



Engineered bacterial
therapeutic idea



Prototype generation



Rational pathway design
Prototype strain construction
In vitro simulations
In vivo proof of mechanism

Strain optimization



High throughput enzyme screening
Expression and payload optimization
Circuit troubleshooting ('Omics)

Lead selection



Strain characterization
- Organ-on-chip testing
- Quantitative in silico modeling
- In vivo disease models
Manufacturability assessment

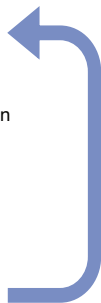
Candidate selection



Process scale-up
Assay development
- Potency and viability
- In vivo biomarkers
IND enabling studies
- In vivo toxicology



Engineered bacterial
therapeutic candidate



Iterative optimization



Process development
Pathway refactoring
Incorporation of auxotrophies
Development of quantitative
biomarkers