2013 TzuChiU_Formosa
Team Members
Hypnoseq.
Right before Us
Infections caused by resistant microorganisms often fail to respond to conventional treatment, resulting in prolonged illness, greater risk of death and higher costs. New resistance mechanisms have emerged, making the latest generation of antibiotics virtually ineffective.
THE RESISTANCE MOVEMENT
Carbapenem-resistant Enterobacteriaceae have been on the move since at least 1996.

**KPC-POSITIVE BACTERIA**

1. **2000:** Analysis of a 1996 sample from a North Carolinian hospital finds infectious *Klebsiella pneumoniae* carrying a gene called **KPC** that confers resistance to carbapenems.

2. **2003:** KPC-positive bacteria are found spreading rapidly through hospitals across New York City. By 2007, 21% of *Klebsiella* in the city carry the resistance gene.

3. **2005:** KPC-positive bacteria make their way from New York to several other countries, including Israel. From Israel, the bacteria travel to Italy, Colombia, the United Kingdom, and Sweden.

4. **2008:** Doctors in Sweden find a new carbapenem-resistance gene, **NDM**. Traced back to India, **NDM-positive bacteria** have moved quickly.

**NDM-POSITIVE BACTERIA**

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We have features for every step of the project.
chloramphenicol

Designed four parts of Cam-antisenses — specific
Primer Design

1. Obtain antibiotic resistance sequence
2. Random selection to seek high specificity regions
3. Reverse the above sequence
4. Add the restriction enzyme site at the end of primers
"Are organisms able to perform an easier mechanism to carry out our desired plan?"
We have features for every step of the project.
Inhibit the expression of the target genes
We have features for every step of the project.
Group 1

pSB1C3 vector

antisense

Colony PCR
LacI PCR from pET11d (E.coli)
In Progress

✓ pSB1C3 group

Clone *Lac I*

Construct the system

Transformation

Quantify the system
Group 2

T7 promoter
AmpR antisense
Ampicillin

pET11d vector

M
GFP anti-1
GFP anti-2
GFP anti-3
GFP anti-4
AmpR anti-1
AmpR anti-2
AmpR anti-3
AmpR anti-4

antisense

100 bp
pET11d

**Diagram:**
- **T7 promoter**
- **Lac operator**
- **Amp antisense**
- **T7 terminator**
- **lac promoter**
- **Lac I**

**Colony**

**Amp**

**IPTG**

**Pink colonies**
We have features for every step of the project.
Decrease the percentage of Antibiotic Resistance
Applications

• Health/Medicine: Knockdown pathogenic genes of bacteria
• New Application: on-off switch
CRISPR

(Clustered Regularly Interspaced Short Palindromic Repeats)
Brand New Design!

CRISPR/Cas9 system
We have features for every step of the project.
Ampicillin antisense 1 (BBa_K1222997)
Ampicillin antisense 2 (BBa_K1222996)
Ampicillin antisense 3 (BBa_K1222995)
Ampicillin antisense 4 (BBa_K1222994)
GFP antisense 1 (BBa_K1222998)
GFP antisense 2 (BBa_K1222989)
GFP antisense 3 (BBa_K1222988)

Lac operator + CamR antisense 1 (BBa_K1222984)
Lac operator + CamR antisense 2 (BBa_K1222983)
Lac operator + CamR antisense 3 (BBa_K1222982)
Lac operator + CamR antisense 4 (BBa_K1222981)
Lac operator + GFP antisense 1 (BBa_K1222987)
Lac operator + GFP antisense 2 (BBa_K1222986)
Lac operator + GFP antisense 3 (BBa_K1222985)

Lac promoter + LacI (BBa_K1222002)

T7 promoter + lac operator + antisense + T7 terminator (BBa_K1222004, BBa_K1222005)

T7 promoter + lac operator + antisense + T7 terminator + Lac promoter + LacI (BBa_K1222000, BBa_K1222001)
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<td>pCam (T7 promoter+Iac operator+CamR antise 2+T7 terminator+Lac promoter+LacI)</td>
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</table>
Human Practices

-Speech

-Facebook Page

-SB Workshop
6. Did our introduction enhance your understanding of synthetic biology.
   □ 非常同意 agree very much  □ 同意 agree  □ 普通 neutral
   □ 不同意 disagree  □ 非常不同意 disagree very much

Did our introduction enhance your understanding of synthetic biology.

9. Would you like to participate in International Genetically Engineered Machine Competition (iGEM) in the future?
   □ 非常同意 agree very much  □ 同意 agree  □ 普通 neutral
   □ 不同意 disagree  □ 非常不同意 disagree very much

Would you like to participate in International Genetically Engineered Machine Competition (iGEM) in the future?
### Gender and Age

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<tr>
<td>Male</td>
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<td>1.3%</td>
<td>38.4%</td>
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<td>0.6%</td>
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### Countries

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<td>Mexico</td>
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<td>South Africa</td>
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### Cities

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<td>Taipei, Taiwan</td>
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<td>Changhua, Taiwan</td>
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<td>Keohsiung, Kaohsiung, Taiwan</td>
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### Languages

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<tr>
<td>English (US)</td>
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<td>English (UK)</td>
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<tr>
<td>Traditional Chinese (Hong Kong)</td>
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### How People Are Talking About Your Page

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<th>Date</th>
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<th>Viral Reach</th>
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<td>Sep 14</td>
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<td>Sep 28</td>
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9/29 Investigator X iGEM 沙龍 活動通知

We participated in Taiwan-iGEM Preparatory Meeting with NCYU_Formosa NYMU_Taipei NTU_Taiwan NTU_Taida

一、活動時間：九月二十九日下午一點至五點
二、活動地點：集思台大會議中心（地下室一樓）—阿基米德廳（附件一）
三、參加隊伍：TzuChiU_Formosa、NCTU_Formosa、NYMU-Taipei、NTU_Taiwan、NTU-Taida
Human Practices

- Speech
- Facebook Page
- SB Workshop
Acknowledgements
Advisors

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Li-Yi Lin
Kai-Chi Liang
Ni-Chun Chung
Yao-Hua Hew
Ruo-Yu Wang
Hsien-Ting Huang
Sponsors


Thank you for your attention.
Amp\textsuperscript{r} mRNA

Kan\textsuperscript{r}

Cam\textsuperscript{r}

\textbf{\texttt{… Alive!!}}