Experimental Evaluation of Single Switches

Two reporter assays were developed to determine termination efficiency in presence or absence of transmitter RNA. For both screening systems, substantial parts were submitted.

**In vitro transcription**

Upon binding to the specific aptamer, malachite green fluorescence increases over 2000-fold. This aptamer was used as reporter for transcriptional read-through.

**In vivo translation**

mCherry fluorescence served as reporter for transcriptional read-through. GFP was used as an internal standard.

Results

NUPACK verified the general concept of logic gates on thermodynamic basis.

Kinfold confirmed our switching process on a kinetic level.

Diffusion can be neglected.

Cloning of constructs was successfully completed.

Sequence of all constructs were verified.

Further measurements will be required to fully verify the concepts of bioLOGICS.

Submitted parts (selection)

- BBa_K494000 Malachite green binding aptamer
- BBa_K494001 In vivo screening system for PoPS devices

Potential of bioLOGICS

- Input: any transcription-inducing BioBrick
- Output: any BioBrick, RNA or custom gene
- Any boolean logic operation possible
- Unlimited number of logic operations
- In silico design: allowing easy-to-use network assembly for everybody
- Orthogonal towards cellular signalling
- Complete system encoded on DNA plasmid
- Operating solely on RNA-level:
  - Energy-efficient
  - High flexibility due to fast turn-over