Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Queueing and Cooperativity in Ligand-Receptor Binding MARIA D'ORSOGNA, TOM CHOU, UCLA — We compare the kinetics of two types of receptors: receptors that only allow ligands to attach to the binding sites in a specific order, and those that allow binding in any order. For equivalent rate constants and cooperativities, we find that receptors with sequential ligand binding are more likely to have all of its binding sites fully occupied than receptors that bind ligands in any order. The mean occupation of sequentially loaded receptors is also higher. However, starting from a totally empty receptor, we find that the mean first passage time to full occupancy is smaller for low-mean-occupation, random adsorption receptors. Our results are contrasted with Hill-like descriptions of receptor occupancy. Scenarios in which distinction of receptor types may be important are also discussed.

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Date submitted: 05 Dec 2004 Electronic form version 1.4