

Chair of Bioprocess Engineering

Development of enzyme cascades for cell-free ATP regeneration from low cost substrates

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Motivation

Adenosine triphosphate (ATP)

= most important energy source in cells

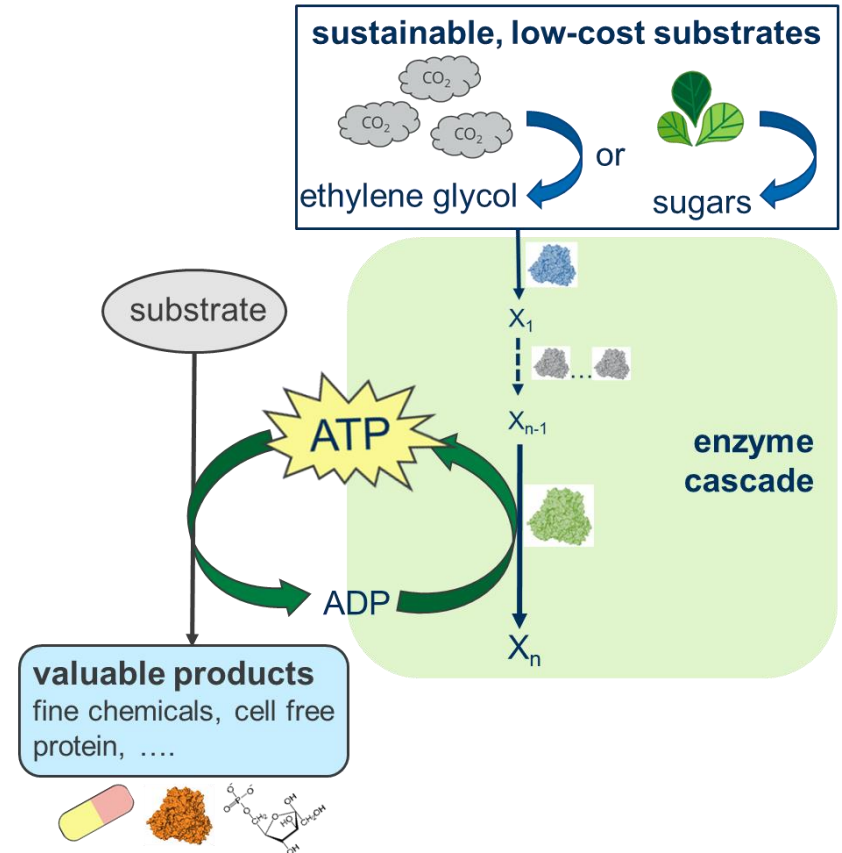
- driving force for biosynth. reactions
- phosphorylation of substrates

→ **required as cofactor by many enzymes**

→ **essential for divers *in vitro* bioprocesses**

but:

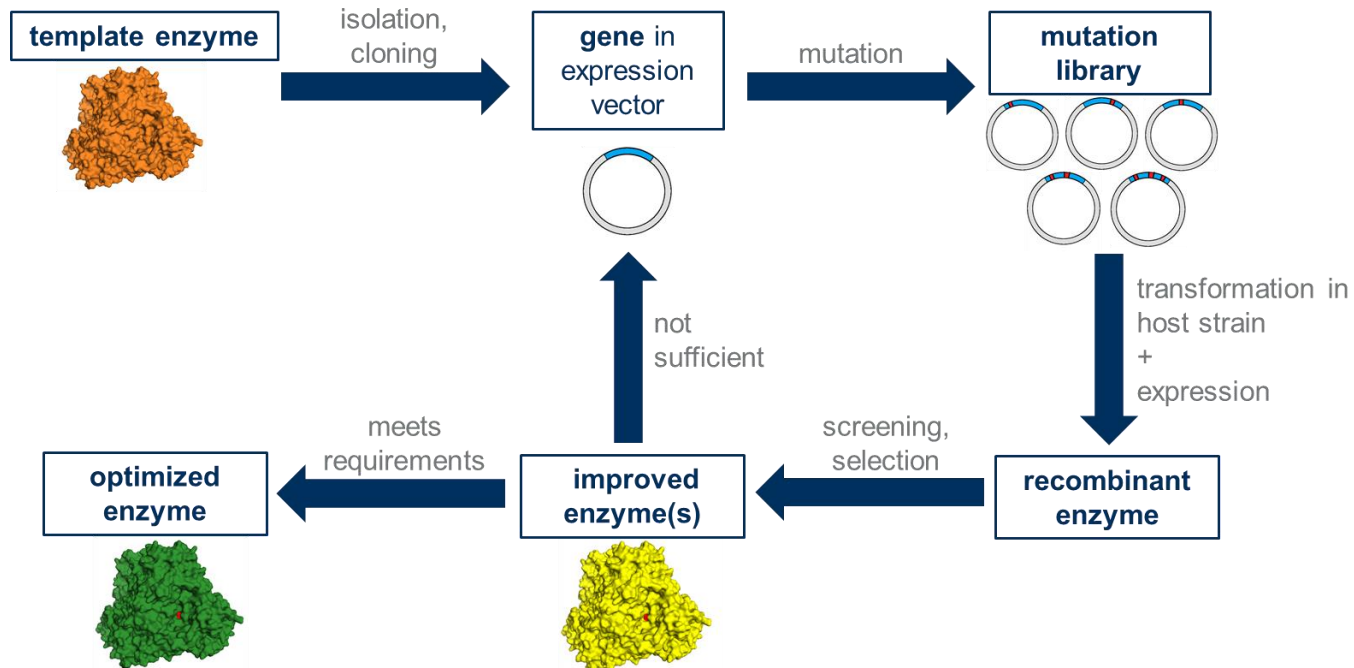
- ATP = very expensive
- existing ATP regeneration systems
 - expensive or instable substrates
 - accumulation of phosphate



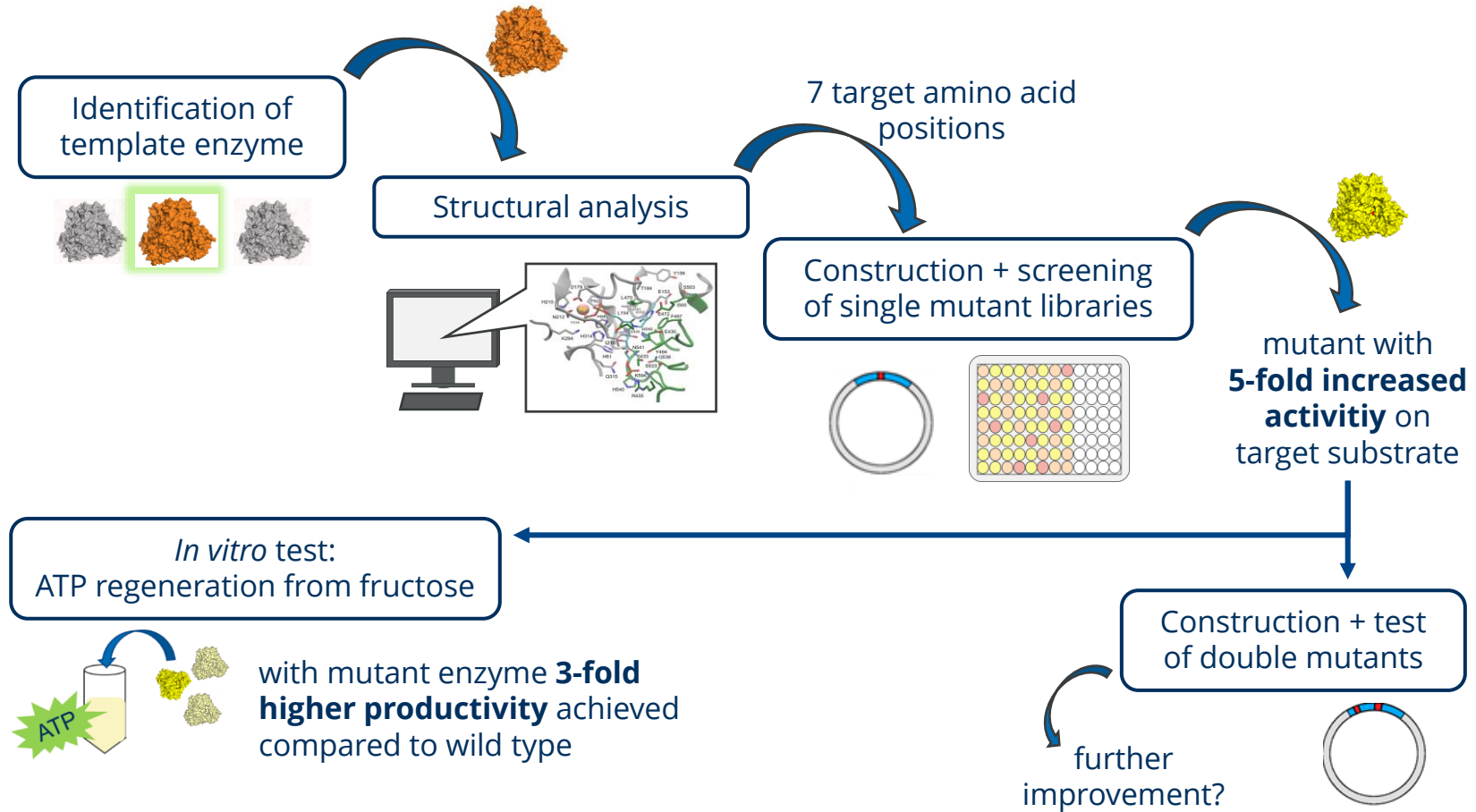
Aim: Expansion of the potential of biocatalysts in cell-free processes through **cost-efficient, cell-free ATP regeneration** without negative impact on the target synthesis

Applied techniques

- Improvement of key enzyme necessary for efficient cascade → **Enzyme engineering**



State of the project: What we have achieved so far



How students can support our project:

Bachelor/ Master/ Diploma thesis or research internship in the fields of:

- **Molecular Biology:**

Cloning, mutation of target genes

- **Enzymology:**

expression optimization, purification, characterization (activity, substrate affinity, stability,...) of enzymes

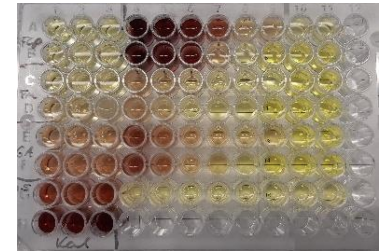
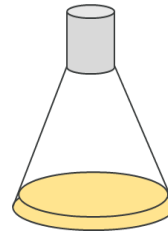
- **Bioprocess Engineering:**

Investigation and optimization of enzyme cascades in terms of productivity and yield



Working as student assistant (SHK):

- Media preparation
 - Protein expression and/or purification
- etc....



[1] <https://tinyurl.com/55kh32kf>