Synthesis, structure and epitope mapping of well-defined Staphylococcus aureus capsular polysaccharides

Østerlid, K.E.

List of publications

Østerlid, K.E., Del Bino, L., Ettelbruck, C., Unione, L., Carboni, F., Arda, A., Overkleeft, H.S., van der Marel, G.A., Romano, M.R., Jiménez-Barbero, J., Adamo, R., Codée. J.D.C., Staphylococcus aureus capsular polysaccharide type 5 and 8 trisaccharide repeating unit frameshifts to define the minimal binding epitope for antibody recognition. *Manuscript in preparation.*

Østerlid, K.E.[+], Li, S.[+], Unione, L., Del Bino, L., Sorieul, C., Carboni, F., Berni, F., van Puffelen, B., Arda, A., Overkleeft, H.S., van der Marel, G.A., Romano, M.R., Jiménez-Barbero, J., Adamo, R., Codée. J.D.C., Synthesis, conformational analysis and antibody binding of Staphylococcus aureus capsular polysaccharide type 5 oligosaccharides. *Manuscript in preparation.*

Østerlid, K.E., Cergano, R., Overkleeft, H.S., van der Marel, G.A., Codée, J.D.C. Synthesis of a set of Staphylococcus aureus capsular polysaccharide type 1 oligosaccharides carrying taurine esters. *Chemistry - A European Journal,* 2025, https://doi.org/10.1002/chem.202500132

Østerlid, K.E., Sorieul, C., Unione, L., Li, S., García-Sepúlveda, C., Carboni, F., Del Bino, L., Berni, F., Arda, A., Overkleeft, H.S., van der Marel, G.A., Romano, M.R., Jiménez-Barbero, J., Adamo, R., Codée, J.D.C. Long, synthetic Staphylococcus aureus type 8 capsular oligosaccharides reveal structural epitopes for effective immune recognition. *J. Am. Chem. Soc.* 2025, https://doi.org/10.1021/jacs.4c16118

Del Bino, L., Østerlid, K.E., Wu, D., Nonne, F., Romano, M.R., Codée, J.D.C., Adamo, R. (2022), Synthetic glycans to improve current glycoconjugate vaccines and fight antimicrobial resistance, Chemical Reviews, 2022, 122, 20, 15672-15716.

Curriculum Vitae

Kitt Emilie Østerlid was born on the 2nd of January 1994 in Svendborg, Denmark. She attended high school at Midtfyns Gymnasium in Ringe and graduated in 2014 with a specialization in mathematics, physics and chemistry. She then moved to Copenhagen to study chemistry at Copenhagen University and after finishing her bachelor project in the group of associate professor Christian Marcus Pedersen working on catalytic activation of trichloroacetyl glucuronic acid donors, she obtained her bachelor's degree in 2018. She continued her master studies in organic chemistry at Copenhagen University and obtained her master's degree in 2020 after finishing an internship in the group of Christian Marcus Pedersen working on the synthesis of well-defined oncofetal chondroitin sulfate oligomers.

In 2020, Kitt moved to Leiden, The Netherlands, to start her PhD research under the supervision of Prof. Dr. Jeroen Codée in the Bio-organic Synthesis group. The work in the Thesis describes the synthesis and evaluation of different capsular polysaccharides of *Staphylococcus aureus*. Parts of the research presented in this Thesis have been conducted in the group of Jesús Jiménez-Barbero at BioGune in Bilbao, Spain and in the group of Maria Romano at GSK in Siena, Italy, where she has been stationed for shorter internships. Parts of this Thesis have been presented as a poster at the GSK PhD and PostDoc student workshop and as a presentation at Eurocarb 2023 in Paris. During her PhD she has attended the following courses and workshops: PAVax first workshop: Glycoconjugate vaccines: Targeting infectious agents with well-defined vaccines, PAVax second workshop: Carbohydrate chemistry, Project Management Course and Transferable skill courses (Science communication, Management of intellectual property in chemical field, Ethical issues in biomedical research, Bio-entrepreneurship and venture capital and Pitch your project.)

Acknowledgements

After four and a half years in The Netherlands, I am finally finishing my PhD. As the saying goes: “All good things must come to an end”. I would, on this final page, like to take the chance of thanking everyone who has supported me during this time.

First of all, I would like to thank my supervisor Prof. Dr. Jeroen Codée for the opportunity for me to work on this project and letting me join the BioSyn group. Thank you for guiding me around the complications of working with long sugar molecules and small annoying acetyl groups. Your knowledge about sugar chemistry will always impress me. Thank you for listening to me when I needed it and for guiding me through the though days. Also thank you to Gijs van der Marel for accepting to be my co-promoter.

I would also like to thank the people who helped with the synthesis. Thank you to my students Bob, Cedric and Renata for your contribution to the synthetic work. Thank you to Nico, Hans, Rian, Fons, Kartick and Maria. Without you, completing these structures would have been very difficult. During my PhD, I had the opportunity to go on short internships, and I would like to thank the lab of Jesús Jiménez-Barbero at CIC BioGune in Bilbao and the lab of Maria Romano at GSK in Siena for hosting me during these periods and for helping me with the experiments. Especially thank you to Luca for the work on the conformational behavior of the oligosaccharides and STD-NMR and to Linda and Filippo for the immunological study. Thank you to Charlotte Sorieul for your help with the in-house biology experiments.

Thank you to the BioSyn group for all the good discussions about chemistry and everything else. Especially thanks to the DE4 wing. Thank you for guiding me through my stay here in the Netherlands and teaching me about Dutch culture.

To my family and friends back in Denmark, I would like to say a big thank you for your support and help when I needed it. Especially thank you to Mathias, for supporting my choice and moving with me to the Netherlands far from your family, friends and job. I promise that you can decide where we will spend the next four years. Thank you to my mom who has always supported me and came to visit as many times as possible.

Kitt Emilie Retoft Østerlid