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**INVITATION to the Public defence of**

# Jana BONGAERTS

To obtain the academic degree of

**'DOCTOR OF PHARMACEUTICAL SCIENCES'**

## Improving LC-MS/MS sensitivity for the quantification of low-concentrated neuropeptides

The public defence will take place on

**Thursday, 19 November 2026 at 6 p.m.**

**In Auditorium Brigitte Velkeniers**
VUB Health Campus
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussels

## Summary of the dissertation

To investigate the possible role of neuropeptides in certain brain disorders, it is useful to measure the concentration of these molecules in the brain over time and Liquid Chromatography–tandem Mass Spectrometry (LC–MS/MS), an advanced lab technique, is often used for this purpose. However, the quantification of neuropeptides is difficult because only small amounts of neuropeptides are present in the brain and they easily stick to surfaces. This PhD research explored opportunities to improve the sensitivity of neuropeptide measurements using LC-MS/MS.

The first part of the research compared two different technologies that convert molecules into charged particles, which is required to be measured by MS. The study also tested "supercharging agents," chemicals that increase the charge state of molecules, making them easier to detect. The second part focused on preventing neuropeptides from sticking to all kinds of materials — a major problem that causes them to disappear before they can be measured- and on improving the detection of neuropeptides by LC-MS/MS. Different approaches were tested, which led to an improved detection at low concentrations.

Overall, this research showed that there is no single approach to optimally analyze the peptides. Obtaining the best results requires optimization of every step of the process — from the treatment of the samples to the instrumental conditions. The work identified promising new tools and showed how to reduce peptide losses, making it easier to study neuropeptides in the brain.

## Curriculum Vitae

Jana Bongaerts was born on 31st January 1994 in Vilvoorde, Belgium. She completed secondary school in the field of Latin-Mathematics at the Atheneum Vilvoorde in 2012, after which she started her academic career in Pharmaceutical Sciences at the Vrije Universiteit Brussel. In 2017, she graduated as pharmacist and Master in Drug Development. Afterwards, she started a PhD with the research groups Analytical Chemistry, Applied Chemometrics and Molecular Modelling and Pharmaceutical Chemistry, Drug Analysis and Drug Information, under supervision of Prof. Ann Van Eeckhaut, Prof. Yvan Vander Heyden, Prof. Debby Mangelings and Prof. Dimitri De Bundel. Her research focused on the development and optimization of Liquid Chromatography-tandem Mass Spectrometry methods for the quantification of low-concentrated neuropeptides.

Jana has published three peer-reviewed first-author papers. Her research results were presented at various national and international conferences. In addition to research, she assisted in different practical courses of Bachelor and Master students in the Pharmacy program, and she was co-promotor of five Master theses.

Since November 2022, Jana is working as an Early Stage Development Scientist (ESDS) at MSD, where she is responsible for the scientific elaboration and project management of Phase 1 clinical trials.