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Biological Signaling: the Role of "Electrostatic Epicenter" in "Protein Quake" and Receptor Activation AIHUA XIE, SANDIP KALEDHONKAR, ZHOUYANG KANG, Department of Physics, Oklahoma State University, USA, JOHNNY HENDRIKS, KLAAS HELLINGWERF, Swammerdam Institute for Life Sciences, University of Amsterdam, NL — Activation of a receptor protein during biological signaling is often characterized by a two state model: a receptor state (also called "off state") for detection of a stimuli, and a signaling state ("on state") for signal relay. Receptor activation is a process that a receptor protein is structurally transformed from its receptor state to its signaling state through substantial conformational changes that are recognizable by its downstream signal relay partner. What are the structural and energetic origins for receptor activation in biological signaling? We report extensive evidence that further support the role of "electrostatic epicenter" in driving "protein quake" and receptor activation. Photoactive yellow protein (PYP), a bacterial blue light photoreceptor protein for the negative phototaxis of a salt loving *Halorhodospira halophia*, is employed as a model system in this study. We will discuss potential applications of this receptor activation mechanism to other receptor proteins, including B-RAF receptor protein that is associated with many cancers.

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