Figure 1A

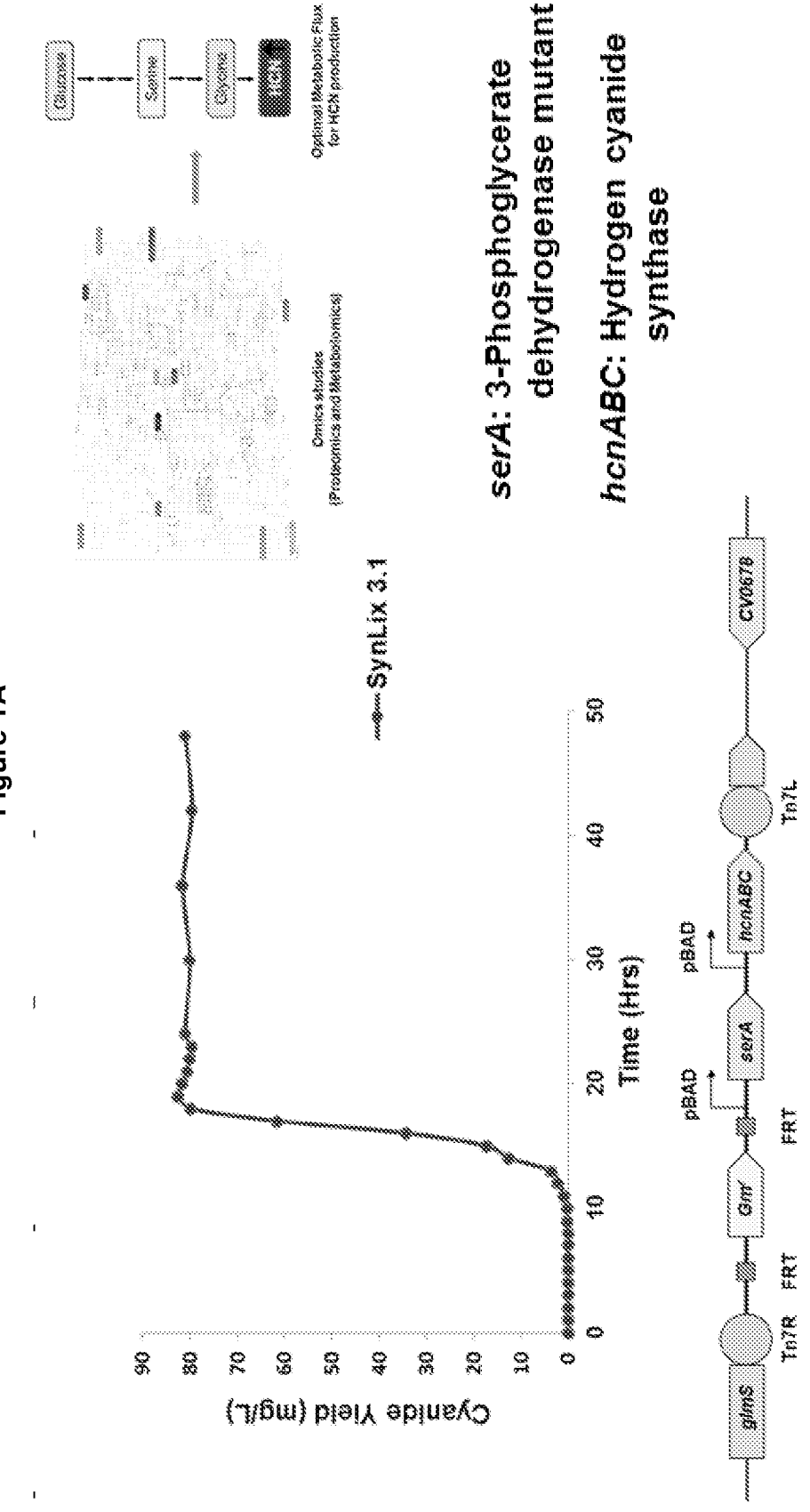

Glucose
Serine
Glycine
HCN
Optimal Metabolic Flux for HCN production
Omics studies (Proteomics and Metabolomics)
serA: 3-Phosphoglycerate dehydrogenase mutant
hcnABC: Hydrogen cyanide synthase
SynLix 3.1
Cyanide Yield (mg/L)
Time (Hrs)
0
10
20
30
40
50
60
70
80
90
glmS
Tn7R
FRT
Gm
FRT
pBAD
serA
pBAD
hcnABC
Tn7L
CV0678

Figure 1B

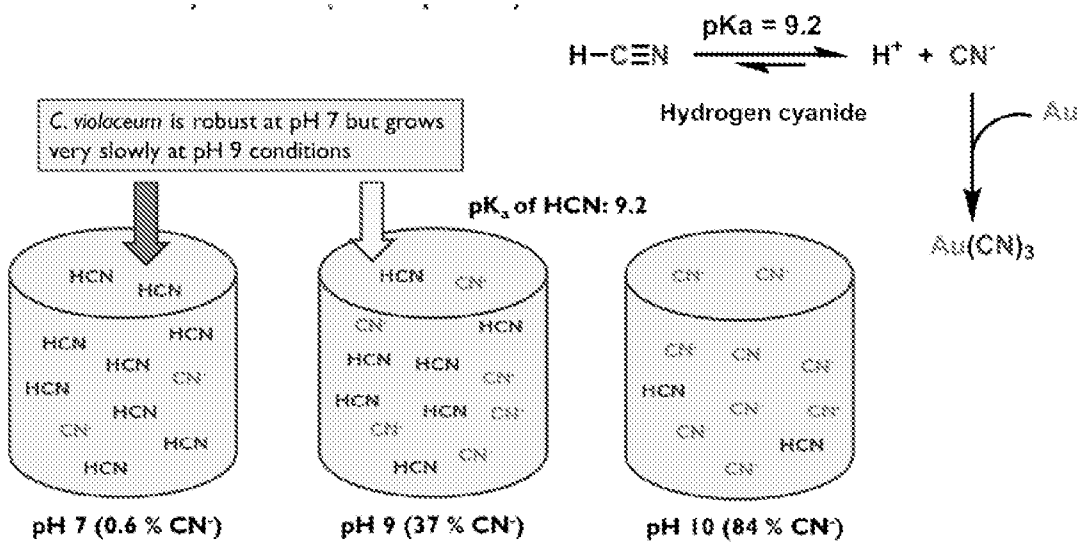


Figure 2

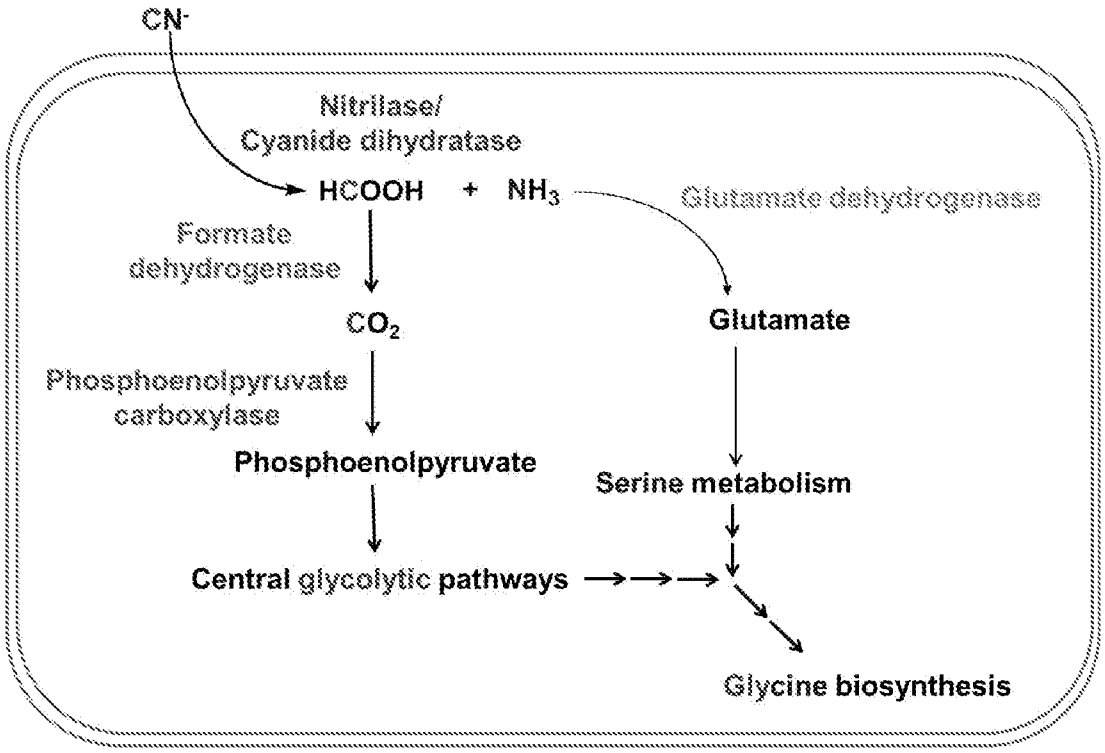


Figure 3

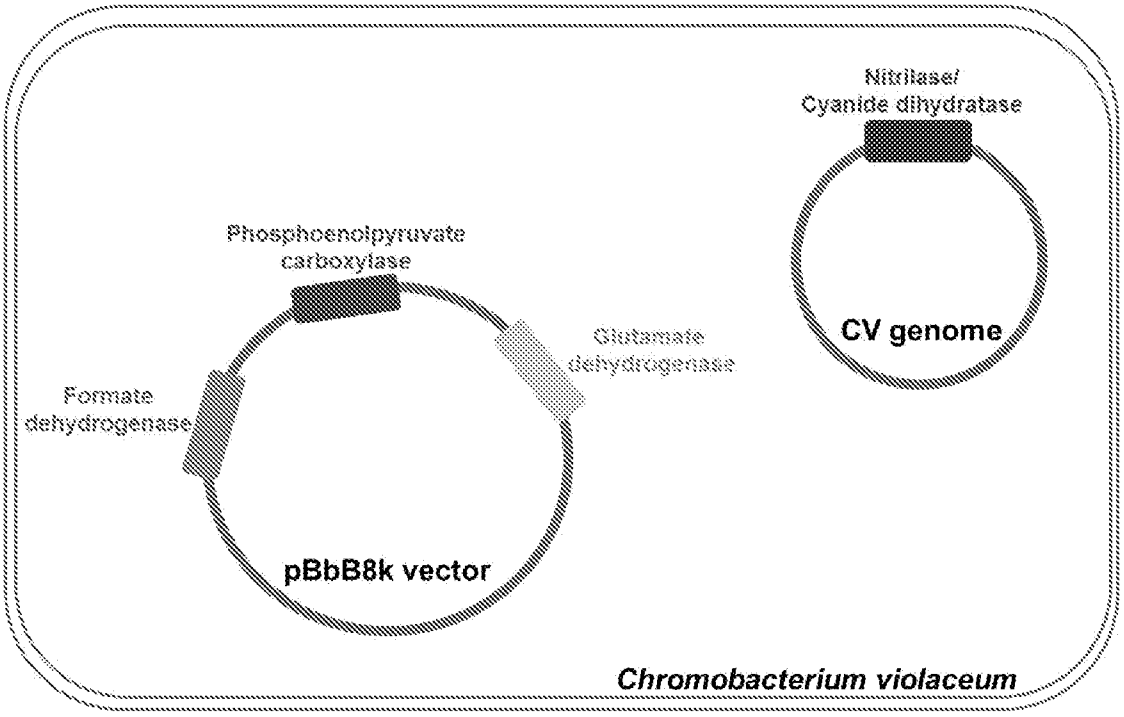


Figure 4

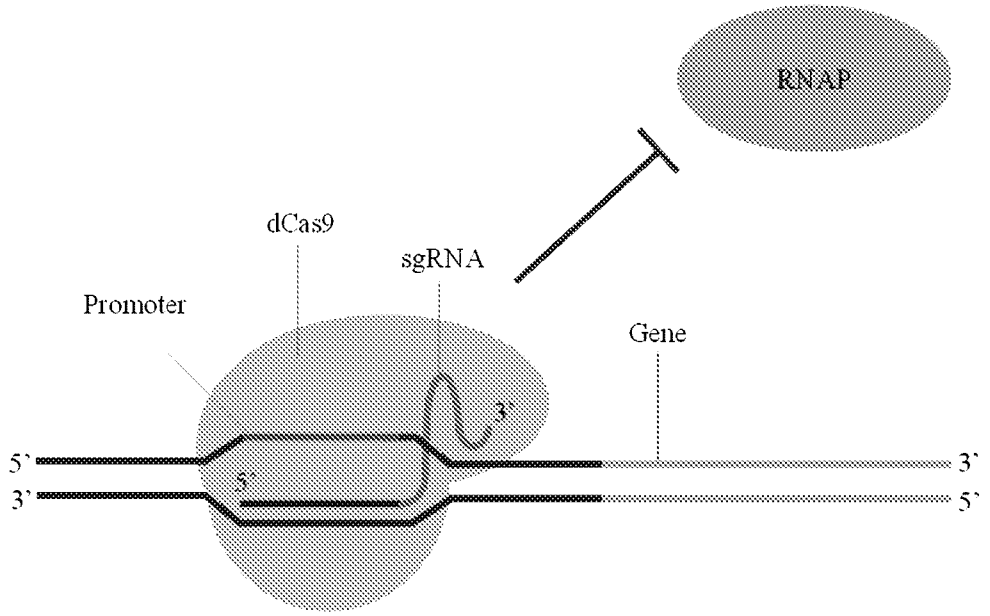
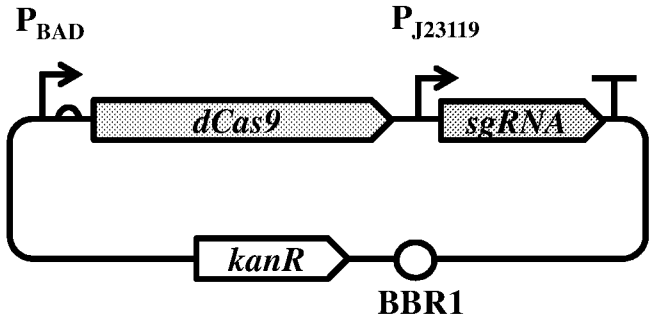
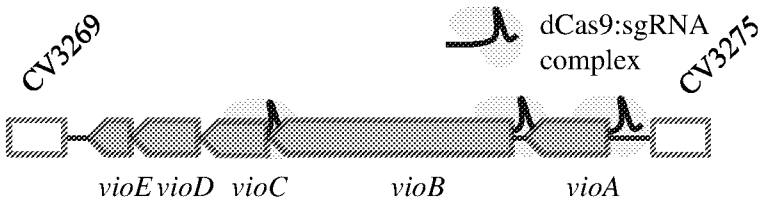


Figure 5

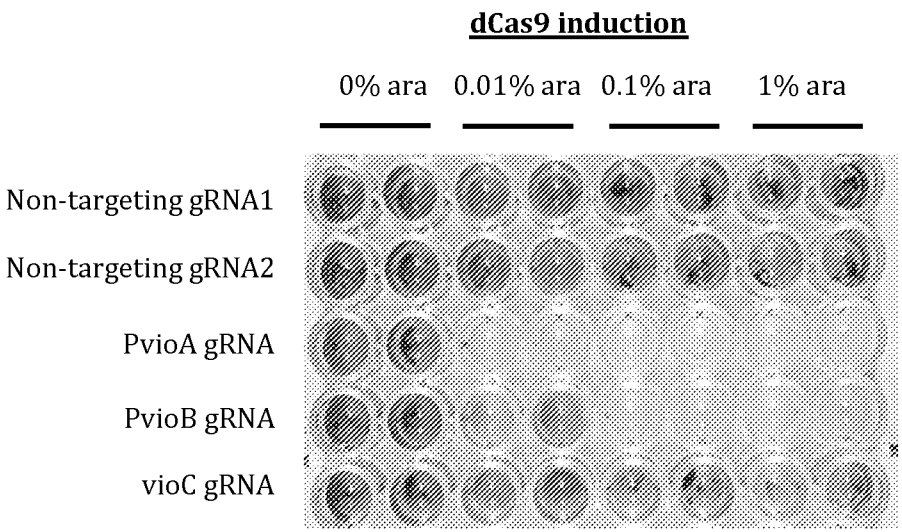
A



B



C



D

Non-targeting gRNA1	1.4	1.1	1.1	1.2	1.4	1.2	1.1	1.3
Non-targeting gRNA2	1.6	1.2	1.1	1.2	1.0	1.1	1.2	1.3
PvioA gRNA	1.1	1.0	0.7	0.6	0.5	0.5	0.9	0.9
PvioB gRNA	1.1	1.1	0.8	1.0	0.9	1.4	0.9	1.4
vioC gRNA	1.0	1.2	1.2	1.9	1.5	1.5	1.1	1.0

OD600

Figure 6

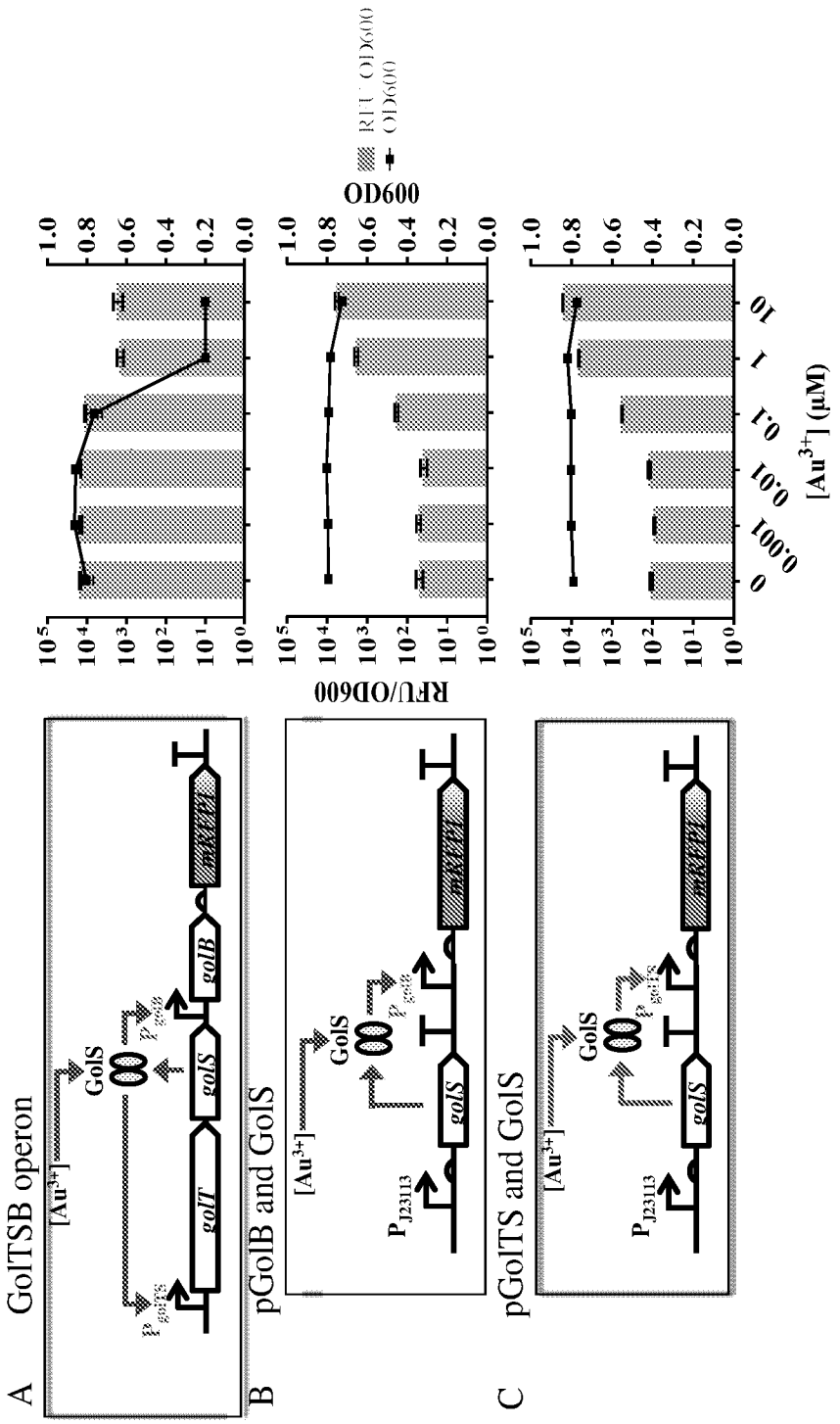

A GolTSB operon
B pGolB and GolS
C pGolTS and GolS
[Au3+]
GolS
golT
golS
golB
mRFP1
P J23113
RFU/OD600
OD600
RFU
OD600
[Au3+] (μM)
0
0.001
0.01
0.1
1
10

Figure 7

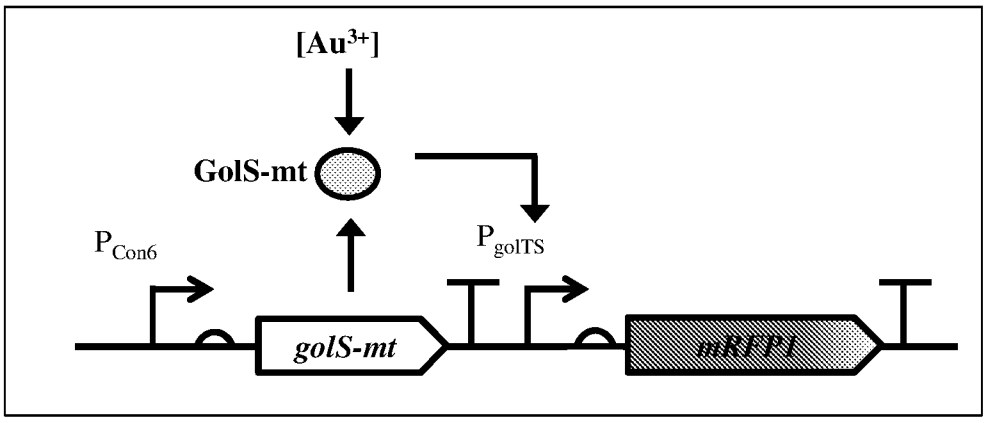
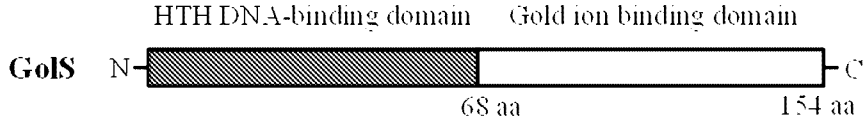


Figure 8

A



B

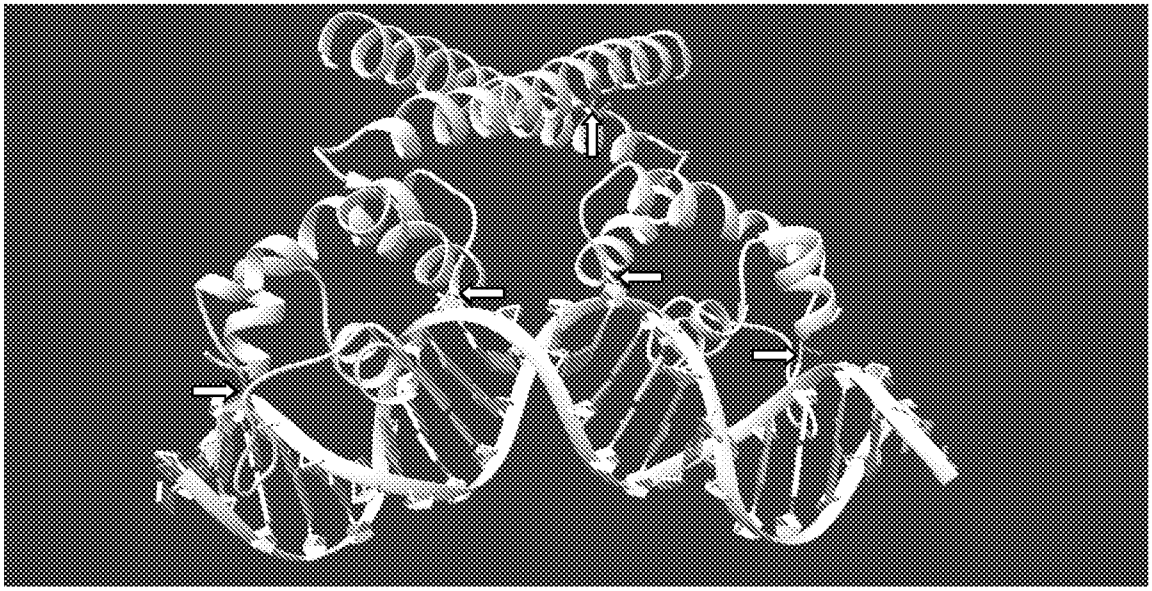


Figure 9

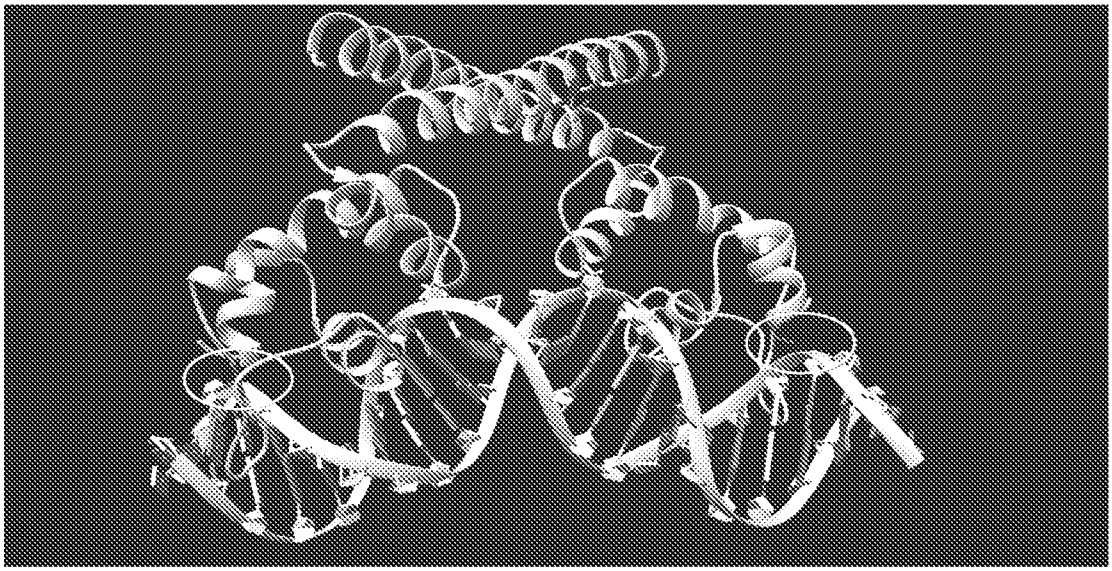


Figure 10

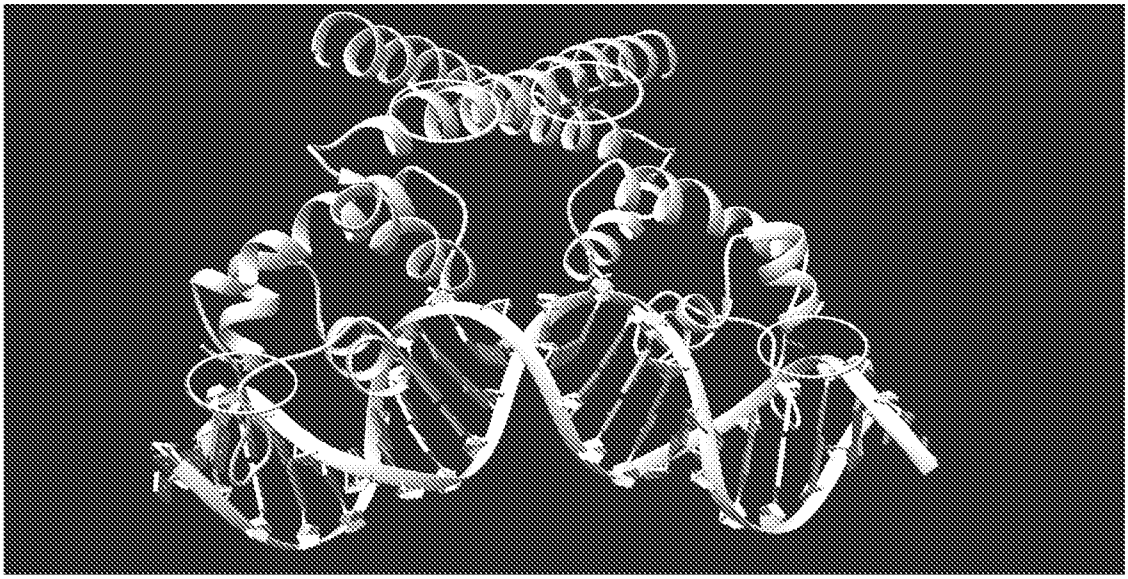


Figure 11

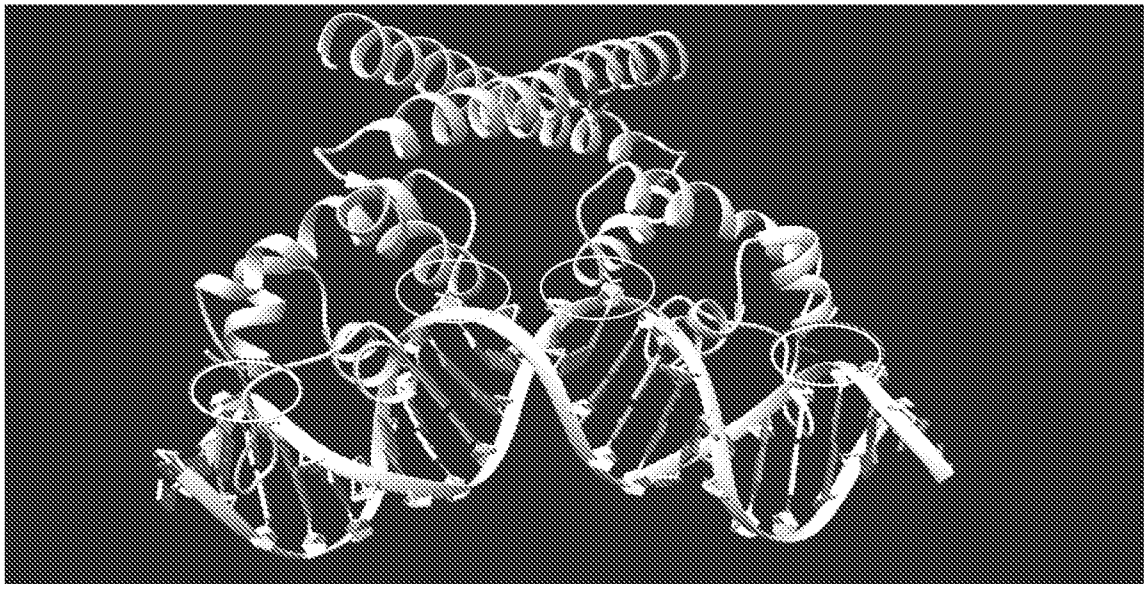


Figure 12

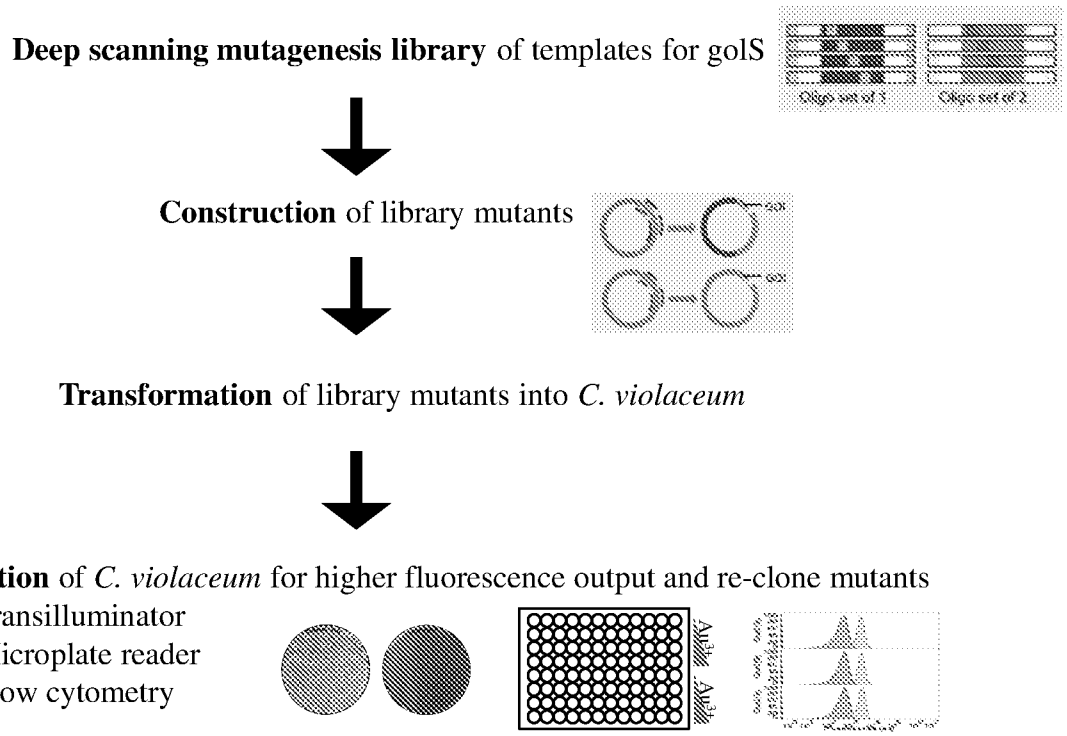


Figure 13

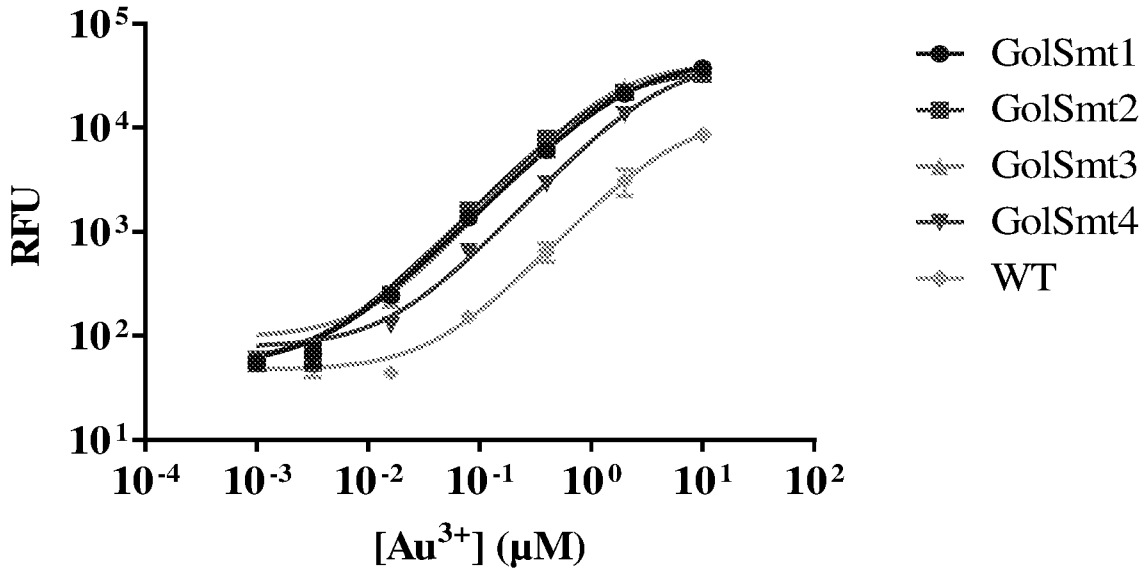


Figure 14

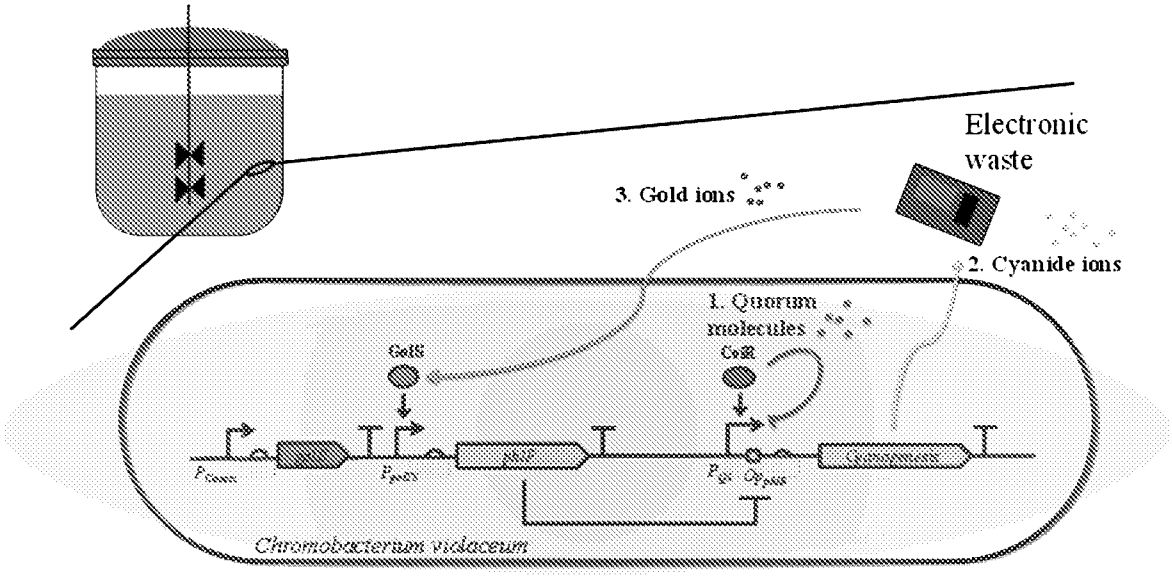


Figure 15

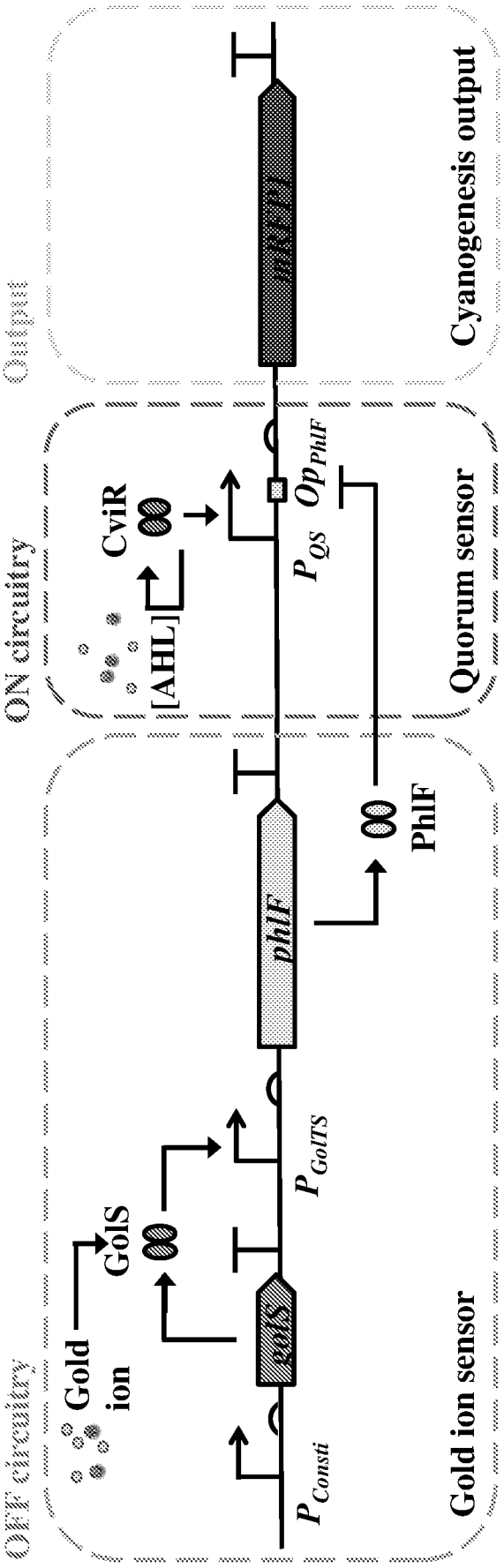

OFF circuitry
Gold ion
GolS
golS
P_{Consti}
P_{GolTS}
phlF
PhlF
Gold ion sensor
ON circuitry
[AHL]
CviR
P_{QS}
Op_{PhlF}
Quorum sensor
Output
mRFP1
Cyanogenesis output

Figure 16

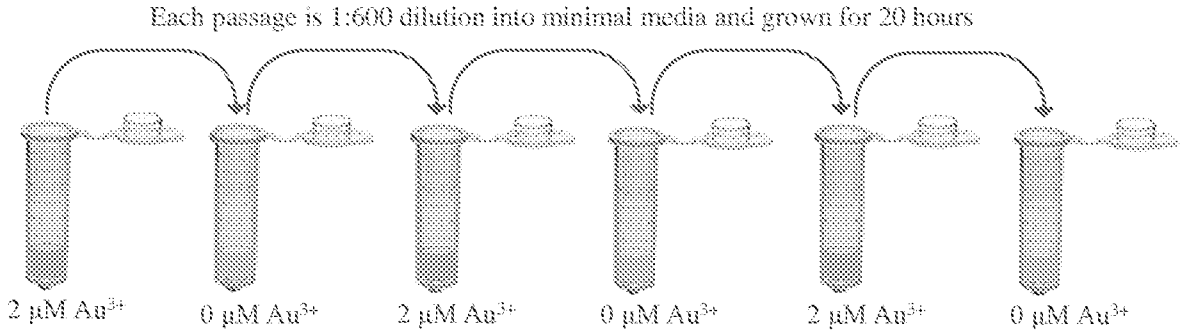


Figure 17

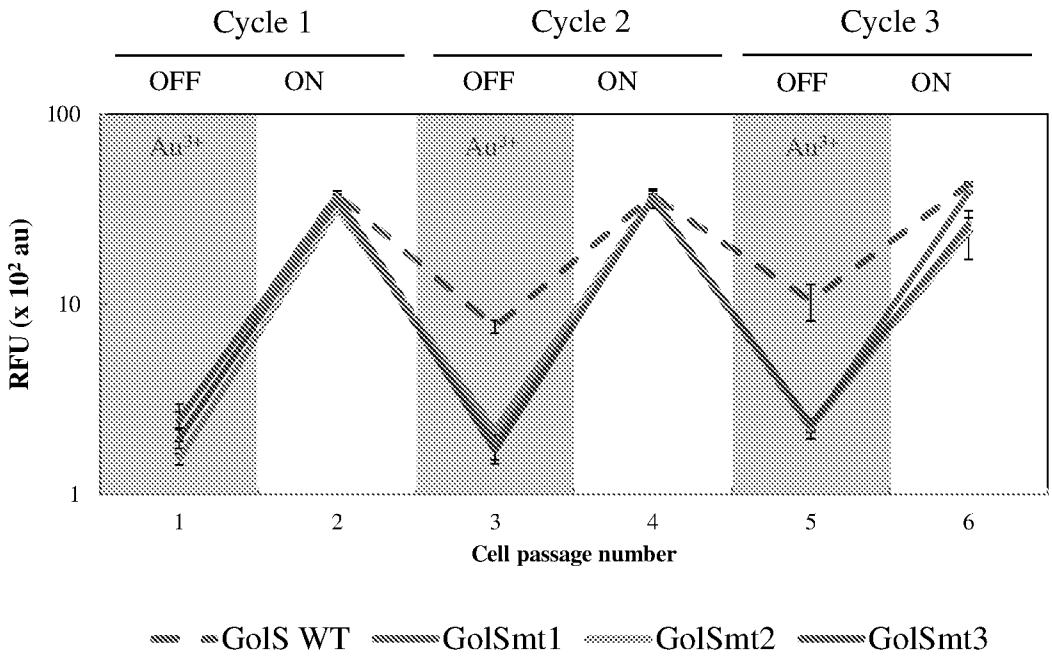


Figure 18

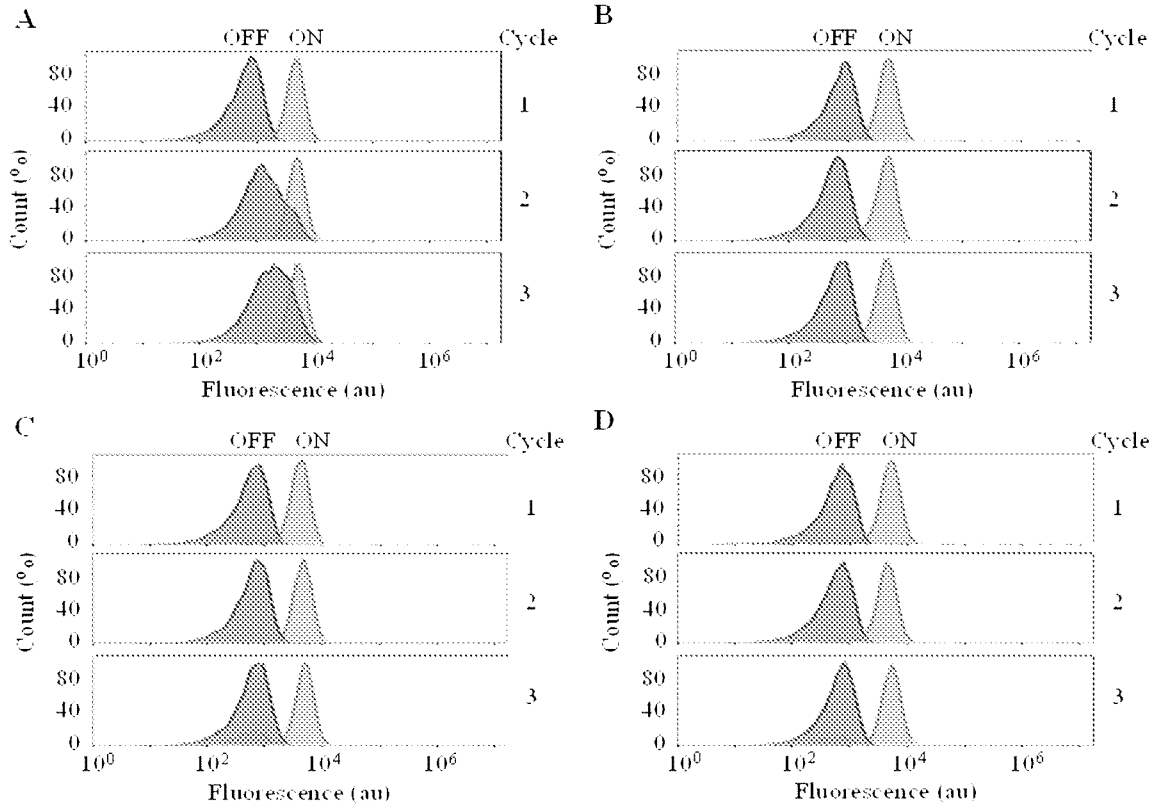


Figure 19

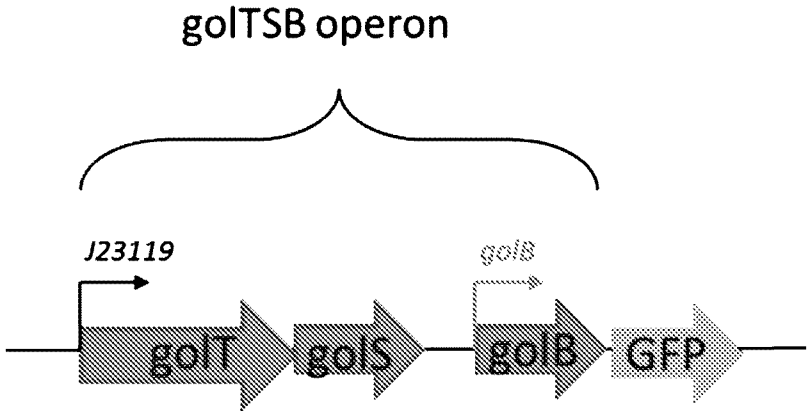


Figure 20

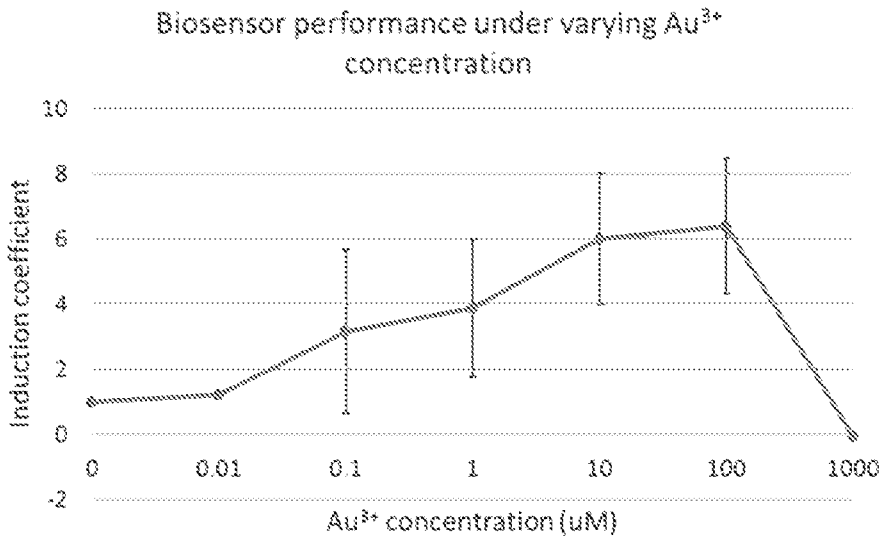
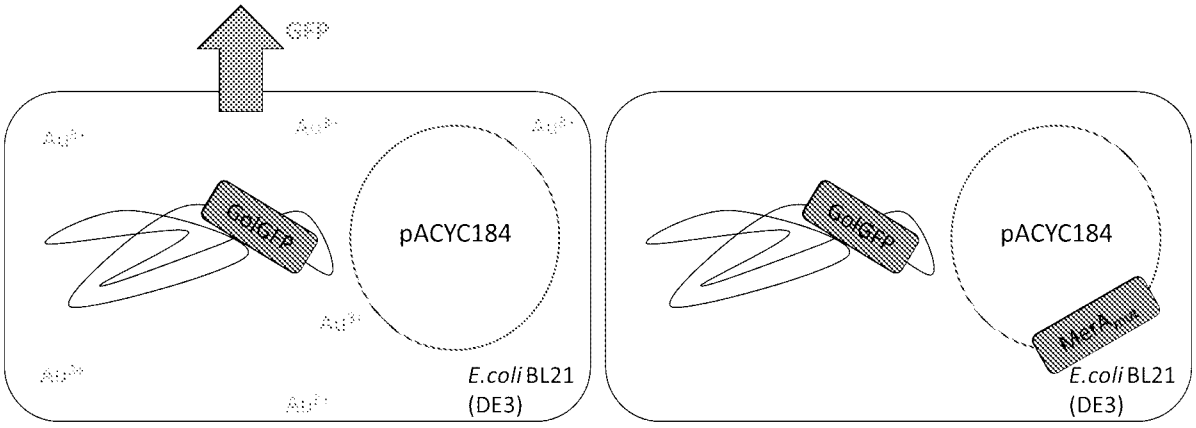


Figure 21



(A) Absence of gold reducing MerA

(B) Presence of gold reducing MerA

Figure 22

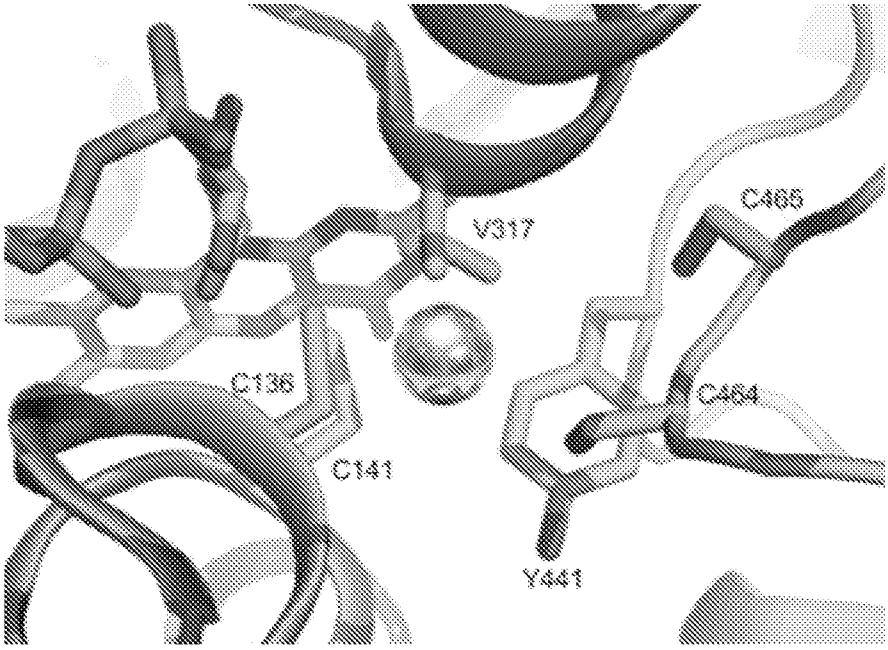


Figure 23

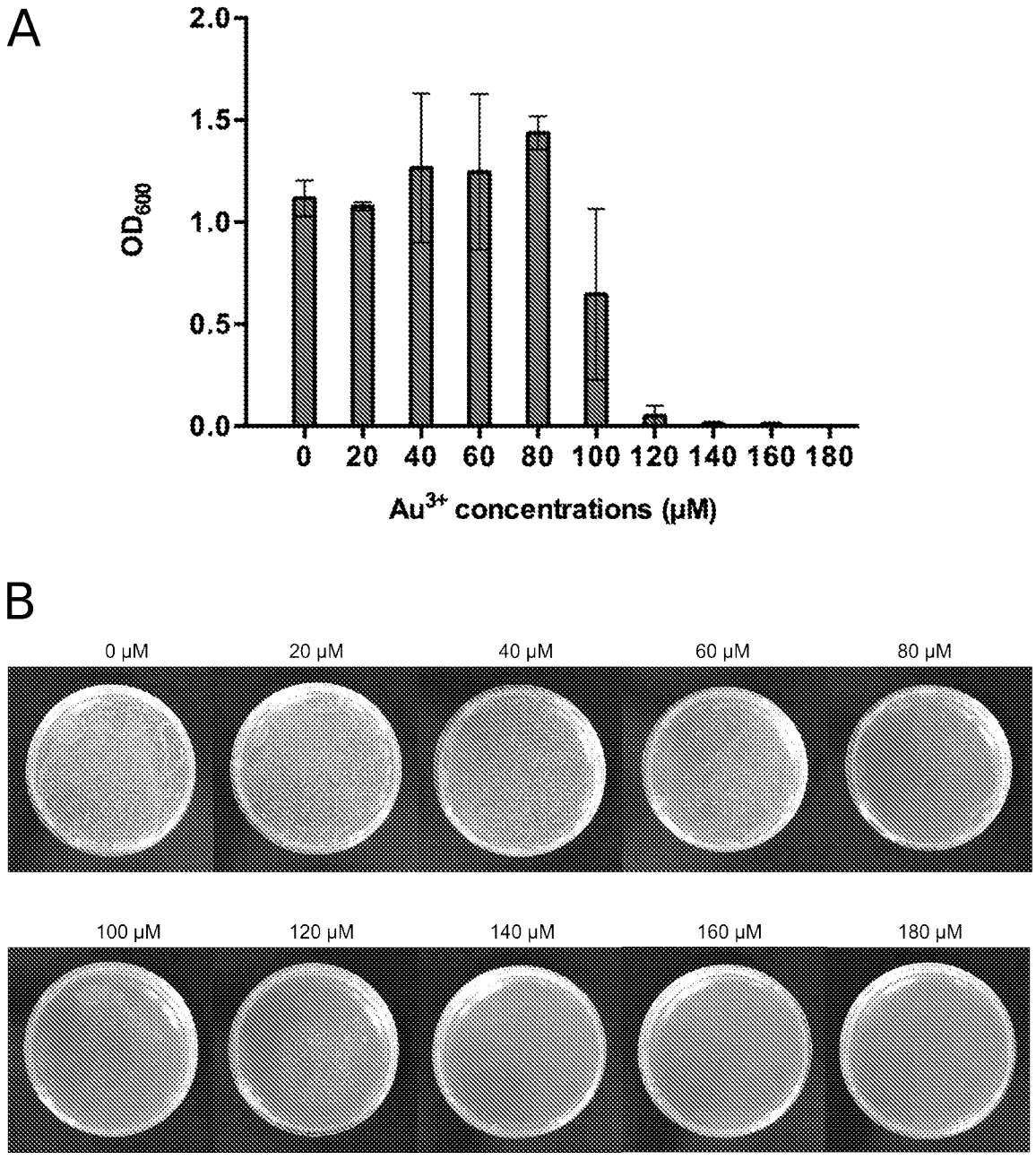

A
2.0
1.5
1.0
0.5
0.0
OD600
0 20 40 60 80 100 120 140 160 180
Au3+ concentrations (μM)
B
0 μM
20 μM
40 μM
60 μM
80 μM
100 μM
120 μM
140 μM
160 μM
180 μM

Figure 24

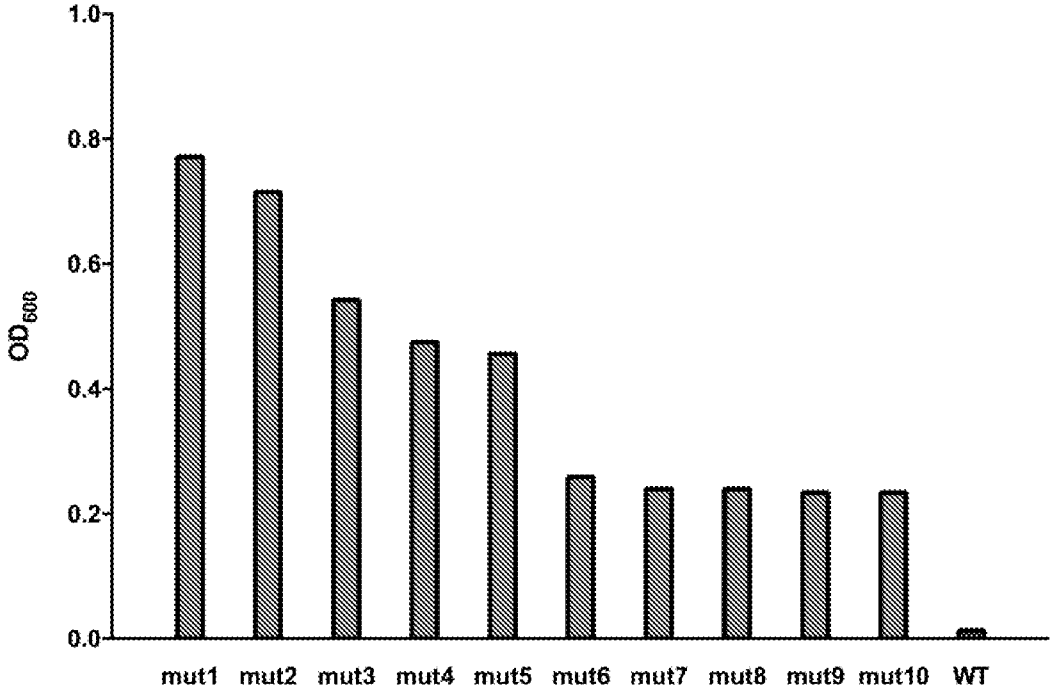


Figure 25

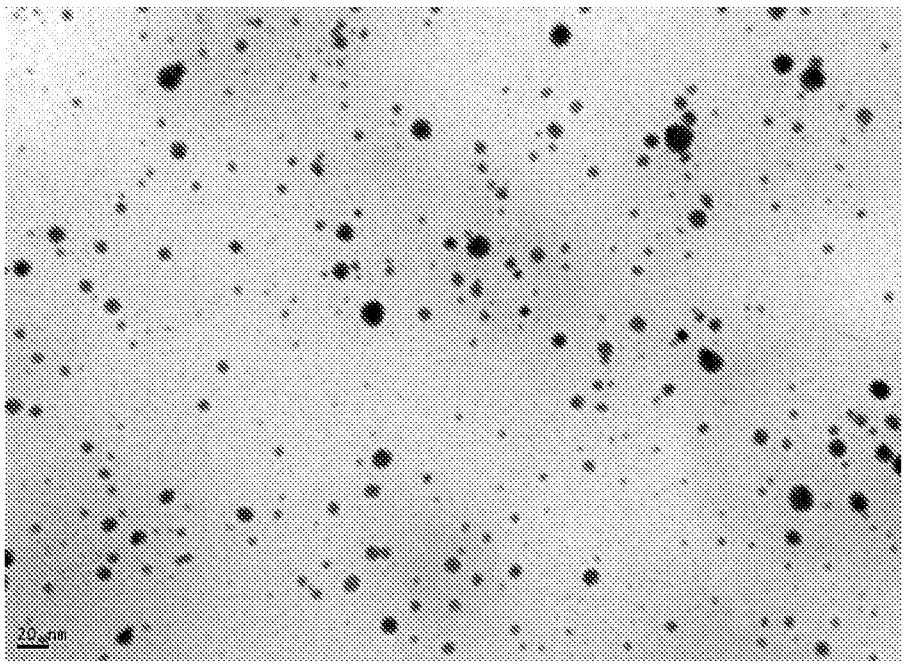
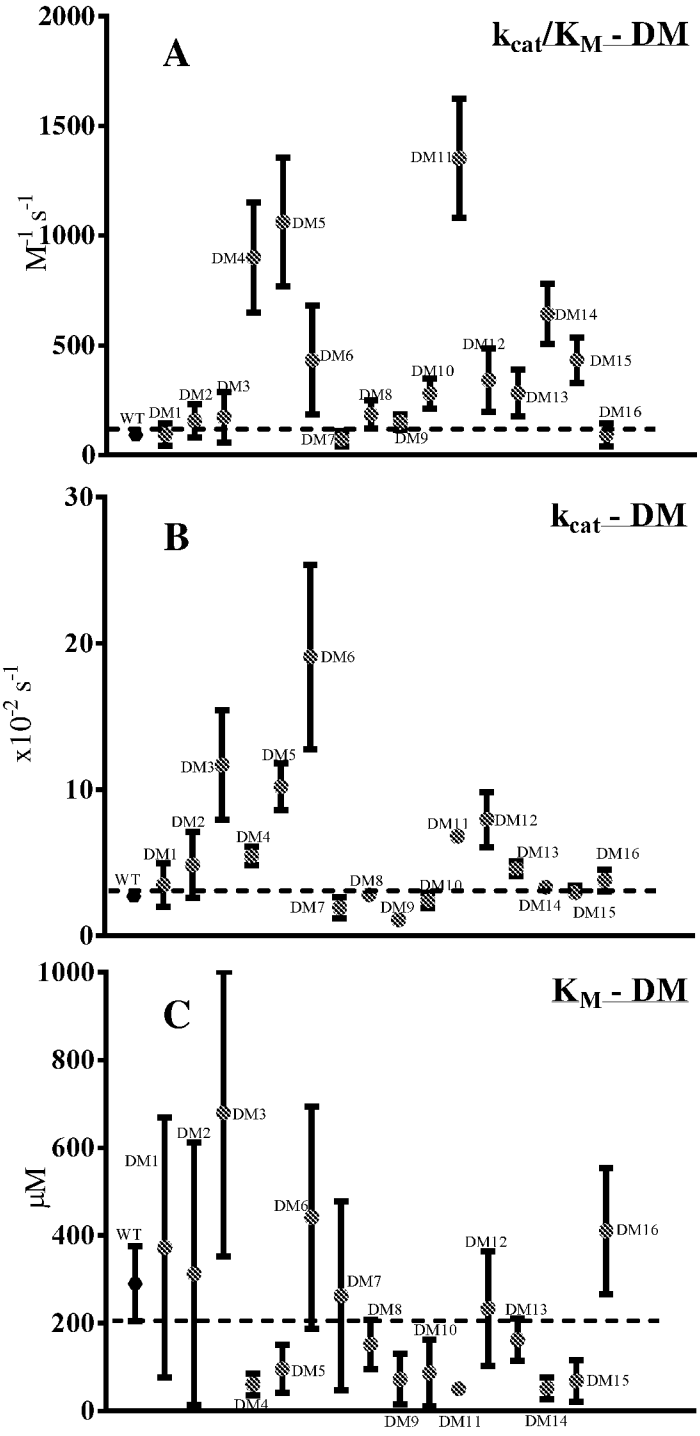


Figure 26



D

no.	Sequence
0	WT MerA
DM1	P49I
DM2	I293F
DM3	T299R
DM4	A323D
DM5	A323D*
DM6	L395G
DM7	G406D
DM8	A411Q
DM9	A411C
DM10	A414E
DM11	G415I
DM12	E416C
DM13	L417I
DM14	I418D
DM15	A422N
DM16	L448T

Figure 27

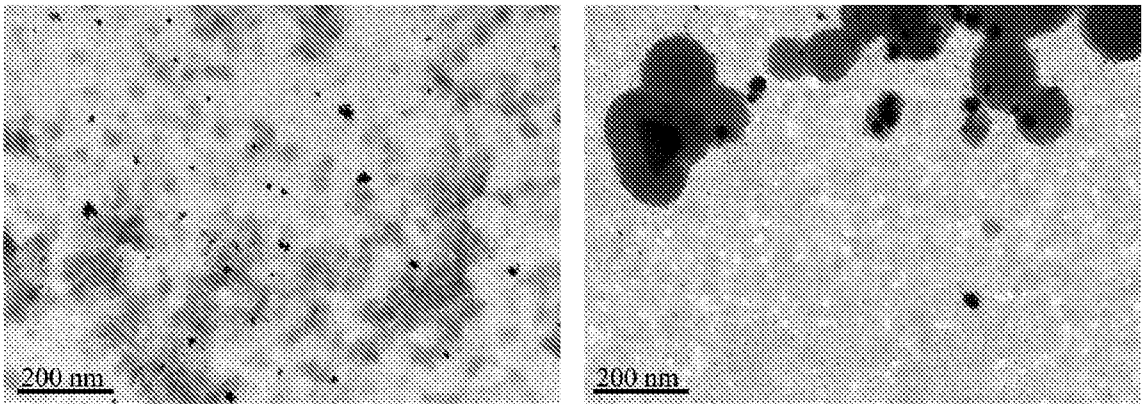


Figure 28

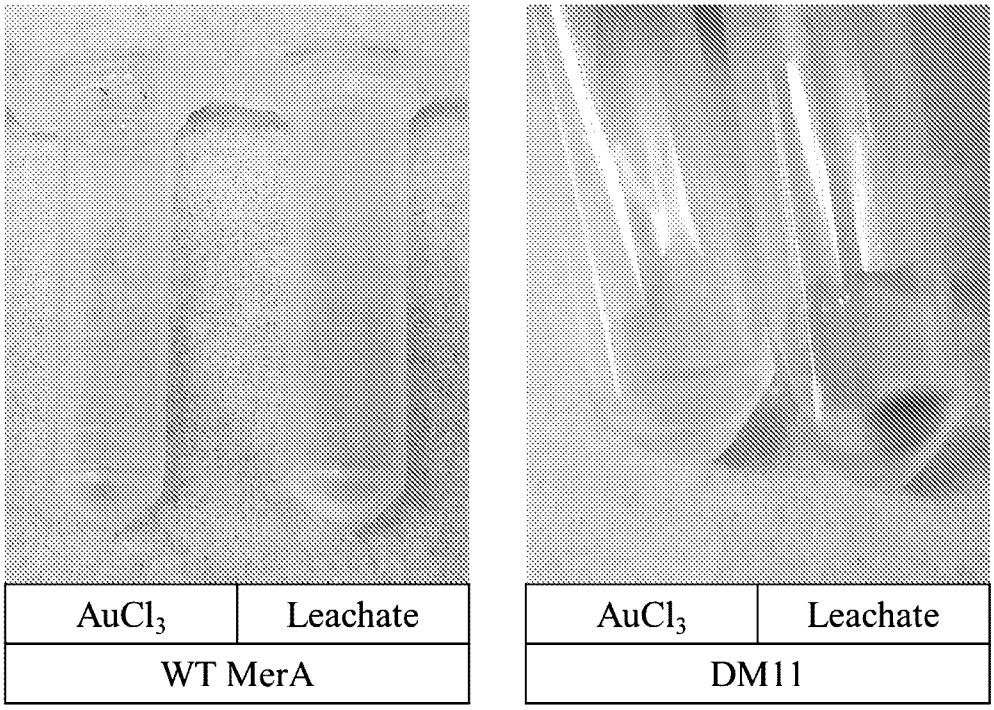


Figure 29

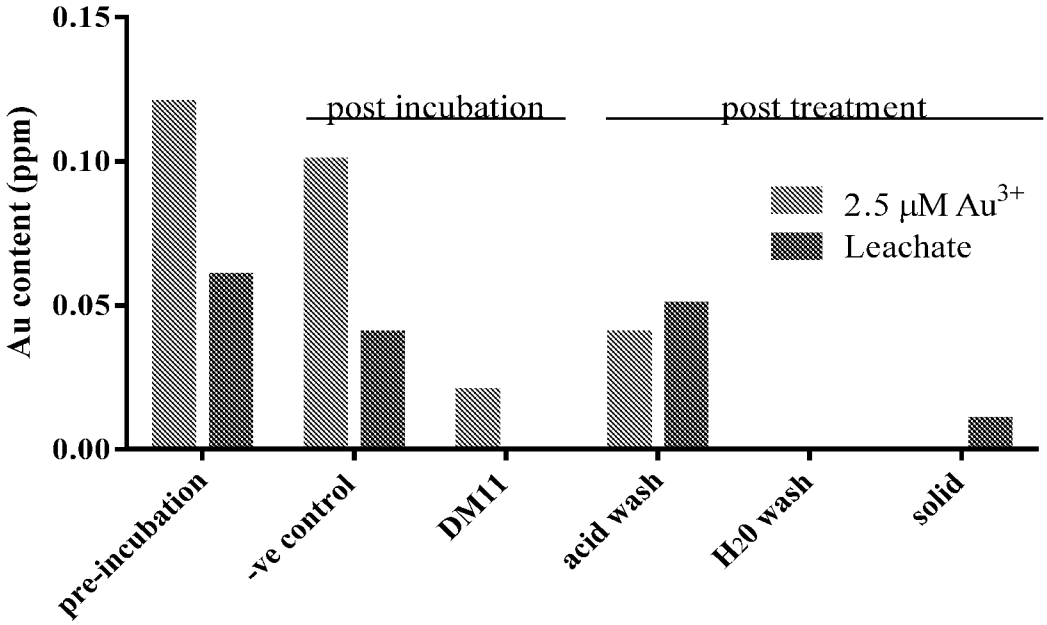


Figure 30

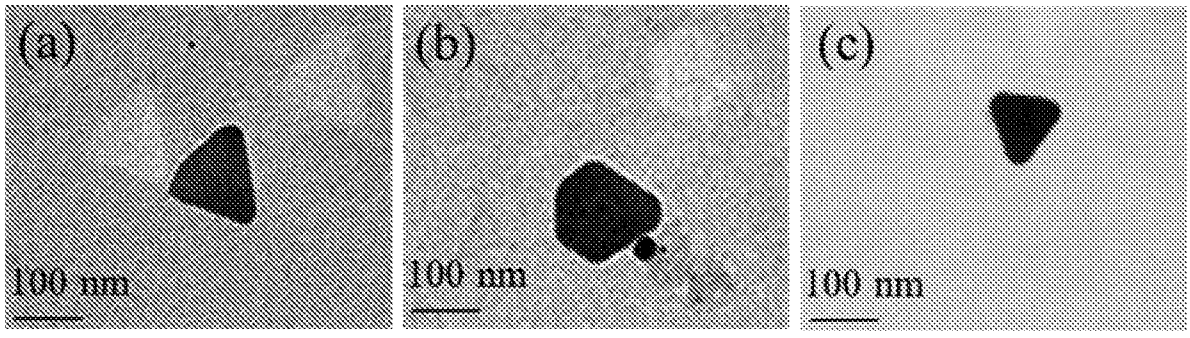
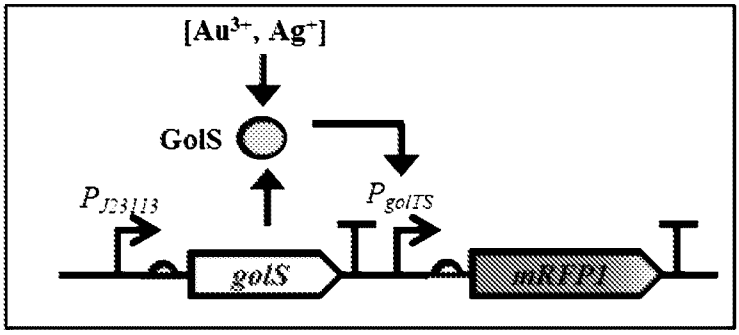


Figure 31

A


[Au3+, Ag+]
GolS
PJ23113
PgolTS
golS
mRFP1

B

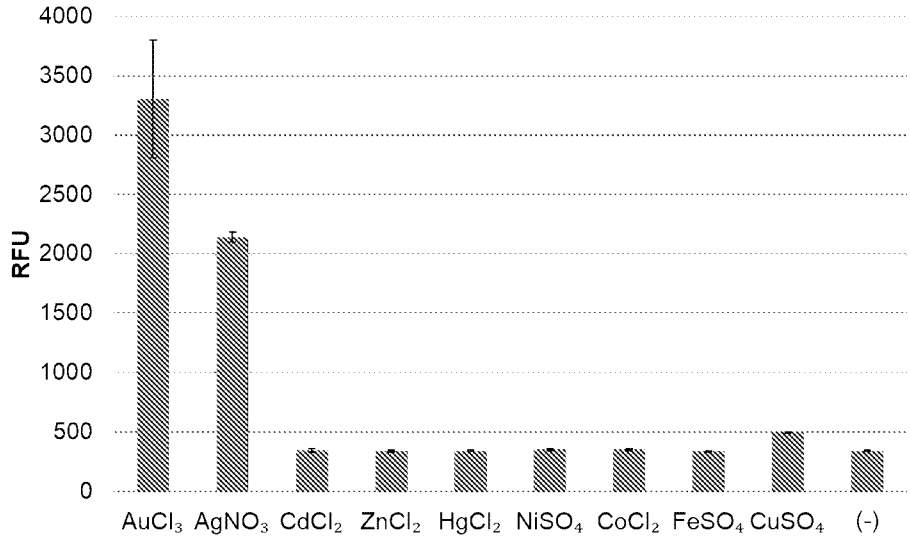

RFU
4000
3500
3000
2500
2000
1500
1000
500
0
AuCl3
AgNO3
CdCl2
ZnCl2
HgCl2
NiSO4
CoCl2
FeSO4
CuSO4
(-)

Figure 32

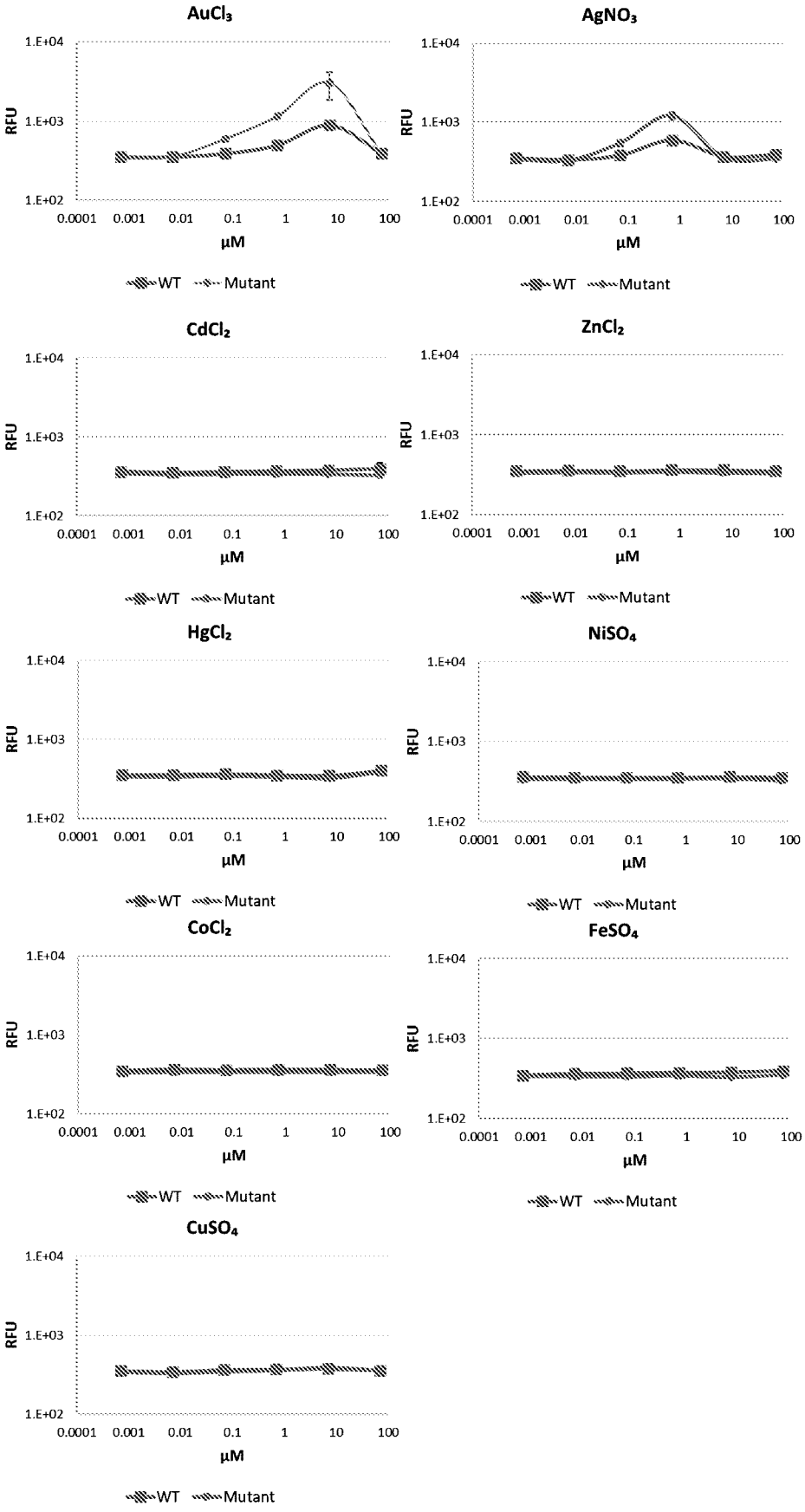

AuCl3
AgNO3
CdCl2
ZnCl2
HgCl2
NiSO4
CoCl2
FeSO4
CuSO4
RFU
1.E+04
1.E+03
1.E+02
0.0001
0.001
0.01
0.1
1
10
100
µM
WT
Mutant

Figure 33

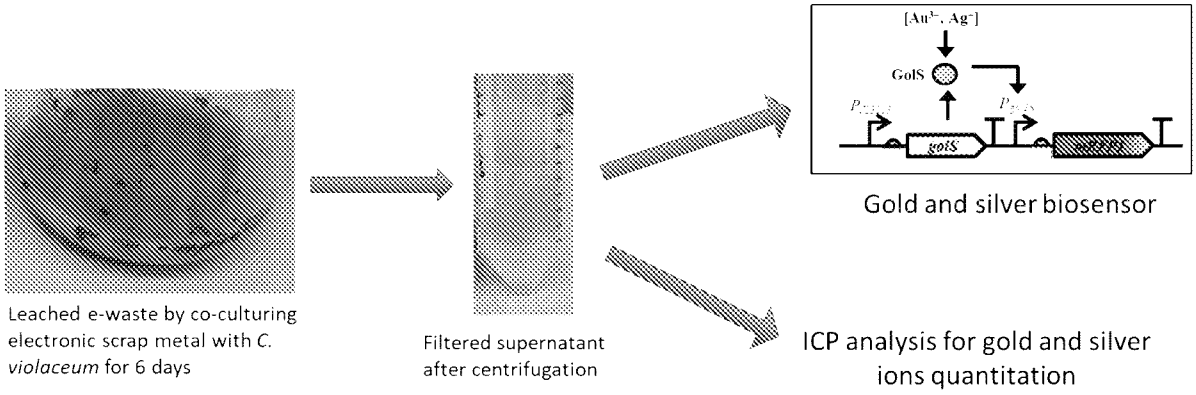


Figure 34

