Binding of proteins to carbohydrate clusters: a QCM-D study on purpose-designed model surfaces.

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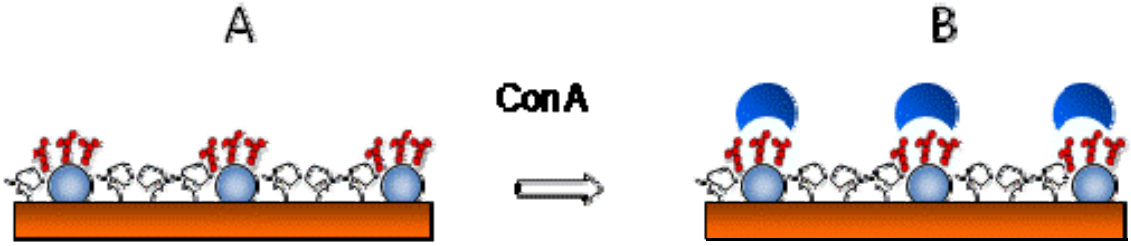
Interactions between proteins and carbohydrates are involved in many biological processes, such as the binding of various viruses or toxins to the cell surface. For such interactions to be sufficiently strong, multivalent binding of a given protein to several carbohydrate moieties is typically required.
Block copolymer micelle nanolithography allows the creation of arrays of gold nanodots where the size of the nanodots and interdot-spacing can be controlled, to meet the needs of each application. We used QCM-D to study the selective deposition of mannose on gold nanodots on silica surfaces. Passivation of the silica surface and the selective binding of Concanavilin A, a mannose-binding lectin protein, to the functionalised surfaces were also tested.
Our initial results suggest that gold nanodots arrays selectively functionalised with carbohydrate moieties could be promising platforms for the spatially controlled presentation of carbohydrate clusters, for protein or cell binding studies.



Binding of Concanavilin A (ConA) to surfaces functionalised with mannose clusters. A) Mannose biofunctionalised and PEG passivated gold nanostructured surface, and B) ConA bound to the mannosyl groups on the gold nanodots.