

Lipopolysaccharides: the importance of the structure in the extreme environment and in human gut

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Lipopolysaccharide (LPS) is a crucial constituent of the outer membrane of Gram-negative bacteria, playing a fundamental role in the protection of bacteria from environmental stress factors, in drug resistance, in pathogenesis, and in symbiosis. The LPS is an amphiphilic molecule composed of three regions: a conserved phosphoglycolipid (the lipid A), an oligosaccharide chain (core OS region), and a surface-exposed O-polysaccharide (O-antigen).[1] One of the most important LPS functions relies in its structure-dependent capability of eliciting an immune response in infected hosts, i.e. depending on its chemical features, an LPS is able to potently activate, poorly activate or not activate an inflammatory response, or even activate an anti-inflammatory one.[2] To investigate how modifications in the structure of this glycomolecule can influence the elicitation of the immune response, the determination of LPS chemistry is a first but crucial step. In this communication I will focus on LPS deriving from both environmental and human intestinal bacteria. On one hand I will show that environmental bacteria can survive in extreme habitats thanks to the development of peculiar modifications of their LPS component.[3] On the other hand, I will show results about the structure of LPS derived from key gut commensal bacteria, and their ability to modulate the immune response [4].

Bibliographic references:

- [1] F. Di Lorenzo et al (2022), *Chem. Rev.* (26) 122
- [2] F. Di Lorenzo et al (2015) *In Carbohydrates in Drug Design and Discovery* pp. 38-63.
- [3] F. Di Lorenzo et al (2017) *Eur. J. Org. Chem.* (28) 4055-4073
- [4] F. Di Lorenzo et al (2019) *FEMS Microbiol. Rev.* 43(3), 257-272.