Microbial glycans immune recognition by human lectins

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In the past decade, there has been a rising interest in investigating the role of bacterial glycoconjugates in the interaction between the human gut microbiota and the immune system. Lipopolysaccharides (LPS) composed by the lipid A, the core oligosaccharide and the O-antigen polysaccharide (Figure 1A), are potent MAMPs (microbe-associated molecular patterns) due to their immunostimulant properties. Although historically known for the endotoxic activity of the lipid A, recent studies unveiled the capacity of LPS to act as weak agonists or antagonists, positioning them as interesting potential drugs to target dysregulated immune response.{1}-{3}

Here I will report the findings of our studies focusing on the interactions between LPS from beneficial and harmful bacteria and lectins, CTL{4} and Siglecs,{5} expressed on immune cells using NMR{6} and biophysical and computational approaches (Figure 1B). We showed that: i) DC-SIGN is able to recognize E. coli R1 OPS, being the outer core pentasaccharide the one that acts as cross-linker between two different tetrameric proteins, ii) B. vulgats mpk LPS{7}{8} is recognized by formation of a heterobivalent interaction with tetrameric DC-SIGN by recognition of the terminal moiety (tMan-Rha-Man) in a length independent manner and the core Fuc residue and iii) Siglec-7 recognized two F. nucleatum strains, ATCC 10953 and 51191,{9} highlighting the recognition of strain 51191 due to the absence of a sialic acid unit.

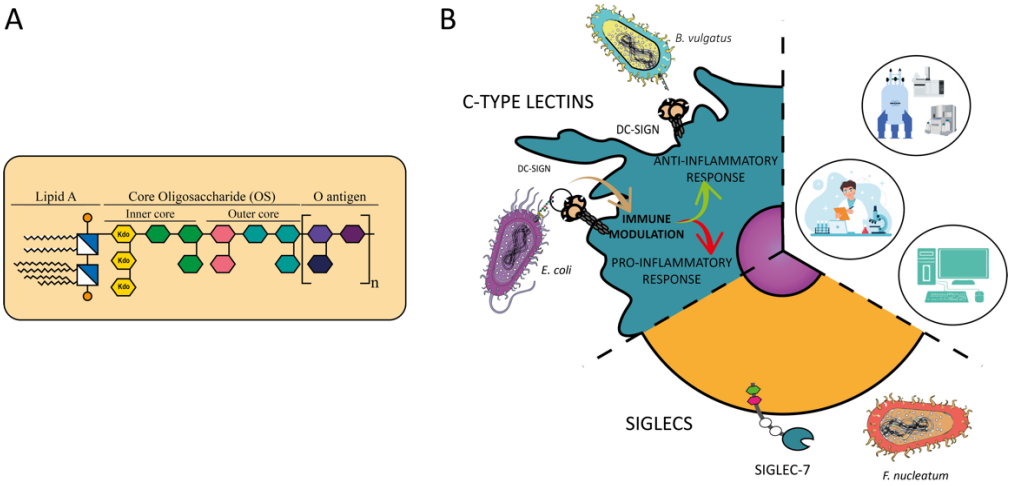

Figure 1. A) LPS schematic representation. B) Bacterial glycoconjugates recognition by lectins studied applying a multidisciplinary approach.

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