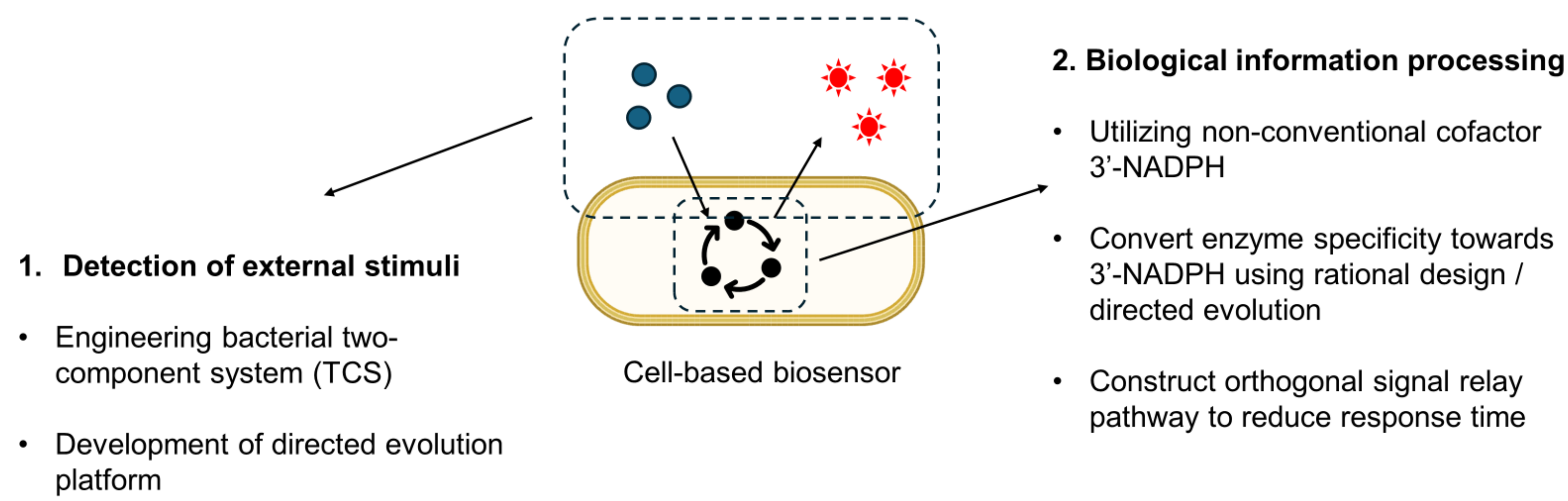


# Protein-based approaches for biosensor development

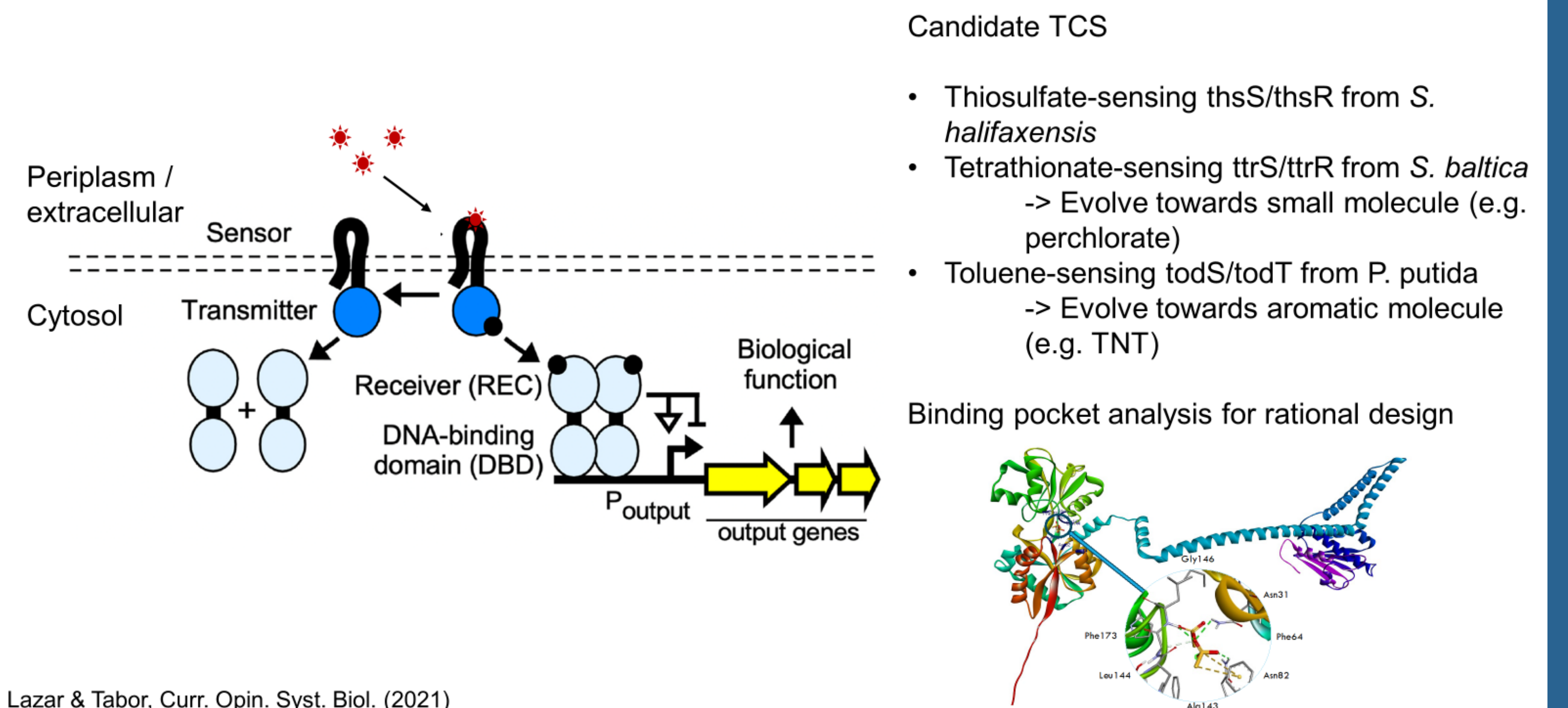
Geoffrey Enwere, Samuel Lim, Ph.D. and Piyush Kumar

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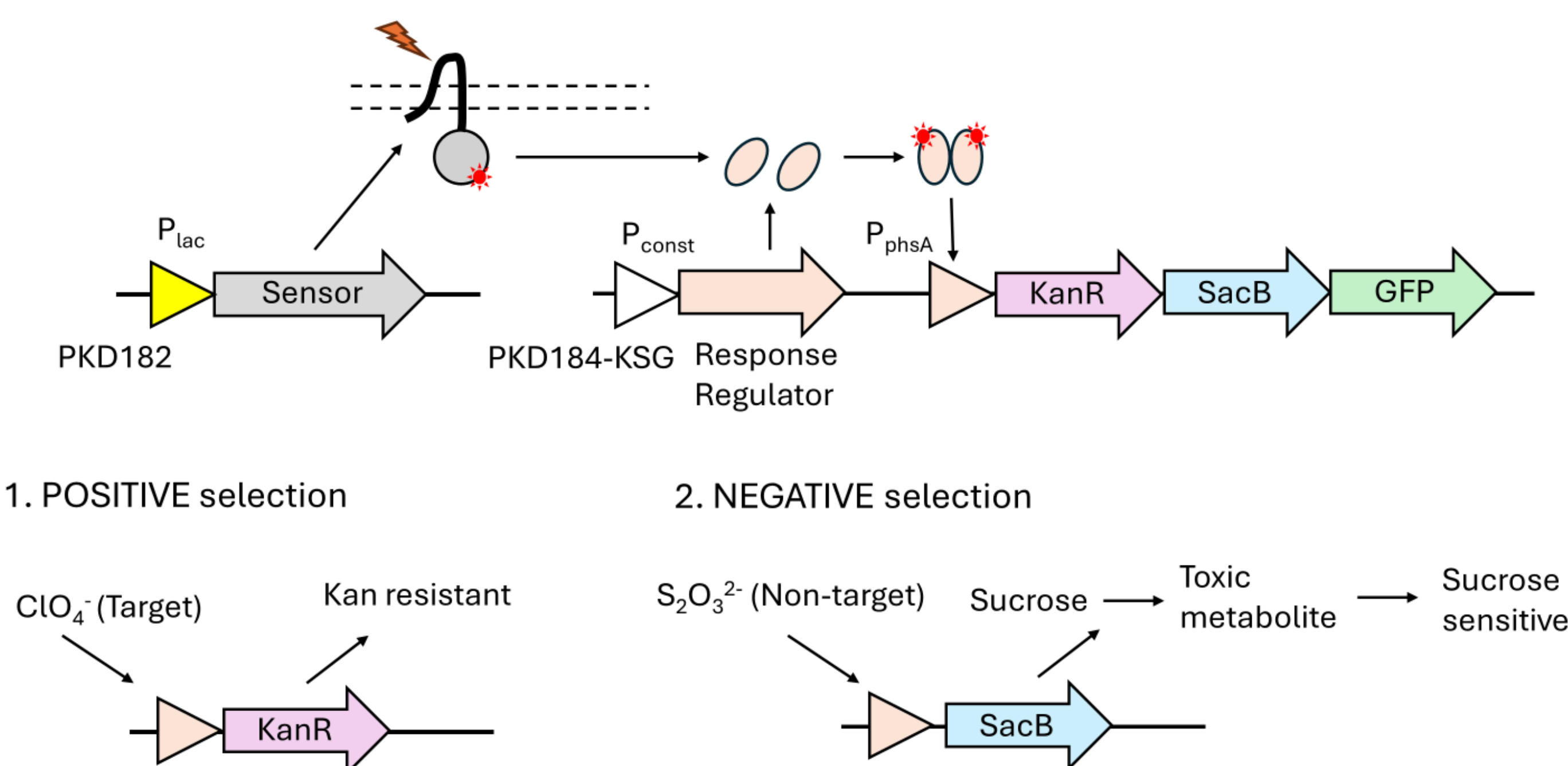
## Two different protein-based approaches for biosensor module development



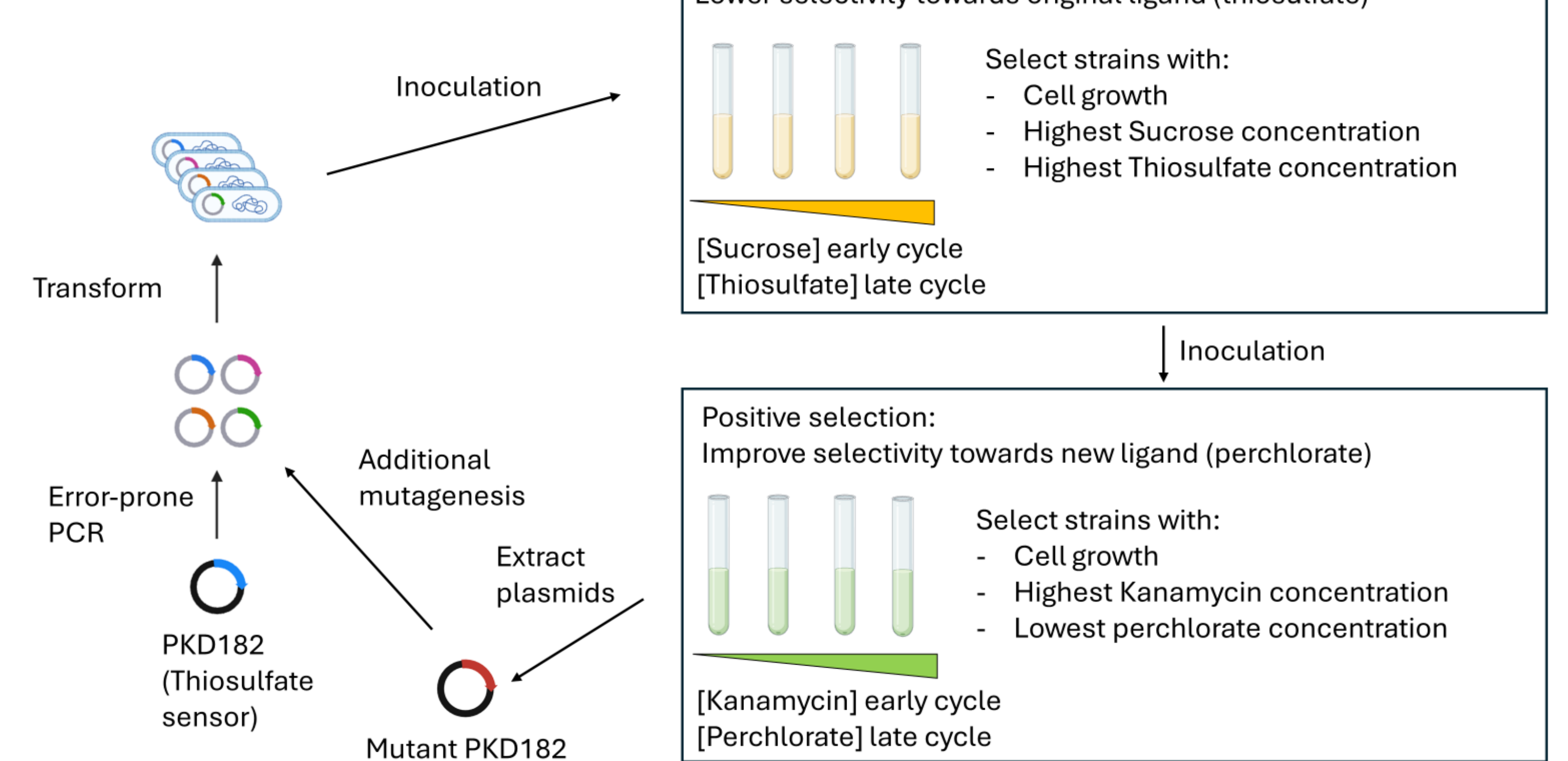
## Engineering bacterial two-component system (TCS) for biosensor module



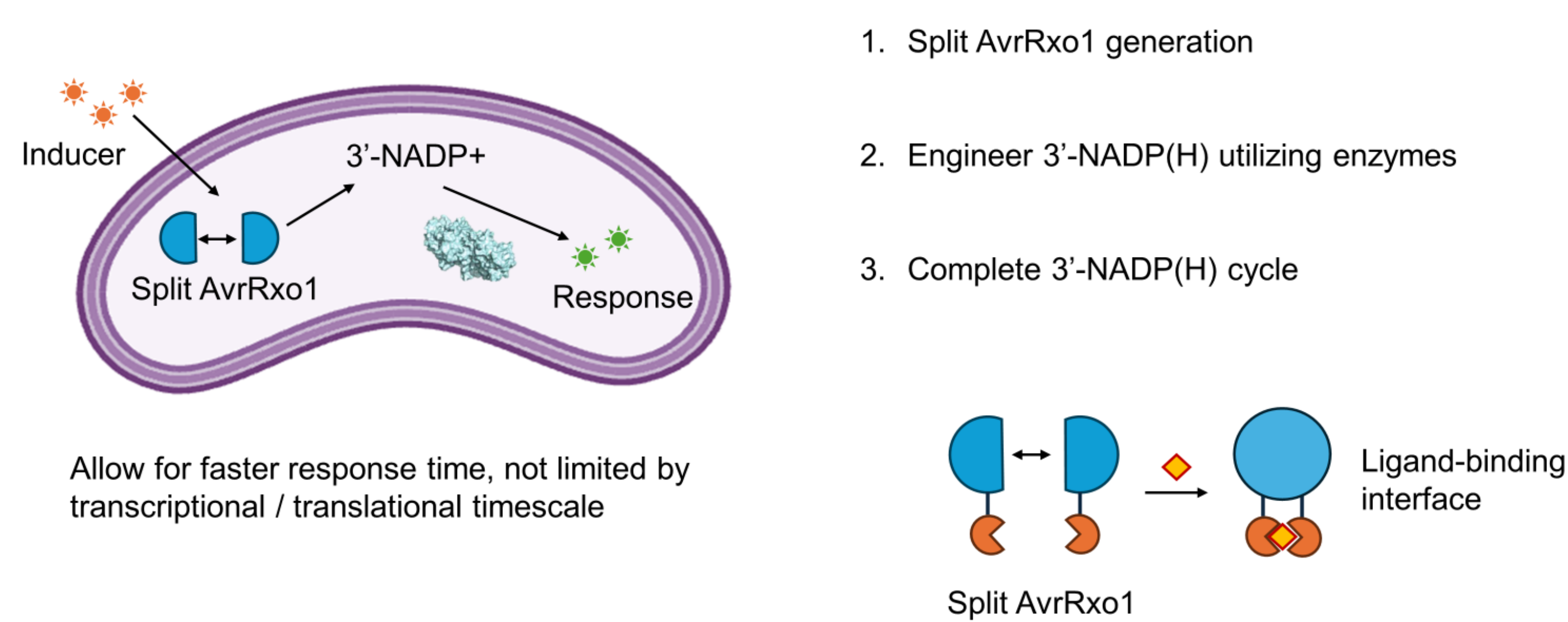
## Development of directed evolution platform



## Directed evolution workflow

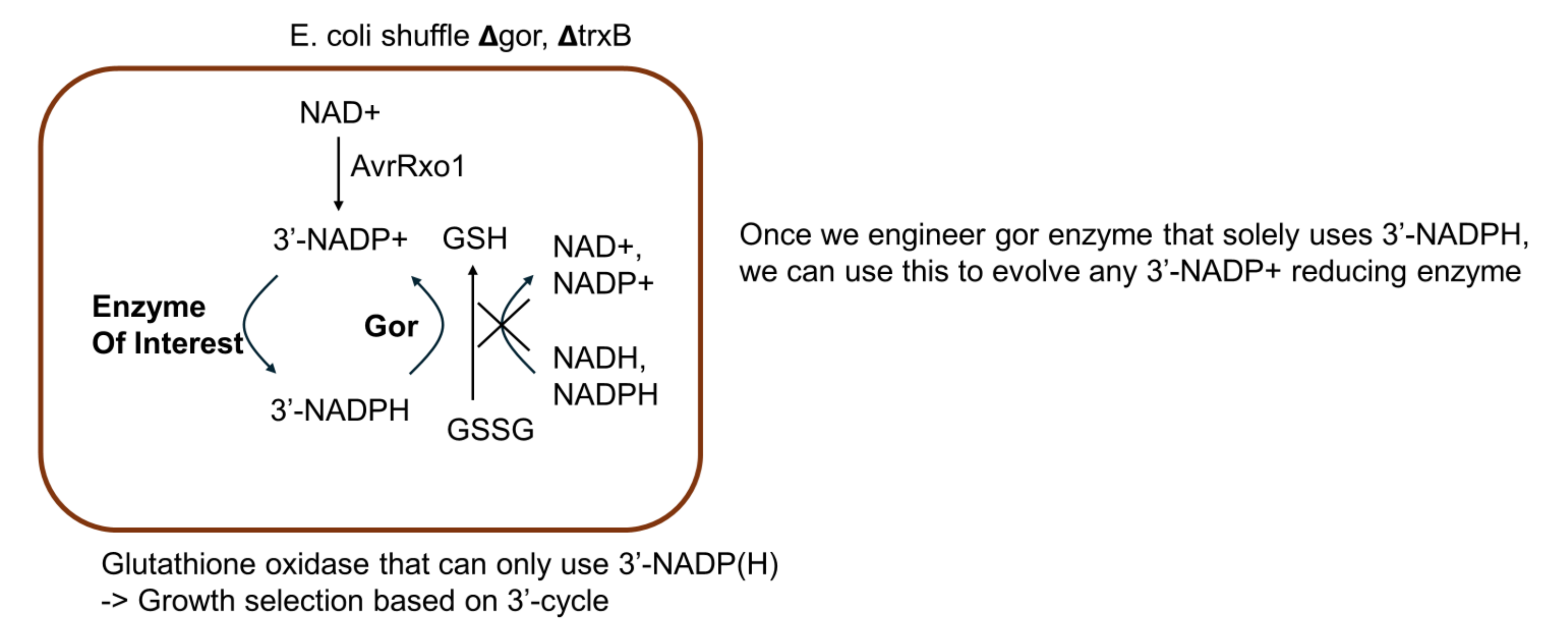


## Engineering metabolic pathway with non-conventional cofactor 3'-NADPH

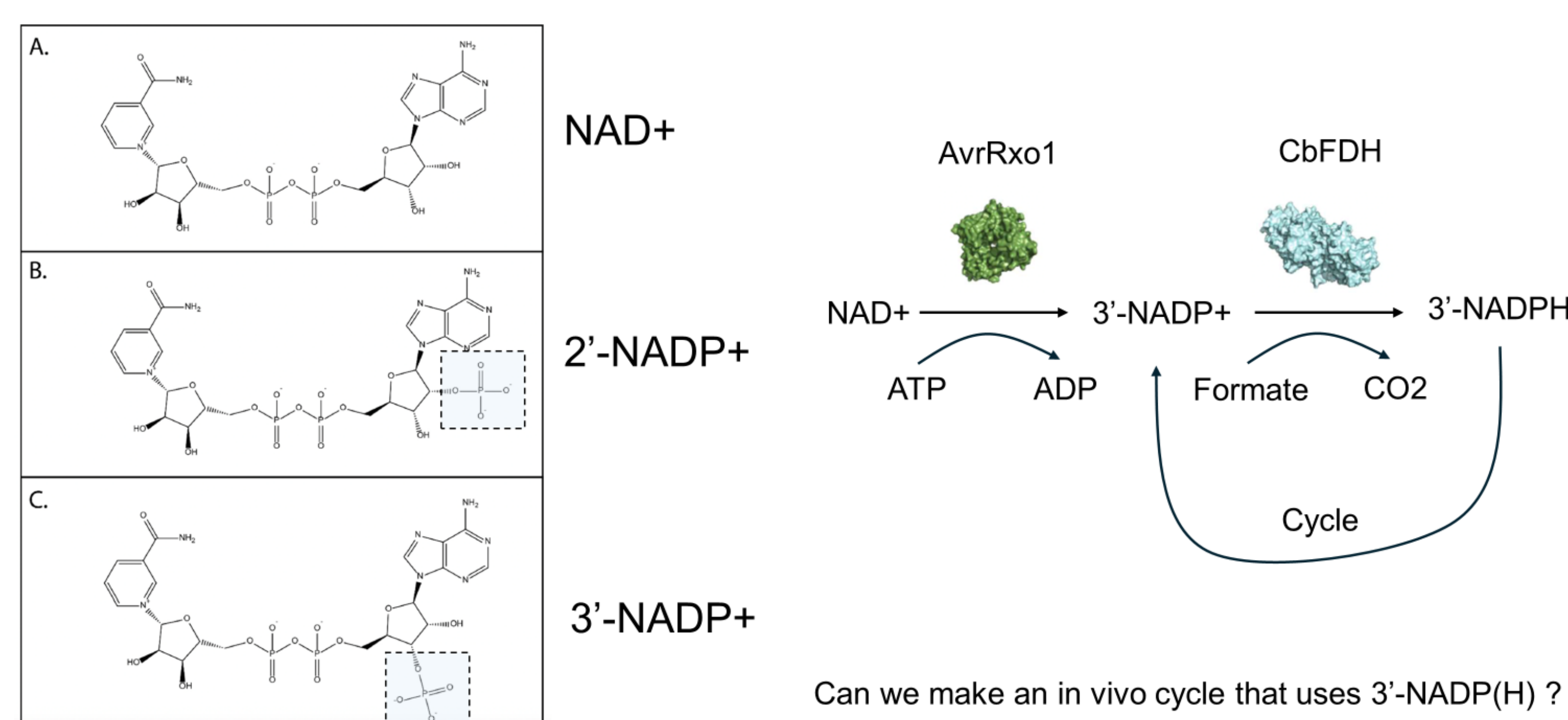


## Platform to engineer 3'-NADP(H) utilizing enzymes

A growth-based selection platform for 3'-NADP(H) utilizing enzymes



## Engineering metabolic pathway with non-conventional cofactor 3'-NADPH



## Split AvrRxo1 generation using circular permutation

