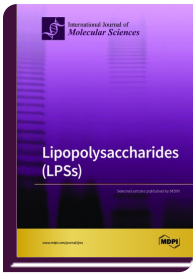
International Journal of *Molecular Sciences*

IMPACT FACTOR 5.6 | Indexed in: PubMed | CITESCORE 7.8

Special Issue Reprint

Lipopolysaccharides (LPSs)



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ISBN 978-3-03928-256-2 (Softback)
ISBN 978-3-03928-257-9 (PDF)

The cytoplasm of Gram-negative bacteria is bound by three layers: an inner membrane, a layer of peptidoglycan, and an outer membrane. The outer membrane is an asymmetric lipidic bilayer, with phospholipids on its inner surface and lipopolysaccharides (LPSs) on the outside, with the latter being the major component of the outer leaflet and covering nearly three-quarters of the total outer cell surface. All LPSs possess the same general chemical architecture independently of bacterial activity (pathogenic, symbiotic, commensal), ecological niche (human, animal, soil, plant, water), or growth conditions. Endotoxins are large amphiphilic molecules consisting of a hydrophilic polysaccharide component and a covalently bound hydrophobic and highly conserved lipid component, termed lipid A (the endotoxin subunit). The polysaccharide component can be divided into two subdomains: the internal and conserved core region as well as the more external and highly variable O-specific chain, also referred to as the O-antigen due to its immunogenic properties. LPSs are endotoxins, one of the most potent class of activators of the mammalian immune system; they can be released from cell surfaces of bacteria during multiplication, lysis, and death. LPS can act through its biological center (lipid A component) on various cell types, of which macrophages and monocytes are the most important.

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