HIGH-THROUGHPUT ENZYME ENGINEERING FOR COMMERCIAL-SCALE PRODUCTION OF NATURAL PRODUCTS

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The natural products world is unparalleled in its molecular diversity and wide application space. There are however numerous challenges associated with realizing the full potential of these molecules. Amyris has fermentatively produced eight different molecules at commercial scale. This track record is due to investment in advanced tools for strain engineering, high throughput screening, analytics, and bioinformatics. An integrated pipeline encompassing these tools has enabled Amyris to rapidly accelerate the engineering cycle and reduce the number of design-build-test iterations needed for microbial production of any natural product. In this presentation, we will discuss how this infrastructure is now being leveraged for high-throughput enzyme mutagenesis and screening, enabling greater access to natural products and their derivatives. Further, the application of our massive screening infrastructure to enzyme libraries would not be possible without equally sophisticated statistical models and data analysis tools. Scientists at Amyris are accessing ever greater portions of the enzyme sequence space to improve specificity and activity – ultimately enabling sustainable industrial-scale production of natural products. This talk will describe how each aspect of the enzyme engineering pipeline has led to rapid and high-quality screening of hundreds of thousands of mutants for multiple enzymes.