

Abstract Submitted
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Kinetics of Multidentate Ligand Binding IGOR GONCHARENKO, MIKE COLVIN, AJAY GOPINATHAN, University of California, Merced — The binding of multivalent ligands to cell surface receptors is an inherent feature of many biological processes and is technologically important in designing drug delivery systems. We analyze the binding and unbinding kinetics of a multi-armed ligand to normal and cancerous cells in terms of the residence time. By mapping the problem to a first passage time solution of the dynamics described by a multi-dimensional Fokker-Plank equation we are able to derive the residence times of the ligands on the cell surface as a function of the number of arms, binding affinity, polymer statistics of the linker arms as well as density, distribution and types of receptor binding sites. Our results point towards ways of optimizing these parameters so as to selectively target diseased cells with specially designed ligands that are capable of drug delivery. Our results also shed light on the recognition and response kinetics of a variety of cell types with specific functions that are triggered by the binding of surface receptors to exogenous ligands.

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