Supplementary Materials

Supplementary Text

In the conformational spread model of the motor switch, sensitivity and CheY-P binding cooperativity depend on two parameters: E_J, the coupling energy between adjacent subunits of the switch, and E_a, the energy difference between active (CW) and inactive (CCW) states of each subunit. We simulated this model in the 2-D parameter space of E_J and E_a, and ploted the dependence of sensitivity and CheY-P binding cooperativity on E_J and E_a, along with a plot of CheY-P binding cooperativity vs. sensitivity, as shown in Fig. S1. Clearly, to obtain a sensitivity of about 16 in this 2-D parameter space, the conformational spread model predicts a CheY-P binding cooperativity of about 9. Other parameters used in the simulation were: the number of protomers, 34, the flipping rate of each subunit, 10^4 s^{-1}, and the ligand binding rate, 10 s^{-1}.

Supplementary Figure Legend

Fig. S1. Dependence of sensitivity (panel **a**) and CheY-P binding cooperativity (panel **b**) on E_J and E_a simulated with the conformational spread model. Panel **c** shows the CheY-P binding cooperativity vs sensitivity using data from panels **a** and **b**.
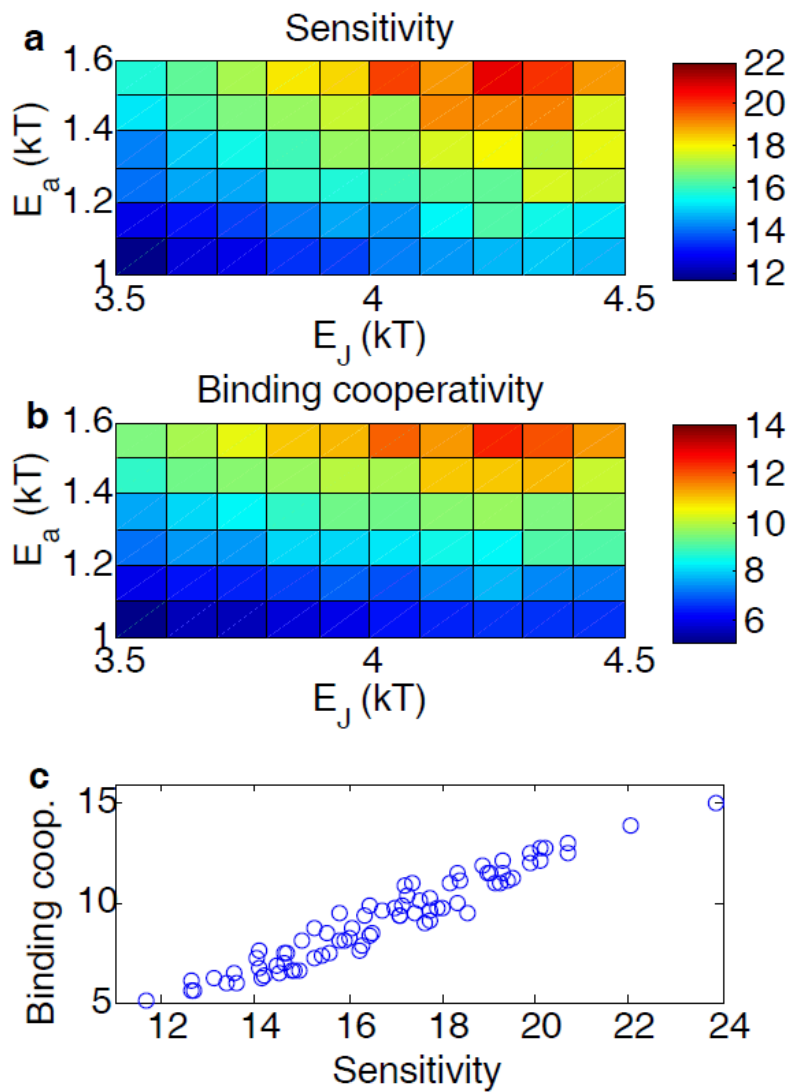
a Sensitivity

b Binding cooperativity

c

Fig. S1