

Board of examiners

Prof. dr. Bernard Uitdehaag

Department of Neurology
Universitaire Medische Centra, Amsterdam, The Netherlands

Prof. dr. Patrick Cras

Department of Neurology, Instituut Born Bunge
Universiteit Antwerpen, Belgium

Prof. dr. Vincent Van Pesch

Department of Neurology
Cliniques universitaires Saint-Luc, Brussel, Belgium

Prof. dr. Ilse Smolders

Department of Pharmaceutical Chemistry, Drug Analysis and Drug Information
Center for Neurosciences
Vrije Universiteit Brussel, Belgium

Prof. dr. Jeroen Van Schependom

ETRO-VUB Department of Electronics and Informatics
Vrije Universiteit Brussel, Belgium

Prof. dr. Johan De Mey, Chair

Department of Radiology
Vrije Universiteit Brussel, Belgium

Prof. dr. Marie B. D'hooghe, Promoter

Center for Neurosciences
Vrije Universiteit Brussel, Belgium

Prof. dr. Jacques De Keyser, Promoter

Department of Neurology
Vrije Universiteit Brussel, Belgium



PhD in Medical Sciences
2019-2020

INVITATION to the Public defence of

Tatjana REYNDERS

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

The role of the gut microbiota and the autonomic nervous system in multiple sclerosis.

The defense will take place digitally on

Wednesday, 6 May 2020 at 5 p.m.

via Zoom meeting, accessible through the following link:

<https://us02web.zoom.us/j/84568024289>

Summary of the dissertation

This thesis was created as a first attempt to explore whether and how the gut microbiome and heart rate variability (HRV) might play a role in the (sub)clinical inflammatory disease activity seen in a heterogeneous population of patients with multiple sclerosis (MS). A two-centre cohort of MS patients, including subgroups based on predefined disease characteristics and disease course modifiers, and age- and sex-matched healthy controls was recruited and prospectively followed for twelve months.

Differences in gut microbiome beta diversity, the proportion of Bacteroides 1 and 2 enterotypes and the relative abundances of fourteen genera were able to discriminate between MS and healthy controls. Alpha and beta diversity, enterotypes and bacterial composition were also able to differentiate between predefined MS subgroups. We found a first indication that the relative abundance of *Butyricoccus* could be related to subclinical focal CNS inflammation.

While the examined HRV parameters (SDNN and RMSSD) did not significantly differ between groups, longitudinal analysis showed an association with increased vagal output at baseline and self-reported relapse occurrence during the following months.

Further exploration of these leads in those with a more benign disease course might lead to a better understanding of the role of the gut-brain axis and protective mechanisms in MS and assist in the development of safer disease-modifying approaches and prognostic tools.

Curriculum Vitae

Tatjana Reynders was born in Lommel, Belgium on December 30th 1988. After obtaining her medical degree at the Universiteit Gent, she started her training in neurology at the Vrije Universiteit Brussel. Several months after, she also started a clinical PhD in Medical Sciences under the supervision of prof. Dr. Marie B. D'hooghe and prof. Dr. Jacques de Keyser, in parallel with her clinical training. This permitted her to develop some experience in dealing with patients with multiple sclerosis during the four first years in the UZ Brussel, after which she transferred to the Universitair Ziekenhuis Antwerpen to complete her last year of training. Since August 2018, she is working full-time as a neurologist and MS expert in the UZA, where she has finished writing the thesis that will be presented on May 6th 2020.

In 2015, 2016 and 2017 this work was sponsored by the Belgian National MS society with the support of the Fund D.V., managed by the King Baudouin Foundation (2016-C5812060-206012).