bioLOGICS

Logical RNA-Devices Enabling BioBrick-Network Formation

Technische Universität München

iGEM Jamboree
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bioLOGICS Connect your BioBricks!

- Light
- Temperature
- Fluorescence
- Toxin
- Virus Particle
- Motility
Logic Network Connecting BioBricks

Requirements for logic gates:

- Input = Output
- Specificity
- Scalability
Antitermination based switch

Input

Output
Logic gates

- NOT gate
- AND gate
- OR gate
The bioLOGICS Network

Input = Output

Specificity

Scalability
**In Silico Design**

![Diagram of In Silico Design](image-url)
**In Silico Design**

![Diagram of DNA molecules](image)

ΔG = -42.78 kcal/mol
In Vitro Transcription

Malachite green binding aptamer

→ 2000x increase in fluorescence
**In Vitro Transcription**

Diagram showing the interaction between a switch (red, green, blue) and a reporter (Malachite Aptamer) leading to transcriptional read-through and transcriptional termination. The graph on the right shows fluorescence at 650 nm over time, with blue and black lines indicating different conditions.
In Vitro Transcription

![Diagram showing In Vitro Transcription process with a switch and reporter, and a graph showing fluorescence at 650 nm over time with two lines representing transcriptional read-through and His-Term.]
In Vivo Measurements

- GFP
- mCherry

Transcriptional read-through
Transcriptional termination

Normalized in vivo fluorescence [%]

Wavelength [nm]

Trp-Term
Trp-Term + Transmitter

GFP
mCherry
In Vivo Measurements
Submissions

Malachite Aptamer

🔍 BBa_K494000
malachite green binding aptamer

🔍 BBa_K494001

in vivo measurement plasmid
Outlook

Evaluate and optimize Terminators

Evaluate and optimize Transmitter

Characterize Logic Gates

First bioLOGICS Network
Thank you for your attention!
Questions?

Input molecules activate cellular BioBricks which lead to transcription of transmitter RNA molecules.

A simple switch is the basic unit for logic gates (AND/OR/NOT).

Transmitter RNAs connect logic gates to form a network controlling transcription of output mRNA.