TECHNISCHE UNIVERSITÄT DRESDEN

DRESDEN concept

Chair of Bioprocess Engineering

Synthetic biology applied to production of the Methionine Analogon HMTB

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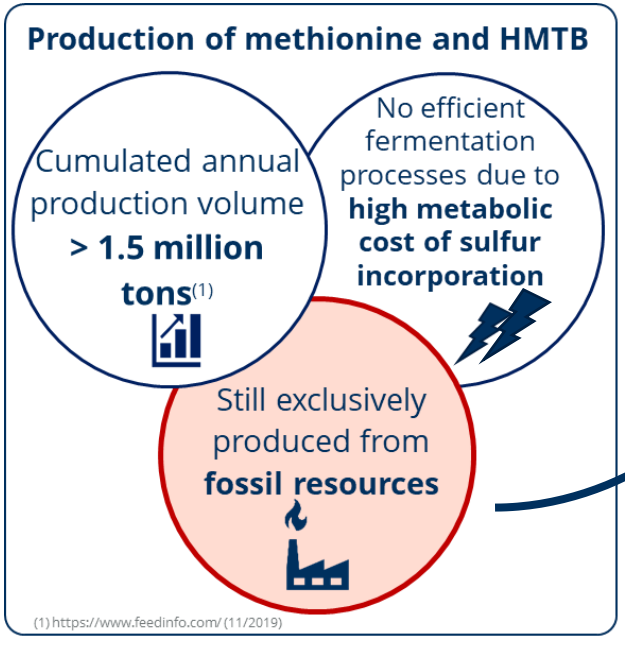
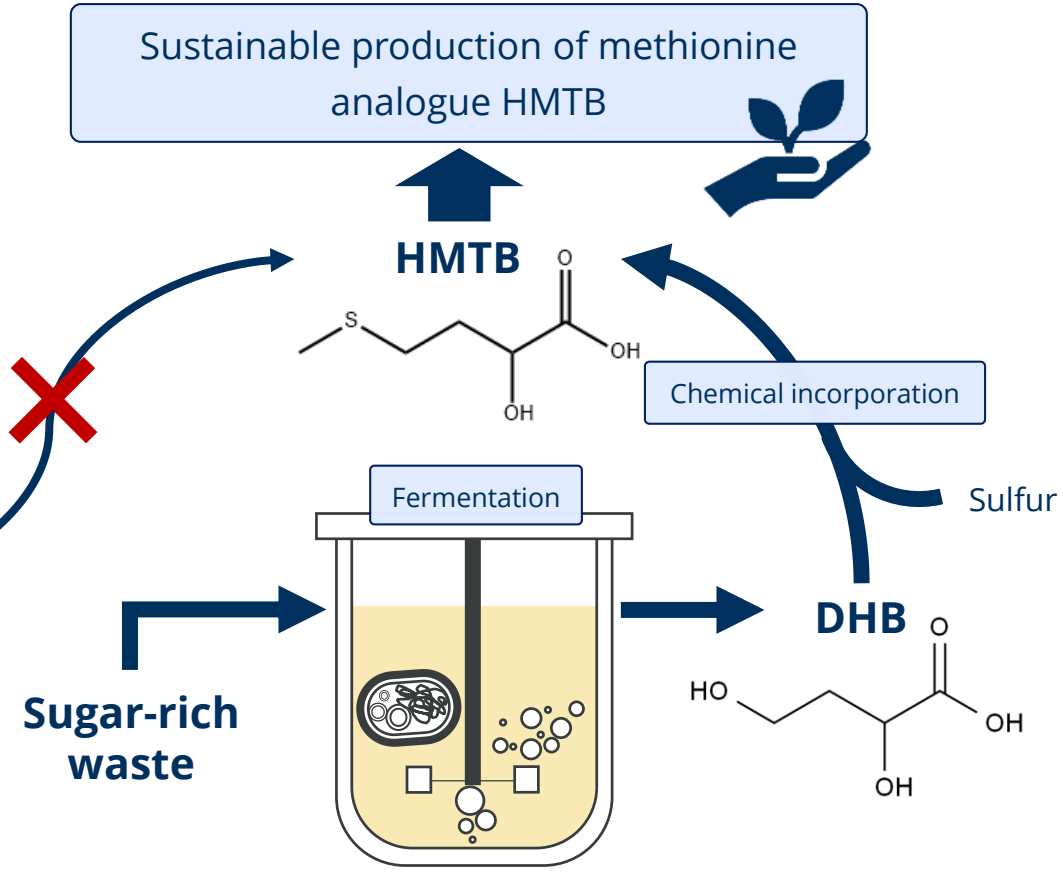
Motivation

Two-stage process for the production of HMTB





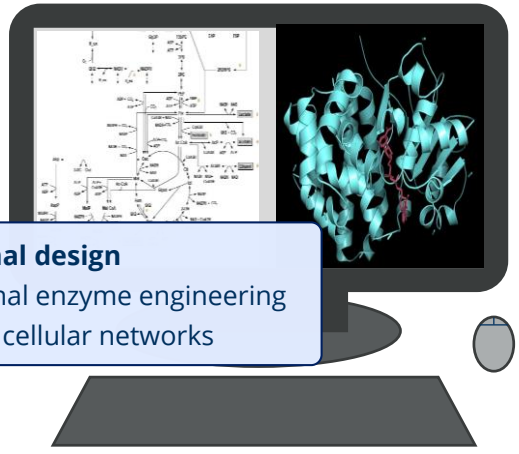
(1) https://www.feedinfo.com/ (11/2019)

HMTB: 2-hydroxy-4-(methylthio)butyrate
DHB: 2,4-dihydrohybutyric acid

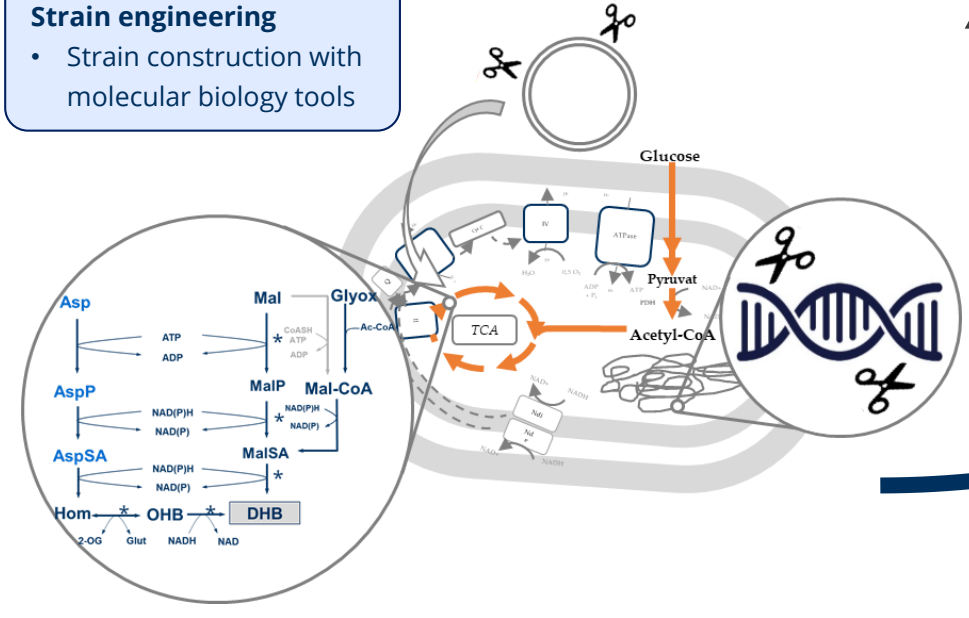
Methods
For microbial synthesis of DHB

Enzyme engineering
- Targeted mutagenesis
- Random mutagenesis and directed evolution

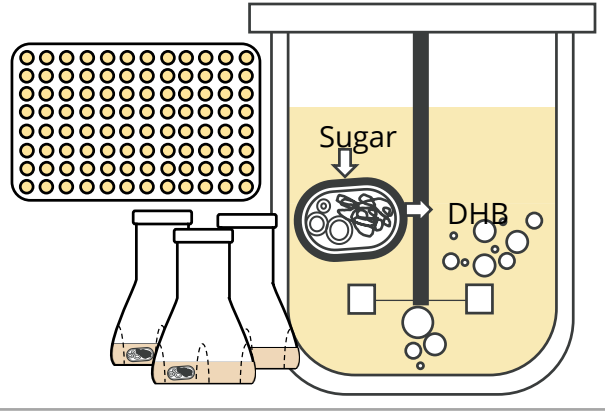
Strain engineering
- Strain construction with molecular biology tools



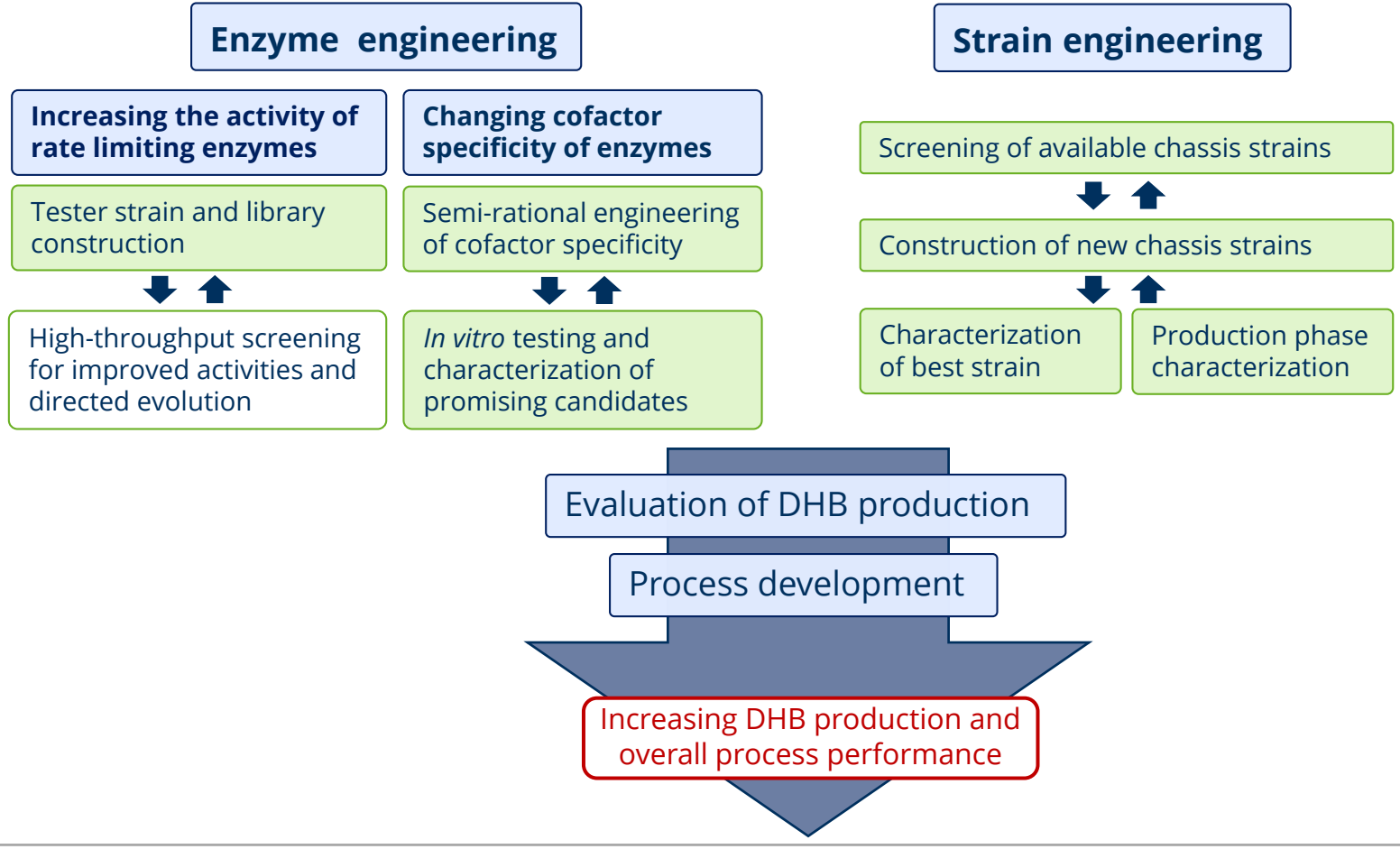
Computational design
- Semi-rational enzyme engineering
- Analysis of cellular networks



Strain characterization
and
Optimization of fermentation process



State of project



Possible research topics for students

Enzyme engineering

Molecular biology including cloning/plasmid construction, targeted and random mutagenesis, enzyme assays, development of high throughput enzymatic assays

Strain engineering

Metabolic engineering:

from conceptual planning to actual strain construction using molecular biology

Strain characterization/Fermentation

^{13}C metabolic flux analyses using mass spectrometry, optimization of fermentation processes

All topics are suitable for Internships/Bachelor/Master/Diploma projects