

An interview with Prof. Oberdan LEO

Vice-Rector for research and promotion at the ULB

Institute of Medical Immunology, Immunobiology research unit



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What are the key figures for research at the ULB?

The ULB's research budget is €185M, €50M of which come from operating allowances and the rest from competitive financing (€48M from the FNRS and the remainder from public and private funding agencies, both Belgian and European). In addition, the ULB has nearly 3,600 lecturer/researchers of whom around 800 are members of the academic staff (700 from the ULB and 110 from the FNRS) and approximately 2,000 doctoral students. In 2017, 230 doctoral theses were presented. Currently we are able to identify 3,000 research projects in progress, i.e. 3 or 4 per member of the academic staff. The ULB also offers a dozen starting grants for researchers just starting their careers.

What are the strong points of health research at the ULB?

I would like to begin with the works of Prof. Cédric Blanpain, who studies the stem cells responsible for the continuous generation of tumour cells in his laboratory on the Erasme campus. His work has led to the creation of a cancer cluster in partnership with Erasme hospital and the Bordet Institute. In addition, Prof. Blanpain created the spin-off ChromaCure with a view to developing inhibitors for a new target which is a key regulator in tumour initiation and development.

For his part, Prof. François Fuks stands out through his works on cancer epigenetics and more specifically the link between alterations in RNA and the appearance of breast cancer. He too has created a start-up, EPICS Therapeutics, with a view to giving his research clinical applications. Moreover, the ULB is pursuing other cancer immunotherapy research projects using animal models and clinical trials on breast cancer.

We should also point out the ULB Neuroscience Institute and its works on the development of the nervous system from stem cells on, drug addiction and the role of genes in potential resistance to this addiction (Prof. Alban de Kerchove d'Exaerde) and also the pioneering study on the role of a class of receptors in the detection of extracellular signals linked to inflammatory phenomena (Prof. Marc Parmentier).

The ULB is also present in research on diabetes with the ULB Center for Diabetes Research, directed by Prof. Decio Eizirik, who is studying the cell death of β -pancreatic cells which produce insulin.

Lastly, I would like to mention the research carried out within the inter-faculty Immunology Institute by the teams of Dr A. Marchant, Dr S. Goriely and Dr M. Moser which aim to study the mode of action of the adjuvants present in vaccines, the various forms of immune memory and the action of regulatory T cells, and the Vascular Signalling Laboratory led by Prof. Benoit Vanhollebeke, who has just published an article in Science on vascular biology using the zebrafish as a model.

In which Horizon 2020 research projects is the ULB involved?

Currently the ULB has 12 recipients of grants from the highly selective European Research Council (6 ERC Starting, 3 Consolidators and 3 Advanced), 23 individual Marie Curie researchers (doctoral and post-doctoral students) and 29 collaborative projects.

By way of an example, Prof. Cathy Clerbaux, a guest of the Quantum Chemistry and Photophysics Department and a research director at the CNRS (France), obtained an ERC Advanced Grant in 2017 for its project IASI-FT (IASI – Flux and Temperature), which aims to detect global warming indicators based on hyperspectral data measured by satellite.

A recipient of a Consolidator Grant in 2017, Prof. Jean-Benoit Pilet (CEVIPOL) is heading a research project entitled CureOrCurse: it is about studying the effect of the institutional reforms implemented to restore the faith of Europeans in representative democracy. The project plans to combine data already collected at a European level so as to draw up a

“register” for this type of reform and explore the feelings of European citizens in this regard.

In the Starting Grants category, we should mention the 2018 award winners who are Birgit Ricquier for her BANTURIVERS project (study of the various expansions of the Bantu languages in the forests of Central Africa, and especially the eastern part of the Congo Basin), and Hennie Valkenier-van Dijk for her ORGANITRA project, the aim of which is to develop new synthetic molecules capable of transporting phosphorous-based organic compounds such as nucleotides through the cell membrane.

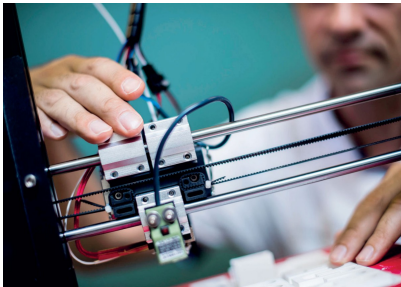
With respect to the award winners of the Marie Skłodowska-Curie programme, we will cite Patricia Bonnavion (Neurophysiology laboratory) and her ADHD-LightUp project, which combines optogenetic, neuron activity recording and behavioural analysis approaches to assess and process some neurons that could be at the origin of the cardinal symptoms of ADHD, Mathieu Bourguignon (Faculty of the Psychological Sciences and Education) and his DYSTRACK project, which aims to achieve a better understanding of the processing of speech in the presence of noise, ultimately to develop new methods to identify and resolve dyslexia at low cost, and Eduardo Castello (Brussels Polytechnic), whose BROS project is focused on the development of robotic systems through which it is possible to certify behaviour using Blockchain technology.



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And let's not forget collaborative projects aiming to provide a response to major societal, industrial and technological challenges. The ULB's Experimental Medicine Laboratory (Prof. Miriam Cnop) is coordinating one, christened T2DSystems: launched on 1 January 2016, this project seeks to develop a system for a biomedicine approach to the risks of identifying, preventing and treating type 2 diabetes.

Finally, I should point out that the ULB has unlocked highly selective European funding within the framework of the Marie Skłodowska-Curie programme. Named [IF@ULB \(Individual fellowships at ULB\)](#), this project with a budget of €9M will for the next five years allow the awarding of 2-year research grants to 63 post-doctoral researchers in international mobility. The three calls for projects are open to all disciplines and will make it possible to increase the visibility and appeal of the ULB and its research centres on an international scale.



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How are technology transfers enacted at the ULB?

The report is very positive: the ULB has a total of 80 active patents which have given rise to 44 active licences. In addition, since 1992 it has led to the creation of 50 spin-offs, 38 of which are still active and partly housed on the Biopark campus in Gosselies – the 3 incubators on this campus host spin-offs from other universities and countries. This multiplier effect is very satisfying for the ULB, which sees to the running of the Biopark campus and thereby participates in the creation of jobs.

In your opinion, what are the main challenges that await researchers in your field of research, immunology?

We are now seeing a paradigm shift in immunology: after a long time spent studying the mechanisms that allow for the activation of an immune response (studies that have led to the development of a large number of vaccines), recently immunologists have realised the importance of immunosuppression mechanisms in the control of immune responses.

In this way, today we consider that inflammatory diseases (such as autoimmune diseases or allergies) are the result of deficiencies in natural immunosuppression mechanisms. In the same way, the recent successes in cancer immunotherapy can be

explained through our better understanding of the immunosuppression mechanisms put in place by tumours to escape the control of the immune system and the development of treatments making it possible to remove this immunosuppression. Despite the recent progress made in immunotherapy however, the majority of patients do not respond to these treatments, and today it is therefore important to continue our research efforts so as to learn to make better use of the immune system to control the various pathologies.