Synthetic Biotechnology

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Engineering whole cell bio-catalysis

Synthetic Biotechnology is a new, cross-disciplinary approach to employ biocatalytic processes for generation of sustainable chemical entities. The group employs advanced bioinformatic tools in combination with molecular simulation to modulate enzyme catalysis towards process relevant parameters, such as product profile specificity or thermotolerance.

The redesigned enzymes are recombinantly incorporated in customized cell systems to address whole cell production of terpenoids or functionalized lipids.

Metabolic perturbations induced by incorporating designed enzyme systems are assessed by comprehensive systems biology methods. Data sets are used to metabolically rewire hosts cells in order to optimize carbon flux towards desired chemicals using new bioreactor concepts. A specific competence of the group is the use of phototrophic and heterotrophic cell systems, which convert CO_2 to value adding chemical entities.