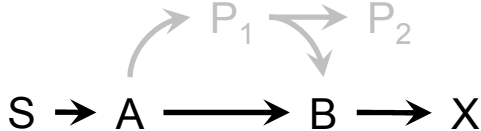
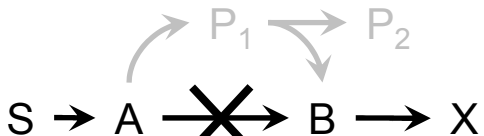


## 1. Wild Type



→ substrate S (glycerol)  
into biomass X via B (pyruvate)

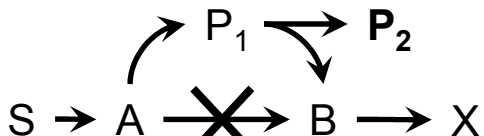
## 2. Starting Mutant



→ B auxotrophic

→ selection by limiting B supply

## 3. Evolved Mutant



→ alternative synthesis of B

→ production of P<sub>2</sub> (or P<sub>4</sub>)