

## MS09 Structural Biology combining methods/High resolution

MS9-05

The interaction of the Lactobacilli surface layer proteins with the lipoteichoic acids from the cell wall

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### Abstract

Surface layers (S-layers) are 2D crystalline lattices of proteins which cover the whole surface of many archaeal and bacterial cells. Since these proteins are in close contact with their environment they fulfil many vital tasks like bacterial adherence to other cells, protection against life-threatening conditions, maintenance of the cell shape and auto-coaggregation. These S-layer proteins are attached to the cell wall by interaction with lipoteichoic acids (LTA). The domain involved in this interaction, the LTA-binding domain, is found in a variety of bacterial cell surface proteins.

Our goal is to structurally characterize the LTA-binding domain and its interaction with the LTA. The soluble fragments of Lactobacilli S-layer protein, containing the LTA-binding domain, were purified and subjected to crystallization. The obtained crystal structures show a unique domain with phosphate molecules bound in the putative binding regions. Isothermal titration calorimetry and thermofluor measurements with LTA and synthesized fragments as well as mutagenesis experiments were performed to characterize the binding. Via Nuclear Magnetic Resonance titration experiments, residues affected upon binding of LTA-fragments and the interaction region could be determined. Furthermore, combining the experimental data and in silico calculations, we propose a model for LTA-binding.

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