ACS SyntheticBiology

Editorial

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Synthetic Biology: Research Perspectives from China

Synthetic Biology has attracted attention from the public, government, and academic sectors alike in China in recent years. It holds the promise to solve pressing problems in Chinese society, such as the increasing demand on petroleum, and also piques curiosity regarding new life forms and the ability to manipulate lives.

In 2011, the Ministry of Sciences and Technology in China allocated significant funding to support basic research in Synthetic Biology via four 973 projects (973 projects are basic science research programs funded by the government of China, to encourage researchers in various scientific fields). These focused on the development of new synthetic biology methods and tools for the field of industrial biotechnology, with an emphasis on the bioproduction of medicine, chemicals, biofuels, and biopolymers, as well as new technologies to reduce the cost of DNA synthesis. A couple more well-funded 973 projects are expected in the coming years.

In this special issue, "Synthetic Biology: Research Perspectives from China", you will see some of the most recent developments in Chinese synthetic biology research.

Using a model that links ribosome binding site (RBS) DNA sequence to toggle switch bistability via integration with a stochastic model with RBS design method, a team led by Professor Qi OUYANG of Peking University has developed a mechanism to predictably design genetic toggle switches with predetermined bistability. Their method can be extended to the quantitative design of other basic modules in synthetic biology as well.

A collaboration between Dr. Tao JIN at the BGI-Shenzhen, China and Dr. Wei HUANG of the University of Sheffield, U.K. led to the successful development of a new mathematical model containing regulator-stimulus binding and promoter activation as two separate steps. Their model fits experimental data and was used successfully to predict gene regulation performance.

Despite recent advances in genomic sequencing and the chemical synthesis of DNA, the construction of large gene-cluster-containing DNA fragments remains an expensive and tedious task. To tackle this problem, my team at Tsinghua University, China developed a gene cluster extraction method based on an *in vitro* single-strand overlapping annealing (SSOA) process. The SSOA method was successfully used to clone an 18 kb DNA fragment encoding NADH:ubiquinone oxidoreductase and promises to be very useful in the cloning of any specific region, at least 18 kb long, of the *E. coli* genome. Additionally, the method provides a cost-effective way for genome assembly as compared to chemically synthesized gene clusters.

These studies are promising steps forward in the field of Synthetic Biology research in China. The future is bright, and we look forward to more exciting developments!

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