Abstract Submitted
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Negative Feedback in the *Vibrio harveyi* Quorum-Sensing Circuit[1] SHU-WEN TENG, Physics Department, Princeton University, JESSIE SCHAFFER, NED WINGREEN, BONNIE BASSLER, NAI PHUAN ONG, Molecular Biology Department,Princeton University — Quorum sensing is the mechanism by which bacteria communicate and synchronize group behaviors. Multiple feedbacks have been identified in the model quorum-sensing bacterium *Vibrio harveyi*, but it has been unclear how these feedbacks interact in individual cells to control the fidelity of signal transduction. We measured the copy number distribution of the master regulators to quantify the activity of the signaling network. We find that the feedbacks affect the production rate, level, and noise of the core quorum-sensing components. Using fluorescence time-lapse microscopy, we directly observed the master regulator in individual cells, and analyzed the persistence of heterogeneity in terms of the normalized time-delayed direct correlation. Our findings suggest that feedback from small regulatory RNAs regulates a receptor to control the noise level in signal transduction. We further tested this model by re-engineering the gene circuit to specifically diminish this feedback. We conclude that negative feedbacks mediated by sRNAs permit fine-tuning of gene regulation, thereby increasing the fidelity of signal transduction.

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