Coli. Touch
Implementation of pressure responsive genetic circuit in E.coli

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Introduction
New input: Pressure
- Previous iGEM projects
- Heat
- Small molecules
- Light
- Our works

Advantage of pressure
- Heat, Small molecules, Light
- Pressure

1. Pressure induction
   tet promoters are known as pressure responsible ones
   [T. Sato et al., 1995]
   - Constructed
     - P₄₅-GFP
     - Tet promoter (P₄₅)
     - RBS
     - GFP
     - Terminator
     - On pSB6

   How to press
   1. Set the display in pressure vessel
   2. Cap the vessel
   3. Apply pressure to 30 MPa
   4. Cultivate at 37 °C

   Result of pressure induction

2. Touch display
   - We planned to create the touch display with many holes.
   - Apply 30 MPa pressure to prototype - touch display (two holes)

   Image of touch display

3. Low pressure-inducible promoter
   Previous study and problem
   Pressure response of P₄₅
   - CAT activity (unit/mg) vs. Pressure (MPa)

   Results of sequencing

   Conclusion
   1. Pressure induction: we constructed pressure-inducible genetic circuit and measured its pressure response.
   2. Touch display: we created the prototype - touch display.
   3. Low pressure-inducible promoter: We confirmed the feasibility of the experimental scheme for the development of low pressure inducible promoter.
   4. Write/Erase cycle: the feasibility of implementation of the Write/Erase cycle was confirmed using numerical analysis and measurement of the critical parameter.

Future work
1. Pressure induction: Confirm pressure response of the lac promoter.
2. Touch display: Create finished product of touch display.
3. Low pressure-inducible promoter: Screen promoter mutants and LacI mutants.
4. Write/Erase cycle: Construct the genetic circuit

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Mathematical model

The feasibility of implementation of Write/Erase cycle

Numerical analysis to identify upper limit

We can implement Write/Erase cycle