Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantitative Analysis of Multivalent Ligand Presentation on Gold Glyconanoparticles and Their Effects on Protein Binding XIN WANG, Department of Chemistry, Portland State University, OLOF RAMSTRÖM, Department of Chemistry, KTH - Royal Institute of Technology, MINGDI YAN, Department of Chemistry, Portland State University — Bio-functionalized nanomaterials, which combine functions of biological ligands and unique properties of nano-sized building blocks, have exhibited increased potential applications in biosensing, therapeutics, and diagnostics. Glyconanoparitcles carrying a monolayer of carbohydrate ligands on nanoparticles provide an excellent platform for sensitive protein recognitions. Using Au nanoparticles as the scaffold, multivalent interactions between glycan ligands and proteins have been demonstrated. However, quantitative analysis especially the binding affinity of the resulting glyconanoparticles is challenging to determine. Here we present a new characterization technique, based on fluorescent competition binding assays, for measuring dissociation constants for glyconanoparticles-protein interactions. Au nanoparticles coupled with a series of un-derivatized carbohydrates were prepared by a photocoupling chemistry. Dramatic binding affinity enhancement was observed due to the high ligand density on nanoparticles, which was highly relevant to ligand display, controlled by the linker type, chain length, ligand size and density.

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Date submitted: 22 Dec 2009 Electronic form version 1.4