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The Netherlands

Advancing helminth glycomics: structural specificity and immunogenicity of schistosomal and filarial glycans

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Citation

Petralia, L. M. C. (2025, April 16). *Advancing helminth glycomics: structural specificity and immunogenicity of schistosomal and filarial glycans*. Retrieved from <https://hdl.handle.net/1887/4212211>

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Stellingen behorend bij het proefschrift

Advancing helminth glycomics

Structural specificity and immunogenicity of schistosomal and filarial glycans

1. Schistosomes and filarial nematodes have distinct glycan profiles, with conserved features throughout helminth families as well as species-specific traits. Genetic distance between organisms, however, does not necessarily reflect glycomic divergence/similarity. [This thesis]
2. Glucuronic acid residues are widely expressed by parasitic helminths as part of specific glycan motifs that form antigenic epitopes. [This thesis]
3. During parasitic infections, mammalian hosts develop antibody responses to a wide repertoire of helminth glycans. This reflects the relevance of those glycans in host-parasite biology. [This thesis]
4. Given the complex associations of IgG subclasses with disease outcomes in filariasis, further research into specific IgG subclass responses to glycan antigens in different endemic subpopulations could shed light on the immunological role and diagnostic potential of these anti-glycan antibodies. [This thesis]
5. When it comes to helminth glycoconjugates, immunogenicity and immunomodulatory capacity must not be mistaken for one another. [This thesis]
6. The presence of anionic or zwitterionic monosaccharides and modifications in glycoconjugates alter their physicochemical properties and affect molecular interactions with (immune) receptors and antibodies. [Adapted from 'Anionic and zwitterionic moieties as widespread glycan modifications in non-vertebrates' Katharina Paschinger & Iain B.H. Wilson, *Glycoconj J.* 2019 Jul 5;37(1):27–40]
7. While clearly antigenic, the endogenous functions and biosynthesis pathways of the glycosphingolipid glycans in most parasites infecting humans and animals are still elusive. [Adapted from 'Glycosphingolipids in human parasites', Richard D. Cummings, *FEBS Open Bio.* 2023 Sep;13(9):1625-1635]
8. Glycomic studies have shown that (parasitic) infections affect the host glycome in unique ways. Complementing these studies with glycoproteomic analyses to determine the presence or absence of glycoproteins and the differential protein glycosylation contributing to the observed disease-specific glycan signatures will be critical to identify biomarkers. [Adapted from 'The Human Blood *N*-Glycome: Unraveling Disease Glycosylation Patterns' Pongracz *et al.*, *JACS Au.* 2024 May 8;4(5):1696–1708]
9. Both glycocentrism and 'glycophobia' constitute unwanted extremes in biology [Ajit Varki]. Comprehensive multi-omics studies such as integrative spatial-omics benefit from incorporating glycomics, which often remains 'the neglected omics layer' [Gordan Lauc]. Conversely, studying glycans as part of their carrier molecules, instead of as separate molecules, by applying glycoproteomics or glycolipidomics approaches provides valuable insights into the biological roles of glycoconjugates.
10. Two and two may no longer add to four outside of our atmosphere. Truth on earth, error beyond – from which I conclude that glimpsed mysteries remain hidden from us simply because nature has not endowed us with the organs necessary to understand them. [Adapted from '*Letter from a Madman*', Guy de Maupassant, (1885)]
11. Highly organized research is guaranteed to produce nothing new. [Adapted from Appendix 1 of *Dune*, '*The Ecology of Dune*', Frank Herbert (1965)]
12. Preserving biodiversity and preserving the environment should be our main task here. [Inspired by Donald G. Comb, New England Biolabs founder]

