Outline of this dissertation

This dissertation highlights the molecular interaction of helminth glycans with the host's immune system, and its capacity to modulate the immune response. Two different helminths are used, namely the gastrointestinal nematode *Haemonchus contortus* (**Chapter 2**) and the trematode *Schistosoma mansoni* (**Chapter 5**). In **Chapter 2** we show that serum of lambs vaccinated with ES proteins of *H. contortus* contains immunoglobulin G (IgG) antibodies that recognize the glycan antigen Galα1-3-GalNAc-, in addition to GalNAcβ1-4(Fucα1-3)GlcNAc- (LDNF), which was reported previously by Vervelde et al [34]. Analysis by anti-glycan antibodies also revealed that *H. contortus* glycoproteins contain both Galα1-3-GalNAc-, and Galα1-3-Gal structures. **Chapter 3** describes a method to synthesize the helminth glycans GalNAcβ1-4GlcNAc (LDN) and α3-fucosylated LDN (LDNF), as a first approach to generate defined helminth glycans in order to study their interaction with the immune system. In **Chapter 5** we show that *S. mansoni* worm glycolipids induce maturation of DC and induce a T helper 1 (Th1) response. The data suggest that worm glycolipids activate Toll-like receptor 4 (TLR4) to induce a proinflammatory response. Remarkably, activation of TLR4 requires the interaction of the worm glycolipids with the C-type lectin DC-specific ICAM3-grabbing nonintegrin (DC-SIGN) that recognizes a subfraction of worm glycosphingolipid species exposing Galβ1-4(Fucα1-3)GlcNAc- (Le^X) and LDNF glycan antigens. In addition to DC-SIGN, the host lectin galectin 3 (Gal-3), plays an important role in interaction with helminth glycans. In **Chapter 4**, the regulation of expression of Gal-3 in dendritic cells is described.