Efficient synthetic system for production of microbial drugs

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Microbial drugs have been widely used to control bacterial or fungal infections, tumors, diabetes, immune diseases, and et al. They play an important role in safeguarding human health and improving the quality of life. *Actinomycetes, fungi, Pseudomonas,* and *Bacillus* are the main drug-producing microorganisms. However, the yield is still too low for a variety of important microbial drugs. There are several bottlenecks such as multi-component coexistence, low matrix utilization, and low yield, which restrict the production of microbial drugs. We have studied the high-yield mechanism of several microbial drugs such as acarbose, daptomycin, fidaxomicin, doxorubicin, amphotericin B, echinomycin and et al, successfully optimized the metabolic networks and developed highly efficient production techniques. In the case of acarbose, a highly effective treatment for type II diabetes, due to the complex biosynthetic pathway and massive structural analogs of acarbose, it is difficult to develop a high-efficiency, low-cost technology for production of acarbose with high-quality. After years of research, we have invented a high-throughput screening method combined with efficient breeding technology to improve the acarbose-producing strain. By investigating acarbose metabolic pathway, and anabolic regulatory genes, the key regulatory factors which affect acarbose synthesis was discovered. Based on these results, a highly efficient synthesis technology was

developed for acarbose production by system optimization and the first industrial production line of acarbose in China was built.

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