Figure 1

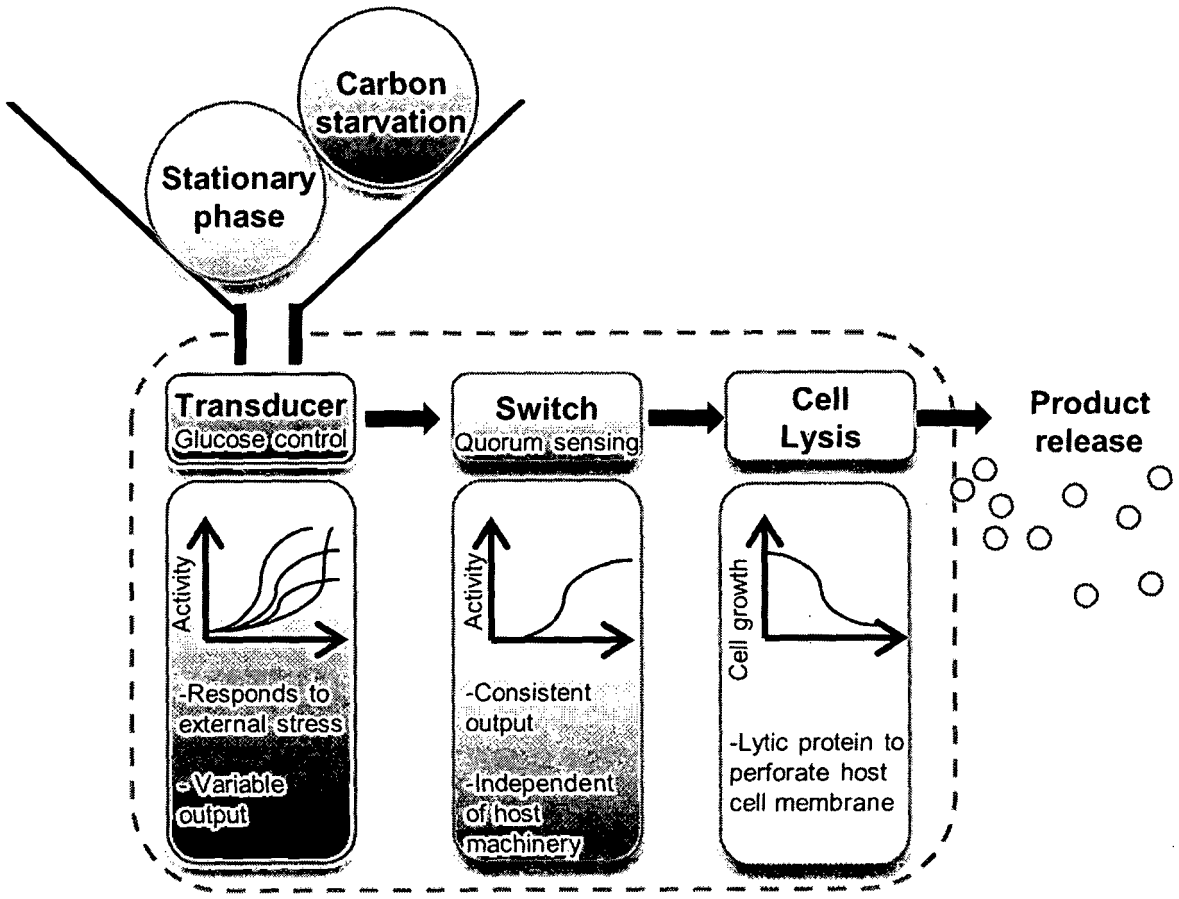

Carbon starvation
Stationary phase
Transducer
Glucose control
Switch
Quorum sensing
Cell Lysis
Product release
Activity
-Responds to external stress
- Variable output
Activity
-Consistent output
-Independent of host machinery
Cell growth
-Lytic protein to perforate host cell membrane

Figure 2

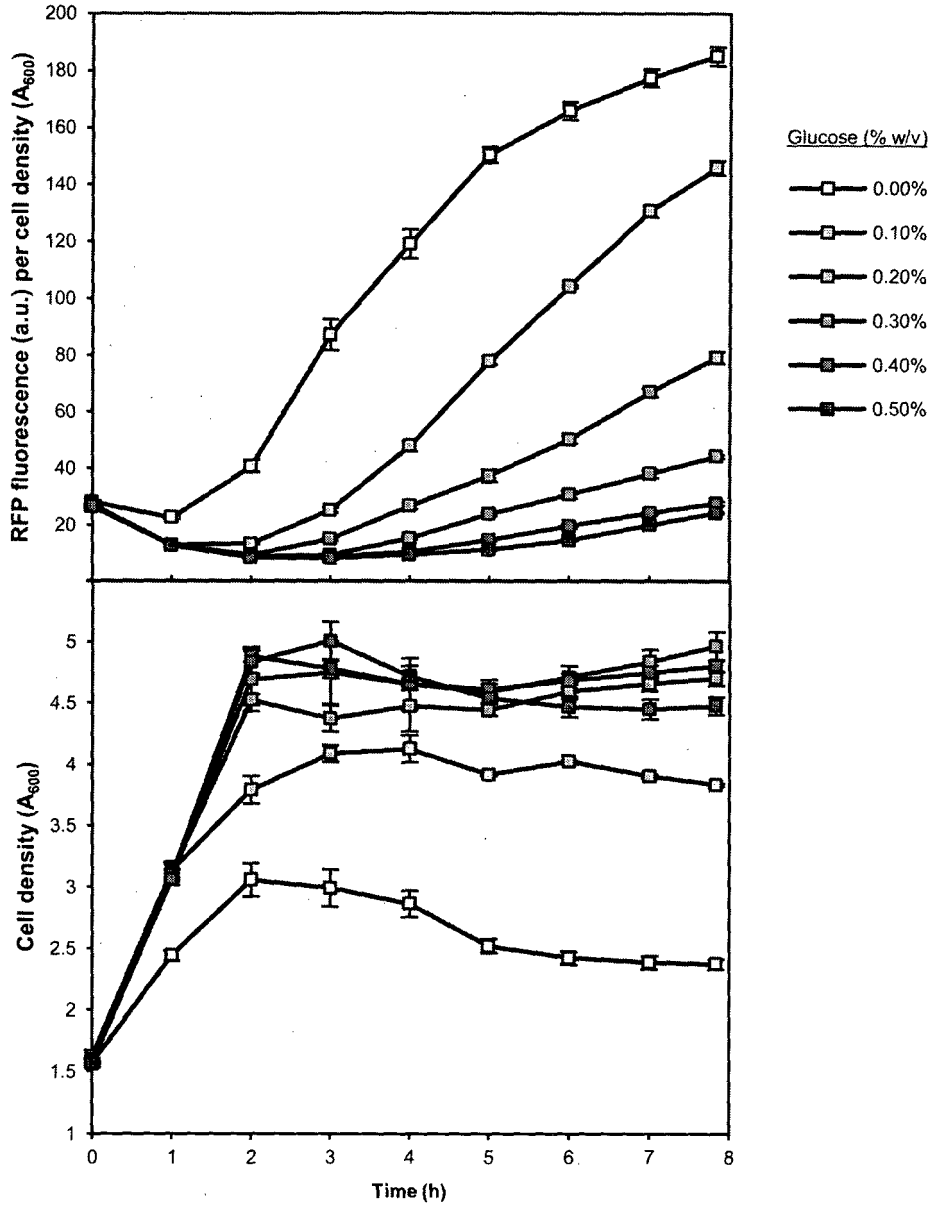

RFP fluorescence (a.u.) per cell density (A_{600})
200
180
160
140
120
100
80
60
40
20
Cell density (A_{600})
5
4.5
4
3.5
3
2.5
2
1.5
1
0
1
2
3
4
5
6
7
8
Time (h)
Glucose (% w/v)
0.00%
0.10%
0.20%
0.30%
0.40%
0.50%

Figure 3

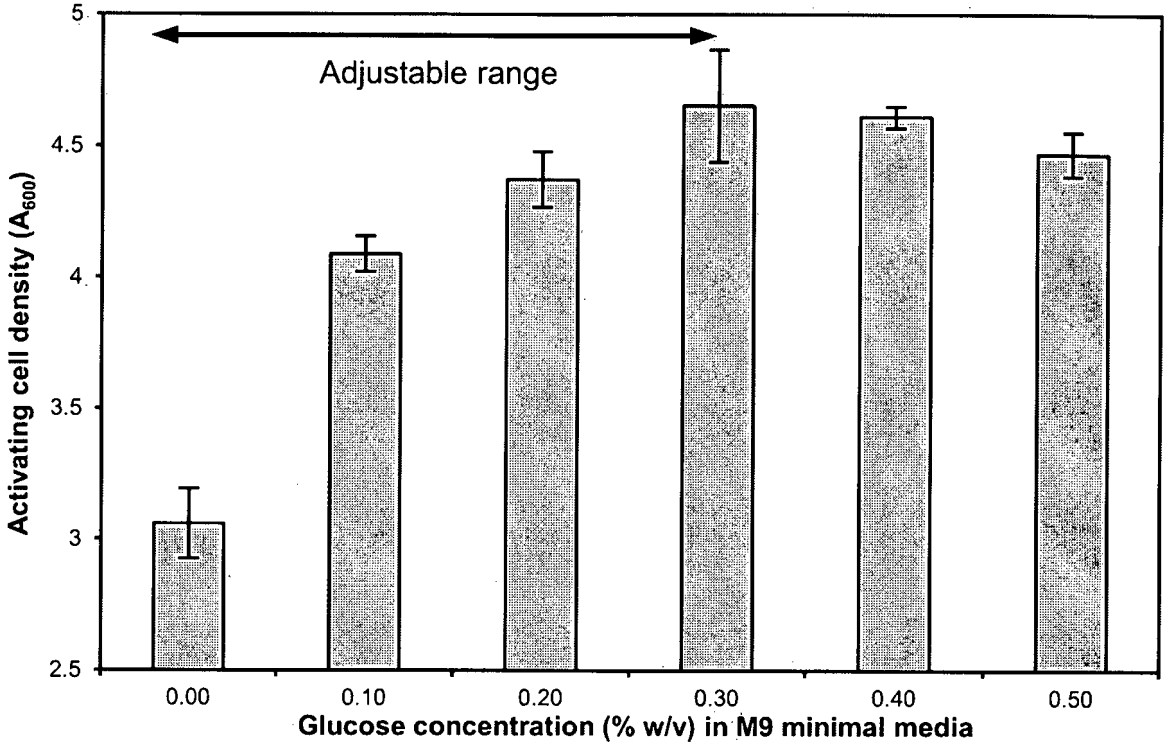

Adjustable range
Activating cell density (A_{600})
5
4.5
4
3.5
3
2.5
0.00
0.10
0.20
0.30
0.40
0.50
Glucose concentration (% w/v) in M9 minimal media

Figure 4

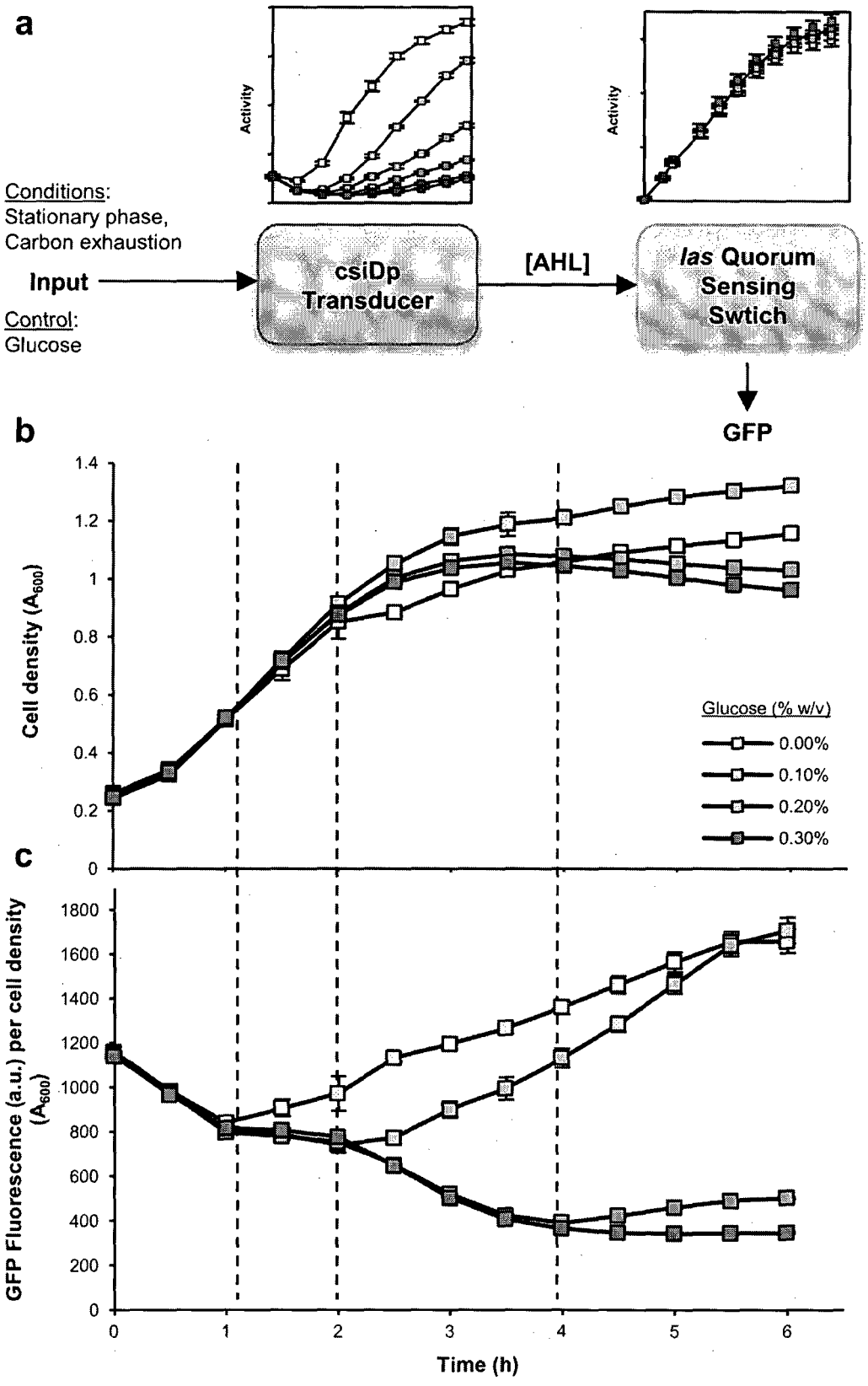
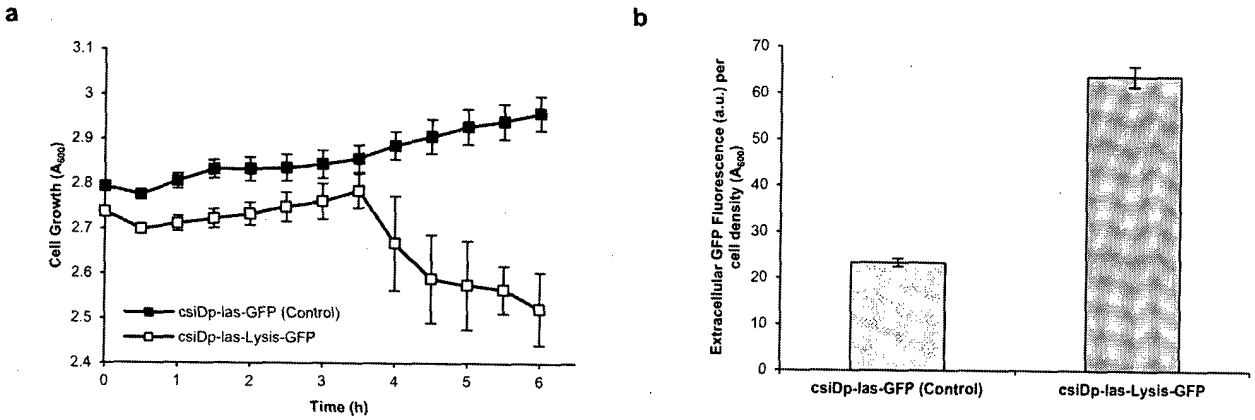

a
Activity
Activity
Conditions:
Stationary phase,
Carbon exhaustion
Input
Control:
Glucose
csiDp
Transducer
[AHL]
las Quorum
Sensing
Swtich
GFP
b
Cell density (A600)
Glucose (% w/v)
0.00%
0.10%
0.20%
0.30%
c
GFP Fluorescence (a.u.) per cell density (A600)
Time (h)

Figure 5





Control

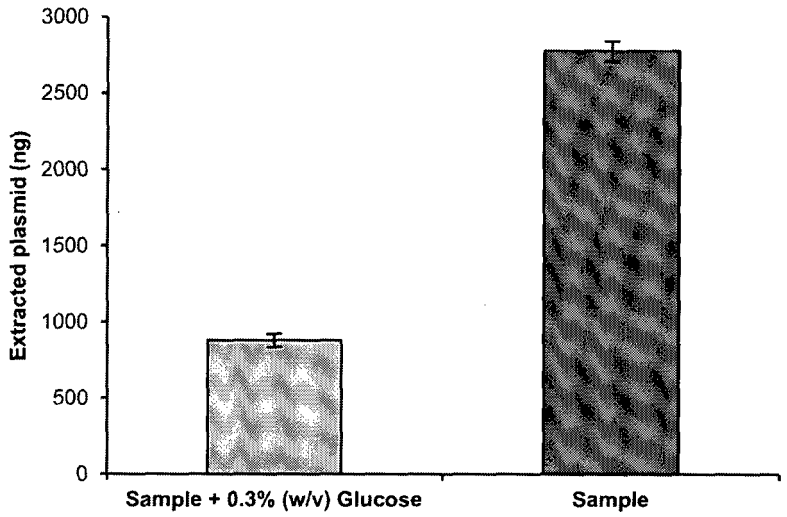
C



Synthetic lysis system

Figure 6

a


3000
2500
2000
1500
1000
500
0
Extracted plasmid (ng)
Sample + 0.3% (w/v) Glucose
Sample

b

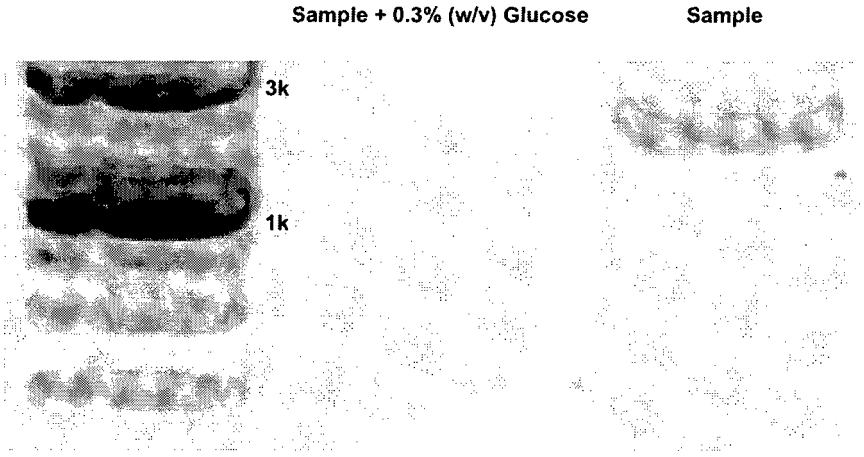

Sample + 0.3% (w/v) Glucose
Sample
3k
1k

Figure 7

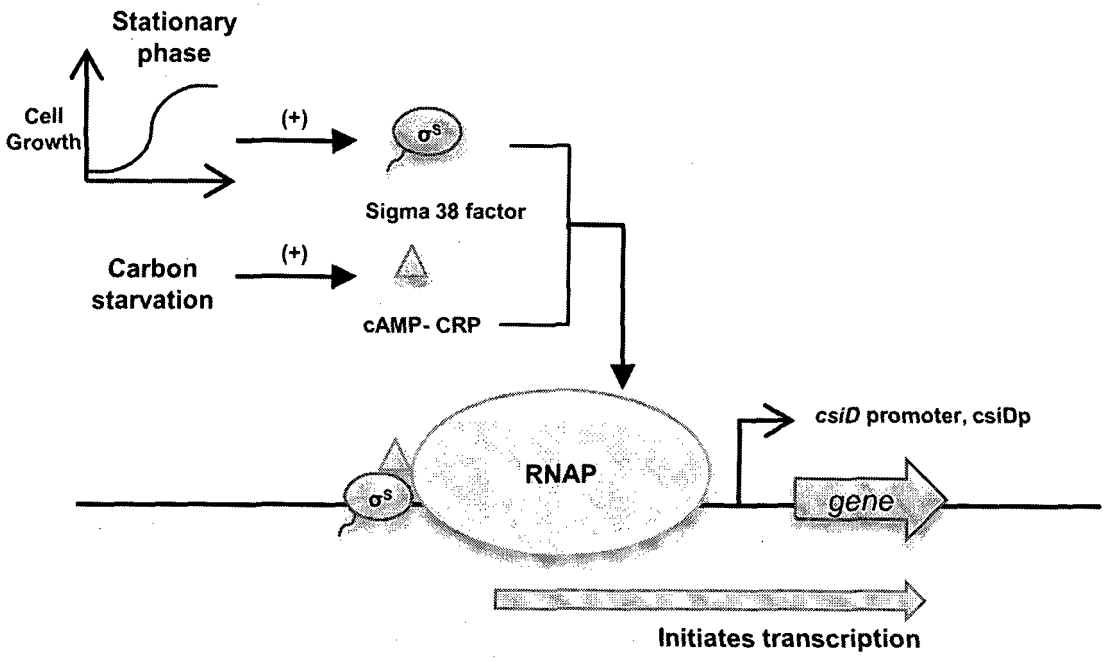
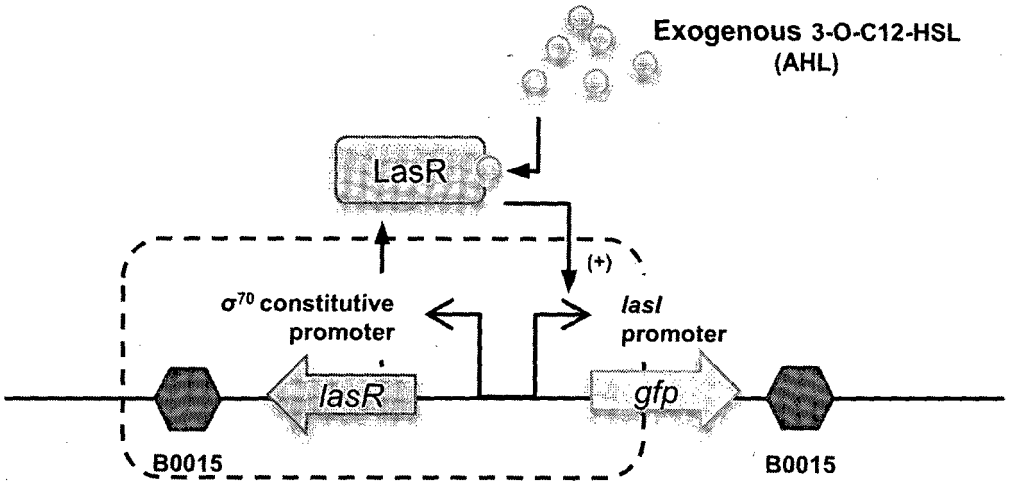

Stationary phase
Cell Growth
(+)
σS
Sigma 38 factor
Carbon starvation
(+)
cAMP- CRP
csiD promoter, csiDp
RNAP
σS
gene
Initiates transcription

Figure 8



las quorum sensing based expression system

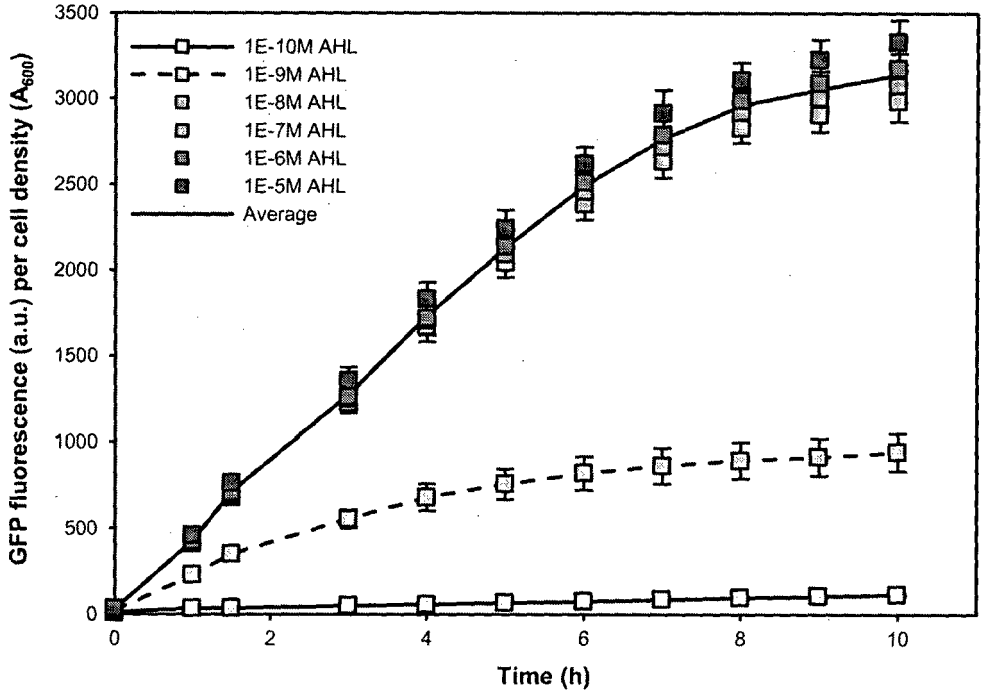
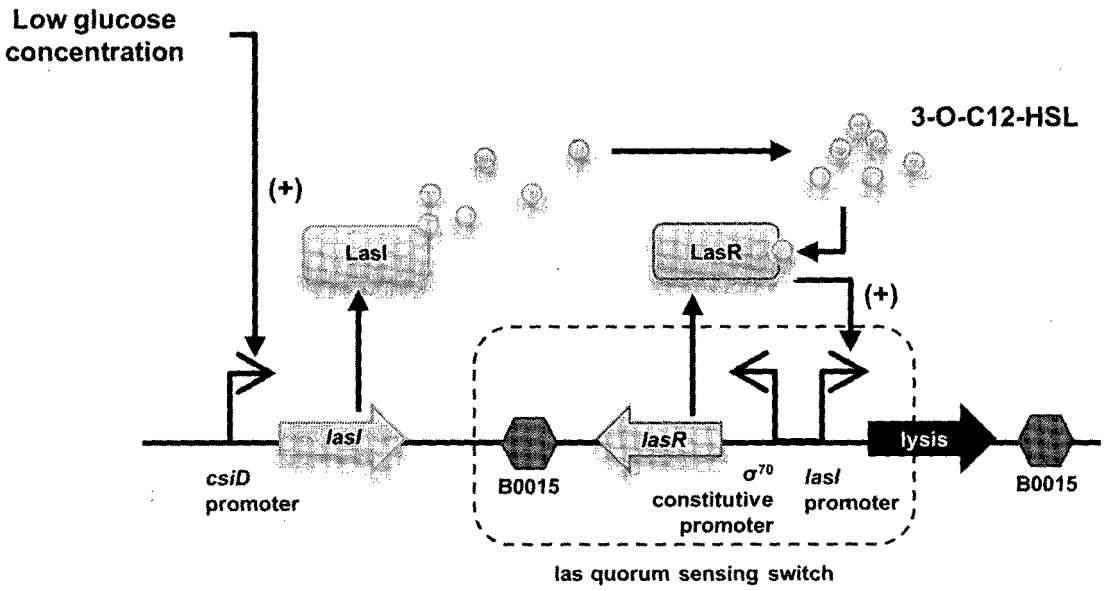


Figure 9



Controllable synthetic lysis system