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Review of the PhD thesis entitled "Structure and immunochemical properties of endotoxin derived oligosaccharides and neoglycoconjugates as vaccine components" by Ewelina Lakomiec.

The aim of this PhD thesis was to design, synthesize and determine the immunologic properties of glycoconjugates of oligosaccharides from E. Coli type R1 and Gram-positive bacteria derived toxoids. More specifically, core oligosaccharides R1 and R1Z were isolated and purified using chromatographic methods and their chemical structure determined using mass spectrometry and NMR spectroscopy. Using these core oligosaccharides and the TTd and TBd proteins, three glycoconjugates were synthesized and characterized and their *in vivo* immunogenic activity were assessed. Both 1D proton saturation transfer difference (NMR) STD and 2D TOCSY and HSQC STD-NMR were used to determine the epitopes on the R1, R1Z oligosaccharides that are involved in the antigen-antibody interactions.

The thesis is divided into a summary, introduction, material and methods, results, discussion and conclusion part. The introduction part is very comprehensive and provide important context to the research performed. Possibly, a slightly more detailed description of NMR and mass spectrometry could have been done. The data are presented and analyzed in a logical and convincing way.
Ewelin Lakomiec appears to have acquired a very strong competence and/or master bacteria, conjugates, design, cloning, synthesis, immunology, vaccine preparations and oligosaccharide structure analysis and interactions. The multidisciplinary aspect of the work is impressive and maybe the main strength/skills of the PhD student should have been enlighted.

The thesis is very well written and the overall presentation is clear. The background, goals and aims of the research are well described in a detailed and coherent manner. Ewelin Lakomiec

shows a very good ability to present her research and put it into a broader scientific context. Antibiotic resistance and ways of fighting it is one of the biggest challenges, and therefore has Ewelin Lakomiec research a high relevance.

Overall, the work of Ewelina Lakomiec is of excellent quality and I do strongly recommend to the Scientific Council of Hirszfeld Institute granting Ewelina Lakomiec to proceed to the further stages of the doctoral dissertation proceedings.

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