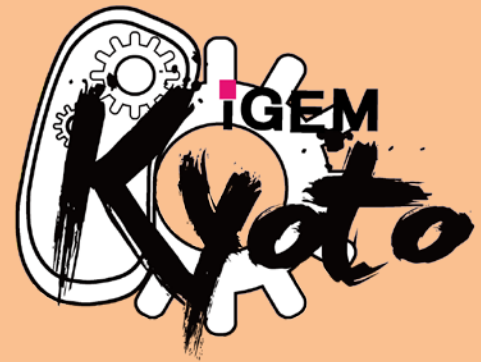
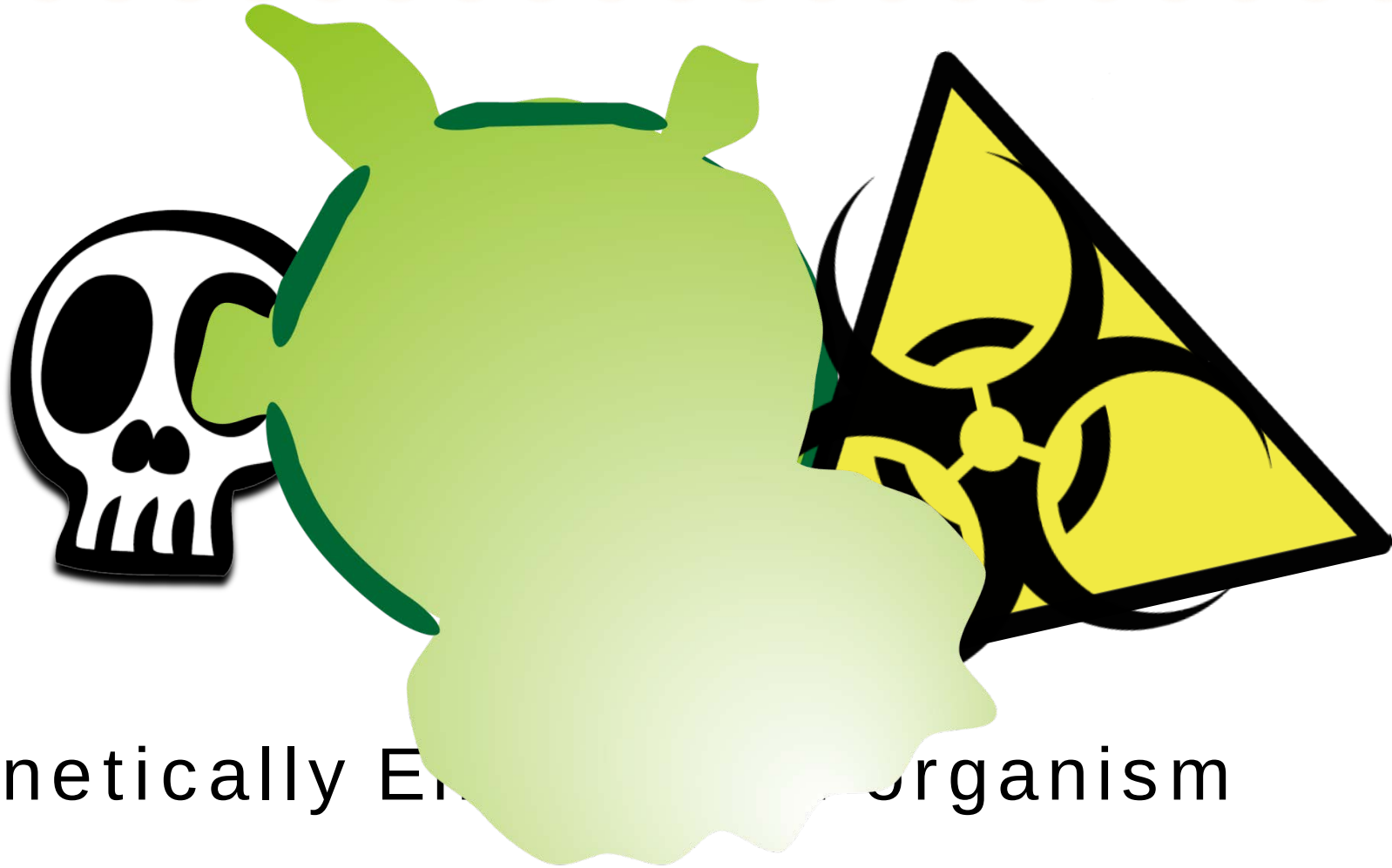




the Fantastic Lysisbox

Cell lysis devices are needed



Genetically Engineered Organism

Cell death devices

Required in many areas

Google

igem kill device

About 32,300 results (0.04 sec)

32,300>>

- Population control
- New applications

Odor device
Light device
Detect device
Report device...

One of the most foundational devices



Cell-cell signaling and quorum sensing:



Cell death: Parts involved in killing cells.



Coliroid: Parts involved in taking a bacteria



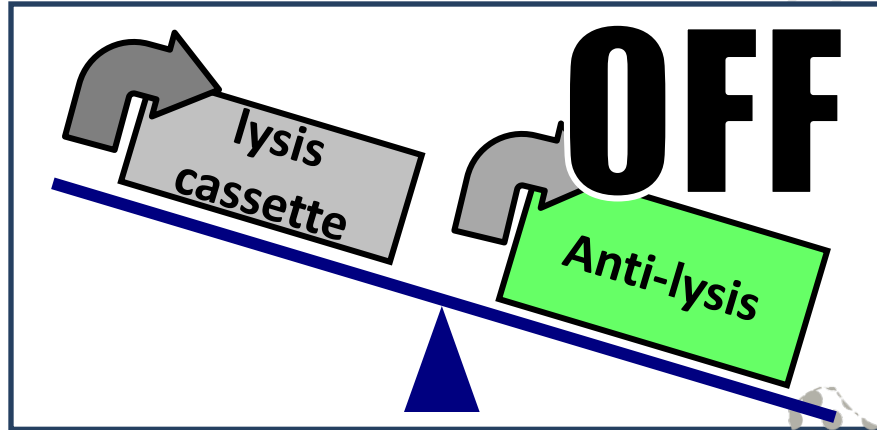
What unsatisfactory situation!

A	BBa_K1	standard
---	--------	----------

the Fantastic Lysisbox

!!!

Description
device - no promoter
ette - ess
device
sis - sice
orda - ge - no promoter
same - phage - no promoter
orda - phage - no promoter



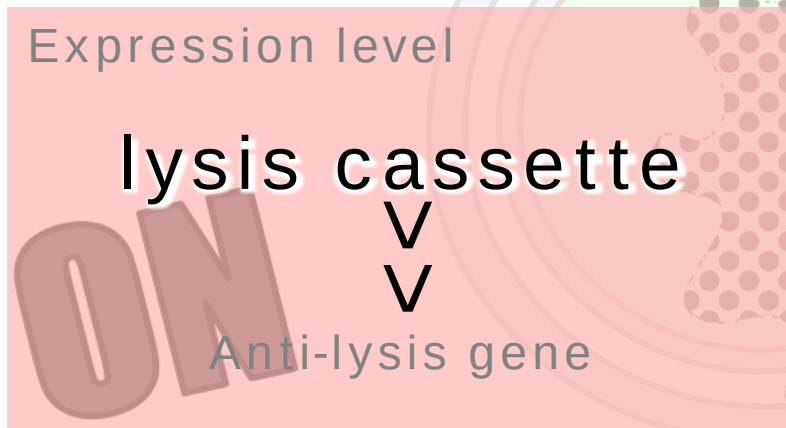
Expression level

Anti-lysis gene

∨
∨

lysis cassette

OFF



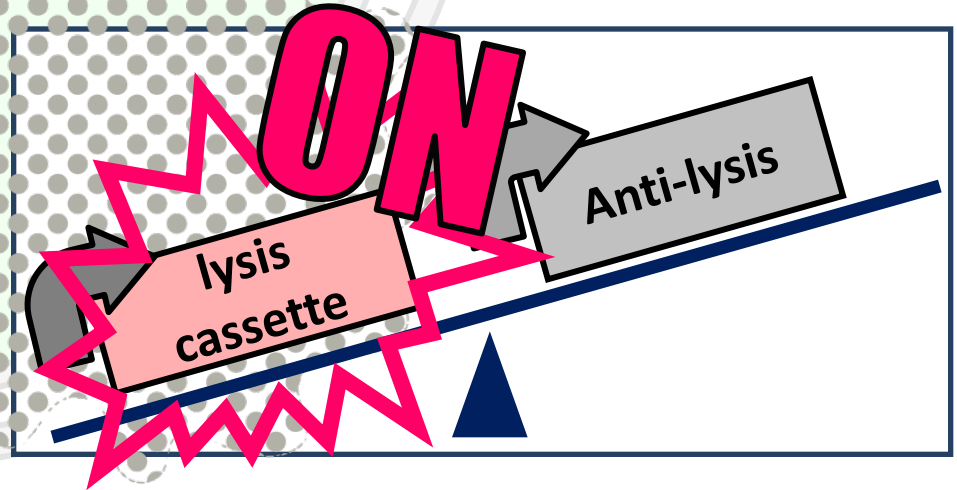
Expression level

lysis cassette

∨
∨

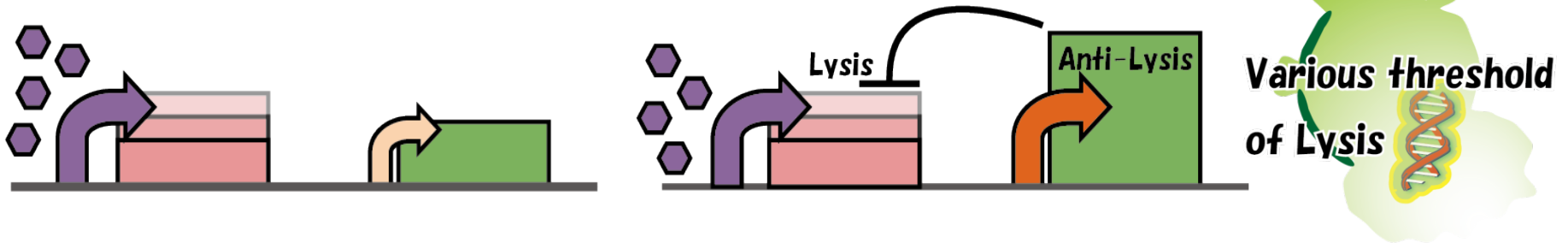
Anti-lysis gene

ON

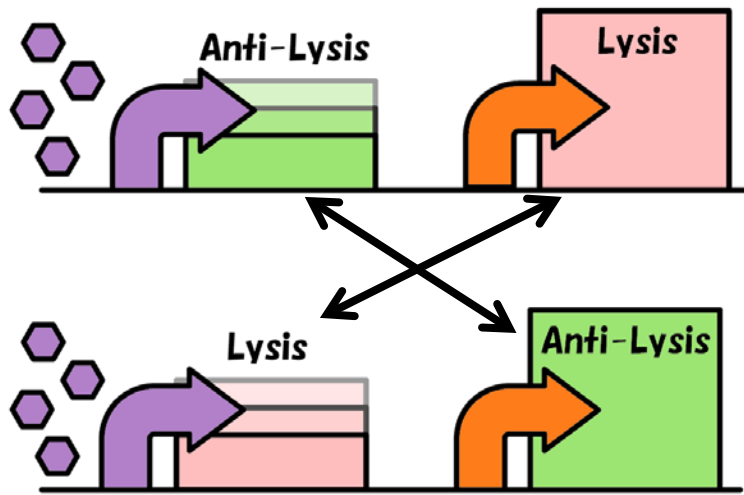


“Lysisbox” has Two Advantages

Flexible Threshold



Opposite function variation



Type1: Inducible cell **Survive**

Type2: Inducible cell **Death**

Goals

1 **Characterization** of
Lysis cassette

2 **Characterization** of
inducible promoter
Lactose promoter



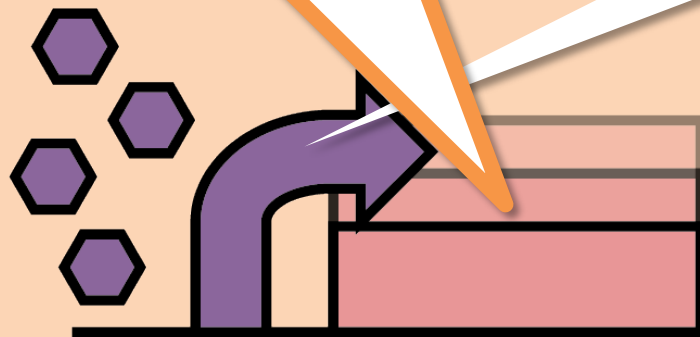
Well-characterized constitutive
promoter family (BBa_J23xxx)

3 **Characterization** of
Anti-Lysis gene

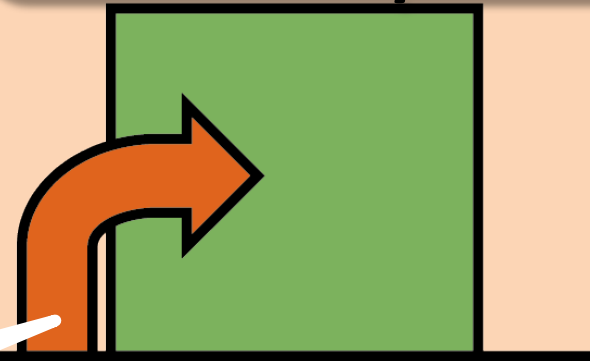
Goals

1 **Characterization** of
Lysis cassette

2 **Characterization** of
inducible promoter
Lactose promoter



Lysis

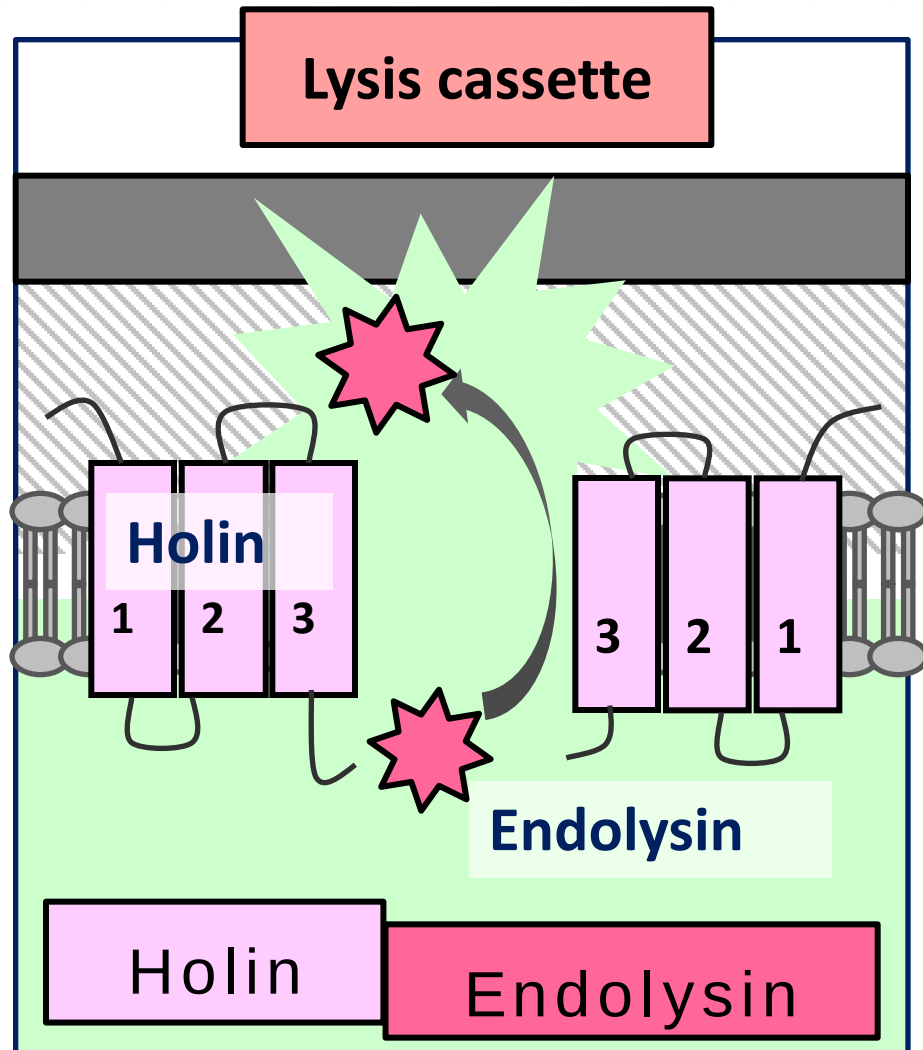


Anti-Lysis

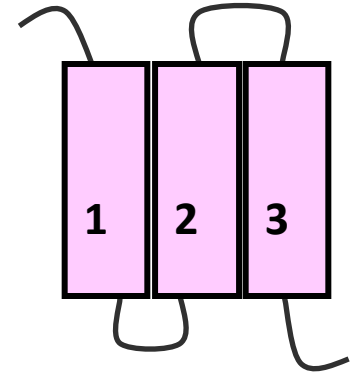
Well-characterized constitutive
promoter family (BBa_J23xxx)

3 **Characterization** of
Anti-Lysis gene

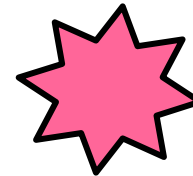
1, The lytic system of **λ**phage



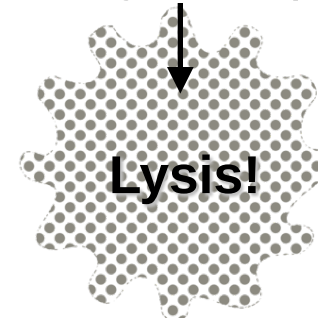
Holin makes a hole
in inner membrane



Endolysin goes through the hole

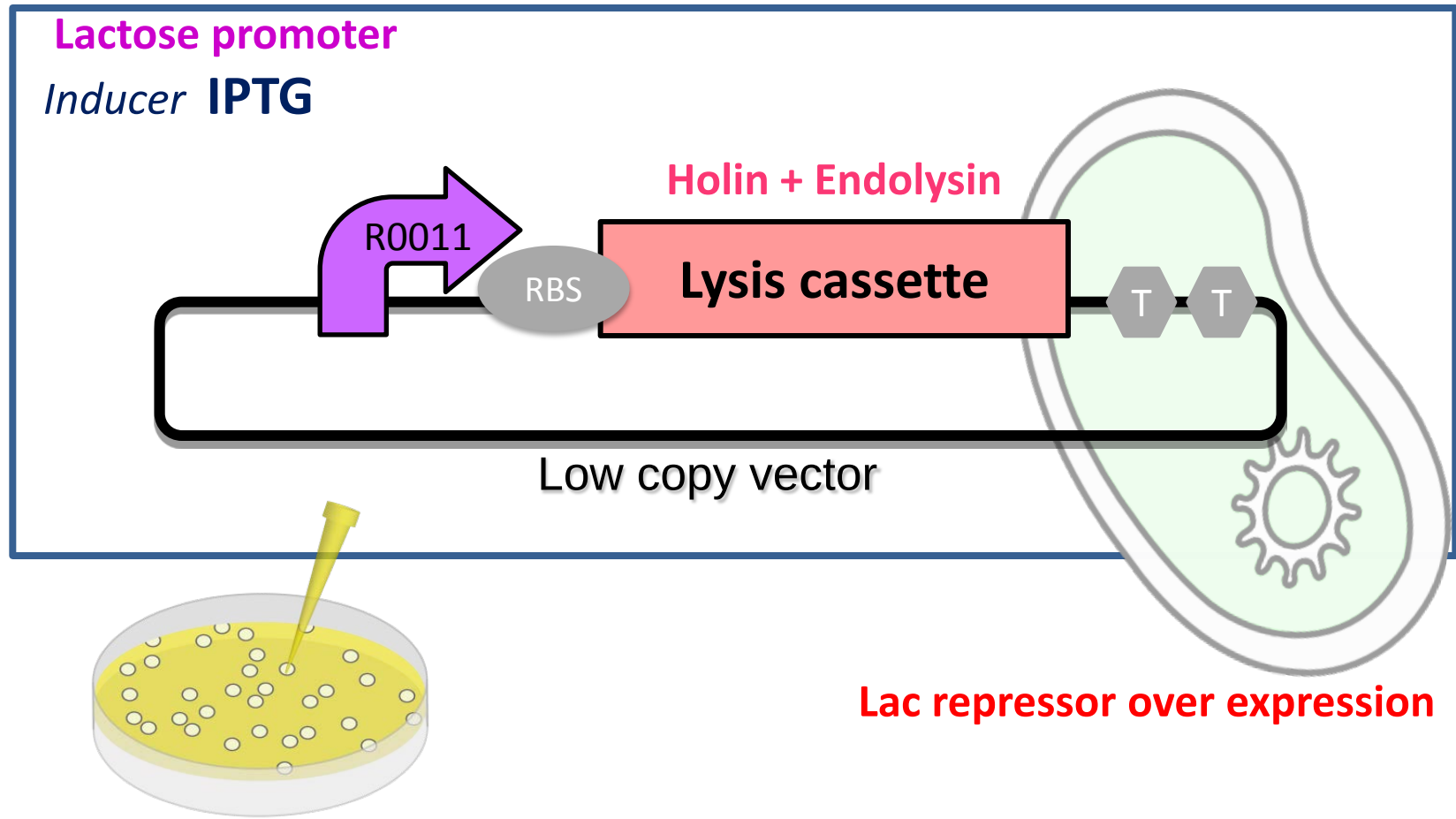


Endolysin degrades peptidoglycan



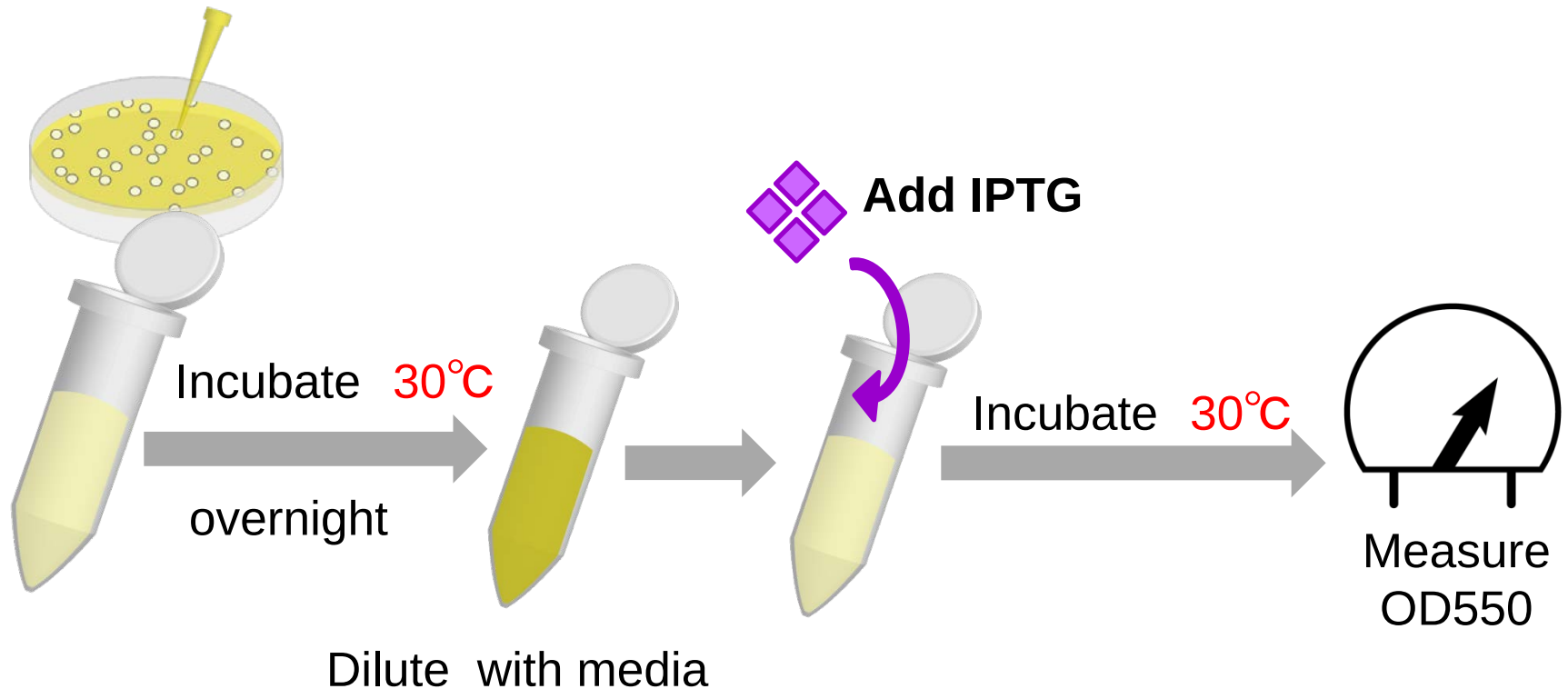
1, Characterization of lysis cassette

[method]



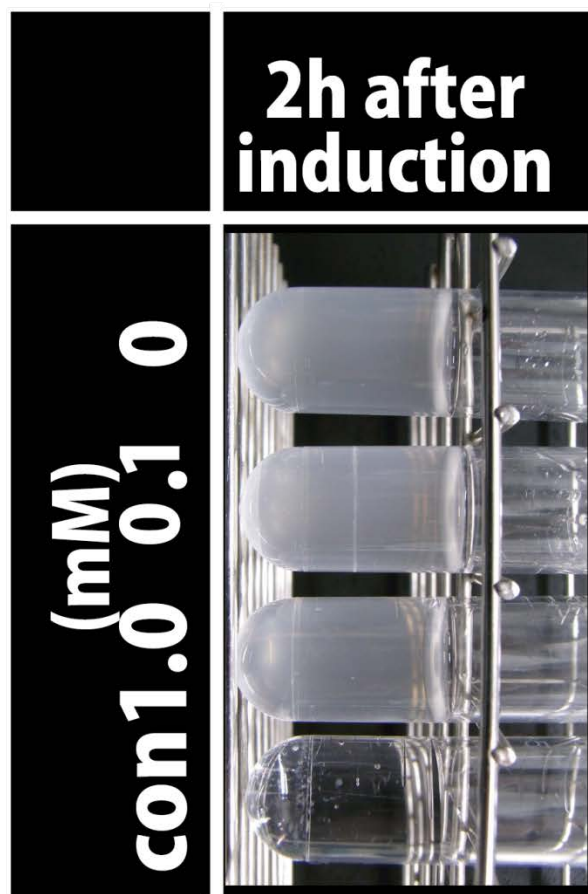
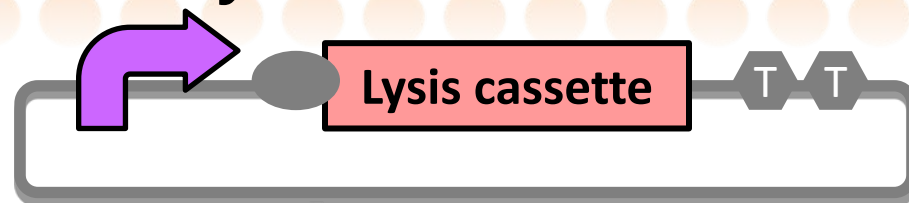
1, Characterization of lysis cassette

[method]

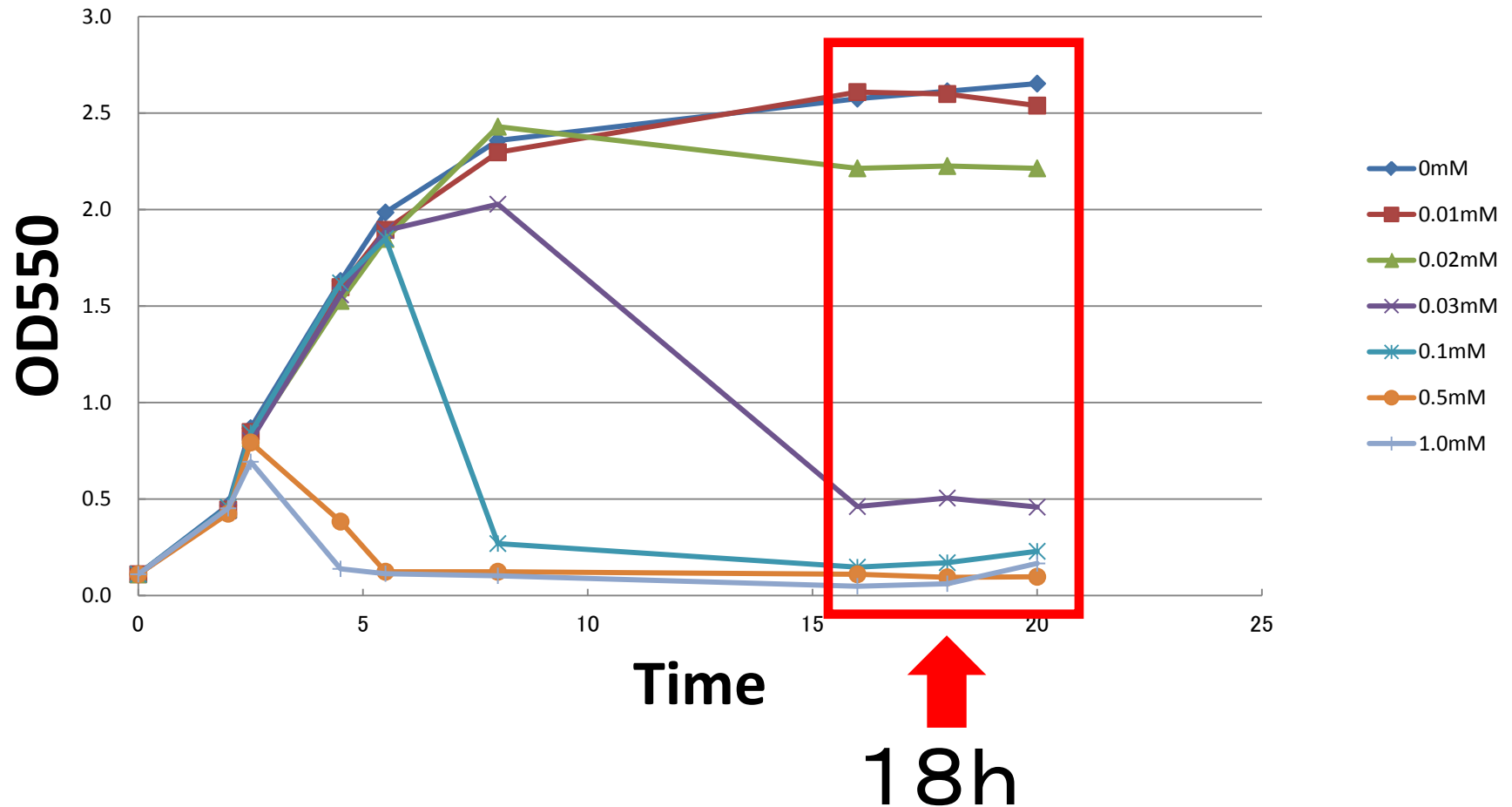


1, Characterization of lysis cassette

[result]



1.Characterization of lysis cassette [result]

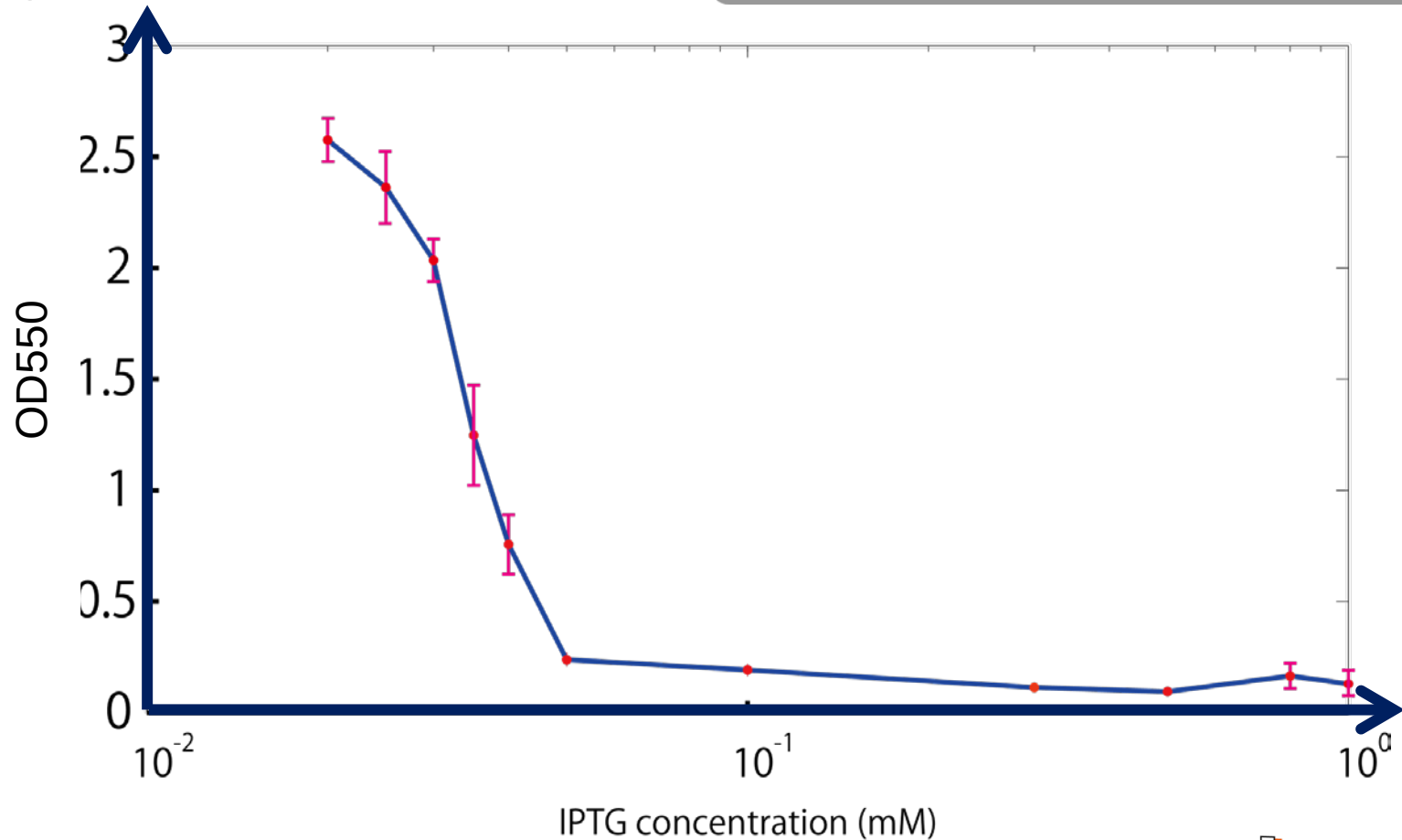


1, Quantitative characterization

[result]



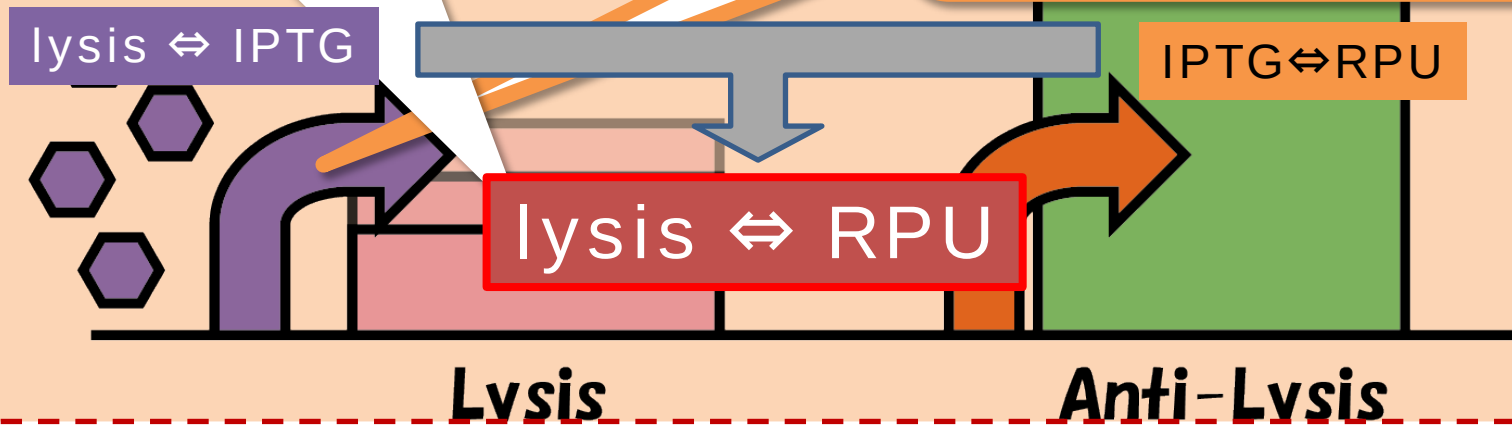
18h



Goals

1 **Characterization** of
Lysis cassette

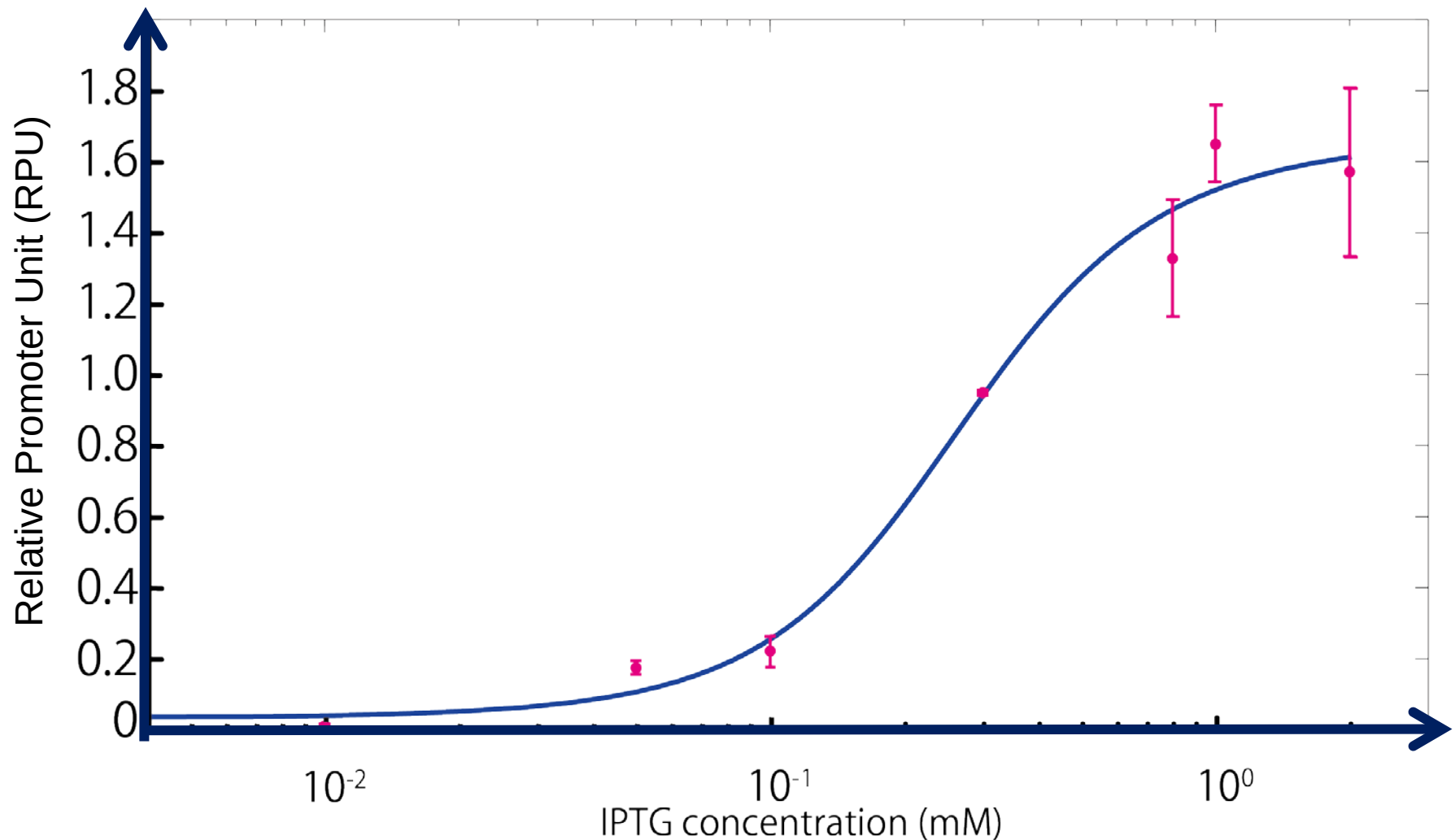
2 **Characterization** of
inducible promoter
Lactose promoter



*RPU(Relative Promoter Units)

- **iGEM recommends** characterizations with RPU
- Small Error
- Independent of measurement conditions

2, Characterization of Plac[R0011]

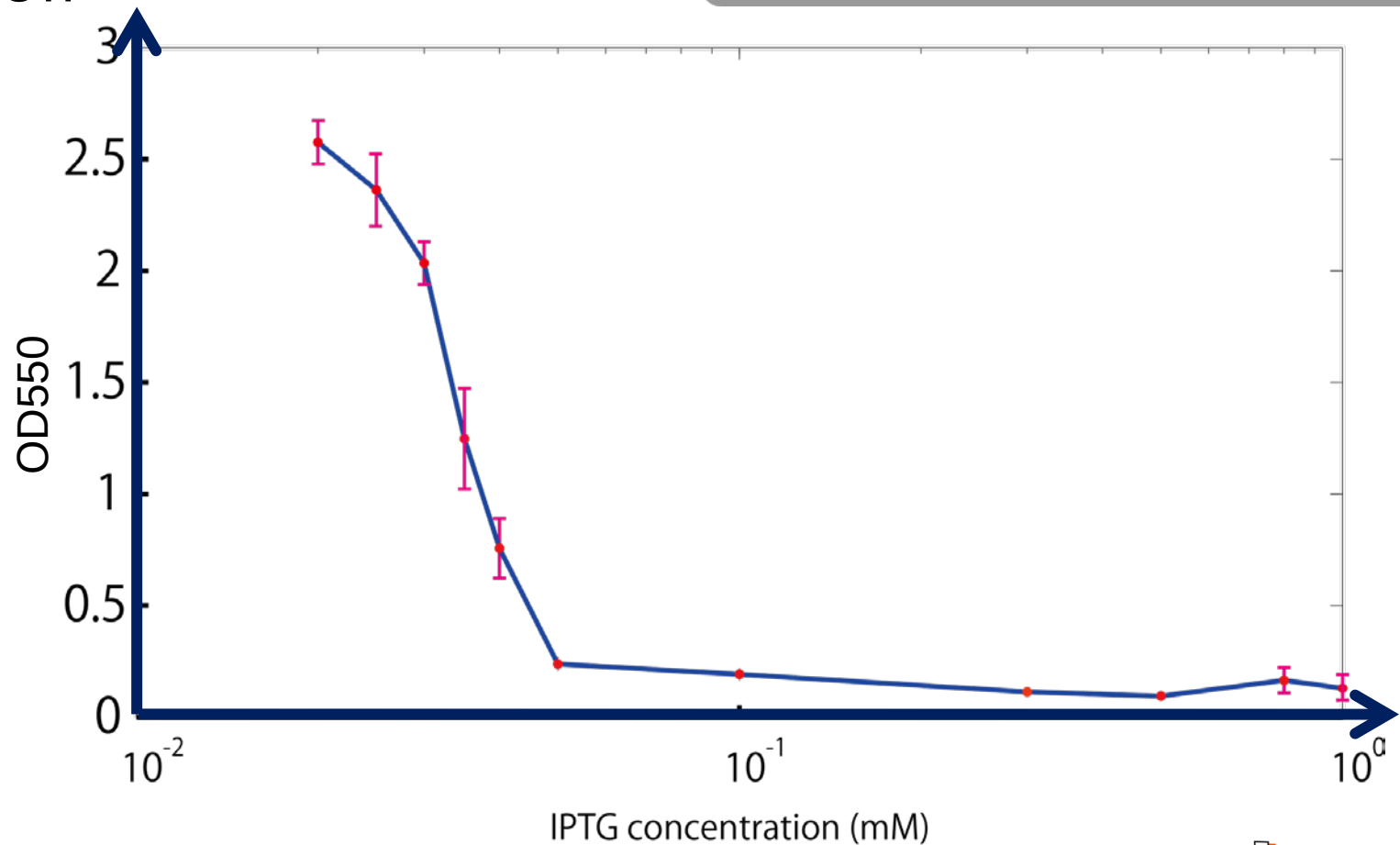


2, Quantitative characterization

[result]



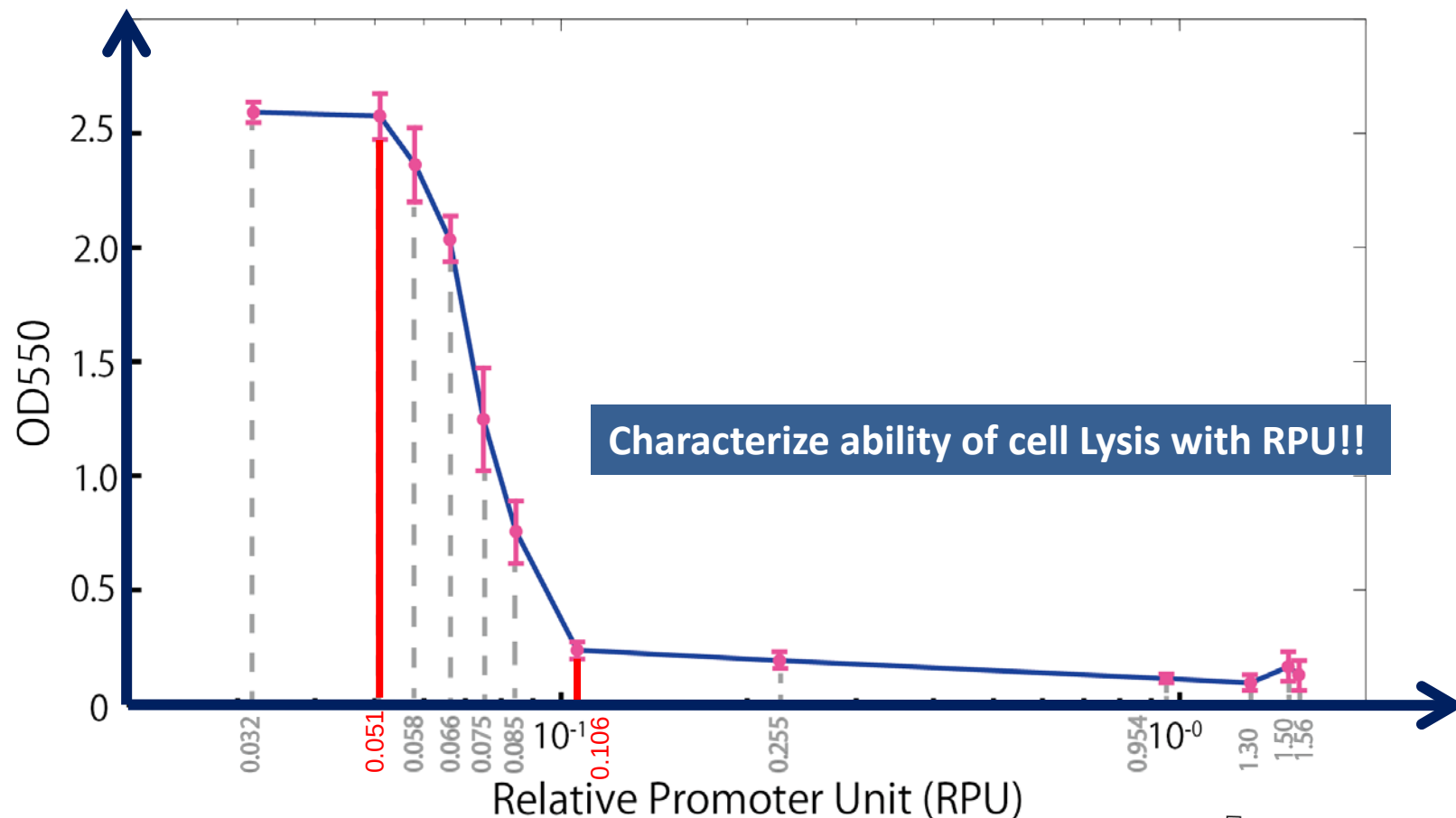
18h



2, Quantitative characterization

[result]

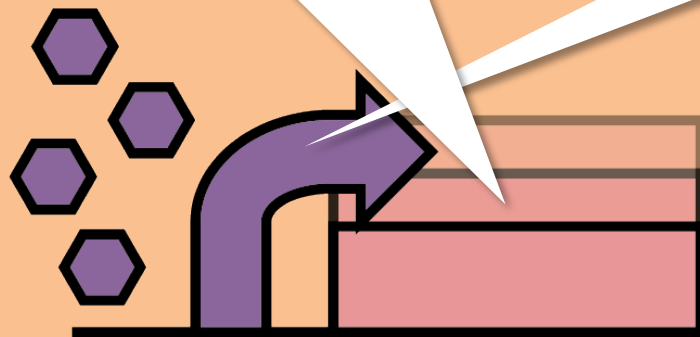
18h



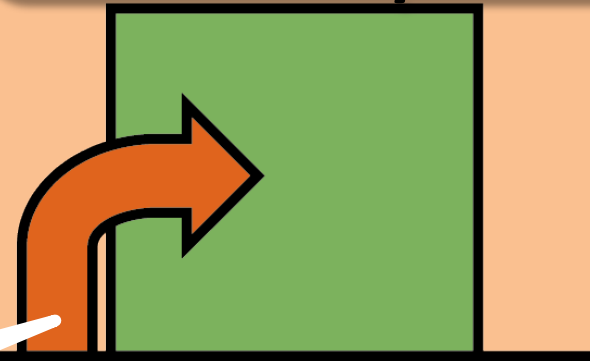
Goals

1 **Characterization** of
Lysis cassette

2 **Characterization** of
inducible promoter
Lactose promoter



Lysis

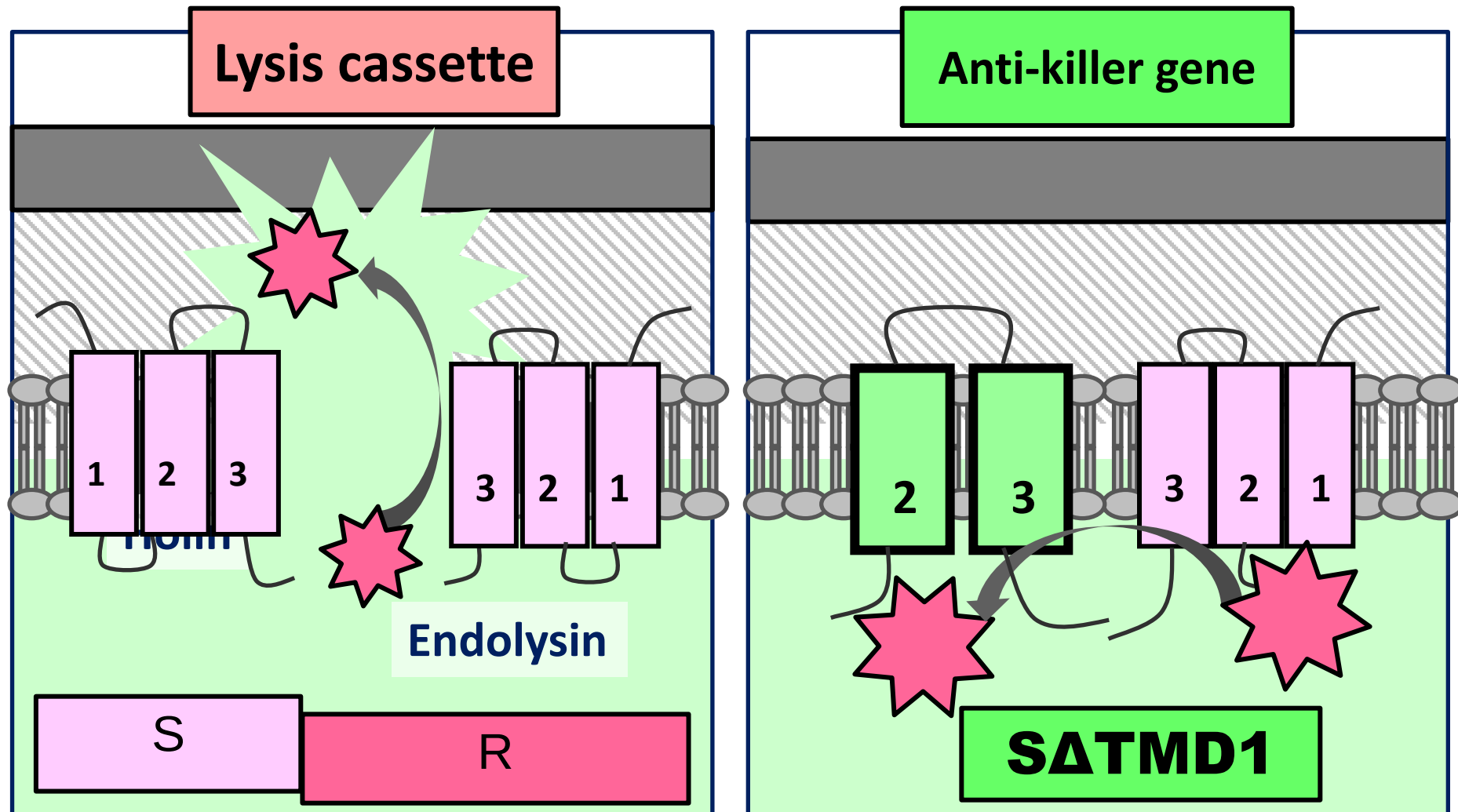


Anti-Lysis

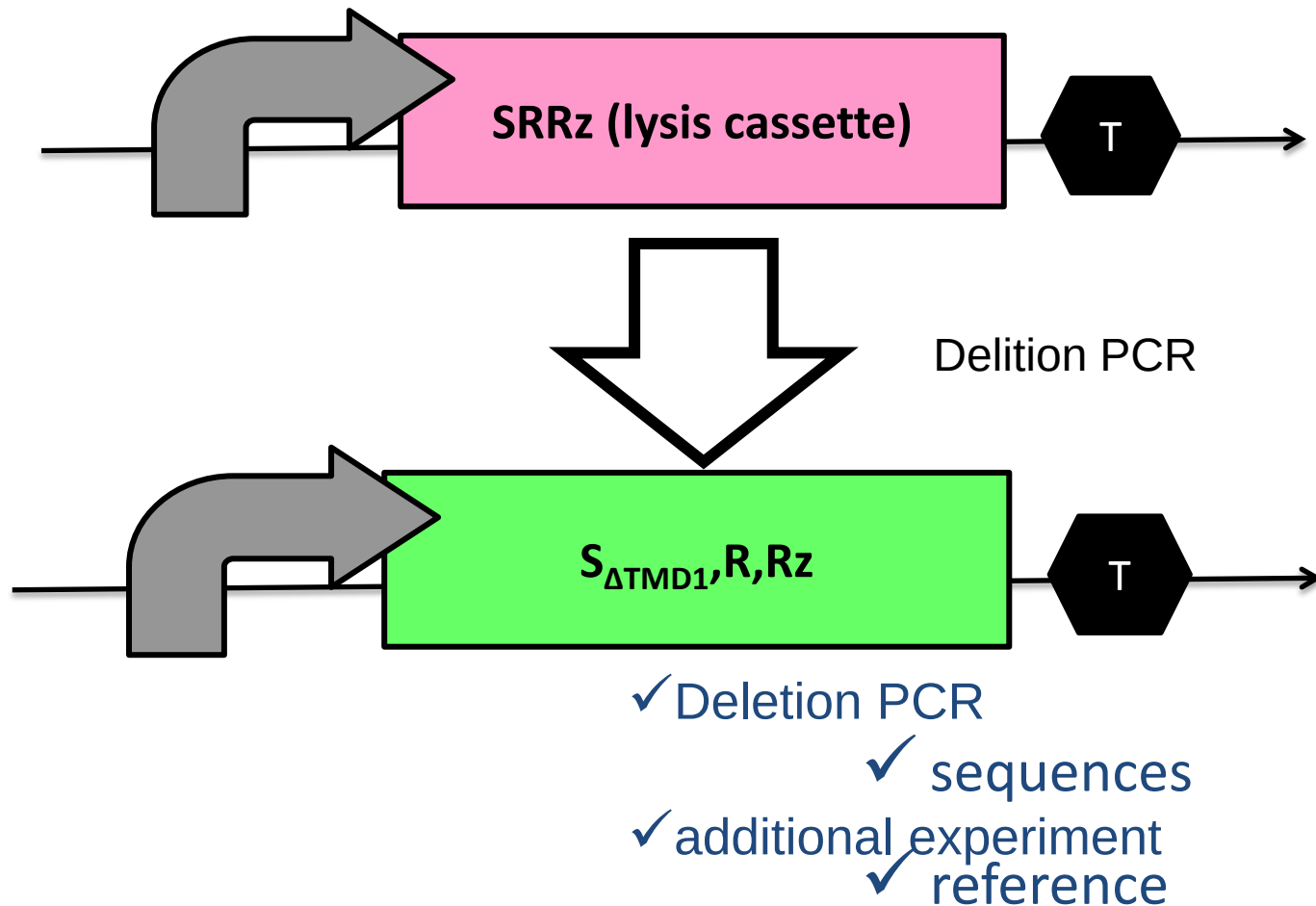
Well-characterized constitutive
promoter family (BBa_J23xxx)

3 **Characterization** of
Anti-Lysis gene

3, The System of $S_{\Delta TMD1}$

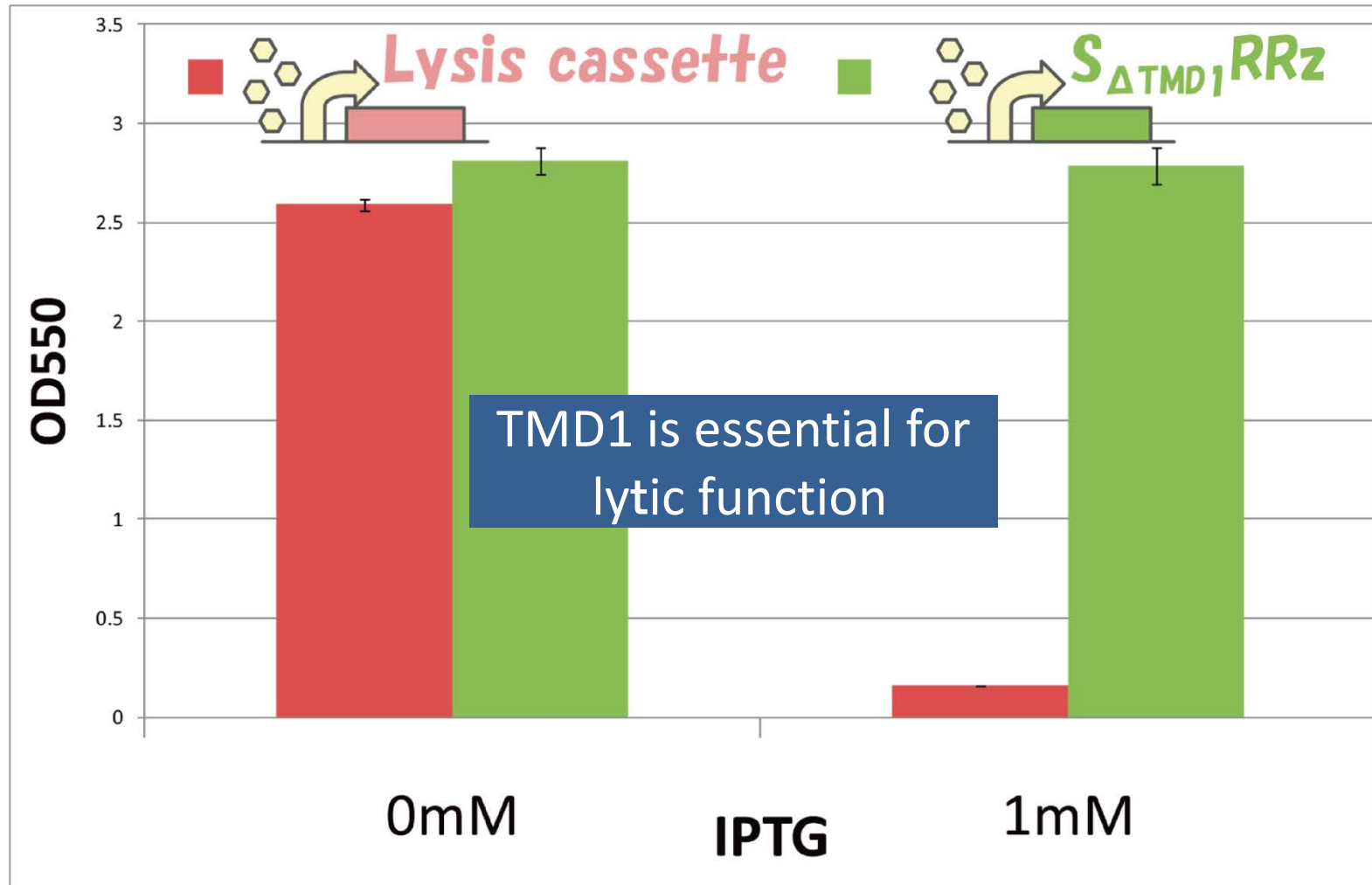


3, Constructing of $S_{\Delta TMD1}$

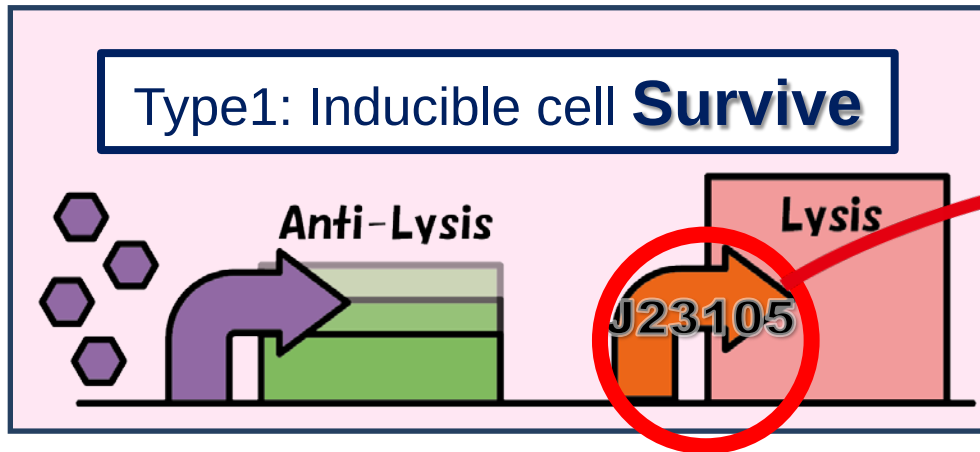


3. Function check of $S_{\Delta TMD1}$

18h



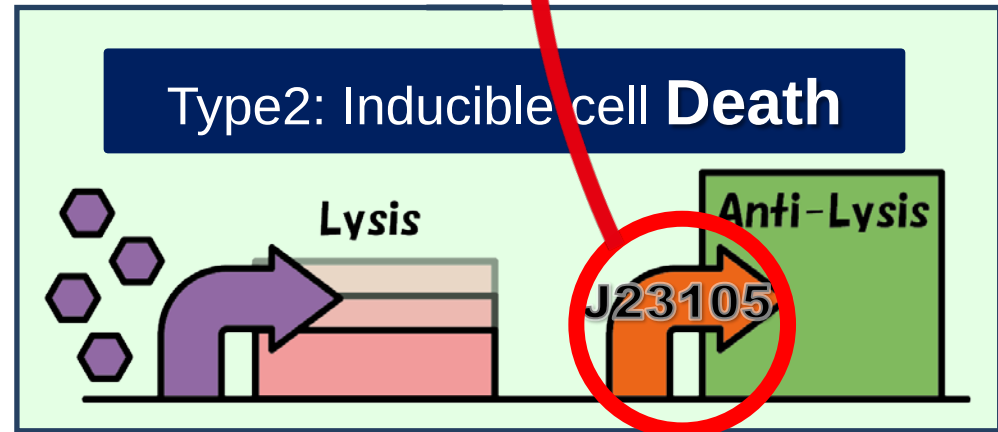
3, characterization of S Δ TMD1



Neither works...
Why?

J23105 S Δ TMD1 K358012 GFP E0046 B0030 B0015 Plac R0011 Lysis Cassette K358004 B0015

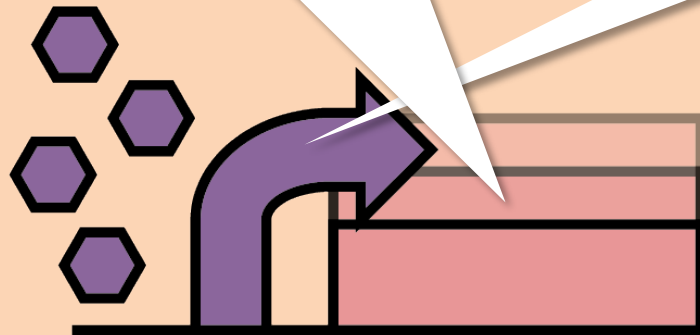
K358021



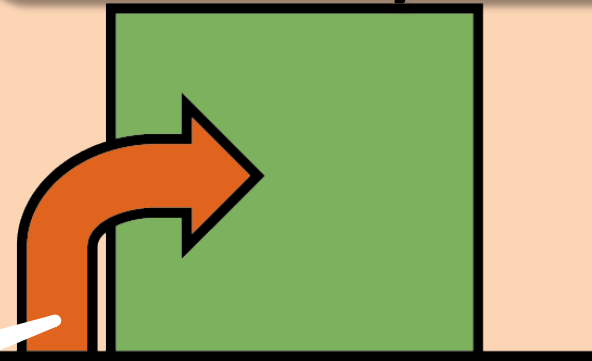
Goals

1 ✓ **Characterization** of
Lysis cassette

2 ✓ **Characterization** of
inducible promoter
Lactose promoter



Lysis



Anti-Lysis

Well-characterized constitutive
promoter family (BBa_J23xxx)

3 ✓ **Characterization** of
Anti-Lysis gene

Registered parts

18parts submitted

		W	BBa_K358000	Measurement	Lac promoter with GFP	Ken Kajita	939
		W	BBa_K358001	Measurement	Measurement Standard	Ken Kajita	919
		W	BBa_K358019	Composite	Lysis cassette regulated by lacP	Ken Kajita	1473
			BBa_K358020	Composite	Lysisbox	Ken Kajita	2690
			BBa_K358021	Composite	Lysisbox -module2-	Ken Kajita	2690
		W	BBa_K358022	Composite	lacP + SΔTMD1RRz	Ken Kajita	1401
			BBa_K358023	Composite	Lysisbox ver.2	Ken Kajita	2690
			BBa_K358024	Composite	Lysisbox -module2- ver2	Ken Kajita	2690
			BBa_K358004	Translational_Unit	lambda lysis cassette[SRRz/Rz1]	Ken Kajita	1273
			BBa_K358006	Generator	lambda lysis cassette with terminator	Ken Kajita	1410
			BBa_K358010	Generator	anti-killer gene with GFP	Ken Kajita	1166
			BBa_K358012	Translational_Unit	SΔTMD1	Ken Kajita	289
			BBa_K358013	Generator	SΔTMD1 with terminator	Ken Kajita	417
			BBa_K358014	Translational_Unit	SΔTMD1RRz	Ken Kajita	1201
			BBa_K358015	Composite	pLac+anti-killer gene	Ken Kajita	1229
			BBa_K358016	Composite	pLac+anti-killergene+pConst	Ken Kajita	1272
			BBa_K358017	Composite	low promoter+anti-killergene	Ken Kajita	1209
			BBa_K358018	Composite	Low promoter+anti-killergene+lacP	Ken Kajita	1272



bioremediation

chromatography

biosensor

the Fantastic

Lysisboy

detergent

fertilizer

iGEM Japan Human Practice

- *attitude survey*

on genetic engineering and biotechnology

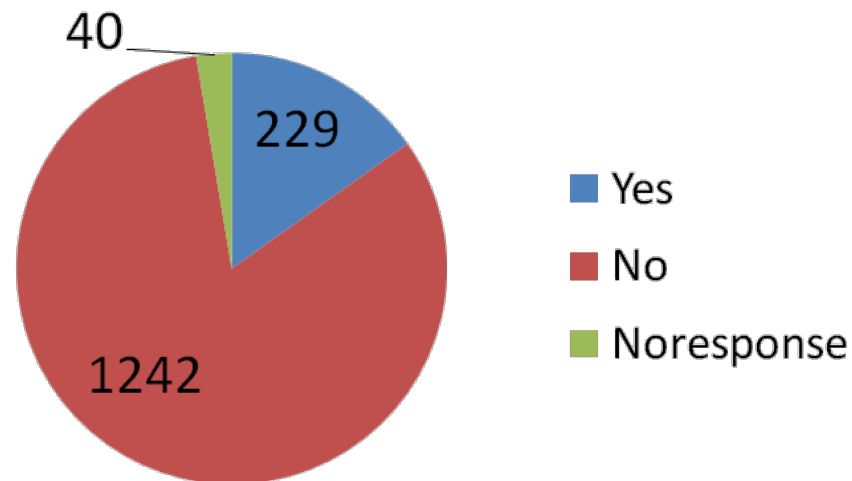
- *With*

Osaka, KIT-Kyoto, Tokyo-Metropolitan, UT-Tokyo

- *Total*

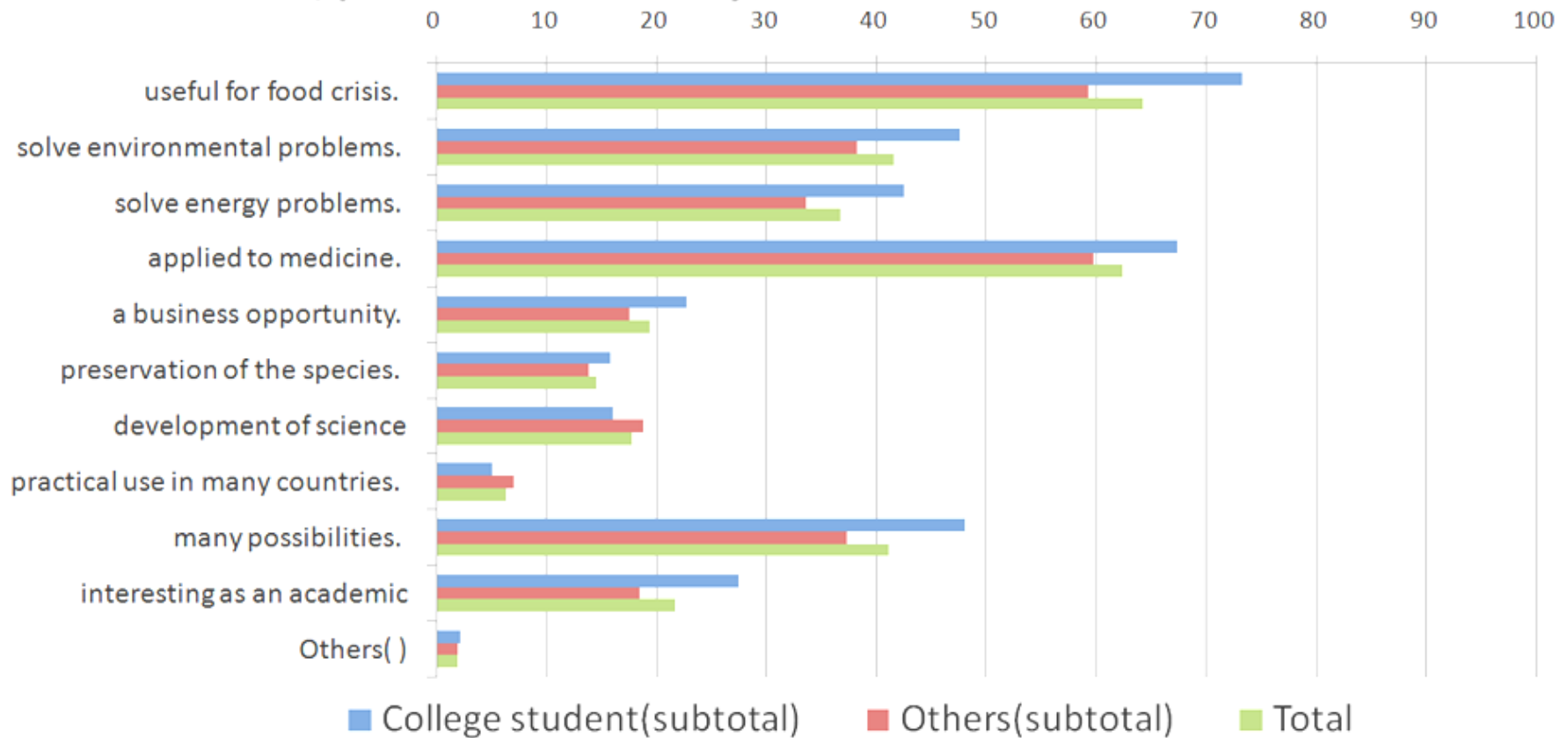
1511!!! ✕Paper-based

Q8 Do you know “Synthetic biology”?



iGEM Japan Human Practice

Q7 If you think the research on genetic engineering should continue
, please encircle every fit reason from below.





Gold medal criteria

- ✓ Characterize or improve an existing BioBrick Part or Device and enter this information back on the Registry.
- ✓ Help another iGEM team by, for example, characterizing a part, debugging a construct, or modeling or simulating their system.
- ✓ Develop and document a new technical standard that supports the (i) design of BioBrick Parts or Devices, or (ii) construction of BioBrick Parts or Devices, or (iii) characterization of BioBrick Parts or Devices, or (iv) analysis, modeling, and simulation of BioBrick Parts or Devices, or (v) sharing BioBrick Parts or Devices, either via physical DNA or as information via the internet.
- ✓ Outline and detail a new approach to an issue of Human Practice in synthetic biology as it relates to your project, such as safety, security, ethics, or ownership, sharing, and innovation.

Acknowledgements

Advisors

Hirohide Saito
Akira Nabetani
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Shun-ichi Kashida
Eri Hayashi

Miki Imanishi
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Elizabeth Nakajima

Professor

Shin
Yonehara

Supportors

Ken-ichi Yoshikawa
Tan Inoue
Kunio Takeyasu
Masahiro Shirakawa
Tokitaka Oyama
Miki Ebisuya



Dear Family & Friends

Thank you!!!