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Developing metabolomics for a systems biology approach to understand Parkinson's disease

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Curriculum Vitae

Cornelius Carmichael William Willacey, was born on 25th June 1992 in the city of Nottingham, United Kingdom. He obtained his high school education and A levels in the study of biology, chemistry, maths and geography at Nottingham Bluecoat School in 2011. Before entering university, he spent time volunteering with the Bluecoat charity, in Pietermaritzburg, KwaZulu-Natal, South Africa.

Following this, he enrolled onto a master program in pharmacy at the University of Bradford, United Kingdom, during which he completed jobs and internships alongside his studies in community practice and industry. His community experience was conducted at Averroes Pharmacy, Nottingham. His pharmaceutical industrial experience included training at Boots Contract Manufacturing, Nottingham, and AstraZeneca, Macclesfield, focusing on pharmaceutical regulations and formulation science, respectively. For his research dissertation, Cornelius worked under Dr Sriharsha Kantamneni on a project titled "*Biochemical analysis of ubiquitination effects on N-methyl-D-aspartate receptor subunit GluN3A*". After developing a passion for neurological research, Cornelius continued working in the lab of Dr Sriharsha Kantamneni and completed a summer research project titled "*Kinesin-I motor complex mediated trafficking of $GABA_B$ receptors in neurons*".

In 2015, Cornelius was awarded his Master of Pharmacy with Distinction. To complete his pharmacy registration for UK practice, he worked as a pre-registration pharmacist at Barnsley Hospital, Barnsley, United Kingdom. In 2016, Cornelius qualified as a registered UK pharmacist with the General Pharmaceutical Council (GPhC), and worked as a locum community and hospital pharmacist.

Also in 2016, Cornelius initiated his PhD in the group of Professor dr Thomas Hankemeier. Under the supervision of his co-promotors, Dr Amy Harms and Dr Ronan Fleming, he focused on the biochemical analysis of diseases coupled to systems biology and the metabolic profiling of Parkinson's disease and alcohol addiction. He developed a successful derivatisation method to improve the detection of metabolites in biological samples which resulted in publications in Journal of Chromatography A and Microchemical Journal. In 2019, he presented his results at the annual American Society for Mass Spectrometry (ASMS) conference in Atlanta, Georgia, United States.

Addendum

After his PhD, Cornelius works for Charles River Laboratories based at their bioanalytical facility in Schaijk, The Netherlands. As a Study Director, he is responsible for project management of bioanalytical sciences working with commercial partners.

List of publications

[1] **Willacey CCW**, Naaktgeboren M, Lucumi Moreno E, et al. LC–MS/MS analysis of the central energy and carbon metabolites in biological samples following derivatization by dimethylaminophenacyl bromide.
Journal of Chromatography A. 2019:460413.

[2] **Willacey CCW**, Karu N, Harms AC, Hankemeier T. Metabolic profiling of material-limited cell samples by dimethylaminophenacyl bromide derivatization with UPLC-MS/MS analysis. *Microchemical Journal. 2020:105445*.

[3] **Willacey CCW**, Secci ME, Meinhardt MW, Schilperoord T, Kohler I, Harms AC, Karu N†, Sommer WH†, Hankemeier T†. A quantitative atlas of metabolites across regions of the rat brain.
Submitted
† Authors contributed equally

[4] Preciat G*, Modamio J*, **Willacey CCW***, Wegrzyn AB, Lucumi Moreno E, Monteiro FL, El Assal D, Oliveira MAP, Gulersonmez MC, Heirendt L, Zhang Z, Cousins B, Haraldsdóttir HS, Zach S, Hachi S, Harms AC, Vempala S, Hengerer B, Schwamborn JC, Glaab E, Thiele I, Hankemeier T†, Fleming RMT†. Mechanistic model-driven exometabolomic characterisation of human 2 dopaminergic neuronal metabolism
In preparation
*† Authors contributed equally

[5] van Mever M*, **Willacey CCW***, Zhang W, Drouin N, Christina AE, van Veldhoven JPD, van der Es D, Hankemeier T†, Ramautar R†. Profiling acidic metabolites by capillary electrophoresis-mass spectrometry in low numbers of mammalian cells using a novel chemical derivatization approach
Submitted
*† Authors contributed equally

Dankwoord

I would like to start by saying that I am inspired by Thomas for his unwavering support and enthusiasm. You helped me to strengthen my passion for science and push myself to become a better scientist. I only hope that I can maintain a youthful energy like yourself in my approach to new challenges and hopeful successes in the future.

Amy, you kept me grounded and were always there to lend a helping hand when I needed it. Your commitment to making sure everyone achieves their dreams is something to marvel at. Ronan, your support in my scientific and personal development will always be remembered. Naama, I honestly don't think I would have made it to the end if it wasn't for you! You offered your expertise in all the right places - your brutal honesty gave me the kick up the bum and helped me to keep aiming higher. For this, I am forever grateful.

Throughout the PhD journey, I have been supported by fantastic scientists that shared their knowledge and passions in the field that I love. I would like to thank Rawi, Edinson, Alireza and Liesbeth for their motivation.

I would also like to thank my students, Maik, Rianne, Martijn, Tom, Noelle and Alissa, for their help in contributing to my PhD research and giving me the chance to work with fresh, developing minds. Supervising your work was very enjoyable for me, and helped me to further enhance my research and supervision skills.

I enjoyed the collaboration with both the consortium of SysMedPD and SybilAA. Both projects had ambitious aims and I believe that metabolomics was a fundamental part in contributing towards the end goal. I would like to thank all members that assisted in the development of my scientific skills and also for the pleasant conversations along the way.

I consider myself extremely lucky to have had the opportunity to have worked alongside (and partied with!) many amazing individuals throughout my period at Leiden University. I was a traveller through many offices during my time at Leiden – there are too many names and too many enjoyable conversations to mention!

My wholehearted special thanks to my wife, Alisa. You unconditionally supported me through all the good and bad times during my PhD. You even managed to maintain

your energy whilst carrying our beautiful daughter, Aubrey, with the additional stress of the pandemic. Not many people could handle so much!

Finally, a special thanks to Aubrey. You were a big (but tiny) distraction towards to end of my PhD, but you are the most beautiful distraction a dad could ever ask for. Hopefully, you grow up to be as critical as me and point out all of the flaws in this thesis ☺.