Narasimha Murthy, B.; Sampath, S.; Jayaraman, N., 2005, "Synthesis and Langmuir studies of bivalent and monovalent α-D-mannopyranosides with Lectin Con A", *Langmuir*, *21*, 9591 – 9596.

This Article reports Langmuir studies of a bivalent and a monovalent sugar containing glycolipids and their interactions with a protein (lectin). The clustered nature of a sugar ligand and its presentation are known to play a crucial role in its effective interaction with a lectin. Clustering of the sugar ligands has set a paradigm in approaches to study carbohydrate-protein interactions in general. Modeling of a two-dimensional surface is thus clearly desirable in approaches to understand glycolipid-protein interactions. The purpose of the present investigation is to assess the carbohydrate-protein interactions in a two-dimensional system, which would resemble closer to the naturally occurring glycolipid-protein interactions. As multi- or oligovalency of sugar unit at the molecular level is essential, a bivalent sugar containing glycolipid two-dimensional surface was constructed by involving Langmuir techniques and subsequently their lectin binding behavior was assessed. For a comparison purpose, a monovalent glycolipid surface was utilized. The most important outcome of these studies is the identification of optimal sugar densities for an effective interaction with lectin, as assessed by the Langmuir techniques. The bivalent sugar ligand binds to the lectin at a lesser sugar density than the monovalent sugar ligand. These results are important and contribute in a fundamental manner about multivalency in glycolipid-protein interactions. The results presented herein should be useful in sustained efforts towards biosensor development, construction of sugar ligands in solid matrices and of multi-layers consisting of alternate layers of sugar-lectin complexes.