

P026 S-Layer-based Nanoarrays
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Bacterial cell surface layers (S-layers) are 2D, crystalline (glyco)proteins that hold a great promise for nanobiotechnological applications, because they consist of protomeric units capable of self-assembling into repetitive nanolattices. Target structures can be coupled to S-layer (glyco)proteins by recombinant DNA technology, resulting in functionalized S-layer nanolattices with spatial control over target display and uniform target orientation, resulting in optimal analyte binding capacity. Creation of a multifunctional nanoarray by co-assembly of different functionalized S-layer fusion proteins shall allow addressing different features simultaneously. Therefore, S-layer technology offers the unique possibility of studying interaction mechanisms between partners. We are developing a nanoarray using the glycosylated S-layer protein (SgsE) nanolattice from *Geobacillus stearothermophilus* NRS 2004/3a. The design and development of an S-layer-based nanoarray detection system is based on detailed insights into the S-layer protein self-assembly mechanism to enable optimization of nanoarray formation, and will be accomplished by coupling of targets to the self-assembly domain of SgsE and by stable and orientated attachment of the functionalized (by target fusion), smooth S-layer protein monolayer onto a chip surface. Comparison of S-layer technology with state-of-the-art microarray technology shows that a typical microarray spot of 1 μm in diameter would contain $\sim 15,000$ targets aligned in an oblique lattice with spacings of 10 nm.