

BBF RFC97: Genetic Circuit Standard 1.0

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1. Introduction:

Current, there is well adopted documentation of biobricks. The Registry of Standard Biology Part set the standard documentation for biobrick. However, there is no standard way to document a genetic circuit, what information should be included in a description of a genetic circuit. We have therefore develop the technique standard for recording a genetic circuits. This standard will help the sharing of genetic circuits' information among synthetic biology community.

2. Purpose

In order to make a distinct network which aims to help everyone to obtain the necessary information of a Synthetic Biology project, we set up a new genetic design standard---- Genetic Circuit Standard.

3. Relation to other BBF RFCs

Some parts of this paper reference the content of BBC RFC 89.

4. Copyright Notice

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5. Contents of Genetic Circuit Standard

5.1 Definition of Genetic Circuit

5.2 Fundamental component of Genetic Circuit

5.3 Description of the Genetic Circuit

- 5.4 The categorization of Genetic Circuit
- 5.5 The evaluation of the Genetic Circuit
- 5.6 The experimental data
- 5.7 The source & reference
- 5.8 The minimum information of submitting a project on Biomiao community

➤ 5.1 Definition of Genetic Circuit

A Genetic Circuit is a biological unit which could achieve specific function(s). In Parts Registry, we found that some submitted parts can already be a functional unit. However, we consider that those parts (which contain a series of Biobricks) have disorganized the Parts Registry and we expect to DEVELOP a standard to solve the problem. The definition of Genetic Circuit can be summarized as following points:

- 1) A Genetic Circuit is composed of genetic Coding-frames.
- 2) A Coding-frame is strictly defined as a combination of various biobricks. It MUST contains four types of component: Promoter, RBS, Coding sequence, Terminator (If a component hasn't been registered in Parts Registry, at least it SHOULD be modularized and standardized). Essentially, a Coding-frame is a DNA sequence.
- 3) Different Coding-frames can influence each other with expressing various molecular signals. They can also be stimulated by the surrounding factors (physical, biological, chemical, etc.). In other words, Different Coding-frames can set up a logical regular system (Such as an AND-gate relation). Therefore, a Genetic Circuit possesses outer and inner logical relations. This is what the Part Registry can't record.
- 4) Each Genetic Circuit SHOULD be given some labels that we can sort it into the Mind Road of the Bio-miao platform.

➤ 5.2 Fundamental component of Genetic Circuit

A Genetic Circuit consists of Coding-frames. A Coding-frame consist of four types of biobrick in the correct order: Promoter, RBS, coding sequence, terminator. Each component SHOULD have an individual number in Parts Registry. If not, stating that how you modularized and standardized the gene is RECOMMENDED.

➤ 5.3 Description of the Genetic Circuit

The Description of a Genetic Circuit SHALL contain following information:

- 1) The function or purpose of the Circuit and how does it work.
- 2) All the components of your Circuit. [Coding-frames and the biobricks information]
- 3) The Circuit Diagram.

➤ 5.4 The categorization of Genetic Circuit

We plan to sort all the circuit according to the practical function it can do. Then the Mind Road will dynamically generate a series of bubbles that contains all the submitted circuits. What submitter need to do is to write some labels that can precisely describe the potential function(s) of your circuit. (Submitter can reference our web app Mind Road)

➤ 5.5 The evaluation of the Genetic Circuit

All the Genetic Circuits SHOULD be given a probable evaluation. At present, we have three ranks.

- The 1st rank: The circuit is reported to be functional in peer-reviewed journals.)
- The 2nd rank: The circuit is reported by one iGEM team and independently successfully reproduced by another iGEM team.
- The 3rd rank: The circuit is reported by one iGEM team. In the future, we will complete the evaluation standard.

➤ 5.6 The experimental data

The Experimental data can well prove the conditions of the Genetic Circuit—whether it successfully functions or it is still resting on a simply design or idea. The data is permitted to be updated. We don't need specially detailed data. The protocol of lab work is enough. This part is relatively free. Share the circuit design is the most important job.

However, several things SHOULD be shown in this part of the Genetic Circuit: The cell type (chassis) which the circuit applies in (E.g: Yeast/E.coli/ES cell), the plasmids information and the construction.

➤ 5.7 The source & reference

This part will indicate the designer of the Genetic Circuit as well as their contact Email. The reference will show the paper(s) or wiki link that provide more detailed information.

➤ 5.8 The minimum information of submitting a project on Biomiao community

All the projects MUST be uploaded on: <http://sustc-genome.org.cn/igem2013/submit.html>. To submit and share a project on Biomiao community, the contributor MUST submit following information at least: The project name; the authors; Year; Description; References (List the article or wiki site). If the project has a diagram, the contributor SHOULD send it to Biomiao work team: igem2013@sustc.edu.cn.

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