

# sbio antimicrobial strategy



Monday, 17 October 2011

### P. aeruginosa has efficient efflux systems + biofilm = a hard target for antiobiotics

### (i) detect AHLS produced by P. aeruginosa (quorum sensing)

(ii) produce pyocin S5 upon guorum detection

(iii) lyse the e. coli cells by e7 lysis protein

(iv) pyocin S5 is released from the cell

... leading to the killing of P. Jeruginosa

http://www.nature.com/msb/Journal/v7/n1/full/msb201155.html

#### how do you do that?





# plasmid map





Part Number	Description	Symbol
BBa_R0040	TetR repressible promoter	4
BBa_R0062	LuxR & HSL inducible promoter	<b>Å</b>
BBa_B0032	Ribosome Binding Site (medium)	4
BBa_B0034	Ribosome Binding Site (strong)	4
BBa_C0179	LasR coding region	1
BBa_E0040	Green Fluorescence Protein	1
BBa_K117000	Lysis Protein	1
BBa_B0015	Terminator	•
pTetR-LasR-pLuxR-	Sensing Device	
pTetR-LasR-pLuxR-GFP	Sensing Device with Reporter protein	
pTetR-LasR-pLuxR-S5	Sensing Device with Pyocin S5	
pTetR-LasR-pLuxR-E7	Sensing Device with ColicinE7 lysis gene	pTet RBS5 LasR Term pLux RBS3 lysis Term
pTetR-LasR-pLuxR-S5-pLuxR-E7	Sensing/killing system construct	





GFP production rate per cell over time at different 30(12HSL inducer concentrations

sensing device coupled with GFP reporter

## Time-averaged GFP production rate per cell at different 30C12HSL concentrations showing optimal operating values



characterization of killing





Effects of lysis protein on E. Coli Surface Morphology

## the amount of pyocin released by the final system <u>eight times higher</u> than W/o the lysis device



# Biofilm inhibition

Close to 90% during the initial attachment phase

#### pTetR-LasR-pLuxR-S5-pLuxR-E7



In7 biofilm cultured with *E. coli* pTetR-LasR-pLuxR-E7



#### pTetR-LasR-pLuxR-S5



In7 biofilm



