Finding Pneumo

HKUST iGEM 2014 TEAM
Introduction
Background and Motive

Otitis Media

Pneumonia

Meningitis
Background and Motive

1.6 million deaths per year

Slovenia

40-70% Killed or Disabled
Current Methods

Require laboratory or hospital setting

- X-ray
- PCR assay
- Sputum gram staining
- Urinary antigen test
Mechanism of Quorum Sensing

DNA uptake and recombination

CSP (Competence Stimulating Peptide)

S. pneumoniae
Pneumosensor Overview

S. pneumoniae

CSP

E. coli

Detection

$\sigma^x$promoters

Signal

$\sigma^x$

RIBOREGULATOR
Pneumosensor Overview
Detection Module
S. pneumoniae $\sigma^x$ Promoters Module

**Pneumosensor**

**Introduction**

**Riboregulator**

**Human Practice**

**Conclusion**
Functionality of $\sigma^x$

<table>
<thead>
<tr>
<th>Promoter</th>
<th>$\emptyset$</th>
<th>J23101</th>
<th>K1379000 ($P_{celA}$)</th>
<th>K1379001 ($P_{comFA}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sigma^x$</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**Bright Field**

**GFP**

Scale bar: 5mm | Gain: 4 | Exposure time: 200 ms | Gamma BF: 1 | Gamma GFP: 1
Relative Promoter Unit Measurement of $P_{celA}$ and $P_{comFA}$

![Bar chart showing relative promoter unit measurements for $P_{celA}$ and $P_{comFA}$ with different promoter conditions.](chart.png)
**Riboregulator**

**Introduction**

**Pneumosensor**

- crRNA: *cis*-repressing
  - CR
  - RBS
  - CDS

- Ribosome

- taRNA: *trans*-activating
  - TA

**Conclusion**
Riboregulator

Pneumosensor
**Key3**

- No description -

**Usage and Biology**

This piece is the riboregulator complement intended for use with the J01080 part.

**Sequence and Features**

<table>
<thead>
<tr>
<th>Subparts</th>
<th>Ruler</th>
<th>SS</th>
<th>DS</th>
<th>Length: 94 bp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Assembly Compatibility:**

10 12 21 23 25 1000

**Parameters**

None

**Categories**

//classic/temporary/uncategorized
<table>
<thead>
<tr>
<th>Name of Riboregulator</th>
<th>Team</th>
<th>Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key1 and Lock1</td>
<td>Berkeley 2005</td>
<td>Yes</td>
</tr>
<tr>
<td>Key3 and Lock3</td>
<td>Berkeley 2005</td>
<td>Yes</td>
</tr>
</tbody>
</table>
**Riboregulator**

**Pneumosensor**

**Introduction**

**Human Practice**

**Conclusion**

**Lock 1 and Key 1**

**Lock 3 and Key 3**

![Graphs showing the effect of arabinose on F/OD600 with different combinations of CR, RBS, and TA.](image)

**Legend:**
- Lock 1 and Key 1
- Lock 3 and Key 3
- CR+RBS GFP
- P_{BAD}
- TA

**Graph Details:**

- **Arabinose:** Missing, IA, CH, CH&IA
- **Conditions:** 1%, 2.5%

**Data Points:**

- F/OD600 values for each condition are shown as bars with error bars indicating variability.

**Key Observations:**

- The presence of CR, RBS, and TA affects the F/OD600 values differently across the conditions.
- The interaction between these elements under arabinose conditions shows varying levels of expression.
Part: BBa_I0500
Designed by: Sri Kosuri  Group: Antiquity  (2003-12-05)

Inducible pBad/araC promoter

Constitutive promoter

CR+RBS  GFP  TT  P_{BAD}  TA  TT

Table:
- Not Released
- Sample It’s complicated
  - 1 Registry Star
  - 293 Uses
  - 4 Twins
Riboregulator

Pneumosensor

Introduction

Human Practice

Conclusion

DH10B

DH5 α

BW25113

Percentage of cells (%)

Arabinose concentration (% w/v)

Percentage of cells (%)

Arabinose concentration (% w/v)

Percentage of cells (%)

Arabinose concentration (% w/v)

Low Fluorescence

High Fluorescence

0 0.2 0.4 0.6 0.8 1.0

0 0.2 0.4 0.6 0.8 1.0

0 0.2 0.4 0.6 0.8 1.0

21
Human Practice
Human Practice
Start-up Kit
Human Practice Projects 2008-2013

3000+ Record Entries
SEARCH ENGINE FOR DATABASE

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If you have keywords for more than one category, click 'Advance search'.
Example: To search information about talks done by HKUST iGEM team, input "Talk" under "Type", and "HKUST" under "Name".
*Abbreviation: [N.America]: North America

You can download the database here.
Analyze and interpret the data
Catch any potential trends
Types of Projects Done in the Past
Conclusion
Characterized $P_{\text{celA}}$ and $P_{\text{comFA}}$

Showed parts from Gram positive bacteria are functional in Gram negative bacteria.
Riboregulator

- Provided additional characterization data for 4 pairs of lock and key.
- Characterized $P_{\text{BAD}}$ in 3 different cell strains.
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