P35 – *Akkermansia muciniphila's* lipopolysaccharides

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Akkermansia muciniphila is a commensal symbiont that inhabits the mucus layer of mammals' intestine. This mucus layer covers and protects the intestinal epithelium against pathogens and compounds derived from food, microbes and host. Mucus contains antibacterial peptides and antibodies; even so, *A. muciniphila* is one of the few commensals that successfully inhabits this niche and plays a role in the natural mucus turnover[1,2,3]. *A. muciniphila* participates as a mucin degrader, breaking down the main glycoprotein of the mucus layer[4]. In preclinical models *A. muciniphila* administration has shown to increase the gut barrier function, preventing diabetes development and protecting from a high fat diet[5,6,7]. This is in line with observational studies in humans where *A.muciniphila* population decreases in metabolic diseases[8,9].

As other gram-negative bacteria, *A.muciniphila* produces lipopolysaccharides (LPS) as major components of its exterior membrane, which protects the bacteria and interacts with the environment and the host[10,11]. Recent studies suggest that LPS can produce relevant changes on the intestinal epithelium permeability and integrity, although the mechanisms are not clear yet[12]. Hence, we aim to understand how *A. muciniphila* improves the barrier function and which role the LPS plays in it. A prerequisite to this study is the knowledge of the structure of *A. muciniphila* LPS, which is afforded by combining chemical analyses and spectroscopy techniques.

A. muciniphila's lipopolysaccharides showed high complexity. The O-polysaccharide is composed by at least two chains: a nonasaccharide and a tetradecasaccharide. Both structures were determined. The particular ramification pattern of the Kdo of the nonasaccharide, leads to the conclusion that the nonasaccharide cannot be directly linked to the lipid A. Instead, it should be a ramification of the tetradecasaccharide.

In future we will fully elucidate the lipopolysaccharide structure by an analysis of the whole deacylated LPS. Our results will shed light on the molecular basis of the role of LPS on the interaction of *A. muciniphila* and its host, and future in vitro and in vivo studies will enable the understanding on this special mutualistic relation.

References

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