Fondation Francqui-Stichting
Fondation d'Utilité Publique - Stichting van Openbaar Nut

Ceremony of the Francqui Prize by his Royal Majesty the King at the "Palais des Académies" on June 11, 2014

Curriculum Vitae - Work - Report of the Jury

Bart Lambrecht

Curriculum Vitae

Bart N. Lambrecht was born on the 19th of April 1968 in Gent, Belgium. He obtained an MD degree from the University of Gent in 2003. After a first year of training in Internal Medicine, he wanted to perform more fundamental research and started a PhD project in the laboratory of Prof Romain Pauwels at Gent University. Here he became fascinated with the immunology of asthma and allergy. His PhD thesis was defended in 1999 and unraveled the role of dendritic cells (DCs) in asthma. In the meanwhile he also spent a year in the Centenary Institute of Cell Biology and Cancer Medicine in Sydney, where he studied T cell activation in the lungs, under supervision of Prof. Barbara Fazekas de St.-Groth. His PhD thesis was awarded with several prizes, including the Horlait-Dapsens Scholarship, The Boehringer-Ingelheim prize in Pulmonary Medicine, The International Schering Plough Respiratory 2000 award and the European Respiratory Society (ERS) Allergy & Clinical Immunology award.

In 1998 he resumed clinical training and specialized in Pulmonary Medicine at Erasmus University in Rotterdam, The Netherlands under supervision of Prof. Henk Hoogsteden. Here, he was able to combine clinical residency and fellowship with postdoctoral work and he set up a new group studying the biology of DCs in asthma, lung cancer and lung infections, funded by the Dutch Athma Foundation and a VIDI grant of the Dutch Science Organisation (NWO). He was appointed member of the Young Academy of the KNAW, the Royal Dutch Academy of Arts and Sciences. In 2005 he got registered as pulmonary physician and in 2006 was appointed Professor of Immunopathology at Erasmus University, a position still held to this day.

In 2006 Flanders announced the first call for the Odysseus program, a return grant program. After spending 10 years in The Netherlands, Lambrecht decided to return to Gent University in 2007 to set up a group working on the immune system of the lung. He was appointed Professor of Pulmonary Medicine and staff physician at the University Hospital Gent. While in the clinic, patients with severe asthma were seen, the Odysseus grant allowed him to go further in detail into the mechanisms by which DCs cause allergy and asthma, together with colleagues Prof Hammad and Janssens. In the meanwhile he also obtained an ERC grant and he co-ordinated a University of Ghent Multidisciplinary Research Platform (MRP) grant, to work on the cell biology

of the unfolded protein response in inflammatory diseases (GROUP-ID consortium).

In 2012 he took over the directorship of the VIB Inflammation Research Center in Gent. This center is one of the 8 departments of the Flanders Institute of Biotechnology and studies the many aspects of inflammatory disease, with the drive to develop new diagnostics and therapeutics based on biotechnology. He has (co)authored 200 papers in the field of asthma and allergy, and organized many scientific meetings on related topics. The thematic area of his group is still centered around unraveling the role of antigen presenting cells in the lungs. His recent work was awarded with the Pharmacia Allergy Research Foundation Award (2005), The ERS Romain Pauwels Award (2006), The Antoine-Faes Prize (2008), The Inbev-Baillet Latour Clinical Prize (2009), The ERS Maurizio Vignola Award (2008), the Sabin Prize Vaccine Research (2010) and The Karel Lodewijck Verleysen Prize (2013).

He is married to Tine Hendrickx, pharmacist, and the proud father of Louis (2003), Olivia (2004) and Maxim (2004). Together they live and work in Ghent.

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His Work

Asthma is a chronic inflammatory disease of the airways that affects the lives of millions of people and poses a significant burden on global healthcare costs, approaching 10 billion euro annually. The incidence of this disease is steadily increasing in westernalized countries, and in some European countries, almost one in every three children is allergic and has features of allergic asthma, allergic rhinitis or atopic dermatitis. Therefore, it is very urgent that we understand these diseases better, if we are to find new drugs and preventive strategies. Since the beginning of his scientific career in 1994, Bart Lambrecht has studied the immunology of asthma and allergy.

Firstly, his work has demonstrated that immunity to inhaled allergens (typically seen as an formation of IgE antibodies to allergens and positive skin tests in patients) is caused by antigen presentation by dendritic cells (DCs), that take up antigen in the lung and present it to naïve T cells in the lymph nodes draining the lung. The precise mechanisms by which DCs become activated have been studied extensively, and his group was one of the first to propose that DCs work closely together with nearby bronchial epithelial cells to promote allergy. Studying the mechansims of sensitization also led to the idea that endogenous danger signals are released in the lungs of asthmatics (like ATP and uric acid) and contribute to DC activation and persistence of disease. A recent discovery was the crucial role for the unfolded protein response (UPR) in causing DC activation in the lung. The UPR is a cell biological process often initiated upon cellular stress. At the same time, the Lambrecht team identified a second subset of DCs called plasmacytoid DCs (pDCs) that are able to suppress the development of allergy and asthma, opening up the possibility that these cells could be exploited for prevention of allergy. Through this work, we understand better how allergy and asthma develop when allergens are encountered for the first time, and we also understand better how air pollution, cigarette smoking or respiratory virus infection causes an increase in allergic diseases.

Secondly, Lambrecht was the first to propose that DCs also have functions in asthma when the disease is already well underway. Removal of DCs from the airways by genetic strategies cures all the features of the disease, illustrating

that targeting the DCs is a novel and promising therapeutic intervention strategy that should be further exploited. As a proof of concept that this strategy works, several classes of therapeutic drugs have been discovered that target the function of DCs and can be exploited to suppress all the features of asthma. As a result of these studies, several drug companies are now developing DC-targeting approaches to interfere with allergic inflammation and asthma.

Thirdly, in studying the ways by which antigens are recognized in the lung, Lambrecht's group has made important progress on fundamental aspects of lung immunity, applicable to other diseases like lung- and pleural cancer. This has, amongst other medical intervention approaches, led to a clinical trial employing DCs for the treatment of aggressive pleural tumours. In the process of studying DC biology, he also made seminal observations on the mechanism of action of adjuvants, molecules added to common vaccines like tetanus vaccine. Based on this, he is the inventor of an entirely new class of adjuvants of the layered double hydroxide family. With this class of adjuvants, it will be possible to study structure-function relationships of adjuvants, allowing rational design of new inorganic adjuvants, something that has been impossible in the past.

His work was published in over 200 international articles and book chapters. His work is frequently cited and he has received numerous international recognition awards. Lambrecht loves to discuss science and has organized several international meetings on the topics of allergy, astma and immunology. In the future his team will continue to unravel the function of these fascinating cells, and as a pulmonary doctor he will continue to search for applications in medicine.

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Report of the Jury (April 7 & 8, 2014)

Asthma afflicts millions of people and this disease has developed epidemic proportions in the last several decades, causing untold misery to sufferers.

The recipient of the 2014 Francqui prize in Biological and Medical Sciences is Professor Bart Lambrecht, who is distinguished by his groundbreaking work on the basic mechanisms whereby the immune system deviates from its normal role in protecting us from pathogens and instead initiates and maintains an asthmatic response in the lungs. Lambrecht's brilliant, focused studies have demonstrated the key role of dendritic cells in asthma, and also revealed how signals from allergen-exposed and damaged lung epithelial cells trigger them to drive a pathological immune response.

Professor Lambrecht's work on asthma, revealing the crucial importance of dendritic cells in an important human disease, holds the promise to contribute new ways to treat or prevent asthma and related immune disorders.

Jury members :

Sir Tim Hunt FRS
Tim Hunt was, until his retirement in 2010, a 'principal scientist' (note, not THE principal scientist) at Cancer Research UK, Clare Hall Laboratories, in South Mimms, Hertfordshire. Dr Hunt was born in 1943 and grew up in Oxford, moving to Cambridge to read Natural Sciences in 1961. He obtained his Ph.D. from the Department of Biochemistry in Cambridge in 1968. He spent almost 30 years in Cambridge, working in the Department of Biochemistry on the control of protein synthesis and the cell cycle, but with spells in the USA; he was a postdoctoral Fellow at the Albert Einstein College of Medicine in 1968-70 and spent summers at the Marine Biological Laboratory, Woods Hole from 1977 until 1985, teaching

laboratory courses and doing research. In 1982, he discovered cyclins, which turned out to be components of “Key Regulator(s) of the Cell Cycle” This led to a share of the Nobel Prize in Physiology or Medicine in 2001, together with Lee Hartwell and Paul Nurse. Tim Hunt was chairman of the council of EMBO (European Molecular Biology Organisation) from 2006 - 2010. In 2011, he was appointed a member of the ERC (European Research Council) Scientific Council. He is a Fellow of the Royal Society, a foreign associate of the US National Academy of Sciences and a member of Academia Europaea.

Chairman

and

Professor Margaret Buchkingham
Margaret Buckingham is a developmental biologist whose research focuses on the formation of the heart and of skeletal muscle as well as on the stem cells that contribute to muscle regeneration. She is emeritus director of research in the CNRS, professor at the Pasteur Institute, with membership of the French Academy of Sciences, the Royal Society and the National Academy of Sciences of the USA. In 2013 she was awarded the CNRS gold medal.

Professor dr. Richard A. Flavell FRS
Dr. Flavell is Sterling Professor of Immunobiology at Yale University School of Medicine, and an Investigator of the Howard Hughes Medical Institute. He received his B.Sc. (Honors) in 1967 and Ph.D. in 1970 in biochemistry from the University of Hull, England, and performed postdoctoral work in Amsterdam (1970-72) with Piet Borst and in Zurich (1972-73) with Charles Weissmann. Richard Flavell uses transgenic and gene-targeted mice to study innate and adaptive immunity, T cell tolerance and activation in immunity and autoimmunity, apoptosis, and regulation of T cell differentiation.

Professor dr. Anders Krogh
Anders Krogh is professor of Bioinformatics in the Department of Biology, the University of Copenhagen, Denmark and is a member of the Royal Danish Academy of Sciences and Letters. He is well known for his pioneering work on statistical models and has co-authored one of the most used textbooks in bioinformatics. His current research interests include DNA sequencing, non-coding RNA and gene regulation.

Professor Douglas Marchuk PhD
Douglas Marchuk is a Professor and Vice-Chair of the Department of Molecular Genetics and Microbiology at Duke University, as well as the Director of the University Program in Genetics and Genomics. He received his Ph.D. from the University of Chicago, working with Professor Elaine Fuchs, and was a postdoctoral fellow at the University of Michigan with Dr. Francis Collins. He is a human molecular geneticist with a long-standing interest in the role of angiogenesis in human disease. His laboratory is credited with the identification of the genes involved in various syndromes of vascular dysplasia, including Hereditary Hemorrhagic Telangiectasia, Cerebral Cavernous Malformations, Venous Malformations, and Sturge Weber Syndrome.

Sir Hugh Pelham FRS
Dr Hugh Pelham has been Director of the Medical Research Council (MRC) Laboratory of Molecular Biology in Cambridge since 2006. His research interests are in basic cell biology, particularly the organisation of the internal membranes in cells.

Dr Pelham studied at the University of Cambridge, and has a B.A. in natural sciences and a PhD in biochemistry. He completed his postdoctoral studies in Baltimore (USA) and has been a staff member at the Laboratory of Molecular Biology since 1981. He was elected a Fellow of the Royal Society in 1988 and received a knighthood for services to science

Professor dr. Charles M. Rice
Dr. Rice is the Head of the Laboratory for Virology and Infectious Disease at the Rockefeller University. He is a prominent figure in research on members of the *Flaviviridae* including hepatitis C virus. Dr. Rice received his bachelor’s degree from University of California Davis in 1974 and earned his Ph.D. from California Institute of Technology in 1981. From 1986-2000, Dr. Rice was a faculty member at Washington University in St. Louis. Dr. Rice has co-authored over 400 articles in the field of virology, serves as a reviewer for numerous journals, is a past President of the American Society for Virology, a Fellow of the American Association for the Advancement of Science, and a Member of the National Academy of Sciences

Members

Professor Hans Clevers, MD, PhD
Hans Clevers (1957) studied biology and medicine in Utrecht, the Netherlands, and worked as a postdoc at the Dana-Farber Cancer Institute at Harvard University. From 1991-2002, he was professor of Immunology at the University Medical Center in Utrecht, the Netherlands. From 2002-2012, he was director of the Hubrecht Institute in Utrecht. From 2012-2016 he serves as President of the Royal Netherlands Academy of Arts and Sciences, while maintaining his laboratory in Utrecht. His work on Wnt signaling, stem cells and cancer has lead to numerous prizes and awards.

Professor dr. Soren Brunak
Prof. Brunak is the founding Director of the Center for Biological Sequence Analysis at the Technical University of Denmark, which was formed in 1993 as a highly multi-disciplinary research group today comprising 160 employees. Søren Brunak has been highly active within biological data integration, where machine learning techniques often have been used to integrate predicted or experimentally established functional genome, metagenome and proteome annotation. His current research does combine molecular level systems biology and healthcare sector data such as electronic patient records and biobank questionnaires. The aim is to group and stratify patients not only from their genotype, but also phenotypically based on the clinical descriptions in the medical records. An additional focus area is now adverse drug reactions

Professor dr. Gunnar Van Heijne
Professor Gunnar von Heijne works in the Department of Biochemistry and Biophysics at Stockholm University, Sweden, where he directs the Center for Biomembrane Research. He has publishes more than 330 papers in bioinformatics and membrane protein biochemistry. He is a member of the Royal Swedish Academy of Sciences, the Royal Swedish Academy of Engineering Sciences, Academia Europaea, and EMBO. He is a member of the Nobel Committee for Chemistry, which he

chaired 2007-2009.

Associeted Members

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