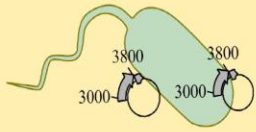
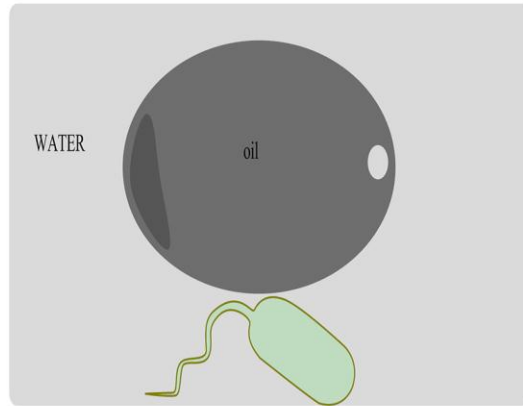


Project



we want to built E.coli have the ability to degradate alkane, by transgenetic using sythetic biology. we enable E.coli have more potential to be "oil-eat" bacteria.

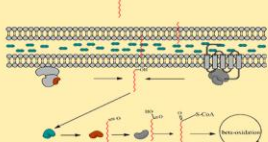


Inspiration



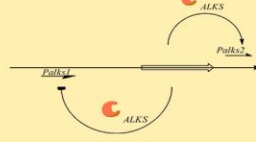
we found some oil-degradation bacterium have many interesting properties, which can help other chemical compounds usage or eliminate, so we found responsible genes and heterologously expressed to study their gene function.

Degradation



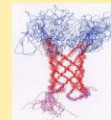
Degradation we chose one cytochrom and one terminal oxidase, they can add one hydroxy at the end of alkane chain, which can advanced the continue step of degradation.

Sensing



Using two transcription factor, alkS and GntR, the circuit can sense the existence of alkane and the cAMP, the former can activate the downstream gene expression, the latter can sense the absent of glucose and then turn the state of using hydrocarbon.

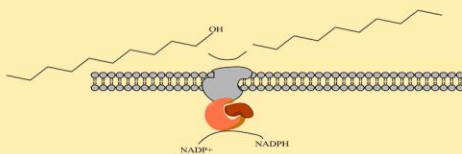
Emulsification



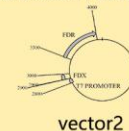
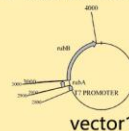
we used one emusificate protein, oprf, which coat oil droplets and stabilize oil in water emulsions, by the β -barrel structure, the protein has many internal hydrophobic residue which can coat alkane.

Conclusion and Perspective

By design a electron transport chain, the enzyme can get ennergy directly and easily, so we designed a template vector which can be used to provide electron to the function enzyme for further study. The downstream degradation of alkanol and ketone also have specificity enzyme. we also isolated some responsible gene for fusther study.



vector 1: Ferredoxin and Ferredoxin oxireductase
vector2: Rubredoxin and Rubredoxin reductase



Human practice

- iGEM society
- Weekly sythetic workshop
- Transgenetic knowledge publicly to junior

