Abstract Submitted
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Quantitative Dissection of a Bacterial Promoter: Cooperativity, Sensitivity, and Combinatorial Control[1] THOMAS KUHLMAN, Center for Theoretical Biophysics, UCSD, ZHONGGE ZHANG, MILTON SAIER, Division of Biological Sciences, UCSD, TERENCE HWA, Center for Theoretical Biophysics, UCSD — *E. coli's lac* promoter offers a possibility of confronting system-level properties of transcriptional regulation with the known biochemistry of the molecular constituents and their mutual interactions. We repeated a previous study [Setty et al, PNAS 100: 7702-7 (2003)] by removing several extraneous factors which modulated expression of the *lac* promoter. Through characterization of the promoter activity for key mutants and using thermodynamic modeling, we account for the control of the *lac* promoter in terms of known interactions. We reveal how the sensitive response to inducers arises from the accumulation of several weakly cooperative interactions, and depict how the activator CRP plays a dual role as the enhancer and sensitizer of repression by assisting LacI-mediated DNA looping.

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