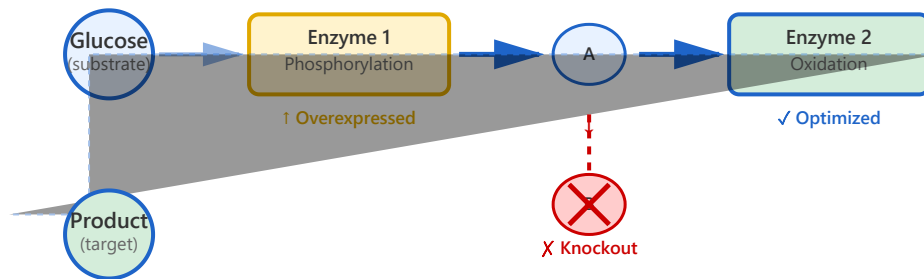


Metabolic Engineering

Metabolic Pathway Optimization



AI-Guided Metabolic Engineering

Flux Balance Analysis (FBA)

- Identify bottlenecks
- Predict knockouts
- Optimize expression levels

Machine Learning Models

- Enzyme activity prediction
- Strain design
- Growth prediction

Flux optimization

Balance metabolic flow

Enzyme engineering

Improve catalytic efficiency

Pathway design

Novel biosynthetic routes

Strain optimization

Host organism engineering

Scale-up prediction

Lab → production modeling