Identification of species-specific glycan antigens of *Schistosoma haematobium*

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Schistosomes are parasitic worms responsible for devastating chronic diseases worldwide. *Schistosoma mansoni* and *S. haematobium* are the major species infecting humans, causing intestinal and urogenital pathologies, respectively. The *S. mansoni* glycome has been studied in detail, revealing complex, immunogenic and life stage-specific glycans crucial in host-parasite interactions. Very little is known, however, regarding the glycosylation and glycan antigenicity for other schistosome species, including *S. haematobium* which is estimated to be responsible for half of the approximately 250 million schistosome infections. Thus, we investigated the glycans expressed on cercariae, worms and eggs of *S. haematobium*. First, protein and lipid-linked glycans were released using enzymatic and chemical techniques and characterized using mass-spectrometry (MS) based approaches. Glycan structures were determined using sequencing techniques including exoglycosidase digestions in combination with MALDI-TOF-MS, and porous graphitized carbon-liquid chromatography-MS for in-depth resolution of complex isomeric structures. Our analysis revealed substantial differences between *S. haematobium* and *S. mansoni* glycosylation. Notably, *S. haematobium* glycosphingolipid (GSL) glycans are built on a trihexosyl core unlike the disaccharide core described in *S. mansoni*, are enriched in terminal acidic residues, but present a lower degree of fucosylation. The protein-linked glycans, on their hand, present core-modifications and terminal motifs identical to *S. mansoni*, although expressed with major quantitative differences. Next, a selection of glycans representative of *S. haematobium* and *S. mansoni* glycomes including a broad coverage of the differential structures was purified and printed on a glycan microarray. Upon array screening, we observed a strong binding to acidic GSL glycans of IgG in sera from *S. haematobium*-infected individuals compared to *S. mansoni*-infected individuals and uninfected controls. These results indicate that the identified species-specific glycans of *S. haematobium* are immunogenic and may play a role in *S. haematobium* specific immunobiology and pathology. Additionally, they constitute a potential diagnostic target specific for *S. haematobium* infections.