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Multi-level structural and functional characterization of therapeutic glycoproteins by mass spectrometry

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(...) Nothing of significance was ever achieved by an individual acting alone. (...)

— **John C. Maxwell, 2006**

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CURRICULUM VITÆ

Steffen Lippold was born on the 19th of April, 1992 in Goslar, Germany. He obtained his Abitur in 2011 from the Grosse Schule in Wolfenbüttel. Afterward, he started his Bachelor's studies in Biology at the Technische Universität Braunschweig. During this time, he participated in the International Genetically Engineered Machine student competition. After his graduation in 2014, he enrolled in a Master's program in Biochemistry/Chemical Biology at the Technische Universität Braunschweig. His study focus was the development of drugs. In addition to his regular curriculum, he performed two industrial internships at Roche Basel and Kaiseraugst, Switzerland. During his first internship, he worked on polysorbate analysis within a technical development department, which resulted in his first scientific publication. In his second internship, Steffen worked in a quality control department for large molecules. There, he gained experience in the analytical methods used for the release and stability testing of antibody-drug conjugates. Both internships profoundly contributed to his interest in analytical methods for the characterization of biopharmaceuticals. After his graduation with honors, Steffen started a PhD program in 2018, under the supervision of Dr. Noortje de Haan, Dr. David Falck and Prof. Dr. Manfred Wuhrer, at the Center for Proteomics and Metabolomics, Leiden University Medical Center, The Netherlands. His PhD program was embedded in the Horizon 2020 Marie Skłodowska-Curie Action innovative training network Analytics for Biologics. In this project, Steffen focused on the development of novel mass spectrometry-based methods for the analysis of therapeutic glycoproteins. He gained comprehensive knowledge in the multi-level characterization of protein glycosylation, which led to six first-author manuscripts and this thesis. Next, Steffen will start a postdoctoral position at Genentech in California, where he will further explore the potential of affinity chromatography-mass spectrometry for the critical quality attribute assessment of biopharmaceuticals.

LIST OF PUBLICATIONS

- 1. Impact of mono- and poly-ester fractions on polysorbate quantitation using mixed-mode HPLC-CAD/ELSD and the fluorescence micelle assay**
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- 2. Glycoform-resolved Fc γ RIIIa affinity chromatography–mass spectrometry**
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- 4. Cysteine Aminoethylation Enables the Site-Specific Glycosylation Analysis of Recombinant Human Erythropoietin using Trypsin**
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mAbs *in press*