



Universiteit
Leiden
The Netherlands

Breathing in thin air: structure, function and therapeutic opportunities of bd type oxidases

Velden, T.T. van der

Citation

Velden, T. T. van der. (2026, September 2). *Breathing in thin air: structure, function and therapeutic opportunities of bd type oxidases*. Retrieved from <https://hdl.handle.net/1887/4309020>

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/1887/4309020>

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

Curriculum vitae

Tijn van der Velden was born in Zoetermeer, The Netherlands, on January the 31st 1997. In 2014 he finished his higher secondary education at the Erasmus College in Zoetermeer, raising his interest in chemistry and biology. That same year he started the bachelor's program Chemistry at the Leiden University of Applied Sciences, where he gained interest in how the simple molecules found in pharmaceuticals are able to affect the complex human physiology. To better understand the development of pharmaceuticals and their mechanism of action he moved to Leiden university to start the bachelor program Biopharmaceutical sciences in 2015. In 2018 he completed the program, where he wrote his bachelor thesis at the Leiden Academic Centre of Drug Research (LACDR) in the group of Prof. Dr. Joke Bouwstra on the effect of the ceramide lipid chain length on phase separation in the skin lipid matrix. This same year he started as an analyst next generation sequencing at the company Baseclear, gaining industry experience and broadening his research skills. In 2019, Tijn moved back to Leiden university to start the master's program Biopharmaceutical sciences, deepening his knowledge in pharmaceutical research and science commercialization. He completed the program (cum laude) with a double specialization in Biotherapeutics, and Business studies. Tijn performed internships in the group of Prof. Dr. Joke Bouwstra (LACDR), Dr. Thomas Sharp (LUMC), and the organ-on-a-chip company MIMETAS. During these research internships he studied adjuvant incorporation into hybrid nanoparticle vaccines, and pentraxin-mediated complement activation on lipid cell mimetics. At MIMETAS, he learned how to convey scientific insights from organ-on-a-chip technology to a broader audience by the development of application notes, webinars, e-books and an online conference. After his Masters, Tijn moved to the group of Prof. Dr. Lars Jeuken for his PhD, the results of which are presented in this thesis. During his PhD, Tijn presented his work at several national and international conferences including Metals in biology 2022, France (Travel grant and poster prize), Surface modification for chemical and biochemical sensing, Poland (Poster prize), European Bioenergetics conference, Austria (Travel grant), circuits of life, UK, and the Kroese Duijster Symposium (Poster award). In addition to his research, he completed courses in project management, scientific writing, presentation skills and pharmaceutical CMC.

List of publications

T.T. van der Velden, A. Halimi, J. pols, W.S. Lam, S. M Hacker, L.J.C. Jeuken, (2026) *Discovery of a novel chemotype targeting Mycobacterium tuberculosis cytochrome bd through rapid screening and structural elucidation.* (Submitted)

T.T. van der Velden, K. Kayastha, F. pelsler, S. Brünle, L.J.C. Jeuken, (2026) *Visualizing the mechanism of quinol oxidation and inhibition of a bd-type oxidase using cryo-EM.* Science Advances, DOI:10.1126/sciadv.aec9946

T.T. van der Velden, K. Kayastha, C.Y.J. Waterham, S. Brünle, L.J.C. Jeuken, (2025) *Menaquinone-specific turnover by Mycobacterium tuberculosis cytochrome bd is redox regulated by the Q-loop disulfide bond.* Journal of Biological Chemistry. DOI: 10.1016/j.jbc.2024.108094

B.R. Streather, T.A. Eastwood, K. Baker, M. Liang, A.E. Bailie, **T.T. van der Velden**, L.J.C. Jeuken, S.W. Botchway, L. Wang, D.P. Mulvihill, (2026) *Peptide-Induced Formation of Extracellular Vesicles that are Distinct From Endogenous E. coli OMVs, and Provide an Enhanced Platform for Protein Production and Purification.* (in review)

D.P. Noone, M.M.E. Isendoorn, S.M.W.R. Hamers, M.E. Keizer, J. Wulffelé, **T.T. van der Velden**, D.J. Dijkstra, L.A. Trouw, D.V. Filippov, & T.H. Sharp, (2024) *Structural basis for surface activation of the classical complement cascade by the short pentraxin C-reactive protein.* PNAS DOI: 10.1073/pnas.2404542121.

D.P. Noone, **T.T. van der Velden**, T. Sharp, (2021) *Cryo-Electron Microscopy and Biochemical Analysis Offer Insights Into the Effects of Acidic pH, Such as Occur During Acidosis, on the Complement Binding Properties of C-Reactive Protein.* Frontiers in Immunology. DOI: 10.3389/fimmu.2021.757633

Acknowledgements

Looking back on the last 4 years gives me a feeling of joy. Being able to spend your time fully engaged in your project is an empowering experience. The feeling of going from an idea to designing experiments and finally achieving results that feed back into this loop is an experience that both gave me confidence and made me more critical of my own thinking. Even though a PhD is always filled with more negative than positive results, it is the feeling of overcoming these problems that dominate and fill me with pride.

First, I want to thank my promotor, **Lars**. The relationship between promotor and PhD candidate is a precarious one. Receiving critique can easily be mistaken for being personal. In the end, all the critique I received was to improve our output and challenged me to go beyond what I thought to be sufficient. I also want to thank you for giving me the freedom to explore my own ideas. Looking at other research groups, this freedom is not a given and has very much molded my experience. You allowed me to explore cryo-EM, making mistakes and eventually reaching successes that now fill this thesis. I also want to thank my second promotor, **Meindert**, who guarded the progress of my thesis during our yearly meetings.

This brings me to **Steffen, Kanwal** and **Willem**. **Willem**, thank you for teaching me cryo-EM how to use the Glacios. Being able to use this microscope boosted my output and allowed me to reach the detail to describe the catalytic cycle discussed in chapter 3. Also, I really enjoyed our conversations at NeCEN about strategies to capture specific enzyme states. It was a joy to talk with someone to bounce my ideas off and equally receive ideas back. Then, **Kanwal**, I want to thank you introducing me to cryo-EM and helping me find my way around data processing, interpretation and model building. Our collaboration has been fruitful and resulted in two manuscripts presented in this thesis. **Steffen**, I want to thank you for helping me get into structural biology and taking the time to help write my first structural chapters.

This brings me to thank my co-promotor **Stephan**. I appreciate your commitment to join the monthly meetings with Lars and me. Your expertise in drug screening has guided me to ask the right questions and find experiments to test these. I also want to thank your labmembers, **Julia, Asad, Marnix** and

Wing-Sam. All of you have helped me to set up screening methods, synthesize new compounds, or showed me how to do proteomics.

I also want to thank my lab members through the years: **Huijie, Imogen, Max, Wagner, Inês, Britt, and Licheng.** Getting your input during our weekly meetings was great, and although it can be difficult to comment on such different projects, it did make me feel supported. This brings me to **Yangli, Ajit, Marko, Lion, Daniel, and Tim.** It was great to talk together, and for the ones still going I wish you all the best with finishing your PhD.

To my family and friends, **mama, papa, Len, Ymke, Jop, Tije, Bente, Jeroen, Ivano, Jolanda, Lorenzo, Maud, Thomas, Daphne, Dylan, Lisette, Derk, and Elles.** Having a solid support group is something that cannot be underestimated. Enjoying time with you has given me a break from my own thoughts and charged me to put renewed energy into my work. To my parents, I appreciate the way you have always nurtured my curiousness and allowed me to do small experiments as a kid. I still vividly remember trying to see how many sugars I could dissolve in dad's coffee and test if this has anything to do with the temperature. Though seemingly small, this has harnessed the curious mind that has brought me here today.

And last, **Rachel.** You have been there for me throughout the years and were able to support me on the bad days. It must have been weird to see me, lost in my own thoughts, thinking about the most abstract of concepts. If you asked me what I was thinking about, you received the most uncomprehensible string of thoughts which made me go from something we saw to a new way of designing an experiment. Some days I just answered with "It is complicated to explain", but you kept asking regardless. It is a nice feeling to have someone at home that tries to understand the weird corners of my thoughts, and even though I sometimes can't explain them, it does make me feel heard and supported. We met while we were young and have grown to be adults together. I can't wait to marry you and call you my wife.