Education & Training specialised in publishing. We met him...

> You left a job you enjoyed – Scientific Editor – to become the Director of Biopark Training (Formation). What attracted you to this post ?

The world of training isn't unknown to me. In my first job I was a trainer, and I coordinated many training projects in the last. At 38, my career has moved between the academic and industrial worlds. Of course the cultures are different, but the two sectors are complementary and have every interest to soak themselves in the culture of the other, to enrich each other, at the same time staying competitive. In fact, I've always thought that setting up an innovative activity (which is certainly the case for biotechnology and biomedical sciences) needs close overlapping between advanced university research, industrial development and continuous training. In ULB at Charleroi, I helped to link the first two parts of the chain and the idea of making a third to fit perfectly with the other two immediately aroused my enthusiasm.

> Three months into the job, are you still enthusiastic ? What are your priorities for Biopark Training (Formation) ?

Enthusiasm is one of the indispensable arms for setting up and implementing new projects. Today I'm surrounded by competent motivated colleagues and our reception, from the beginning of our activity, can only reinforce our active involvement in the development of the Biopark in general and, in particular, Biopark Training (Formation). Our main objective will be to provide training modules of high quality, adapted to the public targeted, for a better competitiveness of our research laboratories and our industries in the life science sector, while at the same time ensuring the durability of our activities.

Etienne Pays

« Understand what nature's trying to tell you »



Winner of the Prix Francqui, coordinator of a Pôle d'Attraction Interuniversitaire (PAI) and a programme of excellence, Director of the Laboratoire de Parasitologie Moléculaire, President of the Management Committee of the Institut de Biologie et de Médecine Moléculaires (IBMM), Etienne Pays talks about himself.

« My passion for research is, more than anything, a quest for the meaning of life. During my secondary school studies in classics, I buried myself in Pascal's *Pensées* and in philosophical debate. I also discovered the theory of the Origin of Species and I only ever had one idea : to understand how the fact of being faced with the environment changed genes. I signed up to study biology in Leuven », remembers Etienne Pays.

The student did his first degree at ULB because, he explains, « I was interested in genetics, I wanted to go to what was the best laboratory at that time, that of Jean Brachet. I discovered the fascinating universe of molecular biology in Rhode-Saint-Genèse ». Etienne Pays became interested in cell differentiation by studying the chromatin of the nucleus. His dissertation finished, he followed up with a PhD, « I asked myself questions which seem so naive today », he smiles ; then, feeling very isolated, having the feeling of « going round in circles », he left, encouraged by Jean Brachet, for a post-doctorate in Glasgow. « At the end of the 70s, the biology research world underwent a real revolution ; discoveries came one after the other ; our knowledge became more refined. I lived through this revolution in particular in Glasgow where I learned the technologies of recombinant DNA ».

Trypanosome

An apprenticeship which he was very soon going to use because after going back to ULB, he left for Strasbourg. « The genome at that time was a real black box ; we sought to find the genes coding for the questions which interested us ». He left for the French city to clone genes for his colleague Gilbert Vassart. « That springtime spent in a beautiful region is one of my best memories : I felt I was beginning a long story ». The young researcher also left with an idea of personal experience on the trypanosome. « One team in Rhode-Saint-Genèse was working on this parasite which causes sleeping sickness. This intrigued me : how could the trypanosome, such a primitive parasite, manage to overcome our immune system ? These observations brought me back to the questions of my adolescence on the origin of life and adaptation to the environment », he confessed.

He was not to know that his time in Strasbourg was to mark his entire career. Etienne Pays succeeded in his cloning ; he returned to Rhode-Saint-Genèse where he was confined to an isolated laboratory, « Some colleagues were afraid », he remembers, « I was working with genes cloned from a

parasite. As for me, no matter the possible risk, I had only one desire : to understand and to be the first to find the answer ». The researcher continued his experiments ; he worked with other teams ; his laboratory grew ; he progressed. His first publication came out in 1979 ; they multiplied in the most prestigious journals. In 1996, he received the Prix Francqui.

Inflammation

« I became interested in the trypanosome as a model of the adaptation of a parasite to its host. The most important advance was no doubt the discovery of apoL-1, a human blood protein capable of killing the trypanosome. The L apolipoproteins are over-expressed in inflammatory pathologies and are involved in programmed cell death : they are promising anti-inflammatory therapeutic targets which we study today in the programme of excellence CIBLES. I feel I'm at a turning point. The trypanosome has no doubt revealed its biggest secrets and a completely new area of research has opened up : apoL-1 involved in inflammation. When you try to understand the mechanisms of life, you also have to understand that you can't have the pretensions of imposing your ideas on nature. What a good researcher has in common with the trypanosome is the capacity to adapt to the environment », he says, with a smile « Being a researcher is being aware of the most recent literature, having a synthetic viewpoint, being capable of making the right hypothesis and developing the experiments which will allow you to demonstrate it... This requires both intellectual and manual skills. You also need a solid morale : you often make mistakes, the experiment doesn't work, you have to start again, propose a new hypothesis : life is complex, difficult to penetrate ».

Is it still as much a passion after all these years in the lab ? « I've got a complete character ; when I was young, it was a real passion : I worked in the laboratory day and night, I didn't take holidays ; fortunately, my wife also worked in the lab, she understood. Today I've calmed down a bit and I've found another passion : the history of mediaeval France. The contrasts of this period intrigue me : wars, the plague, death, alongside masterpieces such as cathedrals and polyphonic music. I read voraciously about this period and I visit France, to see places loaded with history and emotion ».

Marc Vander Kelen, about Immune Health



Don't say BioVallée any more but Immune Health. Three questions to Marc Vander Kelen, CEO of the public research centre recognised by the Walloon Region.

> Biovallée is finished, you're now Immune Health. Why this change of name ?

Marc Vander Kelen : Biovallée has evolved since its creation in 2001. In 2006 it became a public research centre recognised by the Walloon Region, BioVallée redefined its areas of competence and organisation and created in 2007, the first integrated vaccinology centre in the Walloon Region. It was necessary to adopt a name which was more appropriate to our present activity.

> Tell us about this activity in a few words.

Marc Vander Kelen : Immune Health provides biopharmaceutical companies with an ideal partnership in order to facilitate the development of their new injectable vaccines or medicines. Our centre covers two main areas : first, measuring the response of the immune system to vaccines and/or injectables under development ; second, clinical investigations in collaboration with the Centre Hospitalier Universitaire (CHU) of Tivoli. In parallel, we are developing research programmes with a view to converting basic research and development in immunology into tools for clinical research. In the beginning our expertise was centred on vaccines ; but, when we wonder about

the efficacy of a vaccine and we measure the parameters demonstrating this efficacy, we can also question the more general reaction of the immune system to such solicitation. We're interested, and we propose to biopharma companies that they should be interested, in the health of the immune system. Today, we're therefore increasing our capacity to measure the response of the immune system. Hence our new name : « Immune Health ».

> You provide services throughout Europe. Are you developing particular synergies with other players in the Charleroi Brussels South Biopark ?

Marc Vander Kelen : Of course, we work in particular with our immediate neighbour, the ULB Institut d'Immunologie Médicale : our research interests intersect naturally. We also interact with some teams from the Institut de Biologie et de Médecine Moléculaires (IBMM) and with several spin-offs on the site : Henogen, DNAvision, Delphi Genetics which, by the way, form part of our scientific committee, alongside notably GSK, UCB and Baxter.

<http://www.immunehealth.be>



IMI : model PPP

José Manuel Barroso, President of the European Commission, opened the academic meeting « The Institut d'Immunologie Médicale, a model of public-private partnership » last January. In his speech, José Manuel Barroso underlined the importance for Europe of creating a circle of collaboration involving education, research and economics ; and of encouraging interaction between the public and private sectors. He recalled that this is where we can find sources of inspiration for the Walloon Region and the Université Libre de Bruxelles, the Institut d'Immunologie Médicale in particular. The IMI is a Public Private Partnership, with a total budget of 10 million euros, 50% of which are provided by the Walloon Region, 25% by ULB and 25% by GlaxoSmithKline Biologicals. During the meeting different players in this fruitful partnership took the floor : Philippe Vincke, Rector of ULB ; Rudy Demotte, Minister-President of the Walloon Region ; Marie-Dominique Simonet, Minister of Research, New Technologies and External Relations of the Walloon Region ; Jean Stéphanne, President of the competitiveness cluster BioWin, CEO of GlaxoSmithKline Biologicals ; Michel Goldman, Director of the Institut d'Immunologie Médicale ; Jean-Louis Vanherweghem, Chairman of the Board of ULB.