Board of examiners

Prof. Dr. David Leslie
Blizard Institute, University of London
London, United Kingdom

Prof. Dr. Youri Taes
Department of Endocrinology, AZ Sint-Jan Brugge
Bruges, Belgium

Prof. Dr. Inge Gies
Department of Diabetology, Children's Hospital
Universitair Ziekenhuis Brussel, Brussels, Belgium

Prof. Dr. Robert Hilbrands
Diabetes Research Center and Diabetes Clinic
Vrije Universiteit Brussel and Universitair Ziekenhuis Brussel
Brussels, Belgium

Prof. Dr. Brigitte Velkeniers, Chair
Department of Endocrinology
Vrije Universiteit Brussel and Universitair Ziekenhuis Brussel
Brussels, Belgium

Prof. Dr. Frans Gorus, Promotor
Diabetes Research Center; Department of Clinical Chemistry; Radio-Immunology
Vrije Universiteit Brussel and Universitair Ziekenhuis Brussel
Brussels, Belgium

Prof. Dr. Ilse Weets, Promotor
Diabetes Research Center; Department of Clinical Chemistry; Radio-Immunology
Vrije Universiteit Brussel and Universitair Ziekenhuis Brussel
Brussels, Belgium

VRIJE UNIVERSITEIT BRUSSEL

PhD in Medical Sciences
2016-2017

INVITATION to the Public defence of

Annelien Van Dalem

To obtain the academic degree of **'DOCTOR IN MEDICAL SCIENCES'**

Minimally-invasive measurements of beta cell function in (pre)type 1 diabetes.

Tuesday 28 March 2017
Auditorium **Vanden Driessche**, 17:00
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:
http://www.vub.ac.be/english/infoabout/campuses

Summary of the dissertation

Type 1 diabetes is a chronic T-cell mediated autoimmune disease leading to a major loss of the insulin-producing beta cells and is marked by circulating autoantibodies. While virtually all first-degree relatives of type 1 diabetes patients who are positive for at least two types of islet autoantibodies will develop diabetes within 20 years, those with dysglycemia and/or low stimulated C-peptide release are likely to develop the disease more rapidly (≤2-3 years). The better outcome of immunointerventions in recent-onset type 1 diabetes patients with relatively preserved functional beta cell mass has provided strong arguments for considering trials in the late preclinical stage. Such secondary immune intervention trials require the identification of individuals with impending diabetes. In this respect, we reported that a decreased beta cell function (assessed by hyperglycemic clamp, the gold standard for measuring beta cell function) could identify autoantibody positive first-degree relatives with 50-70% risk of developing type 1 diabetes within 3 years. Unfortunately, these hyperglycemic clamp tests are time consuming, labor-intensive, costly and difficult to implement on a large-scale in an active seemingly healthy population. Hence there is a need for minimally-invasive alternatives which can be easily implemented Therefore, this thesis investigated the potency of early markers of dysglycemia, such as glycemic variability, and early hormonal markers of type 1 diabetes, such as the proinsulin-to-C-peptide (PI:C) ratio, as minimally-invasive as potential alternatives to the clamp. Our findings showed that elevated glycemic variability or fasted PI:C ratios may achieve diagnostic performances similar to that of the hyperglycemic clamp. Both relatively simple tools are promising for metabolic follow-up studies aiming to avoid diabetes ketoacidosis in high risk individuals and for the selection of candidates of choice for intervention studies

Curriculum Vitae

Annelien Van Dalem was born on May 31st, 1988 in Ghent, Belgium. After having completed secondary school at the Koninklijk Atheneum Denderleeuw, she started a training in Pharmaceutical Sciences at the Vrije Universiteit Brussel (VUB) in 2006 and graduated as a Pharmacist in 2011 with the highest distinction. She was awarded the "Prize of the Bank van Breda" for best study results. Immediately after her graduation, she obtained a grant ('aspirant') from the Research Foundation Flanders (FWO) and started a training as PhD student at the Diabetes Research Center of the VUB under the promotorship of Prof. Dr. Frans Gorus and Prof. Dr. Ilse Weets. Her research topic focused on minimally-invasive measurements of beta cell function in (pre)type 1 diabetes. Until now, Annelien is first author of two full papers in peer-reviewed Q1 journals and co-author of five other papers (four in Q1 journals). Her work was presented orally and by poster at (inter)national scientific conferences. During her PhD training she also acquired teaching experience by participating in the Chemistry seminars for bachelor students in Pharmacy. Her research activities are also part of her training plan as clinical biologist at the Department of Clinical Biology of UZ Brussel, which started in 2011 and will be completed by September 2018