VRIJE UNIVERSITEIT BRUSSEL

PhD in Pharmaceutical Sciences 2017-2018

INVITATION to the Public defence of

Melissa VAN BOSSUYT

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

Genotoxic substances in printed paper and board food contact materials: A prioritisation strategy based on non-animal methods.

Thursday 28 June 2018
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

Over the past decades, several food contamination crises caused by the migration of substances from food contact materials (FCM) into food and drinks have been reported. As a result, concerns have been raised regarding the potential adverse health effects for consumers following exposure to these substances. Printing inks and paper(board), two FCM types that are often used in combination, have already been the subject of multiple food contamination issues. Nevertheless, as for the majority of FCM types, no specific harmonised European legislation is in place for printed paper and board. Since thousands of printed paper and board substances have not been officially evaluated for their safe use, identification of those of highest concern is required. In the present work, a prioritisation strategy based on the substances' genotoxic potential was developed, since this toxicological endpoint is related to serious adverse human health effects, including cancer. The developed strategy was solely based on non-animal test methods such as *in silico* tools, literature consultation and *in vitro* experiments. Importantly, within the strategy, most emphasis was put on the substances' potential to induce gene mutations as for this endpoint, *in silico* models are most advanced. By using a battery of 4 *in silico* tools, a first selection was obtained consisting of 106 non-evaluated single substances that were predicted to induce gene mutations in all 4 tools. For these substances, publically available experimental genotoxicity data (including information on the induction of gene mutations) were collected. For the substances lacking (adequate) genotoxicity data, a bacterial reverse gene mutation test was performed. Ultimately, the prioritisation strategy identified a large number of substances of concern, out of which five are of very high concern based on their confirmed *in vivo* genotoxicity, current use, high migration and bioavailability potential and inclusion in European lists with substances of concern. Interestingly, the developed prioritisation strategy can also be applied in numerous other domains with a high need for substance prioritisation.

Curriculum Vitae

Melissa Van Bossuyt was born on the 11th of July 1990 in Jette, Belgium. After completing her secondary education, orientation Greek-Mathematics, she started her academic career at the Vrije Universiteit Brussel (VUB). She obtained the degree of Pharmacist and Master in Drug Development in 2014, after which she joined the *In Vitro* Toxicology and Dermato-Cosmetology research group. Her PhD project was carried out in collaboration with (and financed by) the former Scientific Institute of Public Health, now merged into Sciensano. Under the joint promotership of Professor Vera Rogiers (VUB) and Dr. Birgit Mertens (Sciensano), she developed a prioritisation strategy for the hazard characterisation of substances than can be used in – and migrate from – printed paper and board food contact materials. Melissa has presented the results from this work at 10 national and international scientific conferences, and has received an Excellent Poster Award (out of 101 participants) from the European Commission's Joint Research Centre during its Summer School on Alternative Approaches for Risk Assessment. Melissa was also involved in several other projects both at the VUB and Sciensano. Her work has resulted in 9 scientific publications in international peer-reviewed journals and books, of which 5 as first author. During her doctoral research, Melissa supervised the bachelor and master thesis work of Pharmaceutical Sciences students from the VUB and Biomedical Sciences students from the University of Antwerp. She furthermore assisted in the organisation of the first Joint Meeting of the Belgian and Dutch Environmental Mutagen Society in Rotterdam, the Netherlands. Melissa also stayed several months at the Institute di Ricerche Farmacologiche Mario Negri in Milan, Italy, where she gained experience in *in silico* modelling. Currently, Melissa is working as a toxicologist at Sciensano.