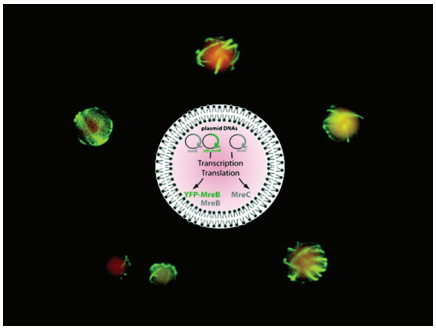
ARTIFICIAL CELLULAR ARCHITECTURE

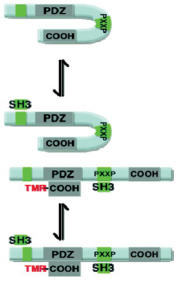
The reconstruction of the bacterial cytoskeleton, while important to the study of natural and artificial living systems, has recently received impetus with the characterization of MreB and FtsZ. In addition, the reconstruction of cell-like architecture is a challenge in the synthesis of artificial living systems. Toward this goal, Maeda *et al.* (DOI: 10.1021/sb200003v) now describe the polymerization of MreB filaments inside liposomes, which are used as membrane systems.



The research described in this study is the first demonstration of a synthetic-biology approach to the reconstruction of a filamentous cytoskeleton in liposomes. The authors suggest that a similar approach might be applicable toward the assembly of artificial cytoskeleton systems.

UNDERSTANDING ULTRASENSITIVITY

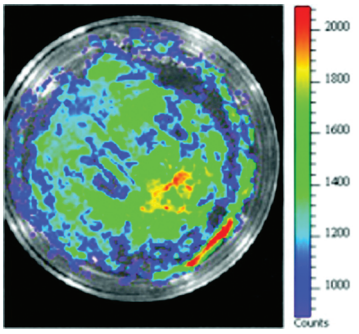
Understanding biological complexity at the level of cell signaling is a key goal of systems biology. Lu *et al.* (DOI: 10.1021/sb200010w) now utilize modeling and synthetic biology experimentation to demonstrate that an ultrasensitive signaling module can be synthesized by adding decoy binding sites to an autoinhibited scaffold protein.



The authors showed that judicious combinations of high and low affinity decoy sites can yield a wide range of values in the response function. The authors then utilized a decoy-containing construct to introduce a response threshold in a novel regulated spindle pole orientation assay described previously by the same group. The modular approach demonstrated in this study is broadly applicable to the examination of other physiologically relevant systems.

DEGRADING HYDROCARBONS

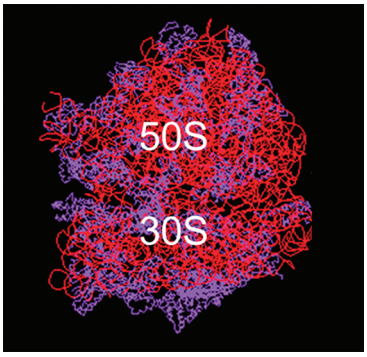
Species of *Acinetobacter* have been reported to degrade various long-chain hydrocarbons and are thus potentially useful in bioremediation. Degradation of *n*-alkanes involves multiple steps catalyzed by specific enzymes. Santala *et al.* (DOI: 10.1021/sb2000066) now describe a biosensor for alkane degradation which is based on *Acinetobacter baylyi* ADP1 engineered with a luciferase reporter.



Because an intermediate of long-chain hydrocarbon degradation served as a substrate for the luciferase reaction, cells luminesce only when actively degrading long-chain alkanes. The system developed by the authors has potential in monitoring bioremediation. It may also be useful as a tool for the screening of libraries of hydrocarbon utilizers.

HIGHLY MODIFIED PROTEINS FOR MULTIENZYME CATALYSIS

Recombinant DNA techniques for easy purification of protein product utilize sequences which encode poly-histidine tags. Wang *et al.* (DOI: 10.1021/sb3000029) extend this routine approach to highly efficient, automated technology for the insertion of



purification tags into genomic copies of genes associated with all the protein components of the translation machinery.

The authors were able to successfully copurify ribosomes and essential translation factors from the engineered strains of *E. coli* and demonstrate activity in cell-free systems. The approach described by the authors might find wide utility in designing systems which employ multienzyme catalysis.

Received: January 29, 2012
Published: February 17, 2012

dx.doi.org/10.1021/sb300007g | *ACS Synth. Biol.* 2012, 1, 42–42