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Modelling Tethered Enzymatic Reactions[1] CITLALI SOLIS SALAS, JESSE GOYETTE, NICOLA COKER-GORDON, MARCUS BRIDGE, University of Oxford, SAMUEL ISAACSON, Boston University, JUN ALLARD, University of California, PHILIP MAINI, OMER DUSHEK, University of Oxford — Enzymatic reactions are key to cell functioning, and whilst much work has been done in protein interaction in cases where diffusion is possible, interactions of tethered proteins are poorly understood. Yet, because of the large role cell membranes play in enzymatic reactions, several reactions may take place where one of the proteins is bound to a fixed point in space. We develop a model to characterize tethered signalling between the phosphatase SHP-1 interacting with a tethered, phosphorylated protein. We compare our model to experimental data obtained using surface plasmon resonance (SPR). We show that a single SPR experiment recovers 5 independent biophysical/biochemical constants. We also compare the results between a three dimensional model and a two dimensional model. The work gives the opportunity to use known techniques to learn more about signalling processes, and new insights into how enzyme tethering alters cellular signalling.

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