**Introduction**

**What is minimal gene set?**

The minimal gene set contains only **essential genes**. Protein encoded by these genes are considered to be the foundation of life, the cornerstones of synthetic biology.

**How to determine the minimal gene set?**

PROBLEMS

- hard to measure the common essential genes
- insufficient information of the interaction information between gene network and essential genes

**OUR NEW STRATEGY:**

- *half-retaining*
- to compare the experimentally determined essential genes among various reference species by software.

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**Project Base**

**A reliable source of data**

We derived most data from CEG which contains clusters of orthologous essential genes. We used five of their seven tables in demand.

**Determining minimal gene set**

**Generating gene network diagram**

It is crucial to know genes metabolism and regulation in building a minimal artificial cell. In order to solve this problem, we combine the KEGG pathway and KEGG module with minimal gene set to generate gene network diagram.

**Processing genes to standard parts**

For researchers aiming to bring their designs into reality, MCCAP provides information related to standard parts and bioscaffold assembly standard. The assembly standard supported by MCCAP contains RFC10, RFC12, RFC21, RFC23, RFC25.

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**Result**

We selected 29 and 16 organisms as reference species in two stability and regularity tests whose results are roughly the same in functional distribution.

**29 species**

**16 species**

**Modeling & Validation**

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**Human Practice**

**the iGEM Southwest Union of China**

**July 25, 2015**

We found the iGEM Southwest union of China for academic communication and held a party participated by Sichuan University, Sichuan Agricultural University, Southwest University of Nationalities, Chengdu Shade High School and Biomasers.

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**APP GAME Father Gene Detector**

We developed an game based on our software strategy to make users gain better understanding of our half-retaining method. It is based on an ancient Chinese myth about dragon and his five descendants. The game is filled with fascinating graphics and euphonious traditional Chinese music and is now available in APP store in China.

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**We Also**

**Communicate with HER - High School Preach**

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**Collaboration**

We cooperated with team SCU China to study how to find out SD signals in DNA sequence and analyze its strength that affects translation efficiency. And we developed an online software based on browser—SDfinder helping user predict the ORF and SD sequence of DNA sequence. User only needs to type sequence that needs to be predicted, select the initiation codons and termination codons. Then comes the prediction.