



# Empirical determination of the attack activation function in quorum sensing bacteria

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# Outline

- Quorum sensing
- *E. coli* monitor
- Results



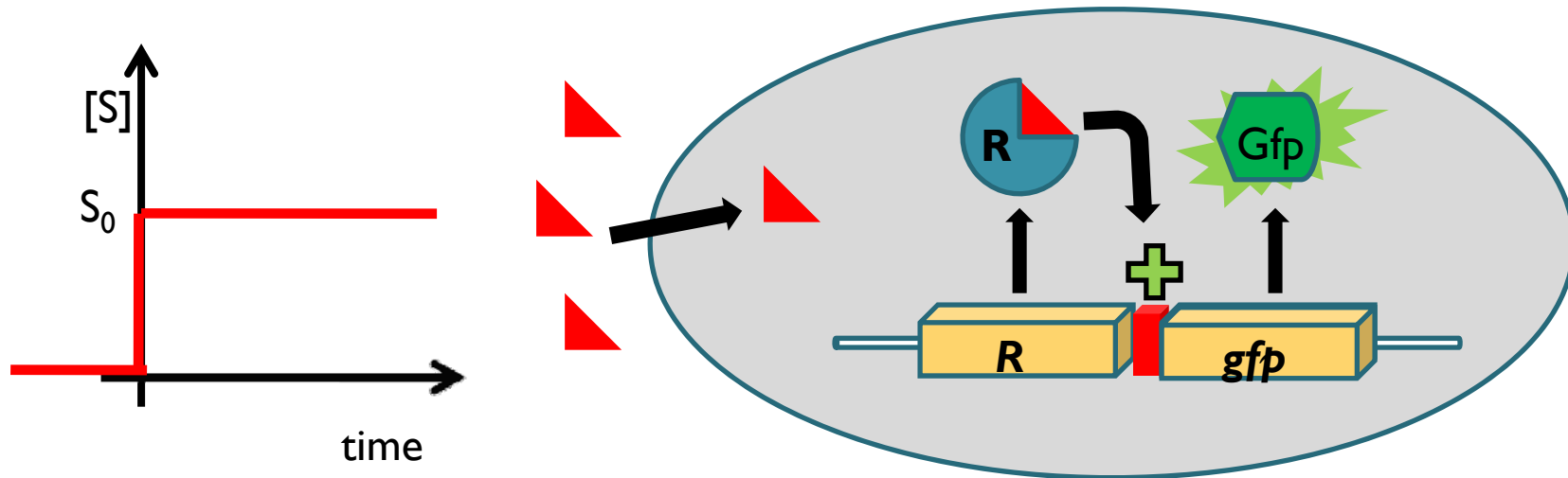
# *E. coli* monitor

The MH205 contains quorum sensing construct from *A. hydrophila*.

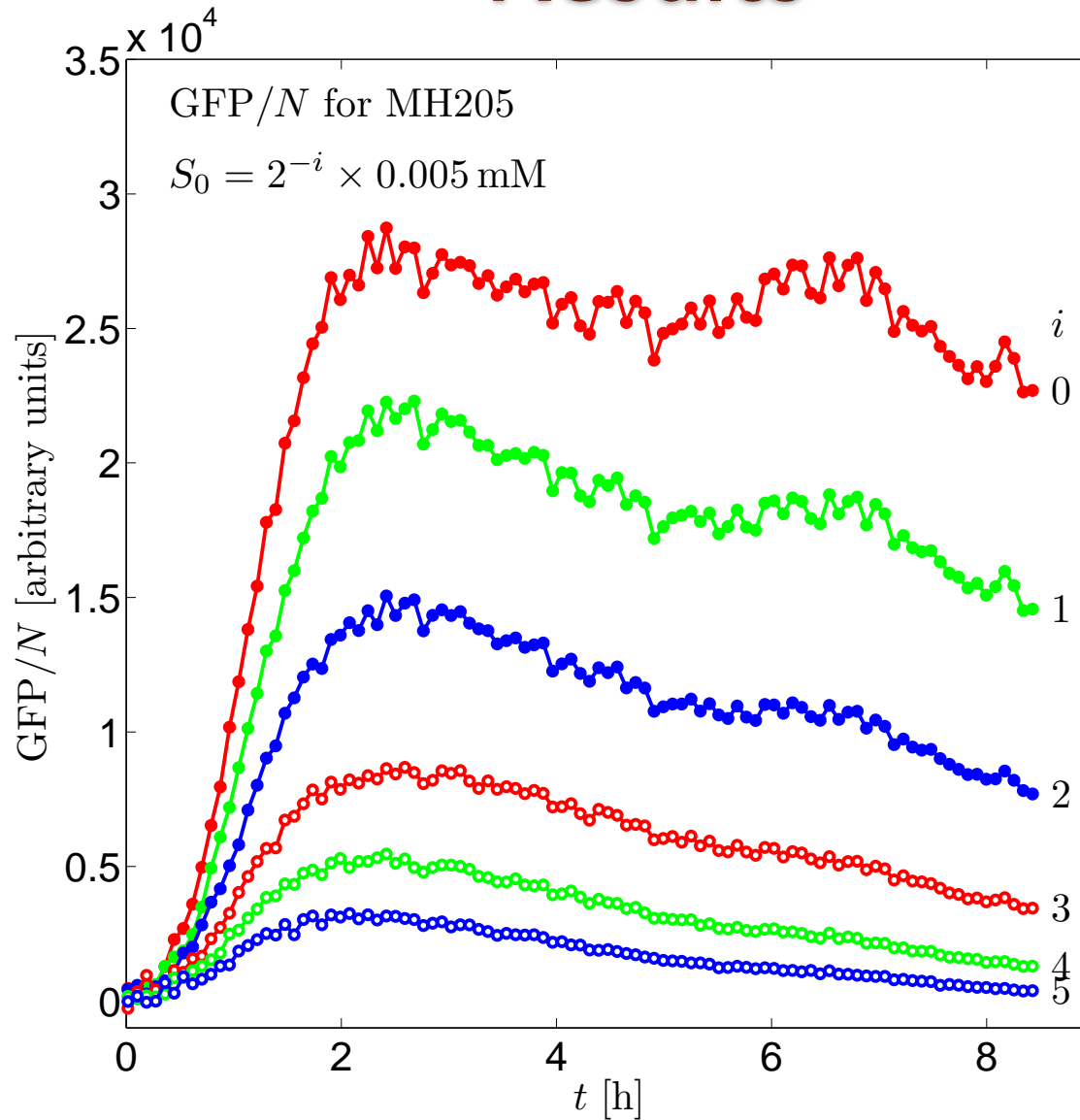
Expresses the quorum sensing activation in terms of an unstable Gfp.

Independent measures of the activation as a step response to predetermined signal molecule concentrations.

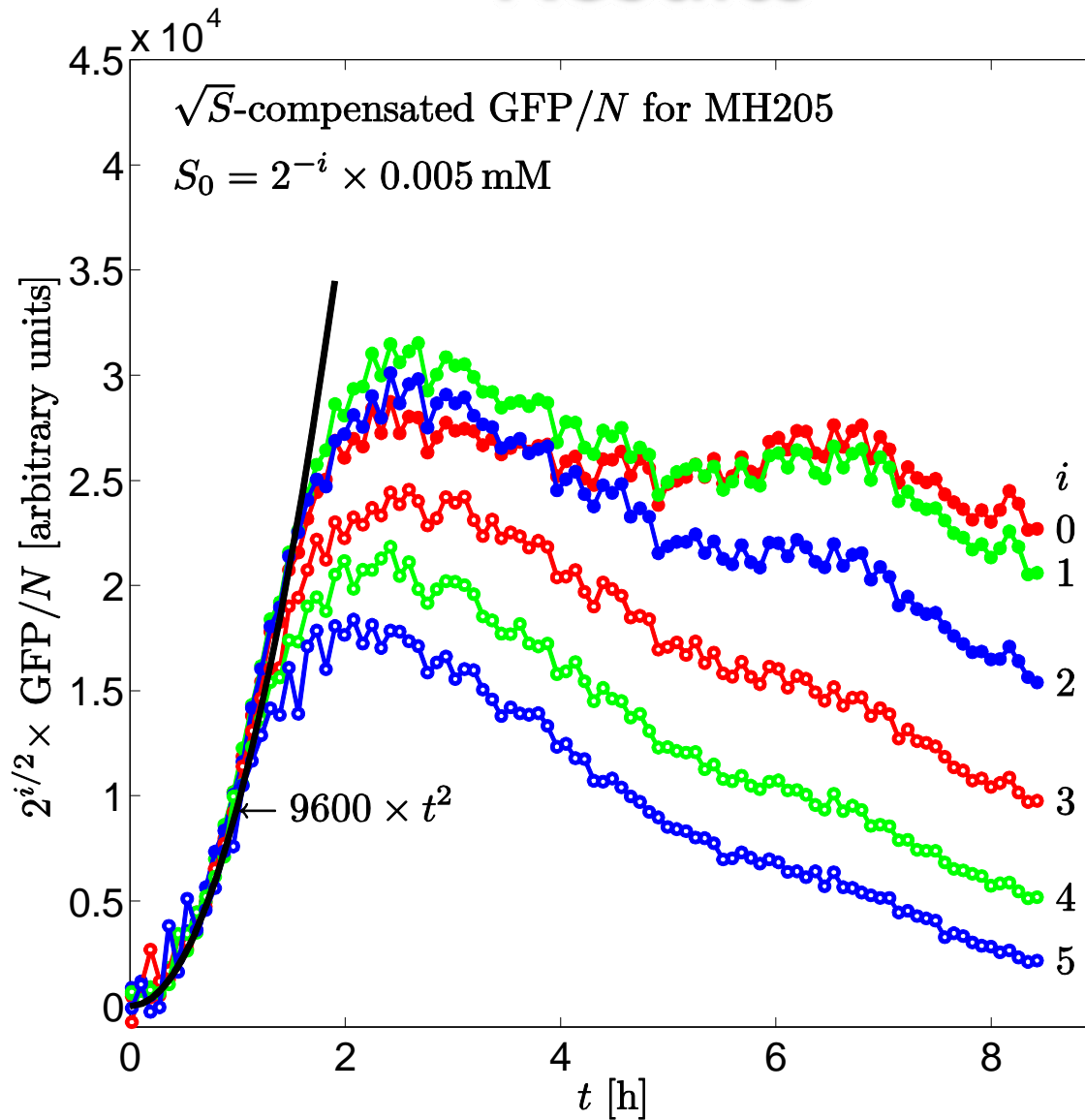
MH205 was grown to logarithmic phase and added to twofold dilution rows of signal molecules to be measured by  $OD_{450}$  and GFP every 5<sup>th</sup> min.



# Results



# Results



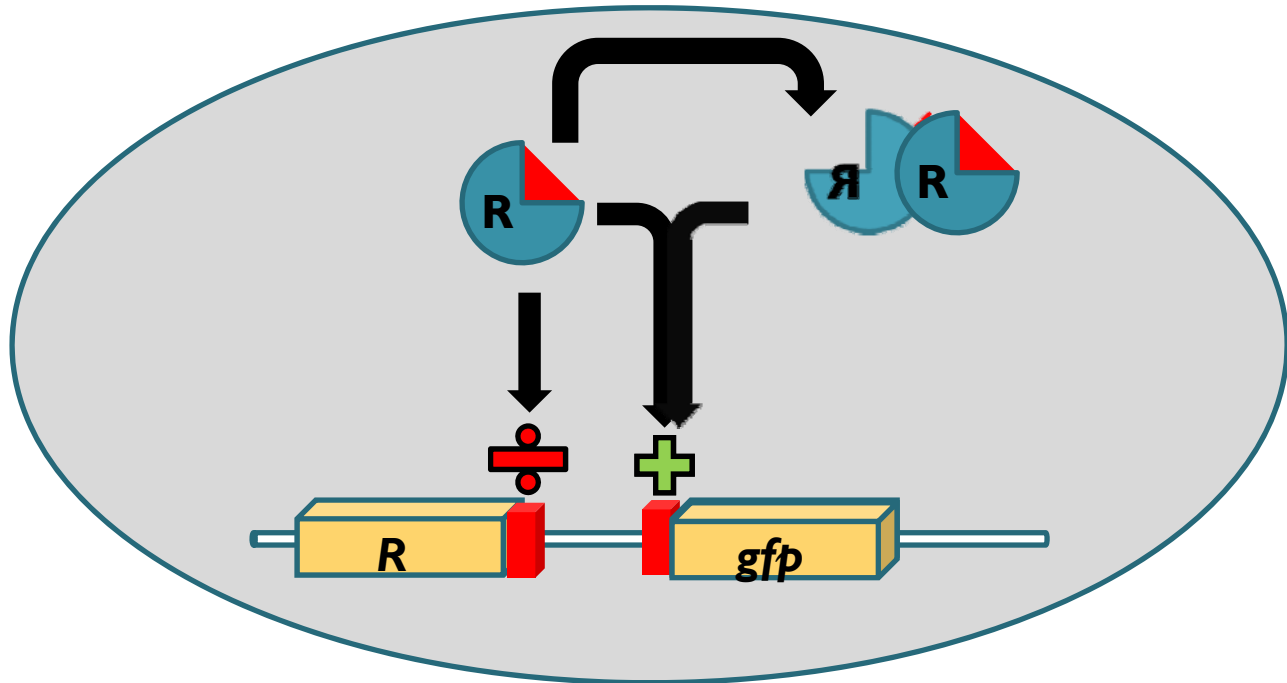


Thank You  
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Questions...

# Supplementary

The activated transcriptional regulator may inhibit its own production.

The activated transcriptional regulator may dimerize before inducing transcription of *gfp*.



# Supplementary

$$\frac{dR}{dt} = \frac{k_1}{1 + r/k_2} - \lambda_R R - k_r^+ R \cdot S + k_r^- r$$

$$\frac{dr}{dt} = k_r^+ R \cdot S - k_r^- r - \lambda_r r$$

$$\frac{dG}{dt} = k_G^+ G - \lambda_G G$$

S = [S] = signal molecule concentration

R = [R] = regulator concentration inside the cell

r = [RS] = concentration of RS complex inside the cell

G = [G] = Gfp concentration