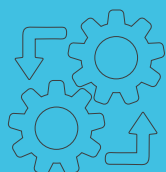
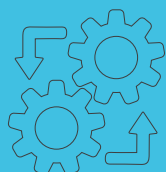


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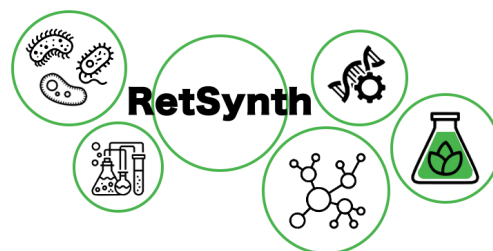
No Auxiliary
Software



Codon
Optimization

RetSynth is a comprehensive tool for rapidly identifying all optimal and sub-optimal pathways for the bioproduction of high value target compounds

The successful biological production of high value target compounds is a slow and complex process. Achieving production of relevant quantities requires the design and integration of pathways into a microbial (chassis) organism. The initial design of pathways requires enormous amounts of genome, enzyme, and reaction data to be sifted through and curated to develop pathways capable of synthesizing a target compound.



Sandia's stand-alone software, RetSynth, uses a comprehensive, curated database in conjunction with a novel mixed integer linear program to overcome this initially slow process by rapidly identifying all optimal and sub-optimal pathways for a user, given a starting chassis organism and target compound. Additional modules maximize theoretical yield by optimizing carbon flux, gene compatibility, and final target separation properties. With its diverse applicability, RetSynth is a time reducing, money saving, easy to use tool for companies looking to optimize and expand their bioproduction capabilities.

RetSynth supplies users with optimal and sub-optimal pathways to produce a target compound either biologically, chemically, or with a hybrid approach. The flux balance analysis module improves theoretical yield by identifying key enzymatic deletions to engineer biological pathways for maximum carbon flux to the desired product. The gene compatibility module directly retrieves genetic information for enzymatic additions and suggests modifications to enhance gene expression in the chassis organism based on the organism's codon bias – functionality which no other software currently provides. The separation properties module identifies chemical intermediates in biological or hybrid pathways with favorable separation properties, ensuring maximum extraction yield prior to producing the final target compound, which can be chemically synthesized from the intermediate after extraction.

TECHNICAL BENEFITS

- Straightforward for anyone to use due to a simple graphical user interface
- Saves time and money: Directly retrieves pathways and suggests modifications to maximize theoretical yield
- Quick interpretation of results with clear images of pathways via the visualization module

INDUSTRIES & APPLICATIONS

- Biotechnology
- Biofuel
- Gene synthesis / plasmid design
- Industrial chemicals
- Pharmaceuticals
- Cosmetics

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