

GINKGO BIOWORKS™

THE ORGANISM COMPANY

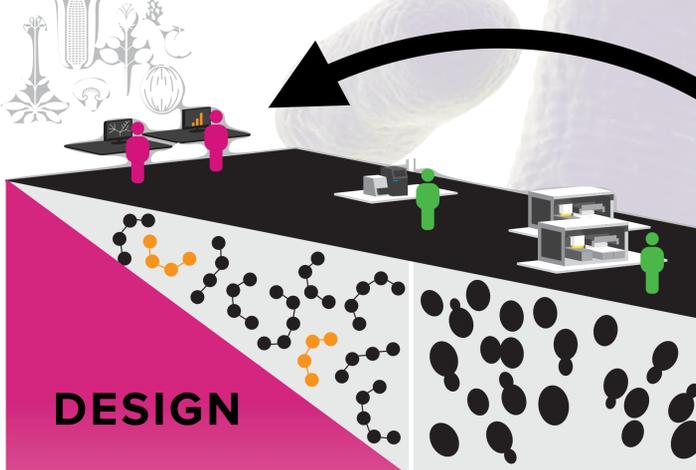
BIOWORKS FOUNDRIES

high-throughput characterization and modification of diverse microbes

BIOWORKS 1



largest capacity organism foundry in the world

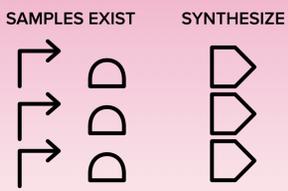


DESIGN

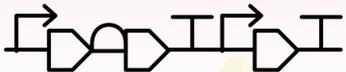
design spec



synthesis/assembly strategy



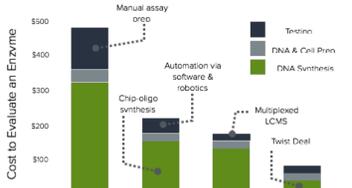
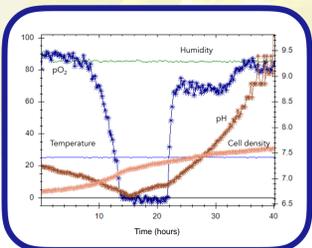
sequence-verified construct



ACTIVE BUSINESS UNITS

- ✦ cultured ingredients: flavors, fragrances
- ✦ strain improvement
- ✦ probiotics

- High-density culture evaluation
- ✦ strain optimization for scale up
 - ✦ medium/feed optimization
 - ✦ real-time tracking of cell density, pH, temp, fluorescence and pO₂

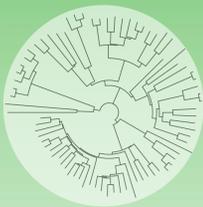


exponential growth in efficiency

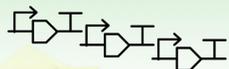
BUILD

part spec
EC 1.2.1.51

bioinformatic part search



standardized designs for synthesis

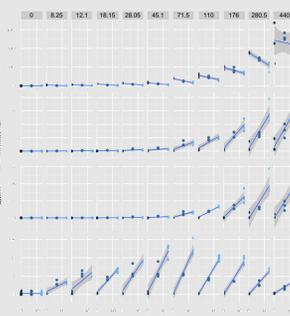
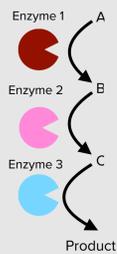


TEST AND FERMENTATION

FOUNDRY CAPABILITIES

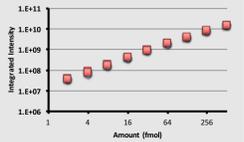
Metabolomics

- ✦ global, central, and secondary metabolism
- ✦ multiplexed LCMS, GCMS
- ✦ pathway enzyme analysis and optimization



Next-generation Sequencing

- ✦ DNA and RNA sequencing with MiSeq, NextSeq
- ✦ strain verification and QC
- ✦ combine with bioinformatics and proteomics to identify gene clusters



Proteomics

- ✦ enzyme expression and solubility
- ✦ global native protein expression
- ✦ robot-mediated mixing for mux

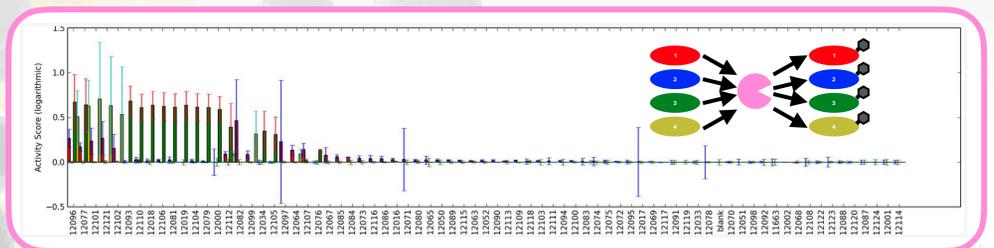
With LCMS and μ PLC, we can screen thousands of enzymes/day



Nanoliter-scale processing

- ✦ improved precision
- ✦ larger-scale: 384-well plates
- ✦ direct-to MS preparation

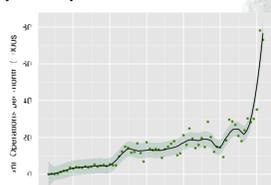
Enzyme specificity and activity on multiple substrates \times hundreds of enzymes in a single experiment



Parallel small-scale fermentation

- ✦ DOE-based approaches to process optimization
- ✦ automated control, monitoring, and sampling

Rapid expansion



exponential growth in scale



next gen. foundry under way

PRESENTER

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