Our Project

Colorful E. coli Weave Time and Space

Color Film

New Standards

Golden Gate Method

Oscillator: Design

In the mathematical modeling section, we focused on the oscillator. We made stimulation to two possible circumstances, one including two proteins and another of three proteins. Firstly, we tried to figure out whether our oscillator design of two proteins can work well in the mathematical models. Then we tried to carry out experiments to prove it. What’s more, we compared our design to oscillators of three proteins. Finally, we got some conclusions.

Oscillator: Models

Color Film: Introduction

Light tricolor theory: red, green and blue can compose any color with different proportion. Their complementary colors are cyan, magenta and yellow that can form any color in pigment with different proportion too.

Disadvantages:
- Complex
- Harmful
- Pollution
- Expensive
- Waste

Advantages:
- Convenient
- Harmless
- Environmental friendly
- Cost less
- Save silver
- High resolution

This part was designed to build the complete blue light sensing and reporting system in a single plasmid. Promoter BBA_B23117 is a constitutive promoter but not a strong one. It will keep concentration of LovTAP in bacteria at a certain level. When exposed to blue light, conformational rearrangements in LovTAP will occur due to the absorption of a photon. The LovTAP can then bind to DNA and repress the transcription of downstream genes.

From these pictures we can see that E. coli will reduce production of pigment when exposed to blue light. Though the corresponding reporter should have been yellow pigment, the reporter shown in the picture is actually RFP. Nonetheless, our result can already prove that the blue light sensor can function as expected and the realization of E. coli color film is possible.

Reverse Assembly Design

In our experiments, we made a problem that we had no idea of getting a single biobrick from a composite device, except by designing specific PCR reactions. So we have to modify the standard backbones to make it more easily disassembled. We keep all the former standards, but add restriction endonuclease sites called HindIII sites both in the prefix and postfix of the backbone (Fig). Once we get the composite product, we can cut this product with the HindIII restriction endonuclease. Then we just need to link this part and vector to get the single.