

P014 Attachment of Proteins to Cyclodextrin Molecular Printboards via Orthogonal Host-Guest and Protein-Ligand Interactions

Manon Ludden and Jurriaan Huskens

Laboratory of Molecular Nanofabrication, MESA+ Institute for Nanotechnology, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands

Multivalency is the phenomenon that describes the interaction between multivalent receptors and multivalent ligands. It is well known to play a pivotal role in biochemistry, particularly in protein-carbohydrate interactions, both in solution and at interfaces. Supramolecular host-guest chemistry has been well established in solution, but its use at interfaces remains limited. In order to build assemblies at surfaces through supramolecular interactions, other demands have to be met, such as larger thermodynamic and kinetic stabilities of the assemblies. For many supramolecular motifs, this inevitably leads to the use of multivalent interactions. The understanding of supramolecular interactions at interfaces provides us with a tool for the quantitative description of multivalency at interfaces, while, on the other hand, the design rules developed in medicinal chemistry can be applied in synthetic systems for the development of new nanostructures. Molecular printboards are self-assembled monolayers functionalized with receptor groups suitable for nanofabrication. The design of guest molecules allows precise control over the number of interacting sites and, therefore, over their binding strength and kinetics. The results presented here deal with heterotropic multivalency, which is the use of multiple interaction motifs. This has been applied to the controlled, selective, and specific binding of proteins, antibodies, and cells to molecular printboards.