

Harnessing the diagnostic potential of highly specific anti-glycan antibodies in schistosomiasis

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Infection or exposure to schistosomes induce a multitude of antibodies specific for a wide range of antigens expressed by parasite larvae, adult worms and eggs. A large proportion of these antibodies recognise antigenic glycans that are part of the parasite's glycoprotein and glycolipid repertoire. While the role of these anti-glycan antibodies in immunity remains poorly understood, they present a so far untapped diagnostic potential as extensive glycomics work has shown that schistosomes contain several unique glycan elements. Identification of single or a combination of few defined glycan candidate antigens is central for future development of a highly accurate anti-glycan antibody detection tool. In order to select such candidate antigens, we applied an iterative target selection process based on custom-made glycan microarrays combined with well-characterised sample sets. We have assessed the specificity and sensitivity of candidate antigens by analysing schistosome non-endemic area samples from a controlled human schistosome infection model, from primary infection traveller samples, from presumed schistosome naïve donor samples as well as samples from a soil-transmitted helminth endemic area. Furthermore, samples from schistosomiasis endemic areas in Kenya were investigated. Through this process a candidate target with promising accuracy for primary schistosomiasis infection has been found. Importantly, we have also gained knowledge on longevity of specific antibody responses as well as relationship between exposure dose and timing of antibody response induction for both IgM and IgG. Development of a highly sensitive and specific antibody detection assay would be a beneficial addition to the existing diagnostic tool repertoire for schistosomiasis. An accurate antibody detection tool would have particular impact and use in traveller diagnostics as well as in very low endemic, near- and post-elimination settings for transmission monitoring purposes.