

About Our Project

1. What is your chassis organism?

Check all species you are genetically modifying in your project.

- E. coli (lab strains that are not harmful to humans)
- Yeast (Saccharomyces)
- Lactobacillus
- B. subtilis
- Others (give species names):
- No chassis organism (please comment):

Comments:

Our chassis is a E. coli strain mostly DH5alpha or Top10.

2. Do you plan to experiment with any other organisms, besides your chassis?

What organisms, and what experiments will you do? Please explain briefly. Please include the names of species / cell lines / strains.

For now we do not plan to experiment with any other organisms besides Escherichia coli.

3. How will your project work?

Describe the goal of your project: what is your engineered organism supposed to do? Please include specific technical details and names of important parts. (Even though your project might change, please describe the main project idea you are working on right now. See the example answers for help.)

We plan to develop a microorganism to accelerate rubber degradation. For this end, rubber degradation enzymes (RoxA and Lcp) will be expressed and secreted in *E. coli*. In order for these to be folded in a correct manner, we also inserted in the DNA circuit biobricks related to a special excretion system (signal peptides, OmpA). A kill switch mechanism (using hokD) is also included in the circuit design, ensuring that the GMO is safe for the environment and would not be able to survive if accidentally released. As we plan to use the developed bacteria inside bioreactors, it would add additional steps to safety; further, we will be able to easily ramp up the process. Producing combined rubber degradation enzymes in a simple organism has got great potential to assist a huge ambiental issue in a simple, easy and environmentally friendly manner.

4. How would your project be used in the real world?

Imagine that your project were fully developed into a real product that real people could use. How would people use it? Check all appropriate boxes.

(Note: iGEM teams should not release modified organisms into the natural environment.)

- Our project is foundational / we do not have a specific real-world application in mind (Examples: library of standardized promoters, system for communication between cells)
- Only in the lab (Examples: reporter strain for measuring the strength of promoters)
- In a factory (Examples: cells that make a flavor chemical for food, cells that make biofuel)

- In a consumer product that ordinary people buy
(Examples: cells that clean your clothes, bread made with engineered yeast)
- In agriculture / on a farm
(Examples: cells that guard against pests, engineered rice plants, cells that promote growth of crop plants)
- In a small enclosed device
(Examples: a bio-sensing strip with cells that detect arsenic)
- In the natural environment
(Examples: cells that remove pollution from lakes, engineered forest trees that can resist drought)
- To be used in the human body, or in food
(Examples: anti-cancer bacteria, bread made with engineered yeast, engineered rice plants)
- Other
(Examples: bacteria that live on Mars)

Comments:

Our project can be scale up to be applied in bioreactors, degrading rubber and generating other products from the degraded material, e.g. fuel. Bacteria would be on bioreactors for this purpose.

5. Any further comments about your project:

6. Comments about this form: Is it easy or difficult to use? Are the questions confusing?

I believe this form is very easy to use and that the questions are clear.