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Thiosugars: reactivity, methodology and applications

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Curriculum Vitae

Jerryt (Jerre) Michiel Madern was born on the 9th of January 1989 in Vlaardingen, the Netherlands. After completing his secondary education with majors in Life Science & Technology (with Biology) at the Stedelijk Gymnasium Schiedam in 2007, he commenced his studies at Leiden University and the Technical University of Delft with the study program “Molecular Science & Technology”. In 2007 he had his first experience with the Bio-Organic Synthesis department (Biosyn, prof. dr. H.S. Overkleeft) in a practical course supervised by Erwin Tuin, working on salmonella antibiotics. The research bachelor internship was also done at the Biosyn department, and supervised by Gerbrand van der Heden, working towards the synthesis of ADPR fragments. The Bachelor degree was obtained in 2011.

He enrolled in the Master’s program Research in Chemistry – Design & Synthesis at Leiden University in 2012. The research master internship was carried out in the Biosyn department, supervised by Hans Kistemaker, continuing with work on ADPR fragments. The Master degree was obtained in 2015.

From September 2016 until 2021, he conducted his PhD studies at Leiden University in the Biosyn group under supervision of Gijs van der Marel, Jeroen Codée and Dima Filippov. Parts of the research described in this thesis were presented on posters and/or oral presentations at the CHAINS conference (Veldhoven, The Netherlands, 2016-2019), the KNCV International Symposium on Organic Chemistry (2018), the International Carbohydrate Symposium (Lisbon, Portugal, 2018) and EuroCarb (Leiden, the Netherlands, 2019).

In Januari 2022, Jerre continued his scientific career at the Leiden Academic Centre for Drug Research department (LACDR, prof. dr. A.P. IJzerman) at Leiden University, working on bridging the gap between organic chemistry and reinforcement learning AI, focussing on de-novo drug design, supervised by prof. dr. Gerard van Westen.

Acknowledgements

Sitting here at the end of the line I realize writing the acknowledgements has become very hard for me. The whole process from starting as a PhD student up until this day has been a very wild ride, with many highs and many lows. In this time I've learned so much, not just about science, but also about the world and about myself. There's been countless people who have helped me, supported me or have been there for me in a variety of ways, both within the academic world as outside it. I know that if I attempt to name everyone and everything I'm grateful for I will certainly forget people. So with that being said, let me make an attempt.

I would like to start by thanking Gerbrand van der Heden, Hans Kistemaker, Richard van der Berg, Gijs van der Marel and Dimitri Filippov. These are the people that have inspired and taught me the most from the very beginning of my academic career as a student.

Next, I want to extend my gratitude to my promoters and supervisors, Jeroen Codée, and once again, Gijs and Dima. Thank you for all the interesting discussions, for the guidance, the lessons, and even all the off-track funny convos during meetings. Thanks for your patience and understanding in my times of need or trouble. And as Biosyn is a team I'd also like to thank its big boss, Hermen Overkleeft, as well as all the staff members. Specifically Hans, Bobby and Rian who have personally helped me with some projects. Similarly I'd like to thank Fons and Karthick, of the NMR department, for their help with some of the more complex NMR experiments or data analyses. Thanks to all the bachelor and master students who have worked on my projects during their internships.

Two of the most amazing people I've met during my time with Biosyn were Mirjam Huizenga and Tim Ofman. I am honored to have them on my side as my paranymphs. They have been great company both in the lab as outside, helped me with my experiments, with my analyses, with my publications, and now finally also with my thesis and defense ceremony. Most importantly perhaps, they have grown to become very good friends.

Many of the people I shared a classroom with, during my time as a bachelor and master student here, have also decided to stick around and do a PhD within Biosyn or our faculty. It was great being part of this "generation", both in an inspiring and a fun way, and I'd like to thank everyone who was a part of this generation. Alexi, Dennis, Mark, Jim, Thomas H, Ian, Jacob, Qiang, Shimrit, Daniel, Ward, Elmer, Berend, Hessel, Tim H, Elko, Mickey, Casper, etc. Jacopo and Francesca, call me rompicoglioni all you want, still love you, thanks for all

the great times, the parties, the dinners, the sleepovers, I'm honored I could be with you on your wedding in Italy. A special thanks to Michel van de Graaf and Thomas van de Ende, we've shared so much time and experiences together from our time as students, to our time as PhD candidates, up until today. You two have grown to be two of my best and most cherished friends.

In addition, I also want to thank the new Biosyn generation, and it was interesting to experience this change in attitude and perspectives along with it. Thanks for the support and the good times Roy, Koen V, Tony, Thijs, Foteini, Pascal, Merijn, Tyrza, Patrick, Vincent, etc. And a special thanks to Koen Rijpkema and Tessa Goté, who joined our group as bachelor students (and I ended up supervising Koen for his master internship), and have since grown to become some of my favorite coworkers and friends, thanks for all the help, support and joy, you two taught me a lot.

As aforementioned I'm also grateful for my time here because, on top of science, I also learned a lot about the world and life in general. It is such a privilege to work with interesting, intelligent and enthusiastic people from all over the world, with different backgrounds, different cultures, different traditions, different etiquettes, different religions and different perspectives. I want to thank everyone who challenged my beliefs and changed or enhanced my perspectives.

Finally, there have been many people outside the university who have supported me and been there for me. My family of course, especially my three sisters, Christine, Anneke and Gerdien. And there are too many friends to mention, but a special thanks to some of the people that have been with me from the start, catalyzing my highs, and caring for me during my lows: Marilyn, Shannon, Esther, Joris, Sytze, Rick.

But let me repeat and reiterate: I dreaded and postponed writing this, I'm sorry to the people I forgot to mention. It's nothing personal, there's just been so many amazing people spread over so much time, I guarantee you by the time this is printed I already regret forgetting about a lot of you. So, with that said: Thank you all, you know who you are.

List of publications

4-Thioribose Analogues of Adenosine Diphosphate Ribose (ADPr) Peptides

Jerre M. Madern, Jim Voorneveld, Johannes G. M. Rack, Hans A. V. Kistemaker, Ivan Ahel, Gijsbert A. van der Marel, Jeroen D. C. Codée, and Dmitri V. Filippov
Org. Lett., **2023**, 25, 27, 4980–4984

Synthesis of Stable NAD⁺ Mimics as Inhibitors for the *Legionella pneumophila* Phosphoribosyl Ubiquitylating Enzyme SdeC

Jerre M. Madern, Dr. Robbert Q. Kim, Dr. Mohit Misra, Prof. Ivan Dikic, Prof. Yong Zhang, Prof. Huib Ovaa, Dr. Jeroen D. C. Codée, Dr. Dmitri V. Filippov, Dr. Gerbrand J. van der Heden van Noort
ChemBioChem, **2020**, 21, 2903

Synthesis, Reactivity, and Stereoselectivity of 4-Thiofuranosides

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J. Org. Chem., **2019**, 84, 3, 1218–1227

Furanosyl Oxocarbenium Ion Conformational Energy Landscape Maps as a Tool to Study the Glycosylation Stereoselectivity of 2-Azidofuranoses, 2-Fluorofuranoses and Methyl Furanosyl Uronates

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