

48b Engineering the Global Regulatory Networks of Cells

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Prior efforts in cellular engineering have attempted to improve strain properties primarily through the modification of localized components of individual pathways in hopes that such local changes will lead to an optimal global system. To this end, many successful examples have been reported that were based on designer regulatory networks, metabolite balancing systems, and rational or combinatorial gene deletion and amplification approaches. However, these approaches lack a cell-wide perspective and are focused on the local, not global system. Here we report on a global regulatory approach that can impact many different cellular properties depending on the applied selection criteria. Using novel techniques to engineer cells at the global regulatory level, we have been able to access phenotypes previously unattainable by other more locally-focused methods.