

CHARAKTERYSTYKA LIPOPOLISACHARYDOW *RHIZOBIUM* I ICH ZNACZENIE W PROCESIE SYMBIOZY

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1. Wstęp. 2. Ogólna charakterystyka lipopolisacharydu. 3. Kontrola genetyczna syntezy LPS. 4. Budowa i biosynteza lipidu A. 5. Struktura oligosacharydu rdzeniowego. 5.1. Znaczenie regionu rdzeniowego w symbiozie. 6. Część O-swoista. 6.1. Biosynteza polisacharydu O-swoistego. 7. Rola lipopolisacharydu *Rhizobium* w symbiozie. 7.1. Symbiotyczne właściwości mutantów *Rhizobium* o zmienionym LPS. 7.2. Cechy mutantów lipopolisacharydowych. 7.3. Zmiany w LPS podczas symbiozy. 8. Podsumowanie

The characterization of the *Rhizobium* lipopolysaccharides and their significance in symbiosis

Abstract: Four types of rhizobial polysaccharides i.e. exopolysaccharides (EPSs), cyclic - glucans, K antigens, and Lipopolysaccharides (LPSs), have been shown by mutation studies to be required in the development of various root nodule symbioses. This chapter deals with LPS, a major constituent of the bacterial outer membrane which plays a crucial, albeit poorly understood role in nodule invasion in the symbiotic process.

Mutations that affect LPS structure indicate that normal abundance and certain structural features of the LPS O-specific polysaccharide are required for successful infection of host leguminous plants. Consequences of abnormal O antigen deficiency include the induction of host defence responses, from early blocks in infection thread formation to defects in infection thread release, severely reduced proliferation of bacteroids and finally stunted nodule development. The LPS also plays an important role in adapting bacteria to the plant and other environments. Its structure is altered during biosynthesis in response to factors such as low pH, low oxygen, and host anthocyanins. The more hydrophobic character of LPS occurred during the differentiation from bacterium to bacteroid and is due to higher proportion of long chain fatty acids attached to the lipid A moiety, shortening of PS O-chain and alterations in the composition of O antigen including an increase in acetylation and methylation pattern of the saccharidic domains. Interestingly, these changes are similar to those exhibited by some pathogenic bacteria on infection of their hosts.

Currently, no information is available on the molecular mechanisms in the symbiont triggering these alterations.

1. Introduction. 2. The general characterization of the lipopolysaccharide. 3. Genetics of LPS synthesis. 4. The structure and biosynthesis of lipid A moiety. 5. The structure of core oligosaccharide. 5.1. The significance of core region in symbiosis. 6. The O-specific polysaccharide. 6.1. Biosynthesis of O-specific polysaccharide. 7. The implication of *Rhizobium* LPS in symbiosis. 7.1. Symbiotic properties of *Rhizobium* mutants with altered LPS. 7.2. Characteristics of lipopolysaccharide mutants. 7.3. Changes of LPS in symbiotic state. 8. Conclusion

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