



# BIO PARK

CHARLEROI BRUSSELS SOUTH

# news

## The Biopark Charleroi Brussels South Newsletter

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### **Innovative partnerships**

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**ULB**

**UMONS**  
Université de Mons



## Mood

### EUROPEAN METACLUSTERS MUST RECEIVE PROPER FUNDING

Cluster policy simply cannot stop at the borders of the region's that underpin it. This is all the more true in the health sector where the issues faced are global ones and the solutions increasingly complex. It is necessary, if not indispensable, to build technological bridges between the European regions that can help to accelerate technological development and bring innovative products and services to market, in order to foster new ways to diagnose and treat disease. European metaclusters, or networks of networks, work to:

- facilitate connections between metacluster members, including as part of joint projects
- build European leadership in emerging fields
- harness the fabric of SMBs in niche sectors with high added value
- launch European infrastructural projects
- enable non-European partners to quickly identify specialist regional hubs

While the advantages of metaclusters are plain to see, Europe must be able to provide the financial means to structure and fully integrate them into its policy for economic growth.

*Frédéric Druck | BioWin  
Communications and International  
Relations Director*

## Biopark: an environment that thrives on partnerships



Director of the Biopark Charleroi Brussels South, Dominique Demonté has a clear objective: to expand the Biopark ecosystem. Here, he tells us about his plans...



### PARTNERSHIPS ARE CENTRAL TO RESEARCH.

*Dominique Demonté* : Indeed, and there are already a great number of scientific partnerships between academics. At the Biopark, we have taken this idea further, with the Université libre de Bruxelles and the Université

de Mons working together to found the CMMI, a research centre dedicated to imaging. We are hoping to reproduce this initiative and to be joined by other university teams working in important fields. By achieving critical mass, promoting communication between scientists, and sharing our cutting edge equipment, our research will become more competitive internationally.



## ARE PARTNERSHIPS LIMITED TO THE WORLD OF RESEARCH?

*Dominique Demonté* : No. Partnerships lie at the heart of everything the Biopark does. This is true for “training” partnerships with FOREM, “international relations” with AWEX, “scientific resources” with the Spow network, or “strategic development” with Igretec. I could go on: we are currently working to create a full Biopark ecosystem.

## WHAT DO YOU MEAN BY “ECOSYSTEM”?

*Dominique Demonté* : The Biopark has been a success in everyone’s eyes, and we have everything we need to carry out our work. However, the Biopark remains on a small scale: if it is to grow, it needs to reach out to its surroundings and form part of a larger system. We must learn our regional strengths and specialisms, and continue to develop them alongside our partners, each working within our specific area of expertise. Then, our focus will turn to the rest of Wallonia, locating complementary research institutes, training centres, and businesses. Only then,

once we have achieved this critical mass, will we be ready to enter the international scene. The Biopark must both drive and be driven by Wallonia’s biotech sector.

## IT’S A WIN-WIN SITUATION?

*Dominique Demonté* : Yes, of course. There are now over 30 businesses operating from the Biopark, just under half of which are ULB spin-offs or related to the university in some way; the remainder is made up of external companies, and the site should continue to grow with even more international stakeholders. We are able to attract companies from far afield thanks to the network we have created, and this ability is good for the region as a whole whether in terms of financial investments, human capital, or visibility, for example.

*Nathalie Gobbe*

## B4B-CONNECTION IMMUNO

B4B-Connection, the French networking event, is leaving France for the very first time to spend two days discussing immunology at the Biopark. B4B-Connection will be on the Biopark on 16 and 17 April to give company presentations, provide an overview of innovative immunology research, and meet professionals working in the sector.

📄 Learn more: [buzz4bio.com/u-3876](http://buzz4bio.com/u-3876)



## PERSONALISED CANCER TREATMENT

For its first birthday, OncoDNA is holding a day of networking and presentations on “DNA sequencing and personalised treatment of cancer: a modern-day revolution”. In addition to scientific conferences, such as that hosted by Professor Martine Piccart (BIG), the event is the perfect opportunity for OncoDNA to launch its new range of ONCODEEP products that support decision-making when choosing cancer treatments. The event will close with an address from Paul Magnette, Mayor of Charleroi, and Jean-Marc Nolle, the Walloon Minister for Research.

The event starts at 2pm on 23 April, on the Biopark.

📄 For further information and to register your attendance: <http://www.oncodna.com/event2014/>







## Delphi Genetics: outstanding expansion

The field of genetics has seen exponential developments in recent years with genome sequencing and cloning, and American multinationals are pumping billions of dollars into the field. In spite of this stiff competition, a successful ULB spin-off of the Biopark is proving able to hold its own.



**Delphi Genetics** was founded in 2001 and can trace its roots back to the IBMM. It works on original genetic engineering solutions, mainly in the sectors of DNA production, recombinant proteins, and made-to-order antibodies. The selling point for its solutions is that they enable the complete removal of the antibiotic-resistant genes that are traditionally used in this kind of solution. The technology used also provides a higher yield.

Since it was founded, Delphi Genetics has been working with the teams at the IBMM to research new genetic engineering solutions. This collaboration has led to the development of technologies based on our understanding

of how poison genes and bacterial antidotes work. The spin-off holds an international licence for patents resulting from its research, and now also submits its own patent applications.

In late 2012, Delphi Genetics and a subsidiary of Merck & Co., Inc. (MSD) signed a broad licensing agreement for use of StabyExpress™ technology, which is used to obtain a high yield and cost-effective expression of proteins without recourse to antibiotics. Delphi Genetics also has licensing agreements for this very same technology with Sanofi Pasteur (June 2009) and GSK (September 2010). In the words of Cédric Szpirer, founder and CEO: “It is Delphi Genetics’ first broad licensing agreement that covers the potential use of StabyExpress™ technology in protein-based healthcare products for humans and animals”. The licences granted to these companies are non-exclusive, so further agreements are a possibility, and new licences should be announced soon.

In January 2012, alongside its partners from academia and the biotech sector (ULg, UCL, Eurogentec), Delphi Genetics announced its participation in a 3-year research project to develop DNA vaccines for veterinary use with

Staby™ technology. This project has already borne fruit with a new department opened to produce made-to-order antibodies using original antigen presentation technology. Other research projects are currently underway to adapt Delphi Genetics’ products to mammal cells and yeast. Delphi Genetics is part of a European consortium of 8 partners working to develop manufacturing procedures for recombinant proteins. Other recent projects involve both local stakeholders, such as the Marloie Centre d’Economie Rurale (CER), and international partners (European, American, and Asian businesses). With these research projects and its own R&D, Delphi Genetics is able to propose new applications for its technology as a licensed product, kit, or service.

*Frédérique Margraff*





Modern research would not be possible without international cooperation. Sharing techniques, points of view, new theories... the list goes on. National and international partnerships between laboratories form part of the research dynamic, and relationships sometimes continue for years on end, dotted with mutual successes. Here, we bring you a case in point.

As often happens in the research world, relationships between laboratories are formed through encounters and experiences abroad, as Eric Bellefroid is all too aware: the manager of the **Developmental Genetics laboratory (IBMM)** has maintained close and regular contact with former German and French colleagues first met... over 20 years ago! "I worked in Professor Tomas Pieler's Göttingen laboratory on my first post-doctoral research programme", he explains. "I met Muriel Perron, who now works in Paris, during my second spell of post-doctoral research at Cambridge in Professor John Gurdon's laboratory. As we work in the same field, it was natural that we keep in touch."

## JOINT PUBLICATIONS

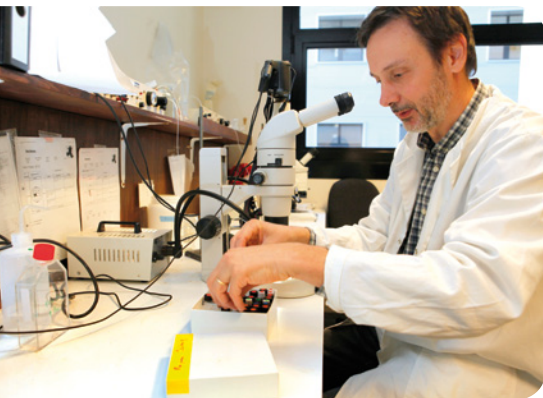
The three researchers do indeed share an interest in the molecular mechanisms that govern neurogenesis: while the teams working under Professor Tomas Pieler and Eric Bellefroid study the behaviour of neuron progenitor cells in the brain and spinal cord, their counterparts in Paris are looking at stem cells in the retina. "Genes expressed in the brain are often also expressed in the eye. When this is the case, I get in touch with Muriel, who is a specialist in this field, and she does the same", the Belgian scientist adds. As for the Göttingen laboratory, they have co-authored 14 publications with the Gosselies laboratory: "We often work together, especially with unfamiliar technologies, like broadband genotyping. But we also regularly swap ideas and exchange doctoral students, etc. Working with laboratories in the same area of research enables us to pool theoretical and technical expertise."

## POOLING COMPETENCES

A recent example of this international collaboration: two recently published articles on specification mechanisms for *GABAergic* inhibitory neurons. Within the dorsal section of the spinal cord, a proper balance of inhibitory and stimulatory neurons is essential

in order to process sensory information. Any unbalance between these two kinds of neuron can cause various disorders, such as hypersensitivity to pain or epilepsy. The first article in *Developmental Biology* describes the identification and demonstration of the crucial role played by the transcription factor Prdm13, the target of proneural factor Ptf1a, in controlling this balance. The second article, published in *Plos One*, shows that another transcription factor, Ascl1, acts upstream of the two initial factors and is also required to produce inhibitory neurons in the retina. This research was only possible through the theories and genetic tools shared by the three teams. "In addition to Ascl1, we saw that Prdm13 is also expressed in the eye", continues Eric Bellefroid. And so, the research travels across the border: "With Muriel's team, we are going to look at this gene's role in the development of the retina. After so many years, we have developed a special relationship", Eric smiles. And a successful one at that!

*Natacha Jordens*





## Business and researchers: a mutually beneficial relationship

Biopark research teams have a number of partners in the business world, including one particularly longstanding relationship with GSK-Biologicals. Let's take a closer look at our researchers' partnership with the world leader in vaccine production.

"GSK has been working with ULB research teams for almost 30 years," reveals Muriel Moser, the Immunobiology Laboratory Manager. With a vested interest in immunology (how immunostimulants work, regulation of the inflammatory and auto-immune response, etc.), it was only natural that the market leader would reach out to researchers. "It was initially an exchange of theoretical ideas, but we cemented a more official relationship in 2008, when the CIBLES programme was launched," Muriel Moser explains. This programme, with funding from the Walloon region, identifies and certifies new pharmacological targets that may be of use in treating diseases linked to chronic inflammation.

### RESEARCH ON CALL...

In 2013, the cooperation was extended to form a PPP (Public-Private Partnership) between the Walloon region, GSK, and the Immunobiology Laboratory. "Our laboratory's goal is to understand and apply a suppression mechanism discovered by the CIBLES programme, in an effort to impede or reduce auto-immune reactions, and diabetes in particular," the researcher continues, "This *on call* research helps GSK to take an all encompassing view of how the immune system works and is regulated". The relationship is mutually beneficial: while GSK calls for research in its areas of interest, the researchers are aware of other points of view, and have easy access to new techniques and ideas. "Following a recent discussion with our

contact at GSK, we directed our research towards intestinal immunity, a subject that falls in line with the company's interests," Muriel Moser specifies, "and on our end, we carry out our research from a broader perspective of treating human diseases. It's a rewarding and mutually beneficial relationship".

### ... AND APPLIED RESEARCH

In addition to this on call research, the Biopark's researchers are also called upon to carry out more applied research. This is especially true of Stanislas Goriely's laboratory (IMI), which is currently seeking to understand the mechanisms behind two immunostimulants. "GSK already uses both of these immunostimulants empirically", explains Stanislas Goriely, "as part of our two PPP, they provide us with their products so that we can learn how these compounds stimulate immunity". The company's goal: to understand and prevent possible side effects. The researchers' aim: to learn how nature works. Perhaps not quite the same goal, but *understanding* and *discovery* remain central to their work.

*Natacha Jordens*



**SANDRA MOREL,**  
**SENIOR SCIENTIST AT**  
**GSK.** In regular contact  
with Muriel Moser as  
part of the "Treg70" PPP

"Partnerships with cutting edge academic laboratories are particularly good for companies like GSK. All of our research projects are underpinned by partnerships, with over 110 currently in progress. This type of partnership grants us access to research subjects that require special skills or knowledge that we don't necessarily have."

"In the *Treg70* project, our team and Muriel Moser's team agreed to research a theme that is of a mutual interest: the mechanisms that control immunity. In practice, research is carried out in the academic laboratory, by researchers who have the expertise needed to carry out these scientific investigations. We provide a beacon to focus on, an applied purpose. It is a fascinating subject and one that is truly important for our understanding of the protective immune responses provoked by vaccines. This type of research also paves the way for new a understanding and treatment of auto-immune diseases."



## A special relationship with business

In 2011, an industrial steering committee was formed to support Biopark Training in the BIOCEL programme: a special relationship that ensures that the available courses suit the market's needs.

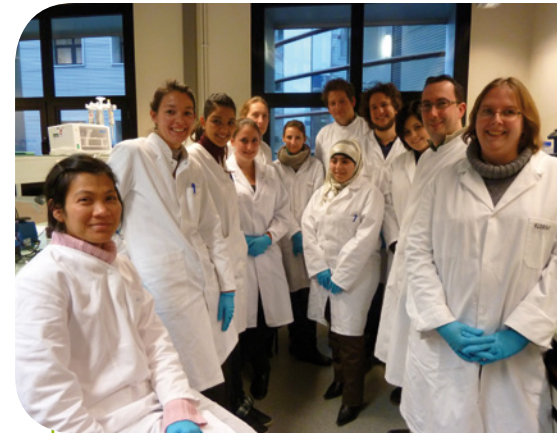
BIOCEL is a cell culture training course, and as such must remain innovative in relation to the techniques and needs of the biotechnology industry. This is why an industrial steering committee has been at hand to support Biopark Training ever since the course was created.

“Cell therapy is a thriving sector undergoing rapid change”, Béatrice Goxe, the BIOCEL Scientific and Educational Coordinator, explains. “Businesses have trouble finding people ready to begin work with in-depth knowledge of cells, cell culture, and its standards. Our regular work with the industrial steering committee means that we are able to meet the needs of business quickly and effectively.”

Biopark Training meets with the steering committee at least once per year. “But we are very often in contact with various businesses”, Béatrice Goxe specifies.

“The BIOCEL programme really is based on clear business needs: what are they missing? Does it require short or long courses? What level of education should we provide? Once we know all of this, we create our programme and submit it to the steering committee for approval. Their professional opinion enables us to adapt or even change some parts of the course, which is always ready to evolve”.

*Damiano Di Stazio*



*BIOCEL, training 2013*

### THE INDUSTRIAL STEERING COMMITTEE

- **Bone Therapeutics**, a spin-off specialising in using cell therapy to treat bone and joint disease.
- **Cardio 3 Biosciences**, a company specialising in the discovery and development of regenerative, protective, and reconstructive therapy for heart disease.
- **Euroscreen**, an international expert in Cell G Protein Coupled Cell Receptors (GPCR), which play a role in the pharmacological response.
- **Lonza**, a world leader on the life sciences market: especially clinical cell therapy products, culture media, and microbe testing.
- **MaSTherCell**, a services company focused on the production of cells for use in treatment.
- **Novasep**, a pharmaceutical and bioengineering company specialising in the development and production of biomolecules for third parties.
- **Promethera Biosciences**, a spin-off that uses stem cells to treat liver disease.



## e-learning : an original pairing



OncoDNA and Biopark Training have united to launch an online course to learn how to analyse the alterations that characterise a patient's cancer cells, in order to help choose more effective personalised treatment.



In an original initiative, Biopark Training and OncoDNA are working hand in hand to develop an online training module for future resellers of OncoDEEP, a test developed by OncoDNA to identify the best possible treatment for the patient's tumour.

Potential OncoDEEP retailers will be able to complete various training modules (general theory and sales training for OncoDNA products), and to assess their knowledge with an end of module test. The aim is to train "approved" retailers and to market the product. "The main aim is to provide properly trained retailers", explains Erika Baus, a trainer at Biopark Training.



Of course, Biopark Training is an old hand in designing online courses. Need an example? How about the flow cytometry training kit (with an online module to introduce theory) for students in higher education. This expertise was why OncoDNA chose to work with Biopark Training. "OncoDNA will benefit from our expertise in training and designing online modules. It is also a great opportunity for us: we can use it to foster similar partnerships in the future", Erika Baus goes on. The launch of the program is planned for April 23<sup>rd</sup>.

*Damiano Di Stazio*

### "WORKING WITH BIOPARK TRAINING? THE NATURAL CHOICE"

India, Saudi Arabia, Brazil, Greece, Turkey, and even Poland... the network of OncoDNA resellers spreads far and wide, and the international delivery of OncoDEEP is underway. "The need for distance learning became inevitable", explains Jean-Pol Detiffe, OncoDNA CEO and founder.

"When creating this pilot project, we immediately thought of Biopark Training. Our online course and grading system means that we know exactly who will be able to sell our kit. DNA sequencing is a highly technical, extremely innovative, and constantly changing field. Not everyone kept up to speed with this technological revolution, making education a necessity, which is why we launched this course".



## The Biopark's appeal to doctoral students

A great success for the Biopark: 17 new doctoral students arrived on campus this year (15 at the IBMM, one at the IMI, and another at the CMMI). These men and women from throughout Belgium and further afield have come to push ahead with research in the various fields studied on the Biopark, such as microbiology, embryonic development, and cell physiology. The success rate for grant applications is also worth talking about: one from the FNRS, eight from the FRIA, ARC funding, BRIC, and a grant from Lebanon. Below is an introduction to these new recruits...



**CORENTIN VERMEIREN, 23, BELGIUM**



Laboratory of Molecular Parasitology, IBMM



Supervisor: Luc Vanhamme



Researching the role of murine ApoL6 in intestinal immunity.



**THIBAUT HALLAERT, 24, BELGIUM**



Laboratory of Bacterial Genetics and Physiology, IBMM



Supervisor: Laurence Van Melderren



Bacterial physiology - Bacterial envelope and metabolism.



**BAPTISTE DUMONT, 26, BELGIUM**



Laboratory of Bacterial Genetics and Physiology, IBMM



Supervisor: Laurence Van Melderren



Bacterial toxin-antitoxin systems  
Bacterial secretion systems.



**SIMON DESIDERIO, 23, BELGIUM**



Developmental Genetics Laboratory



Supervisor: Eric Bellefroid



The role of Prdm12 zinc finger protein in the neurogenesis of the spinal cord.



**NAGUISSA BOSTAILLE, 23, BELGIUM**



Laboratory of Molecular Parasitology, IBMM



Supervisor: Benoît Vanhollebeke



GPR124's signal transduction and activation mechanism during cerebral angiogenesis.



**ELIE SALIBA, 26, LEBANON**



Molecular Cell Physiology Laboratory, IBMM



Supervisor: Bruno André



Arrestin-like proteins in ubiquitylation and endocytosis of the yeast Gap1 permease.



**DUKAS JURENAITĖ, 25, LITHUANIA**



Laboratory of Bacterial Genetics and Physiology, IBMM



Supervisor: Laurence Van Melderen



Bacterial toxin-antitoxin systems.



**MARIE EUBELEN, 24, BELGIUM**



Laboratory of Molecular Parasitology, IBMM



Supervisor: Luc Vanhamme



Research of the pathogenic action of the human apolipoprotein L1 and its mutations in transgenic mice.



**MÉLODY COOLS, 24, BELGIUM**



Molecular Cell Physiology Laboratory, IBMM



Supervisor: Bruno André



Identification and classification of cysteine transporters in yeast vacuoles and the lysosomes in human cells, and to study their effect on the homeostasis of these compartments.



**SHEY ROBERT ADAMU, 26, CAMEROON**



Laboratory of Embryology and Biotechnology, IBMM



Supervisor: Jacob Souopgui



Development of diagnostics and therapeutic tools for Onchocerciasis using the GPCR Ov47.



**CLÉMENT MASSON, 24, FRANCE**



Laboratory of Bacterial Genetics and Physiology, IBMM



Supervisor: Laurence Van Melderen



Regulation of the expression of CsrA, a global regulator of *E. coli*



**STEFFI SANDOW, 26, BELGIUM**



Laboratory of Membranous Transport, IBMM



Supervisor: Anna-Maria Marini



Molecular and biochemical mechanisms of resistance to antibiotics in *Mycobacterium tuberculosis*.



**ARNAUD AZONPI LEMOGE, 29, CAMEROON**



Laboratory of Embryology and Biotechnology, IBMM



Supervisor: Jacob Souopgui



Molecular and functional classification of the Zic2 transcription factor in early embryonic development.



**DESLAVA GERMANOVA, 32, BULGARIA**



IMI



Supervisor: Véronique Flamand



Effect of ischaemia-reperfusion lesions on hepatic regeneration and tumour growth.



**JONATHAN DELHERMITE, 23, BELGIUM**



Laboratory of RNA Metabolism, IBMM



Supervisor: Denis Lafontaine



Functional classification of RRP7A and DUSP11 in ribosome biogenesis and embryonic development in animals.



**YVES-RÉMI VAN EYCKE, 23, BULGARIA**



Diapath Laboratory (CMMI) Lisa (Polytechnic)



Supervisor: Olivier Debeir



Developing image analysis and machine learning tools to quantify data extracted from whole slide images.



### A SOUPED-UP PERMEASE

For several years now, the **IBMM's Molecular Cell Physiology** laboratory has been studying permeases: the proteins that transport specific amino acids across the cell membrane. While the role played by these proteins is well understood, the way that they identify and bind to their substrate remains unclear.

In a recent article published in the *Journal of Biological Chemistry*, **Bruno André** and his team joined forces with the researchers at the laboratory of the Structure and Function of Biological Membranes (Martine Prévost, Faculty of Science): by adopting a computational biology approach, they were able to model the 3D structure of permease Can1, a yeast protein that transports arginine. Using this 3D model, the

researchers gained an understanding of how this amino acid binds to the permease to cross the cell membrane.

By genetically modifying parts of the protein involved in identifying the substrate, the Gosselies researchers were then able to transform the protein so that it identified lysine instead of arginine: the arginine permease became a lysine permease. Understanding how the permease recognises substrates meant that they could accord a new property, *a new role*, to the transporter. This experimental strategy could prove to be of great use in improving other permeases, especially those used in the industrial production of biological molecules.

### A NEW ROLE FOR TORC1 IN MEMBRANOUS PERMEABILITY

TORC1 (Target Of Rapamycin Complex 1) is a protein complex involved in the growth of eukaryotes. Protected throughout evolution, it modifies the metabolism in line with external signals, such as the availability of nutrients, as well as controlling protein synthesis and autophagy.

In an article published in *Nature Communications* in January, Dr **Mélanie Boeckstaens** and her colleagues at the **Membrane Transport Biology laboratory (Anna Maria Marini, IBMM)** proved TORC1's involvement in a new process. The research team studied the membranous permeability of *Saccharomyces cerevisiae* yeast in response to a source of nutrients. They also highlighted the active proteins and molecular mechanisms that enable TORC1 to precisely regulate the activity of a membranous protein: the ammonium transporter Mep2, a counterpart of a mammal's Rhesus factors.

By directly regulating the activity of cell membrane transporters, TORC1 can quickly adjust the cell's permeability to nutrients.

### METHYLATION OF H3K4 TRIGGERS YEAST TO SELF-DESTRUCT

Yeast is an extremely popular model among Biopark researchers: a third study on this model organism was recently published in *PLoS Genetics*. In the article, the **Biology of the Nucleus** laboratory takes a closer look at the links between apoptosis – cell death – and the methylation of a histone: a protein involved in coiling DNA within the nucleus.

Through targeted mutations and inhibiting SET1, the enzyme responsible for its methylation, **Birthe Fahrenkrog** and her team managed to show that trimethylation of the histone H3K4 triggered a chain reaction that resulted in apoptosis of the yeast.

Given that the methylation of histone H3K4 has survived evolution, the researchers are now going to see if the process still exists in human cells. Furthermore, the enzyme responsible for methylation in humans, MLL, is often associated with acute myeloid leukaemia in children, a variety where the cancerous cells often prove resistant to chemotherapy. The researchers will also work to see if methylation of H3K4 is the source of this resistance to apoptosis.