



Universiteit  
Leiden  
The Netherlands

## Global metabolomics and lipidomics approaches to probe virus-host interactions

Zhang, Z.

### Citation

Zhang, Z. (2024, March 6). *Global metabolomics and lipidomics approaches to probe virus-host interactions*. Retrieved from <https://hdl.handle.net/1887/3719975>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3719975>

**Note:** To cite this publication please use the final published version (if applicable).

## Curriculum vitae

Zhengzheng Zhang was born on March 09<sup>th</sup>, 1990 in the city of Changzhi, Shanxi province, China. After graduating from Changzhi No.9 Senior High School in 2009, she got admitted to the major of Chemistry at Shanxi University (SXU) in Shanxi, China. During her bachelor's study, she was awarded university scholarships. In 2013, she obtained her bachelor's degree and did her masters in Herbal Biology in the same university.

During her master's study, she focused on NMR-based plant metabolomics analysis of Traditional Chinese medicines (TCM) where she established quality control and drug efficacy evaluation of Danggui and *Farfarae Flos*. The relevant research results were published in the journal JPBA as well as a patent in isolating the bioactive compound (Z)-*Ligustilide* from Danggui. She was awarded the China National Scholarship due to her exceptional contributions.

In October 2016, she started her PhD project under the supervision of Prof. Dr. Thomas Hankemeier, at Leiden Academic Centre for Drug Research (LACDR) of Leiden University in the Netherlands. Between 2016 and 2020, under the supervision of Dr. Amy Harms and Dr. Ahmed Ali, and with support of Dr. Peter Linderburg, and Dr. Isabelle Kohler, she evaluated and developed lipidomics platforms for infectious diseases. With these platforms, she looked into the role of metabolome and lipidome in virus-host interactions. Since Oct 2020, she has been continuously supported by the Metabolomics and Analytics Centre to continue her research in COVID-19 related projects. Relevant research results were published in the journals Chromatography A, AIDS and Biomolecules. In 2022, she gave a poster presentation at the Metabolomics Conference 2022 in Valencia, Spain. In 2023, she was invited to present her work at a webinar with SCIEX.

## List of publications

### Part of this thesis:

1. J.C. Schoeman\*, **Z. Zhang**\*, A. Kindt, L. Meyer, A. Harms, M.L. Newell, T. Hankemeier, M.J. Bunders. Characterization of neonatal metabolism in low-birth-weight infants born to HIV suppressed mothers receiving cART. In preparation
2. **Z. Zhang**\*, K. Duri\*, K.L.W. Duisters\*, J.C. Schoeman, P. Chandiwana, P. Lindenburg, J. Jaeger, S. Ziegler, M. Altfeld, I. Kohler, A. Harms, F.Z. Gumbo, T. Hankemeier, M.J. Bunders, (2023). Altered methionine-sulfone levels are associated with impaired growth in HIV-exposed-uninfected children. *AIDS*, 37(9), 1367-1376.
3. **Z. Zhang**\*, M. Singh\*, A. Kindt, A.B. Wegrzyn, M.J. Pearson, A.M.A.M. Ali, A.C. Harms, P. Baker, T. Hankemeier, (2023). Development of a targeted hydrophilic interaction liquid chromatography-tandem mass spectrometry based lipidomics platform applied to a coronavirus disease severity study. *Journal of chromatography. A*, 1708, 464342.
4. **Z. Zhang**, K. Naama, A. Kindt, M. Singh, L. Lamont, A.J. van Gammeren, A.A.M. Ermens, A.M.A.M. Ali, A.C. Harms, L. Portengen, R.C.H. Vermeulen, W.A. Dik, A.W. Langerak, V.H. J. van der Velden, T. Hankemeier. Altered plasma lipidome is associated with disease severity in COVID-19 patients. *Biomolecules*. Under revision

\*Authors contributed equally

### Not Part of this thesis:

5. L.M. de Jong, **Z. Zhang**, Y. den Hartog, *et al*, (2022). PRMT3 inhibitor SGC707 reduces triglyceride levels and induces pruritus in Western-type diet-fed LDL receptor knockout mice. *Sci Rep* 12, 483.
6. M. Hoekstra, **Z. Zhang**, P.W. Lindenburg, M. Van Eck, (2023). Scavenger Receptor BI Deficiency in Mice Is Associated With Plasma Ceramide and Sphingomyelin Accumulation and a Reduced Cholesteryl Ester Fatty Acid Length and Unsaturation Degree. *J Lipid Atheroscler. Nov*;13:e5.
7. **Z. Zhang**, M. Fan, X. Hao, X. Qin, Z. Li (2016). Integrative drug efficacy assessment of Danggui and European Danggui using NMR-based metabolomics. *Journal of Pharmaceutical and Biomedical Analysis*, 120, 1-9.
8. Z. Li, **Z. Zhang**, G. Du, X. Hao, X. Qin, (2015). Comparative analysis of Danggui and European Danggui using nuclearmagnetic resonance-based metabolic fingerprinting. *Journal of Pharmaceutical and Biomedical Analysis*, 103, 44-51.

9. **Z. Zhang**, D. Tian, Z. Li, X. Qin, (2015). Evaluation of the Water-Soluble Extractive of Astragali Radix with Different Growth Patterns Using <sup>1</sup>H NMR Spectroscopy. *Zeitschrift fuer Naturforschung C*, 70(9-10)c: 257-263.
10. Z. Li, **Z. Zhang**, L. Zhang, S. Zhang, X. Qin, (2014). A method for Z-ligustilide extraction from European Danggui. Patent No. 201410218763.3

## **Acknowledgements**

The culmination of my Ph.D. marks a significant milestone in both my career and personal life. This achievement wouldn't have been possible without the invaluable support of many many people. I want to extend my heartfelt gratitude to everyone who has played a part in this journey.

First and foremost, Thomas, I will think back with great enthusiasm to have worked with this diverse and dynamic team, always being encouraged by you to explore my own possibilities to develop many technical skills and self-management. Most importantly, the work we have undertaken deeply interests me and sets the foundation for my career path.

Amy, I am very grateful for your supervision and help. Your constructive criticism, insightful feedback, affirmation, and encouragement have been invaluable to my academic growth. Ali, your expertise and unique insights into the research fields have greatly broadened my scientific perspective and highly motivated me to work across fields. Amy, Ali, Peter, Menno and Isabelle, you have always been supportive, giving me solid advice and guidance during challenging times. I appreciate it very much.

I would like to thank all my collaborators for support I have received, including both our internal team and external partners. To Nelus and Alida, thank you very much for helping me start up and throughout with my projects in our lab. To Madeleine, Kevin, Kerina and many others from Zimbabwe team and South Africa, who have greatly contributed to parts of this thesis, for conducting interesting research programs together and for the knowledge on clinical studies and data analysis. To Paul Baker, Mckezine, Rebeka from SCIEX, thank you for all the technical support and knowledge that you shared, your ideas broadened my view a lot. It was really nice to have worked with all of you.

I would like to thank all my colleagues at MAC and BMFL. To Loes, Cathy, Ina and Ariadne, thank you for helping with arranging all kinds of meetings. To Madhu, thank you for saving me from the heavy workload of the method development. To Faisa, thanks you for your considering talk in both my study and personal life. To Gerwin, Sabine, Tim, Marian, Misli and Daisy, thank you for your expertise with troubleshooting the mass specs. To Aga and Michael, thank you for your technical support and for showing me the zz plant.

To my office mates, Simon, Tom, Farideh and Paul, thank you for being kind and support all the time during my Ph.D. To Hyung and Marielle, thank you for the nice translation of the Dutch summary for me. To my students Ischa, Lesley, Adel, Merissa, Mitan, thank you for the work on the different stages of my Ph.D. projects. Specially, I want to thank the engineers Huub, for taking care of the instruments and giving me ideas on troubleshooting. To everyone that I have met in the last seven years, thank you for the talks and drinks we had together. Thanks to all the girls, Mariyana, Barbara, Kanch, Manchu, Marielle, Merys, Ferideh, many thanks for all the laughter we shared together. Lastly, I want to especially thank my Chinese colleagues Wei&Wei, Xinyu, Yupeng, Joyee, Pingping, Bingshu, Congrou, Mengle, Yu, Lu and Xiaoyue; with you I'm not far away from home.

I would also like to thank all my friends that I met here in the Netherlands and back in China, thank you for your company and encouragements.

Last but not least, my beloved mom and dad, your open-mindedness and optimism give me the most confidence and perseverance to pursue my academic dream. Kuankuan, my dearest little brother, you are the best gift which our parents gave to me in my life, thanks for your unconditionally support throughout all the challenging times.