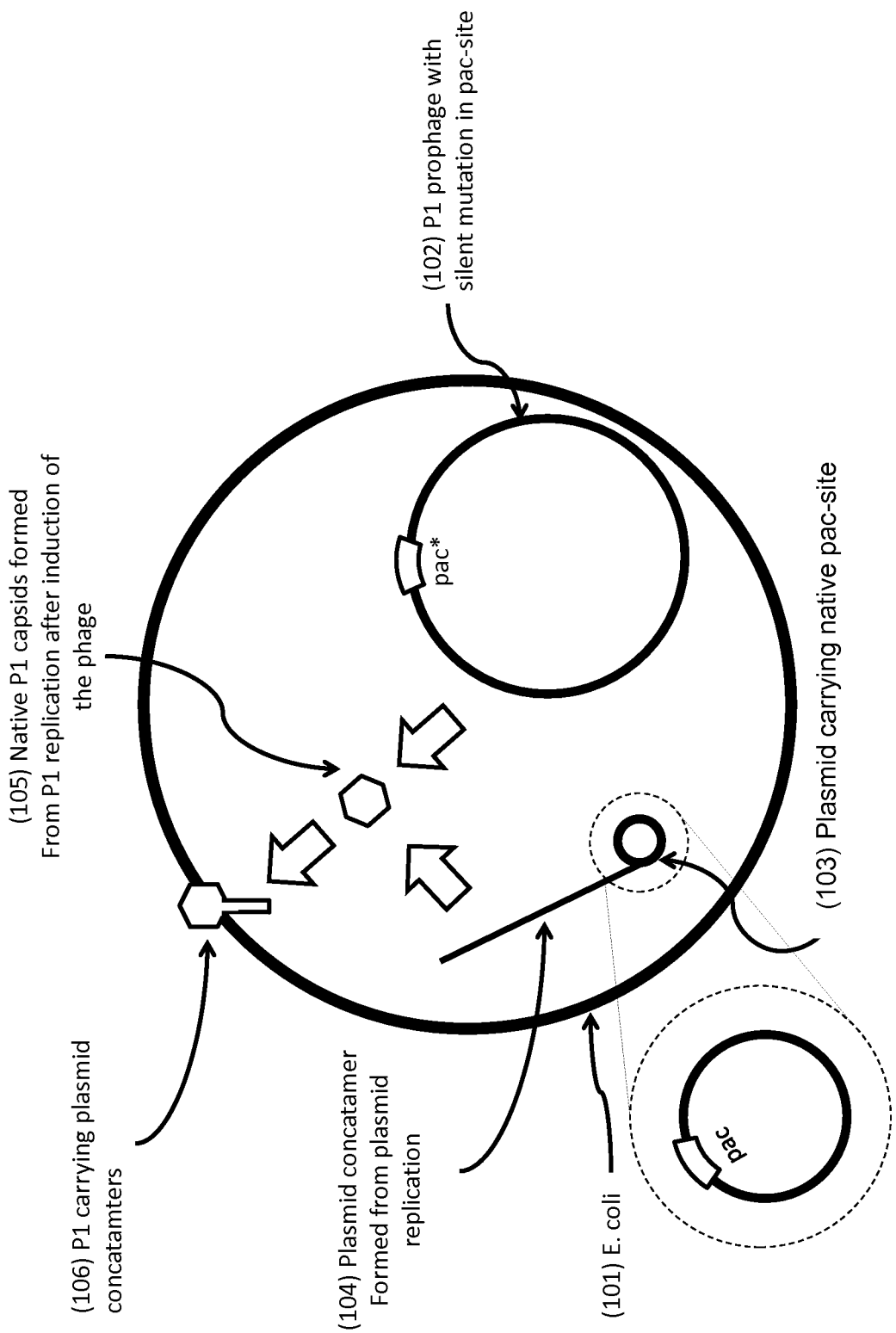
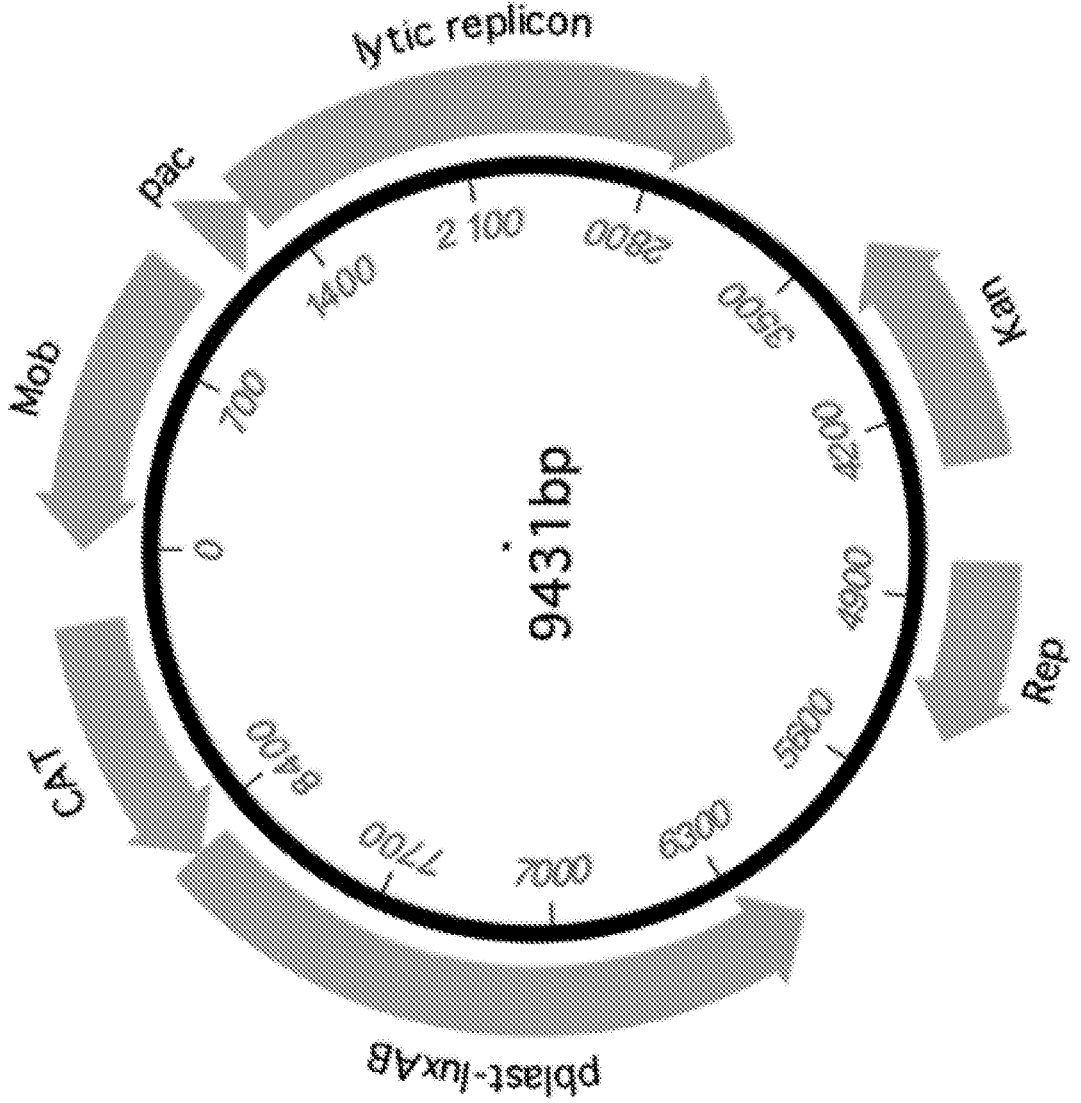


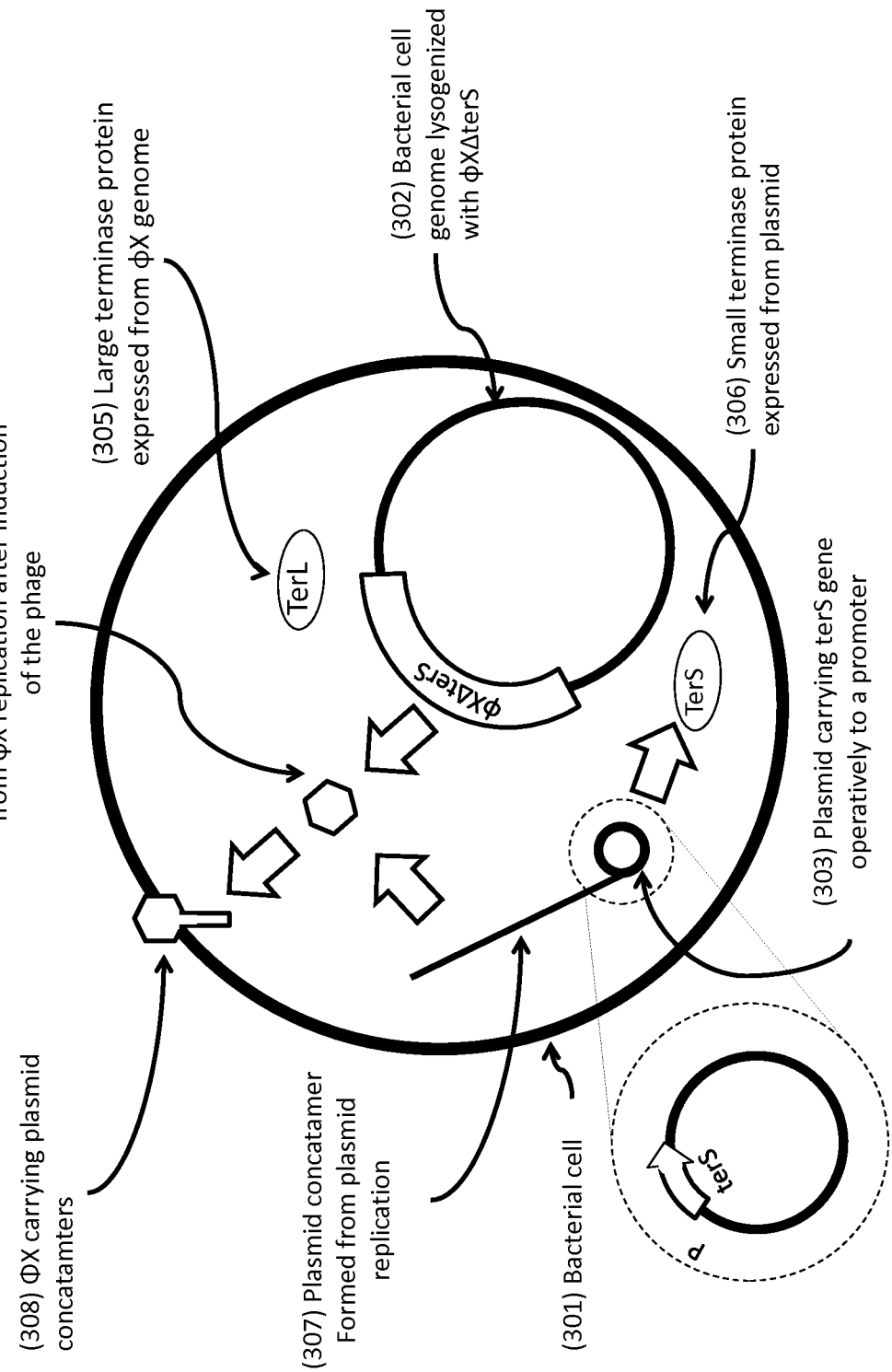
Schematic of a P1-based packaging system (100)

FIGURE 1



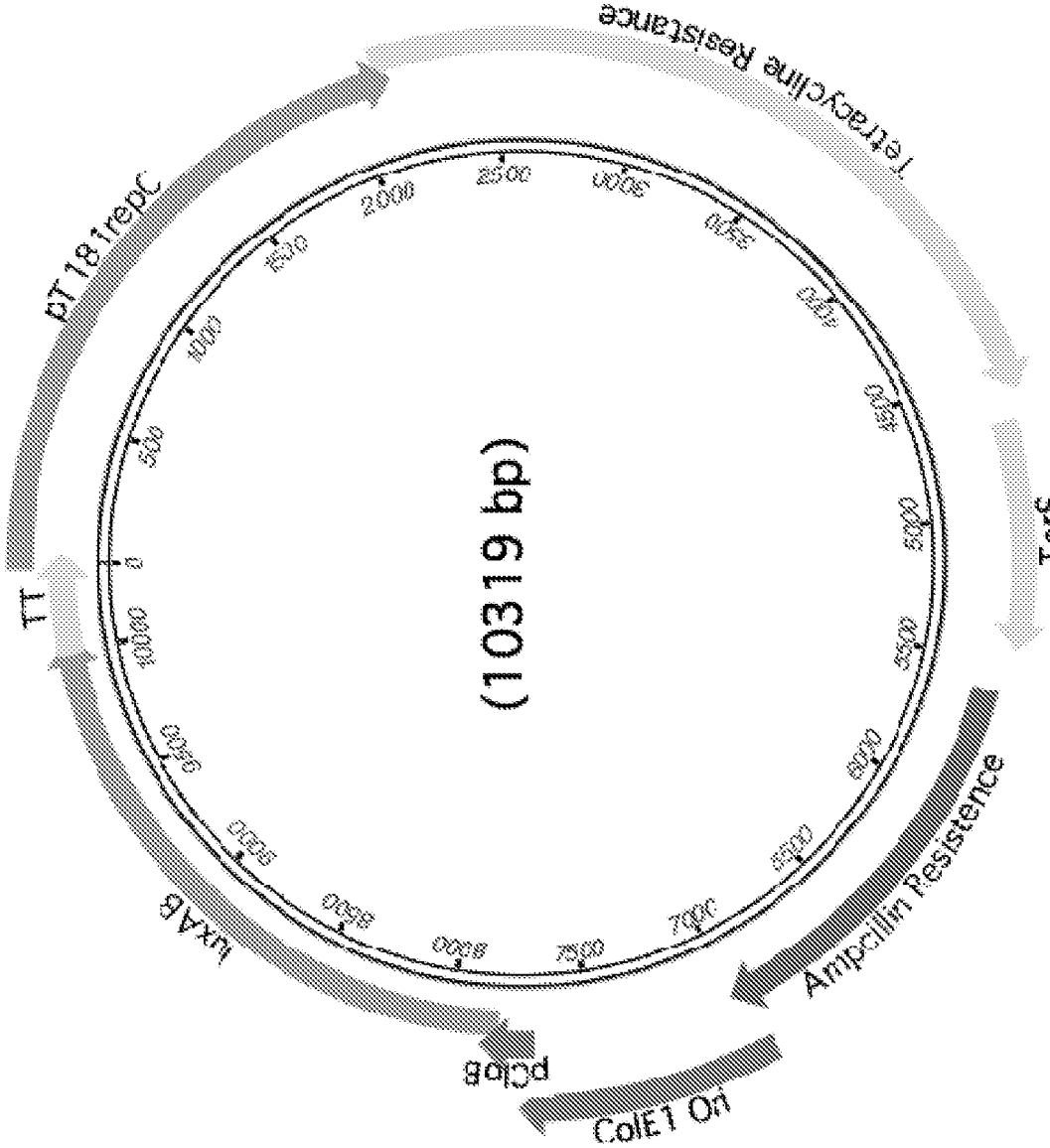
Schematic of pGWP10001

FIGURE 2



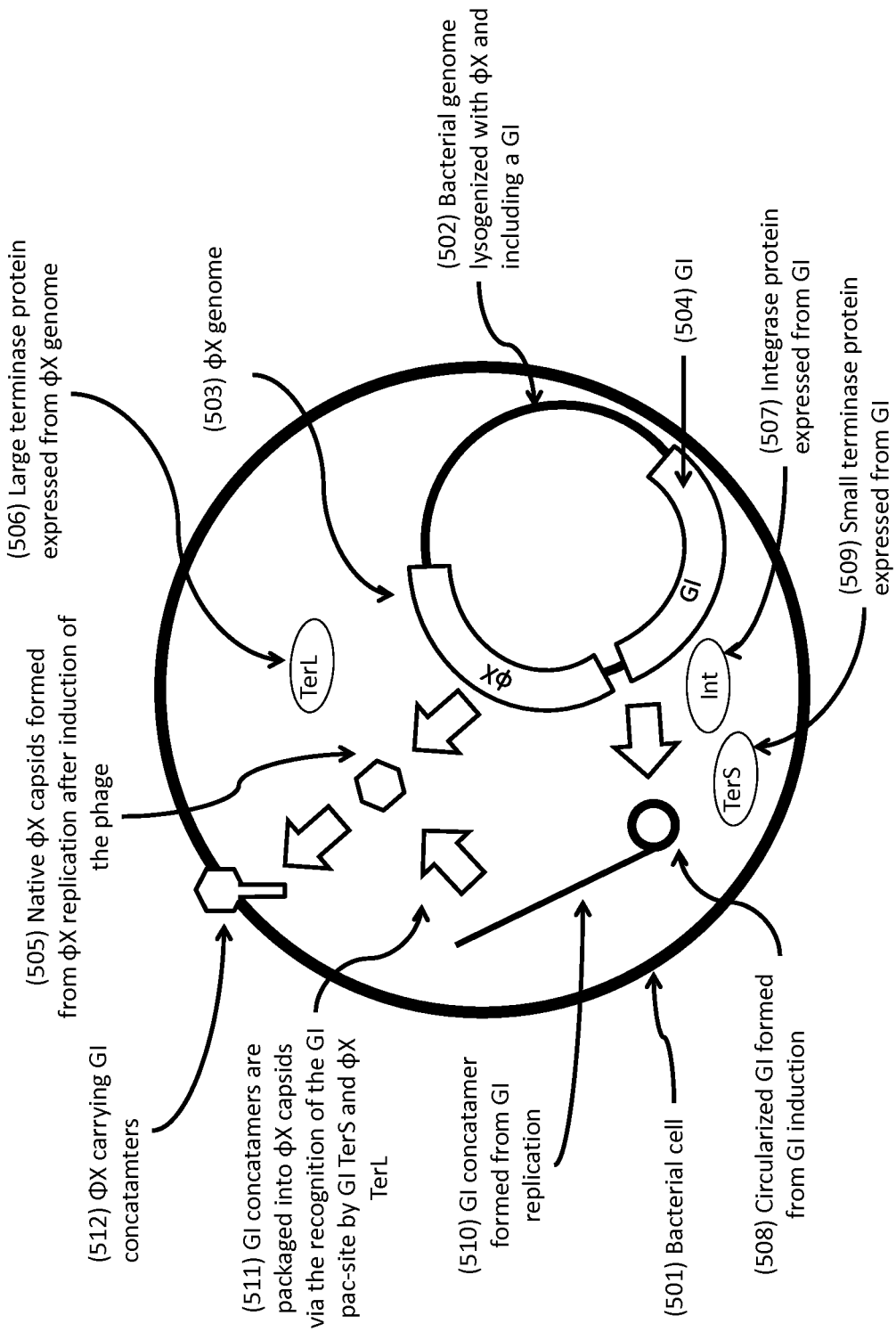
Schematic of a pac-site deletion/complementation packaging system (300)

FIGURE 3



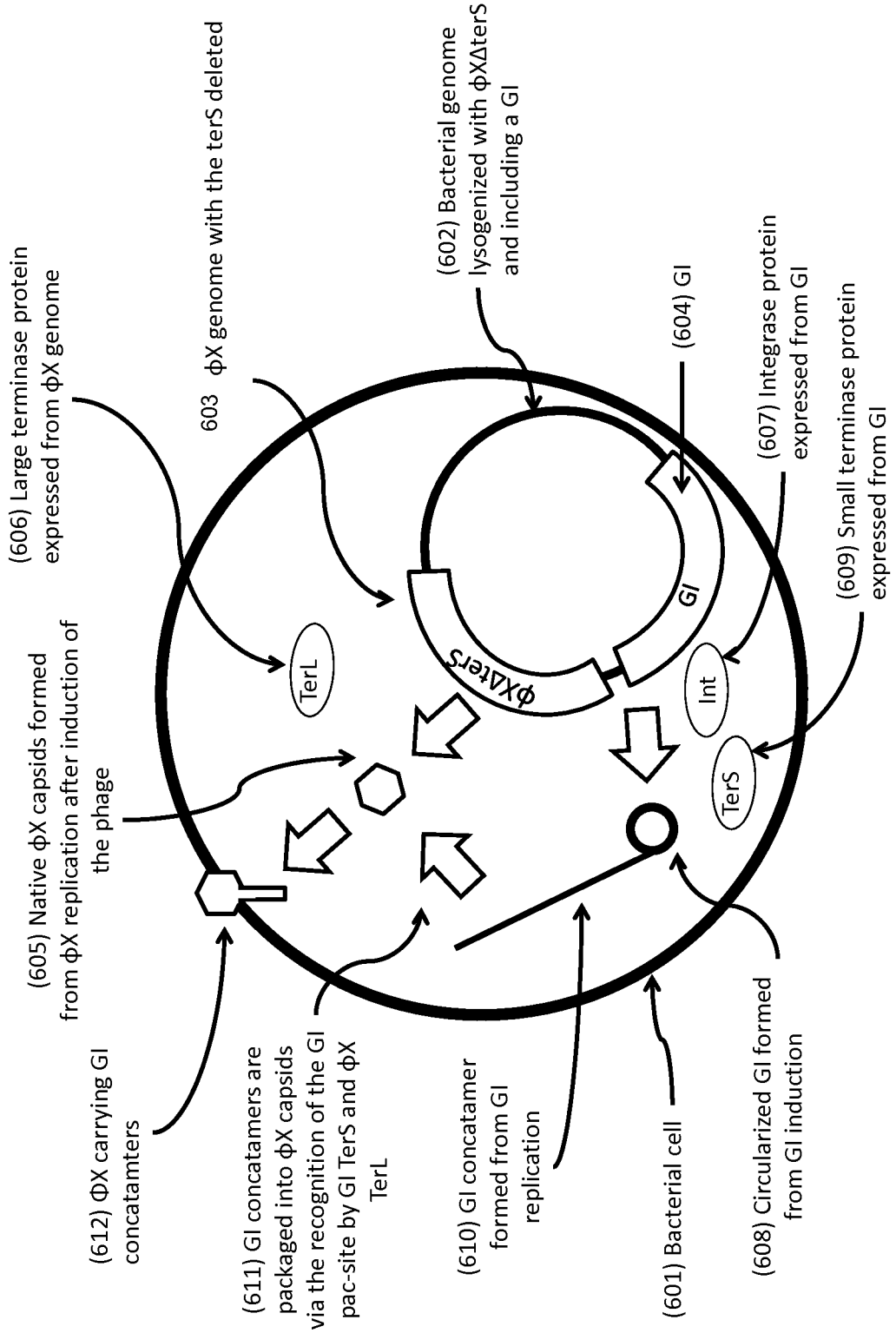
Schematic of pGW80A0001

FIGURE 4



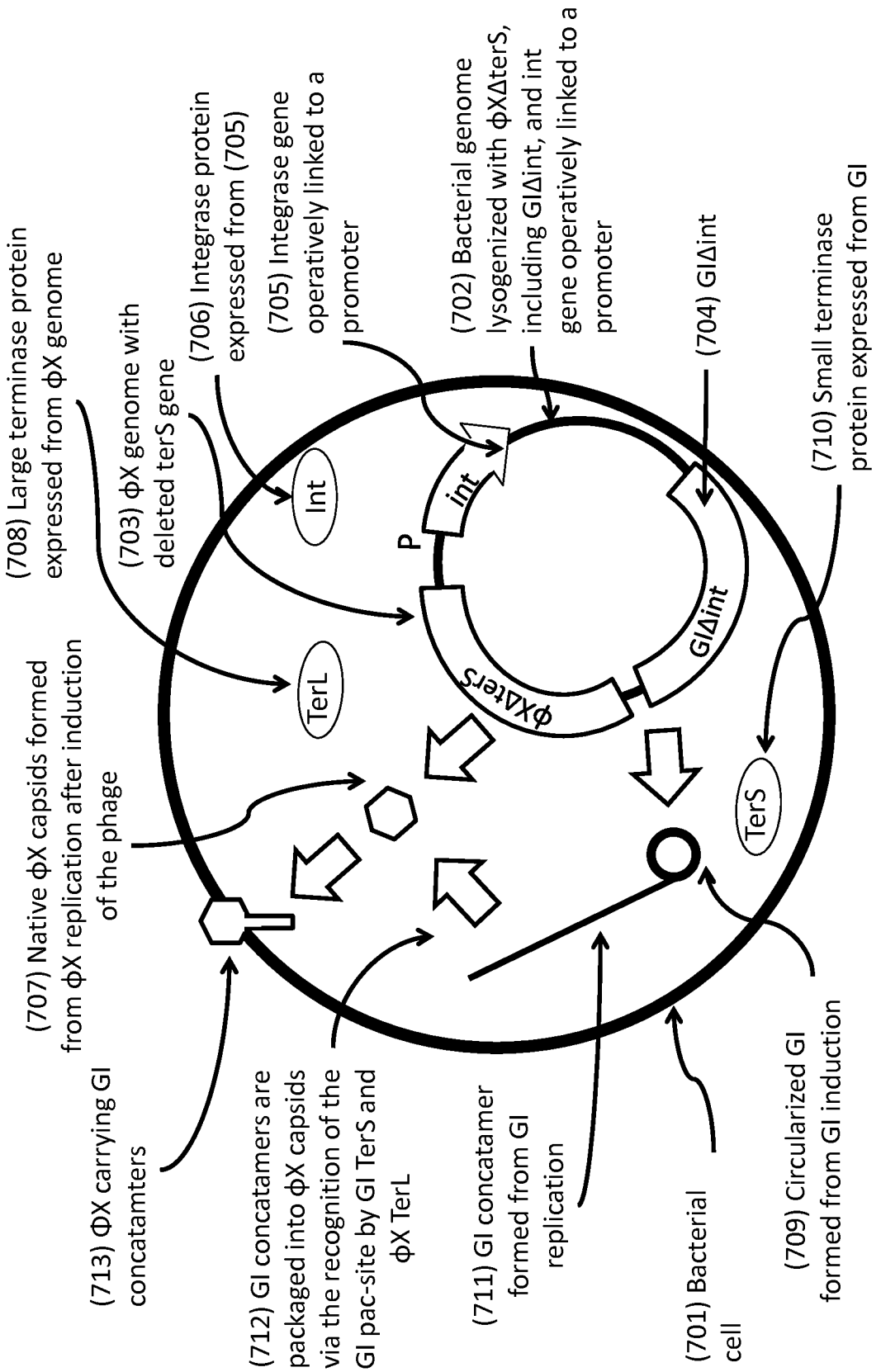
Schematic of a natural genomic-island packaging system (500)

FIGURE 5



Schematic of a genomic island (GI)-based packaging system.

FIGURE 6



Schematic of a genomic-island packaging system that does not integrate into host genome (700)

FIGURE 7

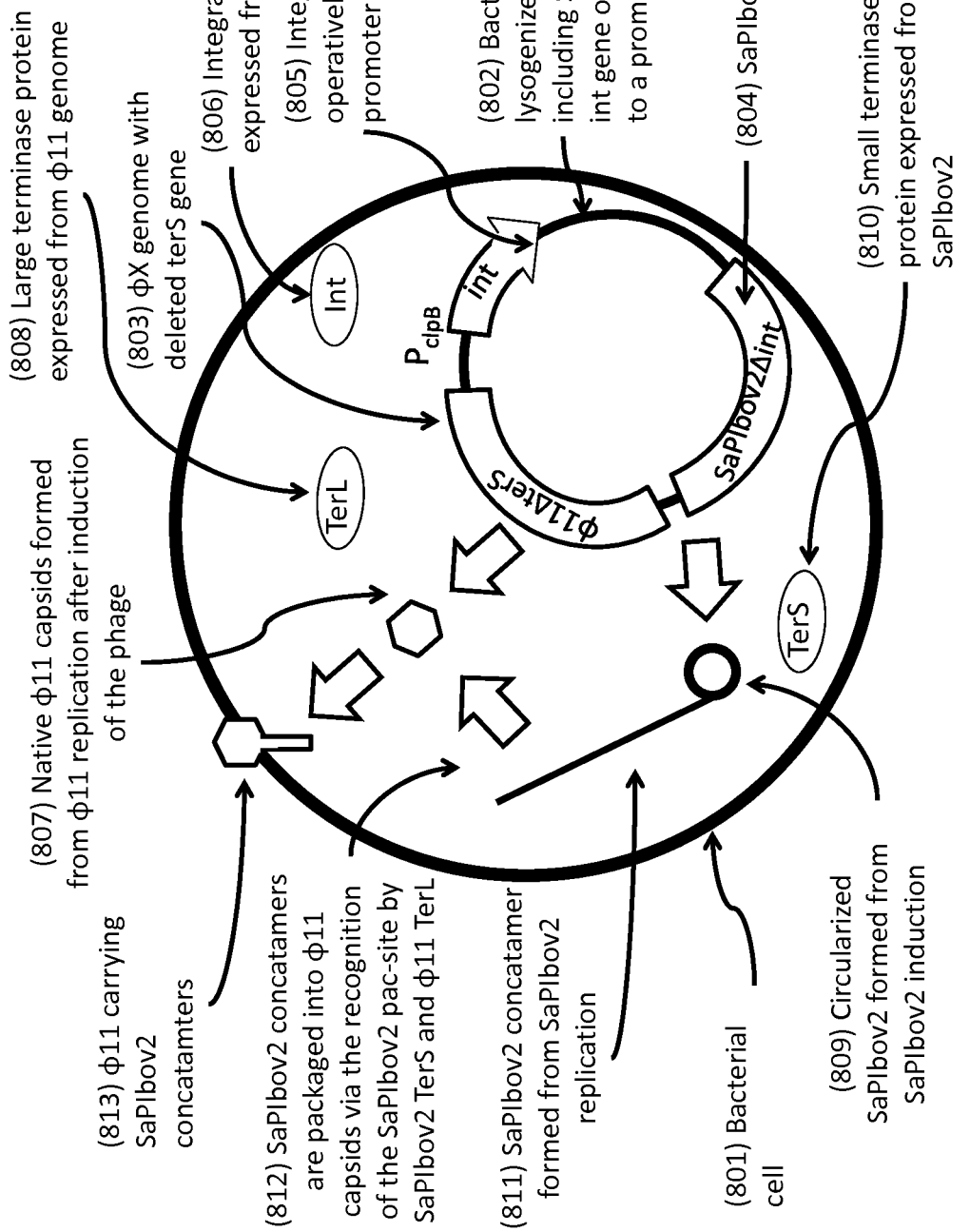


FIGURE 8

Schematic of a SaPIbov2 packaging system that does not integrate into host genome (800)

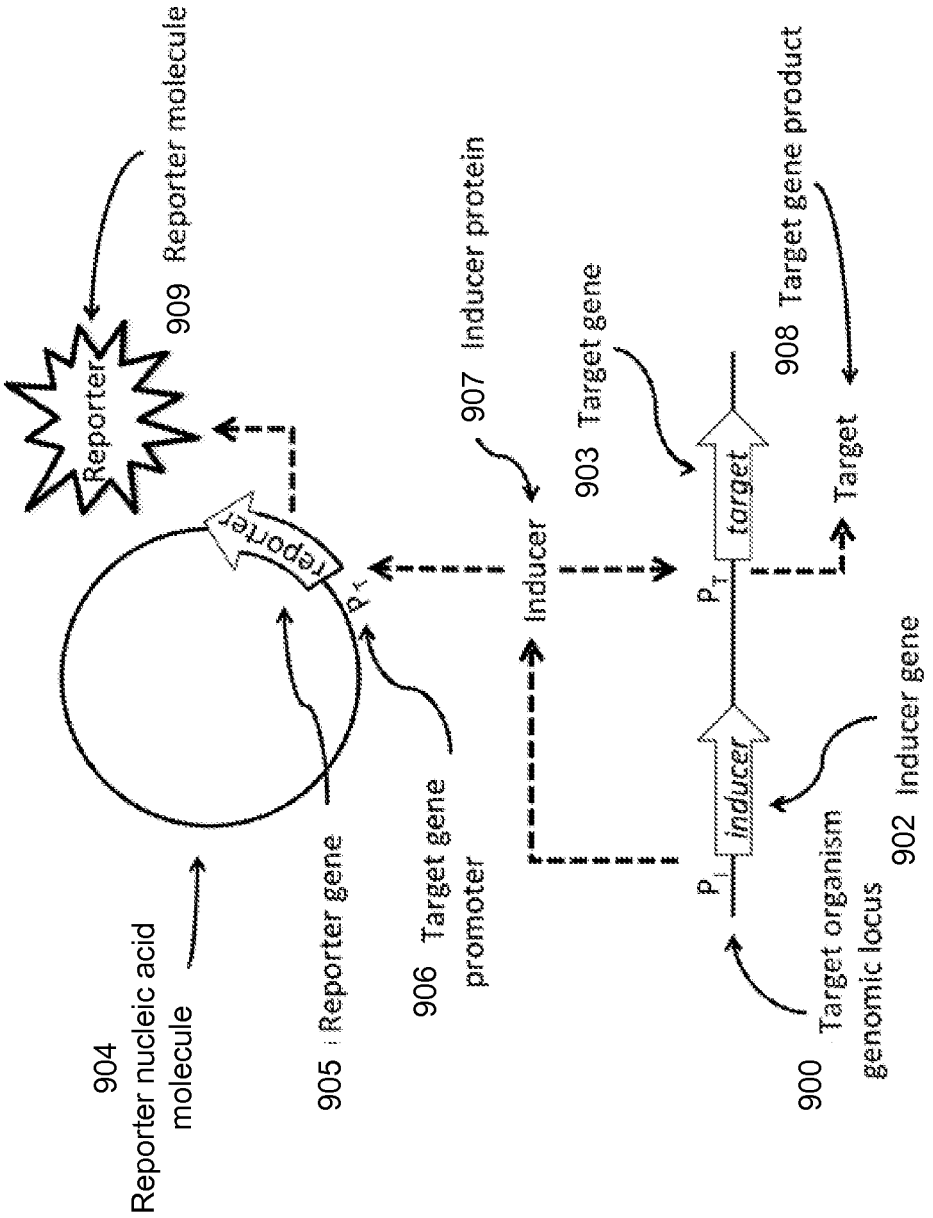

904
Reporter nucleic acid molecule
905 Reporter gene
906 Target gene promoter
907 Inducer protein
903 Target gene
908 Target gene product
909 Reporter molecule
Reporter
reporter
Inducer
target
Target
inducer
900 Target organism genomic locus
902 Inducer gene

FIGURE 9

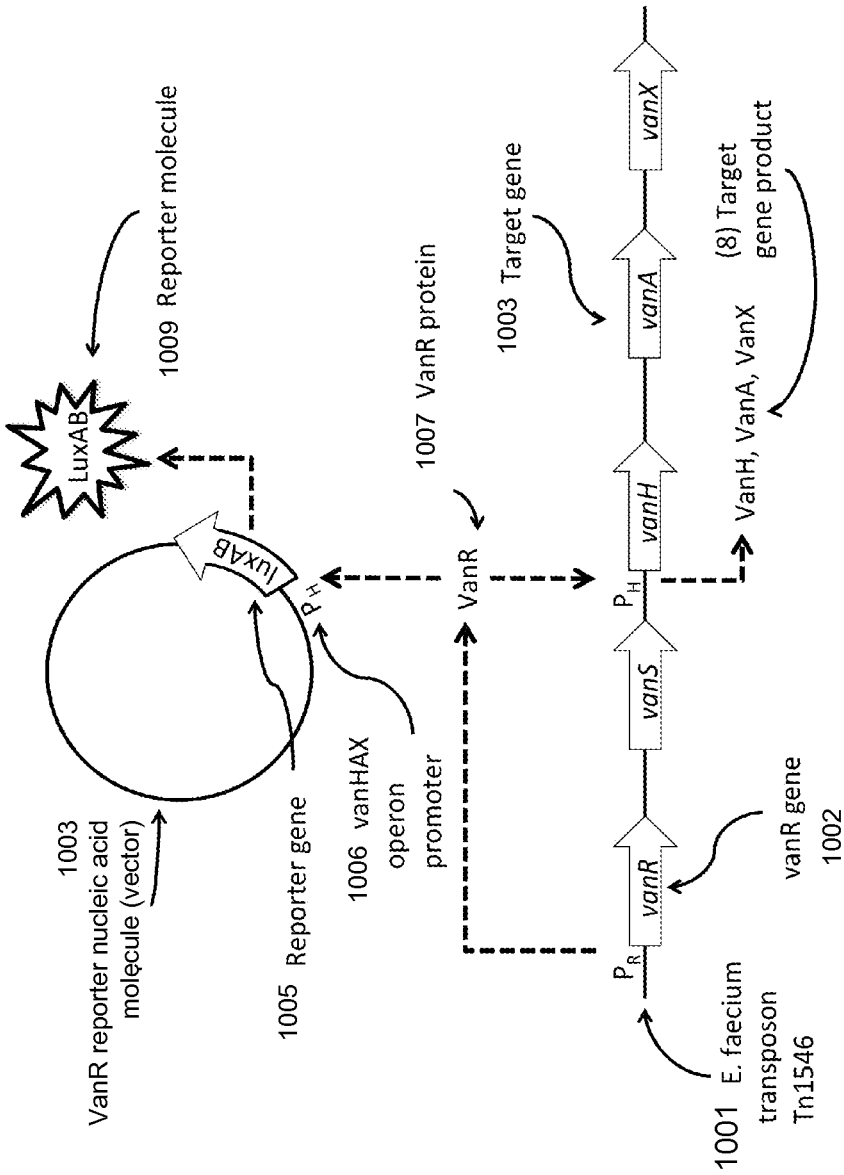

1009 Reporter molecule
LuxAB
1003 VanR reporter nucleic acid molecule (vector)
luxAB
1005 Reporter gene
P_H
1006 vanHAX operon promoter
1007 VanR protein
VanR
1003 Target gene
P_R
vanR
vanS
P_H
vanH
vanA
vanX
VanH, VanA, VanX
(8) Target gene product
vanR gene 1002
1001 E. faecium transposon Tn1546

FIGURE 10

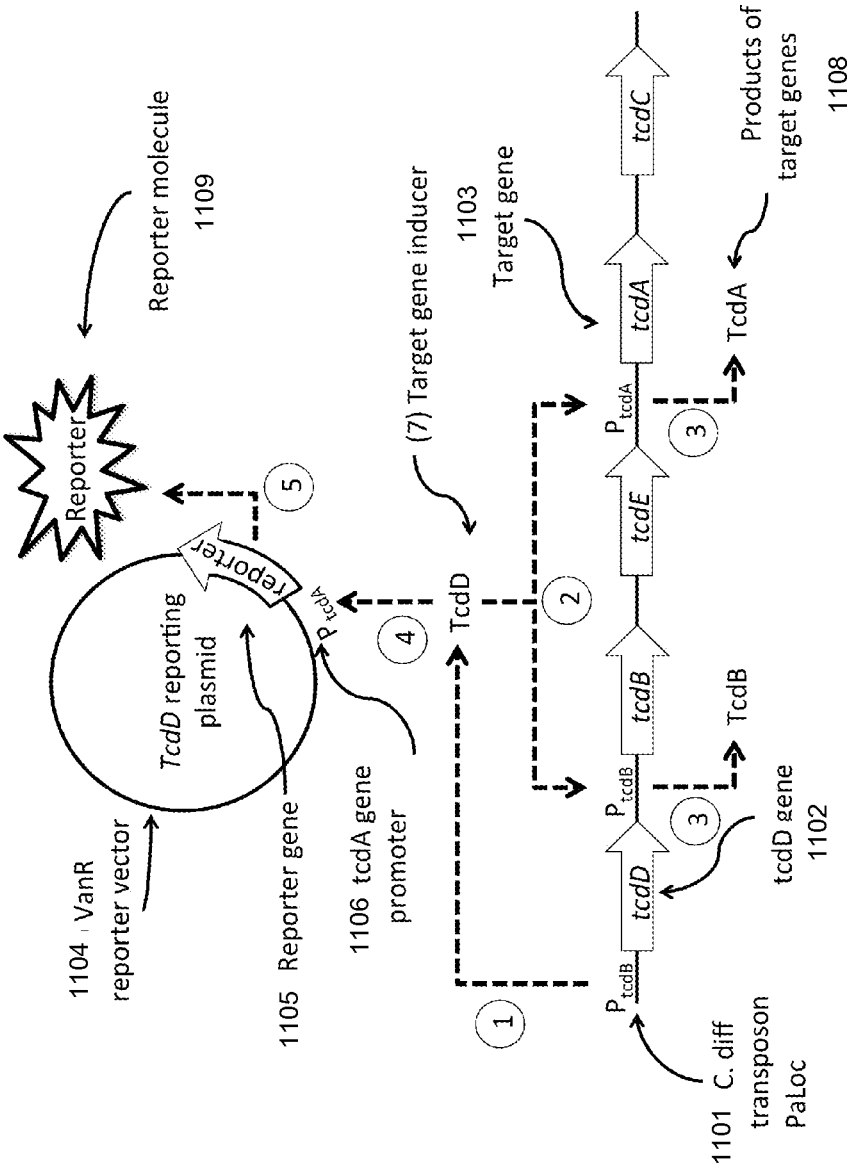

Reporter molecule
1109
Reporter
Reporter
TcdD reporting plasmid
1104 VanR reporter vector
1105 Reporter gene
1106 tcdA gene promoter
(7) Target gene inducer
1103
Target gene
TcdD
TcdA
TcdB
Products of target genes
1108
tcdD gene
1102
1101 C. diff transposon PaLoc
tcdD
tcdB
tcdE
tcdA
tcdC
1
2
3
4
5

FIGURE 11

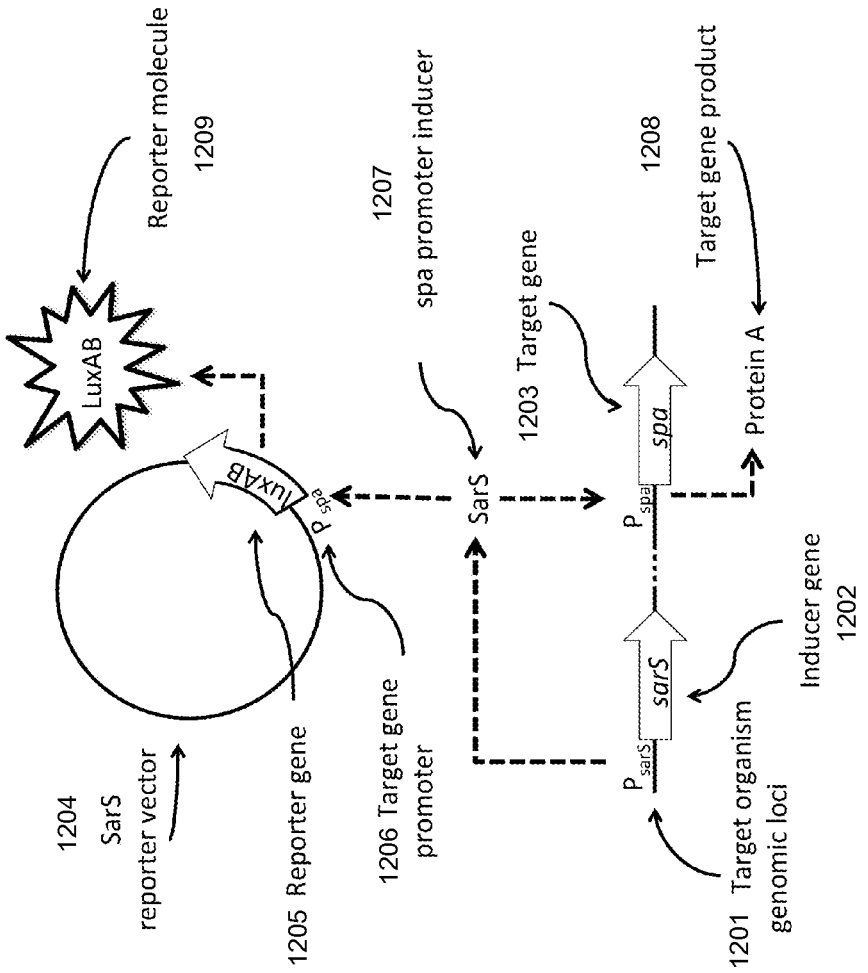

Reporter molecule
1209
LuxAB
1207
spa promoter inducer
1208
Target gene product
1203 Target gene
Protein A
luxAB
P spa
SarS
P spa
spa
1204
SarS
reporter vector
1205 Reporter gene
1206 Target gene
promoter
P sarS
sarS
Inducer gene
1202
1201 Target organism
genomic loci

FIGURE 12

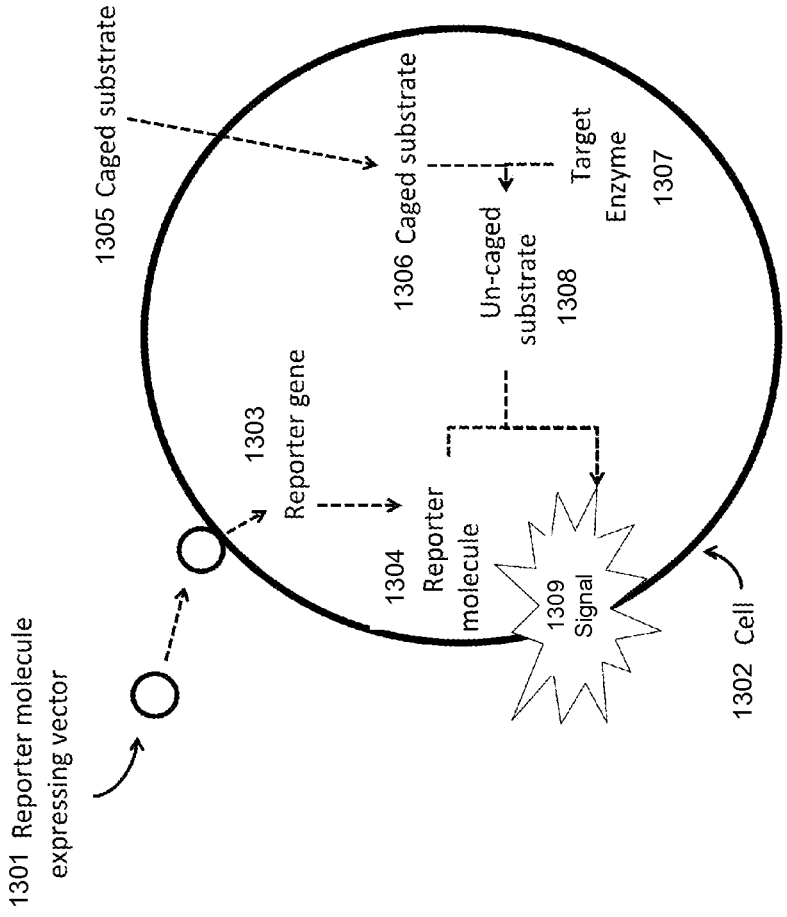

1301 Reporter molecule expressing vector
1303 Reporter gene
1304 Reporter molecule
1305 Caged substrate
1306 Caged substrate
Un-caged substrate 1308
Target Enzyme 1307
1309 Signal
1302 Cell

FIGURE 13

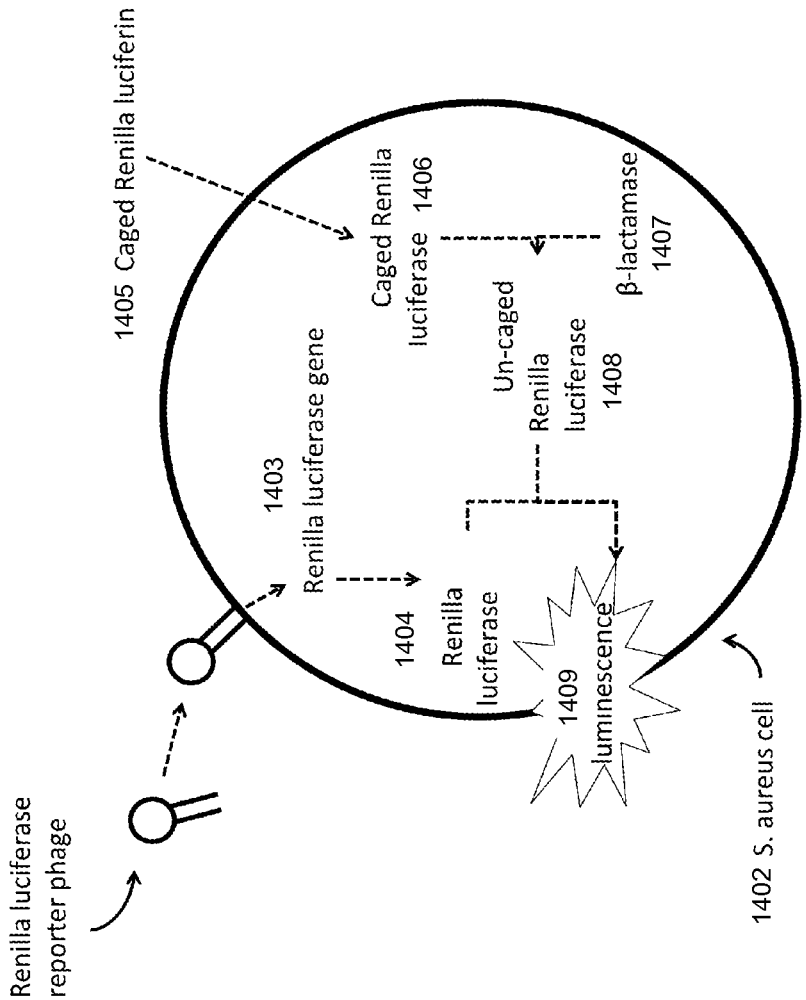

Renilla luciferase reporter phage
1405 Caged Renilla luciferin
1403 Renilla luciferase gene
1404 Renilla luciferase
Caged Renilla luciferase 1406
Un-caged Renilla luciferase 1408
β-lactamase 1407
1409 luminescence
1402 S. aureus cell

FIGURE 14

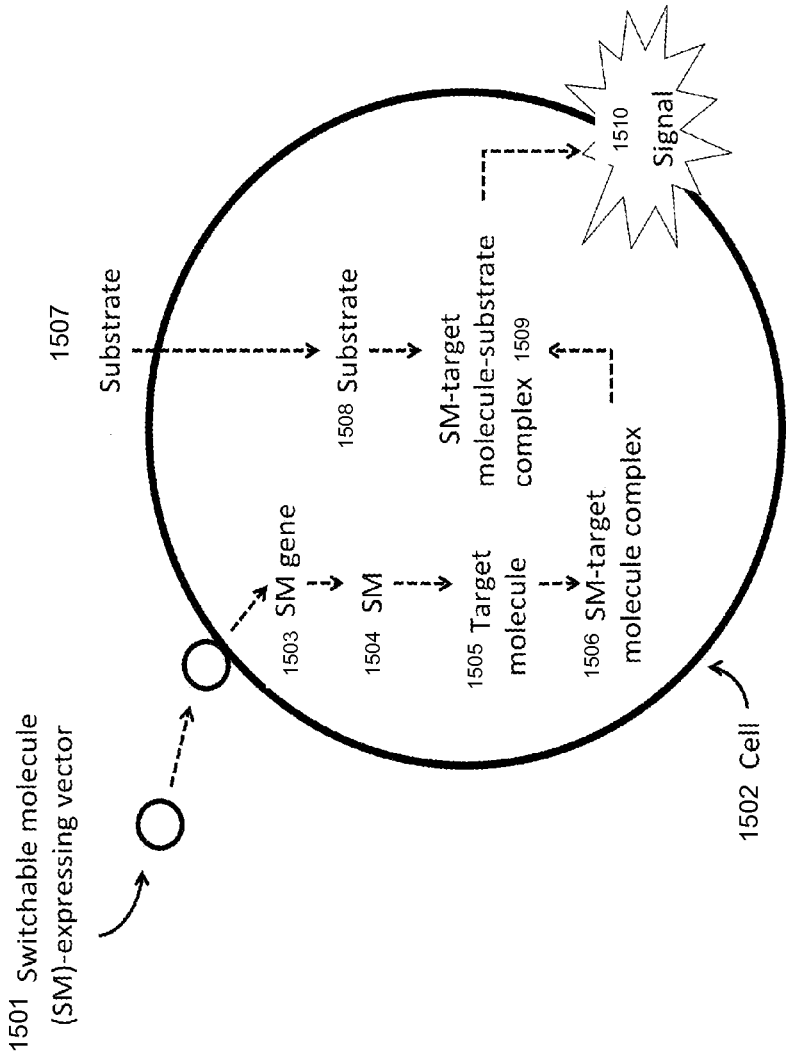

1501 Switchable molecule (SM)-expressing vector
1507 Substrate
1503 SM gene
1504 SM
1505 Target molecule
1506 SM-target molecule complex
1508 Substrate
SM-target molecule-substrate complex 1509
1510 Signal
1502 Cell

FIGURE 15

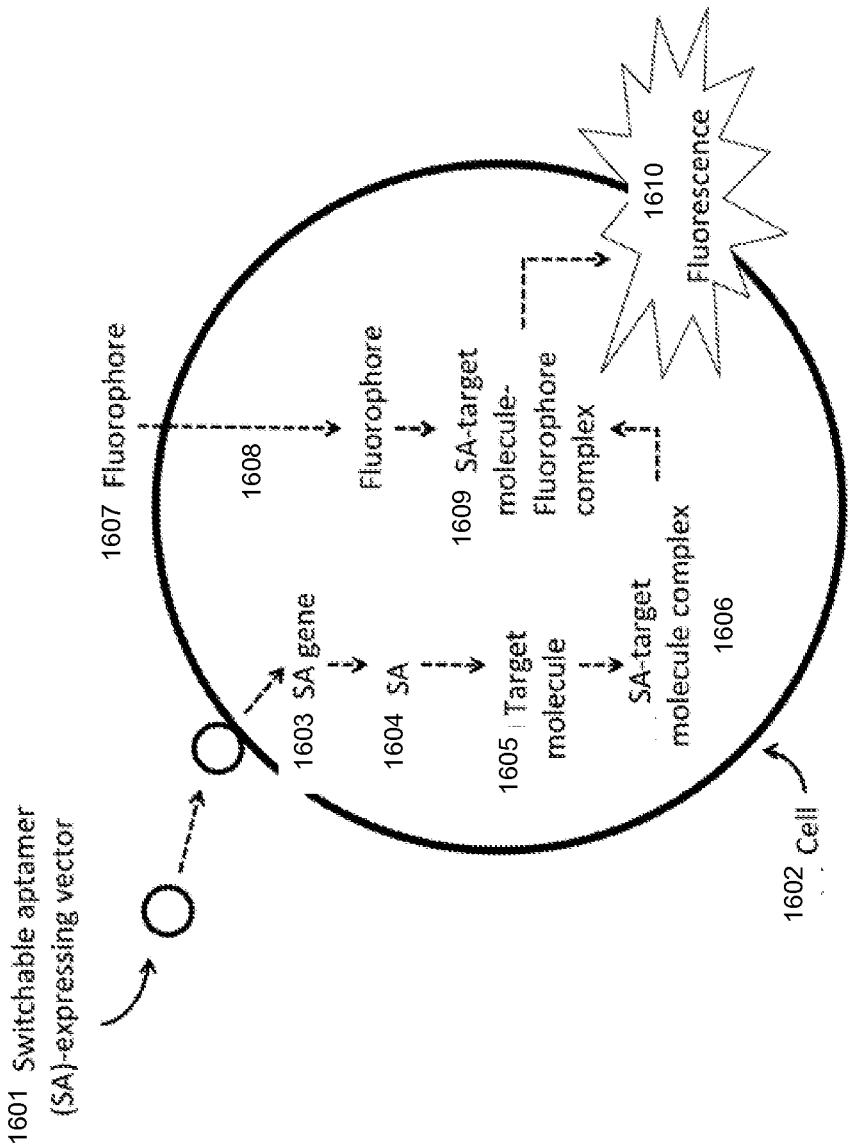

1601 Switchable aptamer (SA)-expressing vector
1602 Cell
1603 SA gene
1604 SA
1605 Target molecule
1606 SA-target molecule complex
1607 Fluorophore
1608
Fluorophore
1609 SA-target molecule-Fluorophore complex
1610
Fluorescence

FIGURE 16

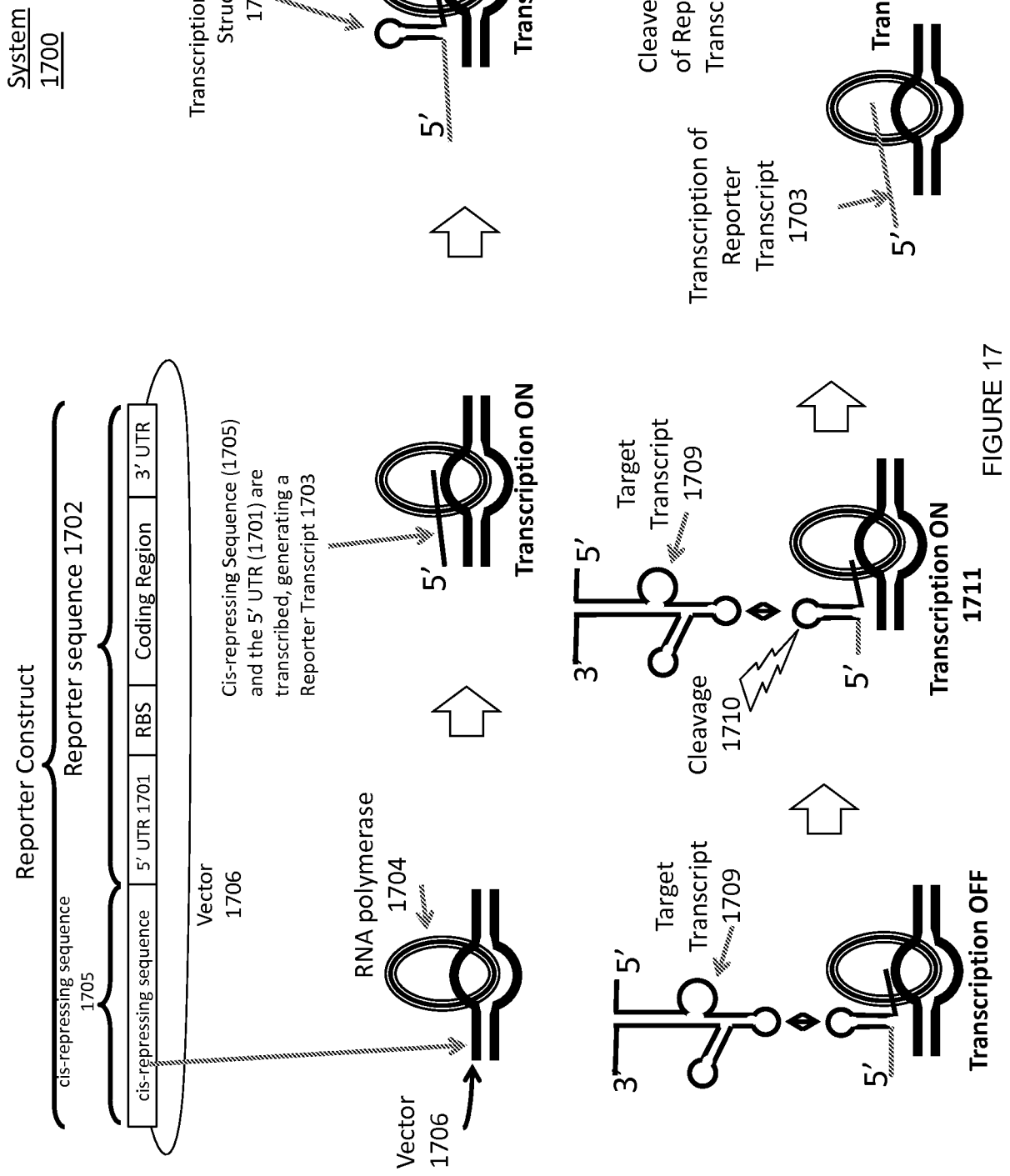

System
1700
Reporter Construct
Reporter sequence 1702
cis-repressing sequence
1705
cis-repressing sequence
5' UTR 1701
RBS
Coding Region
3' UTR
Vector
1706
Vector
1706
RNA polymerase
1704
Cis-repressing Sequence (1705) and the 5' UTR (1701) are transcribed, generating a Reporter Transcript 1703
5'
Transcription ON
Transcription Terminator Structure
1707
5'
Transcription OFF
1708
Transcription of Reporter Transcript
1703
Cleaved Portion of Reporter Transcript
5'
3'
Transcription ON
5'
3'
Target Transcript
1709
5'
3'
Target Transcript
1709
Cleavage
1710
5'
Transcription ON
1711
5'
Transcription OFF

FIGURE 17

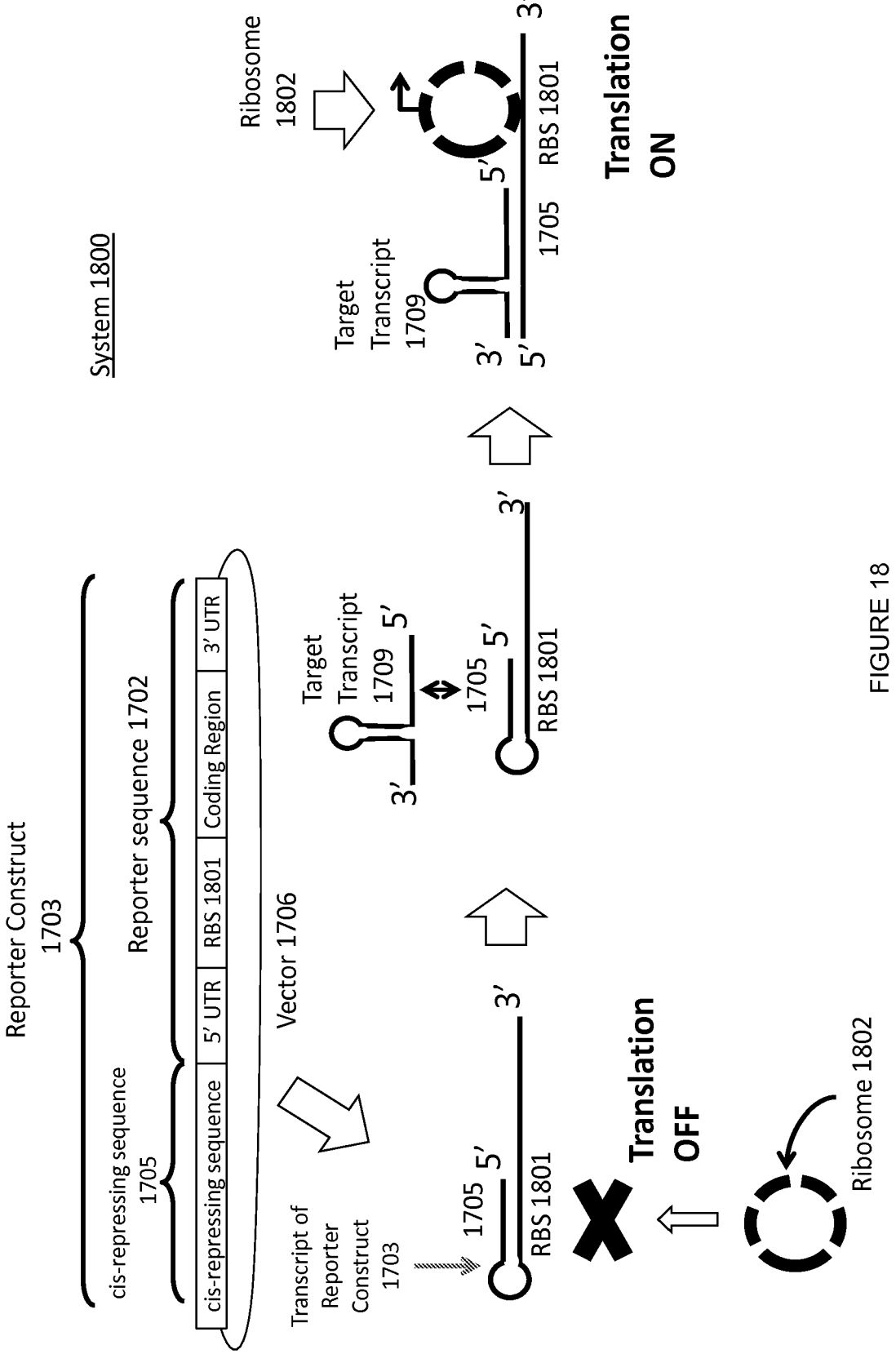

Reporter Construct
1703
cis-repressing sequence
1705
Reporter sequence 1702
cis-repressing sequence
5' UTR
RBS 1801
Coding Region
3' UTR
Vector 1706
Transcript of Reporter Construct 1703
1705
5'
3'
RBS 1801
Translation
OFF
Ribosome 1802
System 1800
Target Transcript 1709
3'
5'
1705
5'
RBS 1801
3'
Ribosome 1802
Target Transcript 1709
3'
5'
1705
5'
RBS 1801
3'
Translation
ON

FIGURE 18

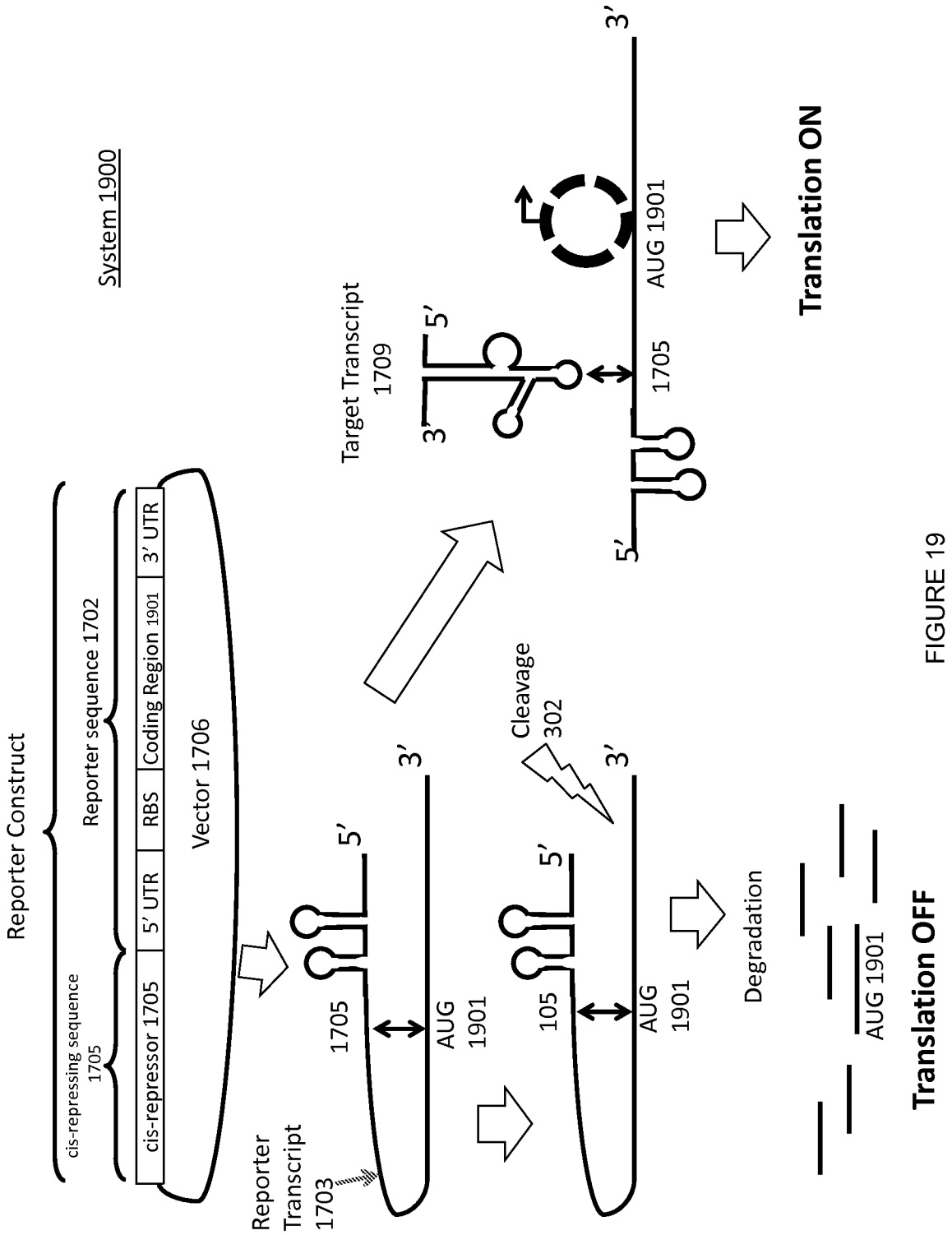

System 1900
Reporter Construct
cis-repressing sequence 1705
Reporter sequence 1702
cis-repressor 1705
5' UTR
RBS
Coding Region 1901
3' UTR
Vector 1706
Reporter Transcript 1703
1705
5'
3'
AUG 1901
Cleavage 302
105
Degradation
Target Transcript 1709
Translation ON
Translation OFF

FIGURE 19

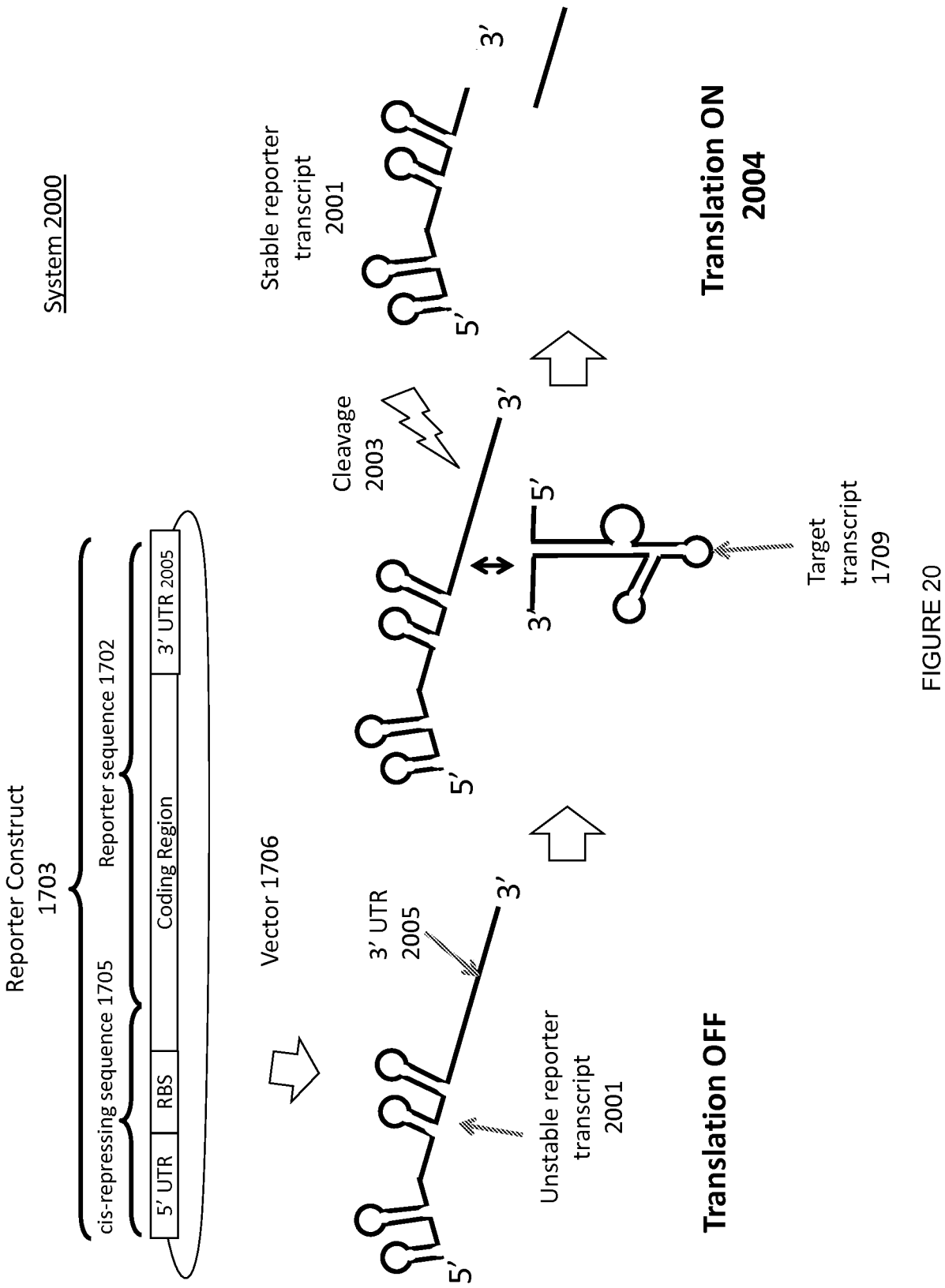
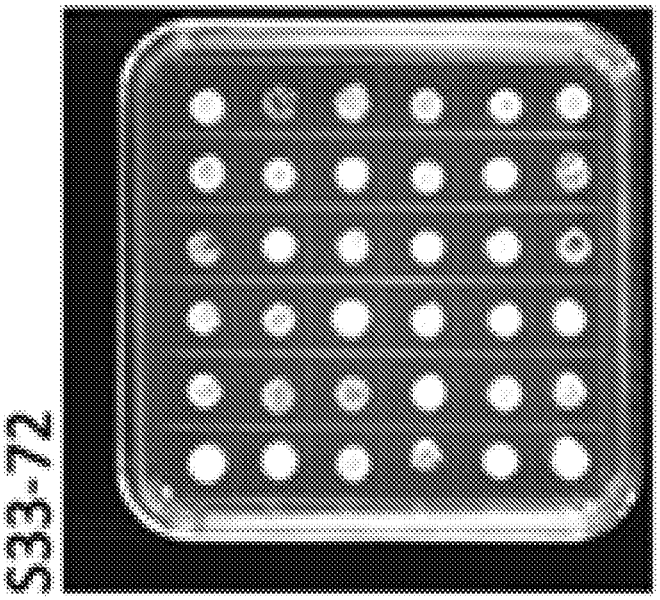
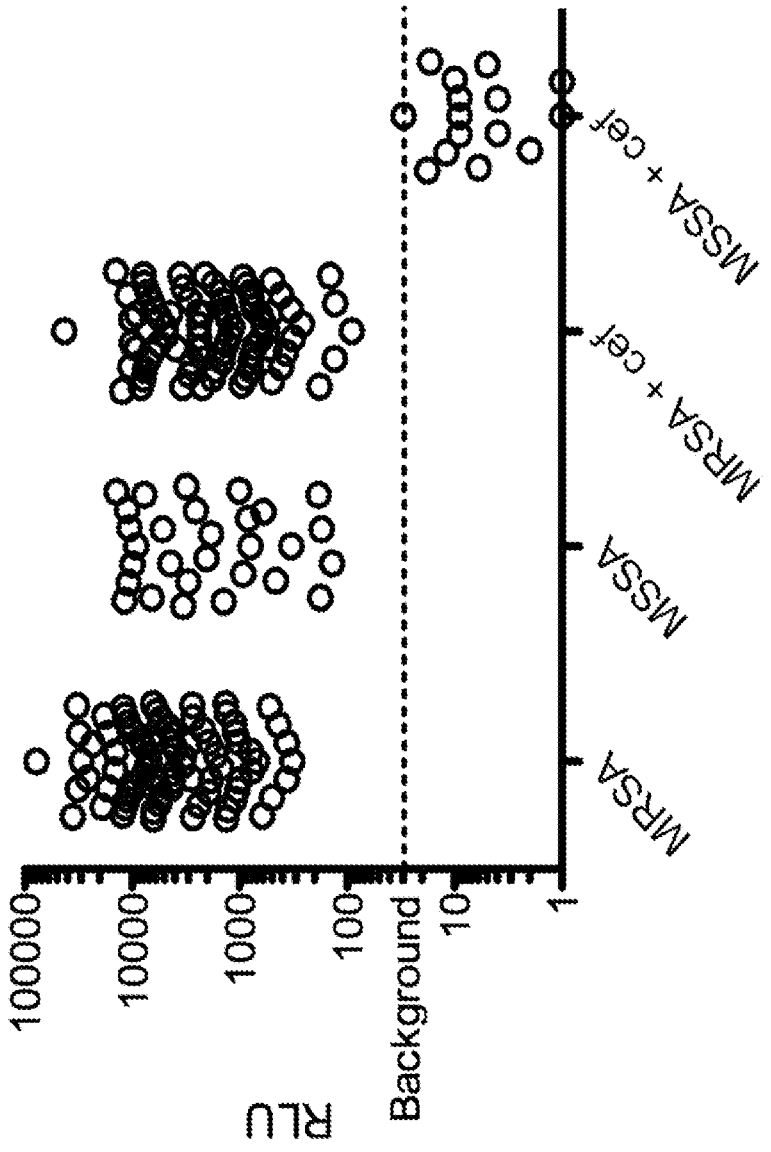

System 2000
Reporter Construct
1703
cis-repressing sequence 1705
Reporter sequence 1702
5' UTR
RBS
Coding Region
3' UTR 2005
Vector 1706
3' UTR
2005
Unstable reporter
transcript
2001
Translation OFF
Cleavage
2003
Stable reporter
transcript
2001
Translation ON
2004
Target
transcript
1709
5'
3'

FIGURE 20



Photograph of transduced MRSA clinical isolates

FIGURE 21



Luminescence in S. aureus and distinguishing MRSA vs. MSSA

FIGURE 22

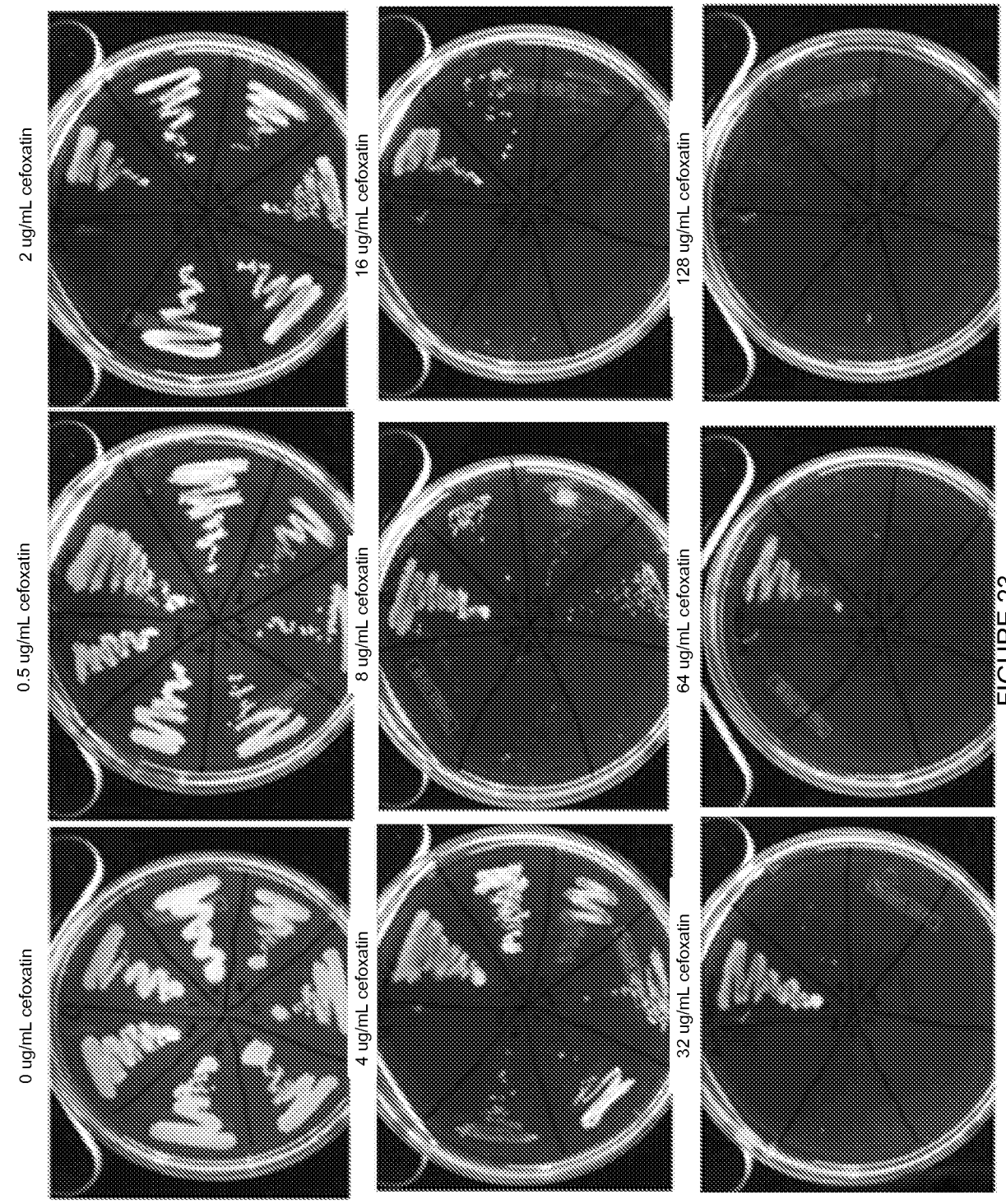
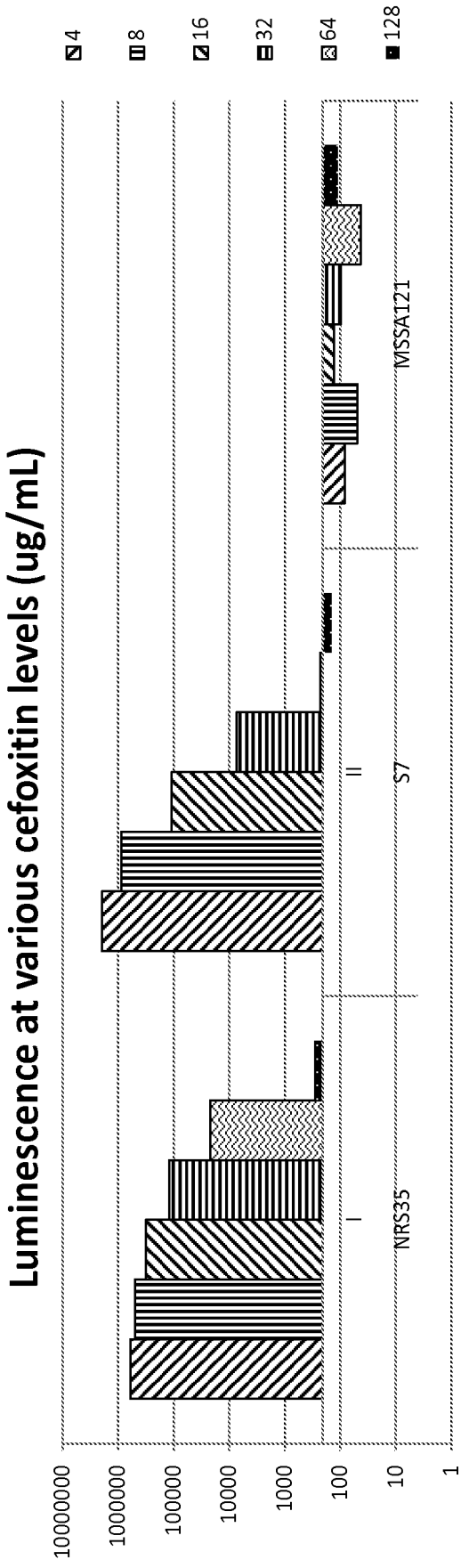

0 ug/mL cefoxatin
0.5 ug/mL cefoxatin
2 ug/mL cefoxatin
4 ug/mL cefoxatin
8 ug/mL cefoxatin
16 ug/mL cefoxatin
32 ug/mL cefoxatin
64 ug/mL cefoxatin
128 ug/mL cefoxatin
Agar Layout: Sectors: Type
I MRSA I
II 57 II
III MRSA III
IV 337 IV
V 101 V
VI mecC
VII MSSA 121

FIGURE 23



Luminescence obtained from MRSA and MSSA at various concentrations of cefoxitin

FIGURE 24

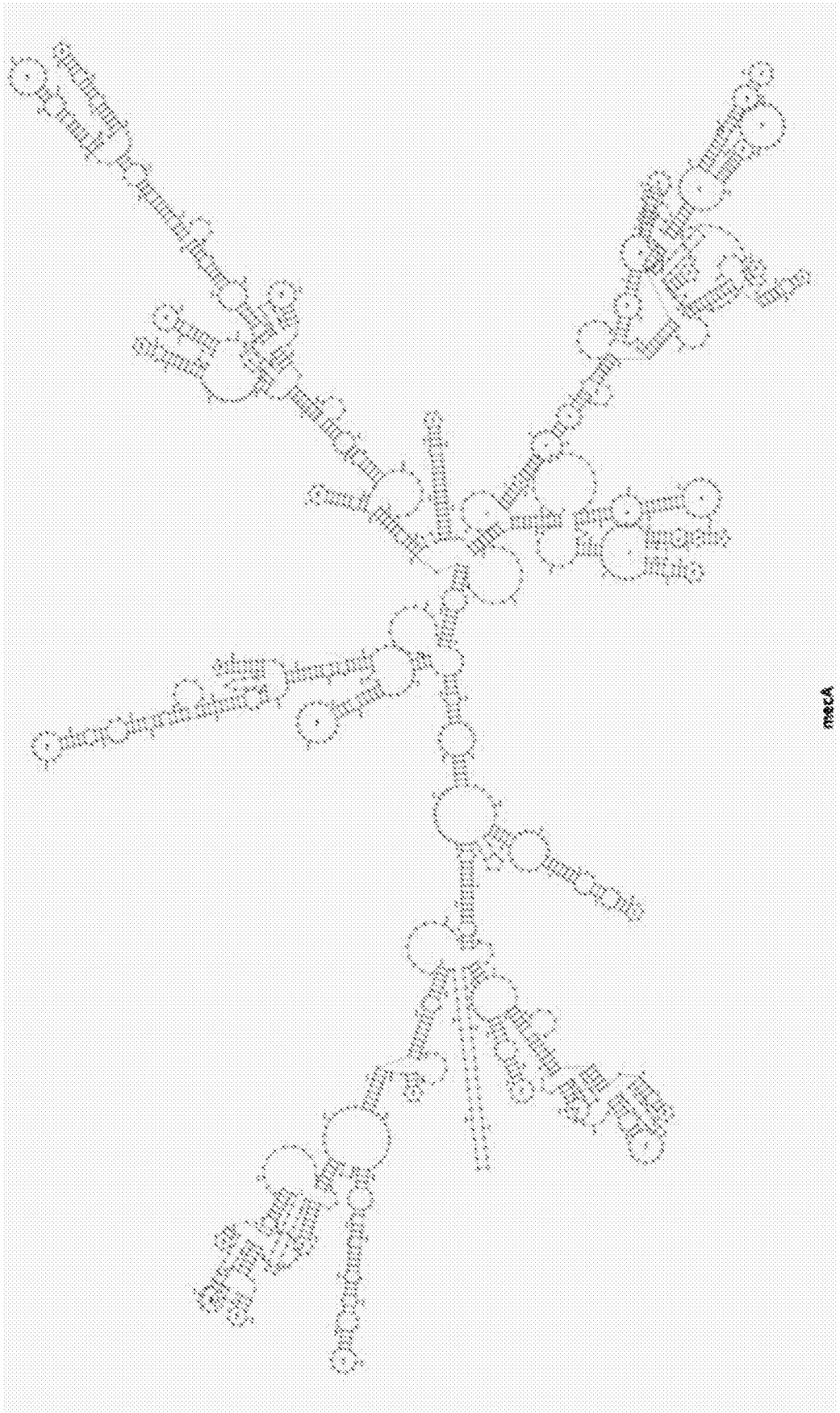


FIGURE 25

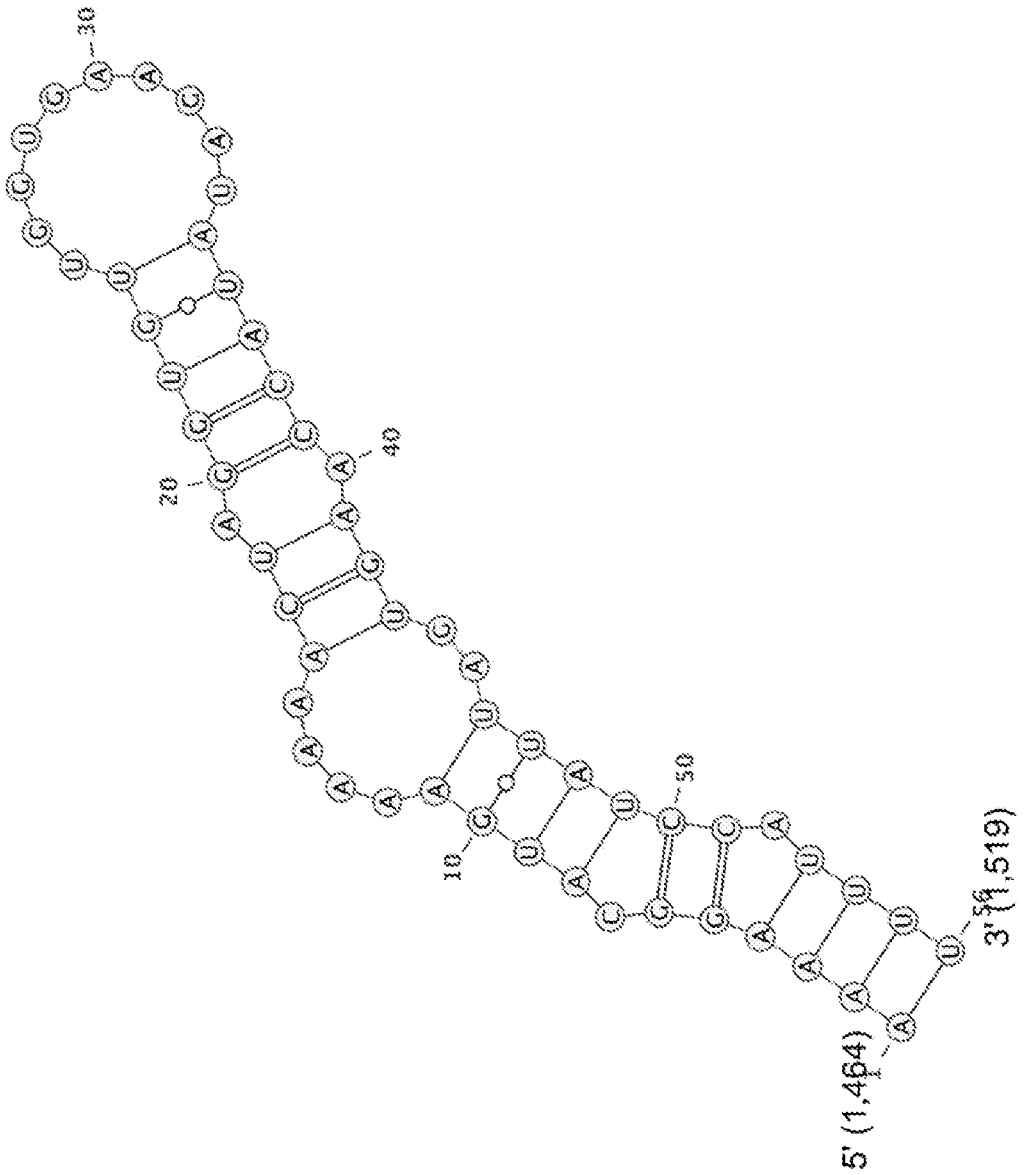


FIGURE 26

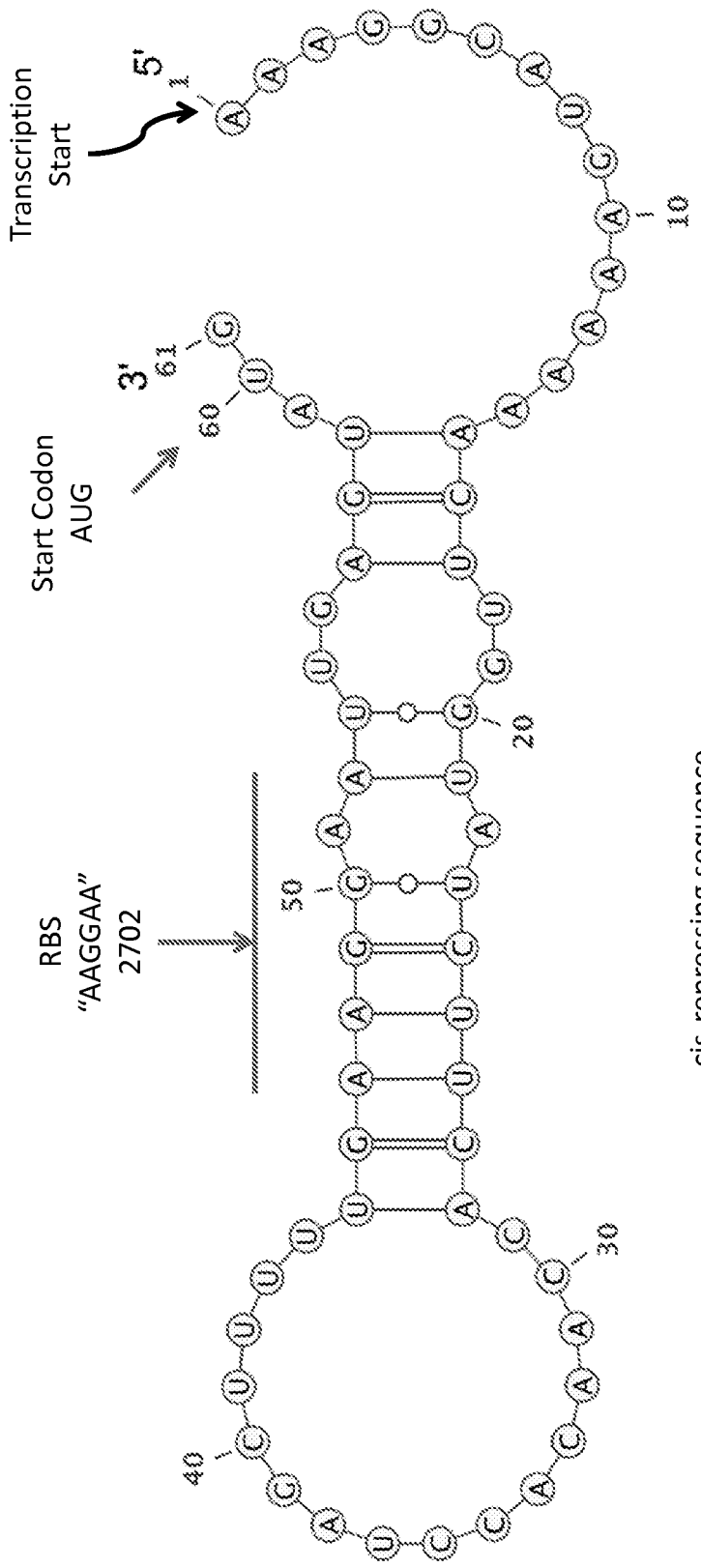

Transcription Start
5'
1
10
3'
61
60
Start Codon AUG
RBS "AAGGAA" 2702
50
20
30
40
cis-repressing sequence (nucleotides 1-58) 2701

FIGURE 27

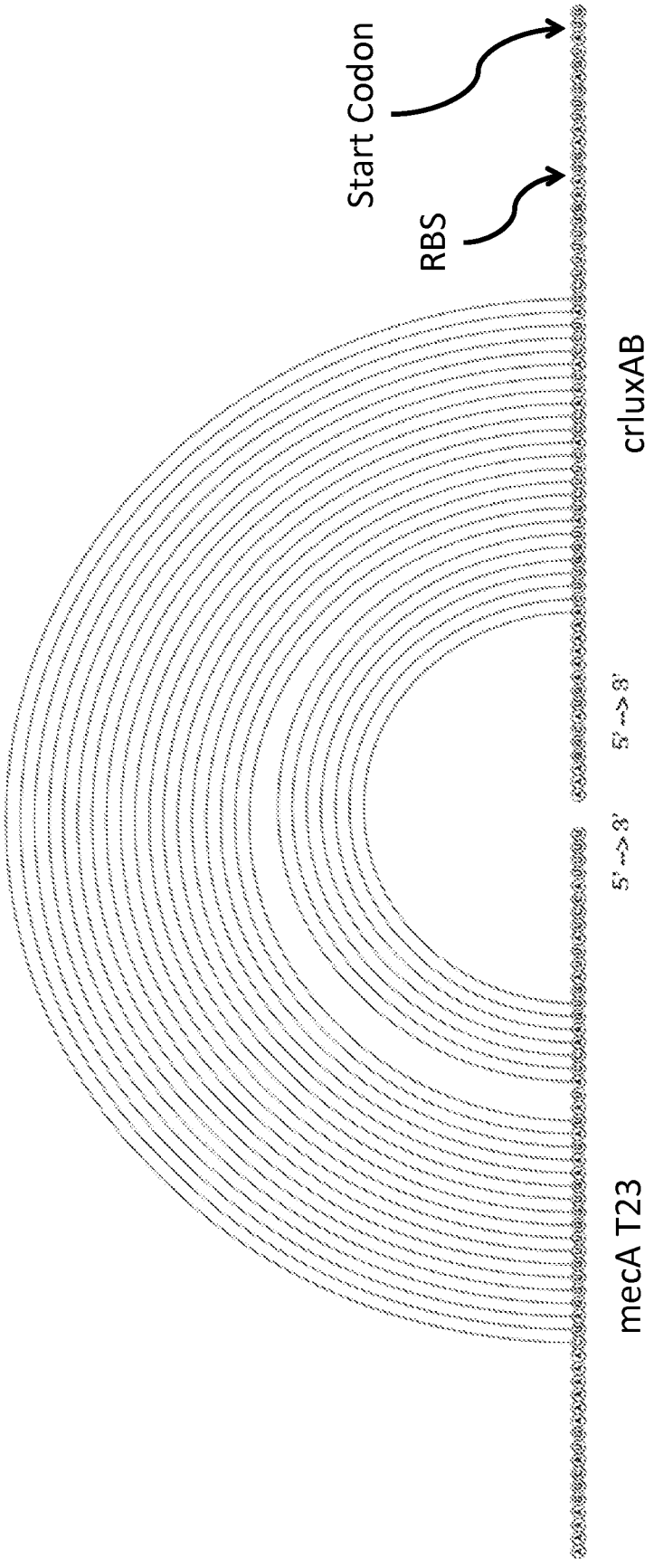


FIGURE 28

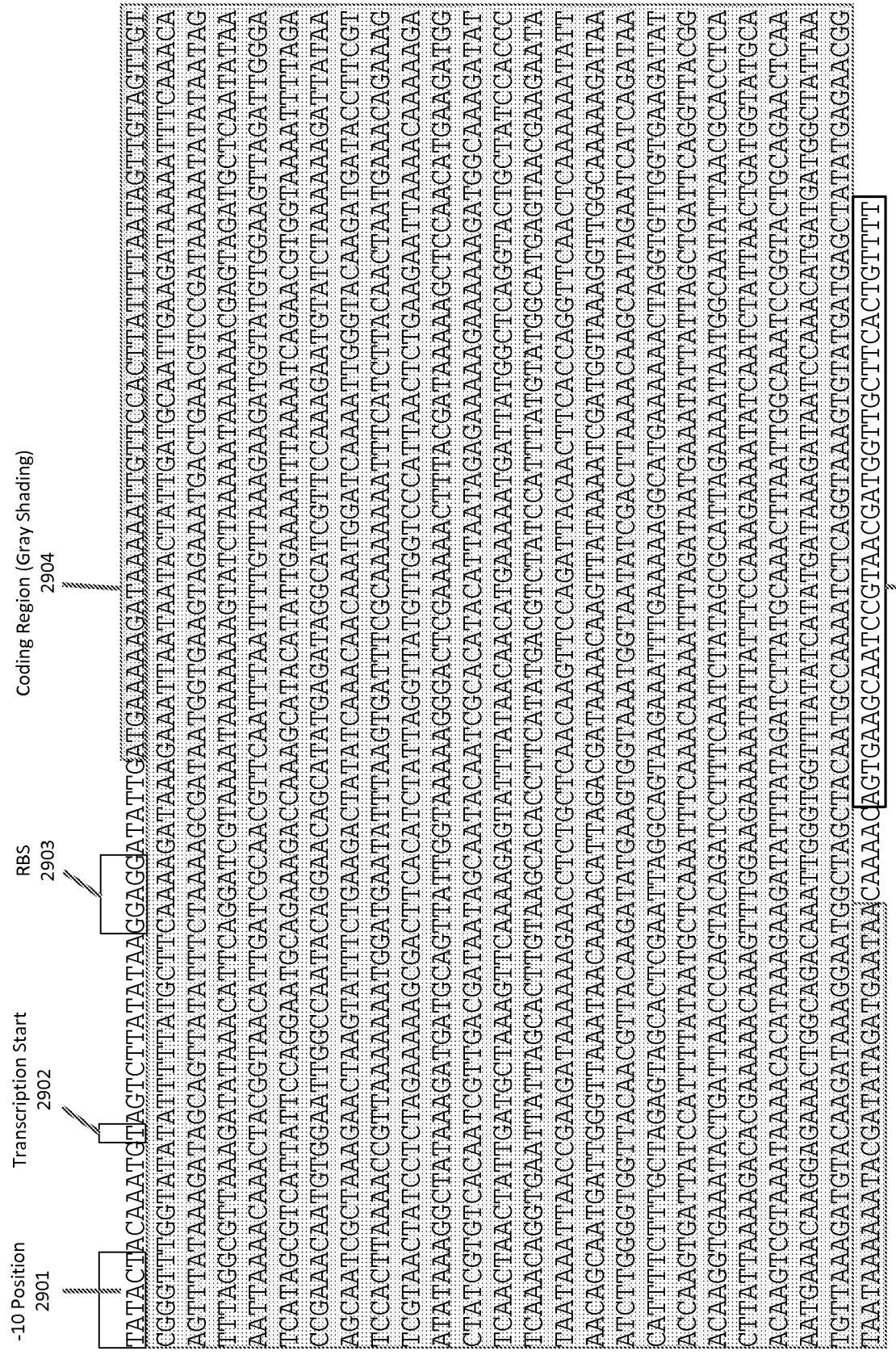

-10 Position
2901
Transcription Start
2902
RBS
2903
Coding Region (Gray Shading)
2904
Transcription Terminator Sequence
2905

FIGURE 29

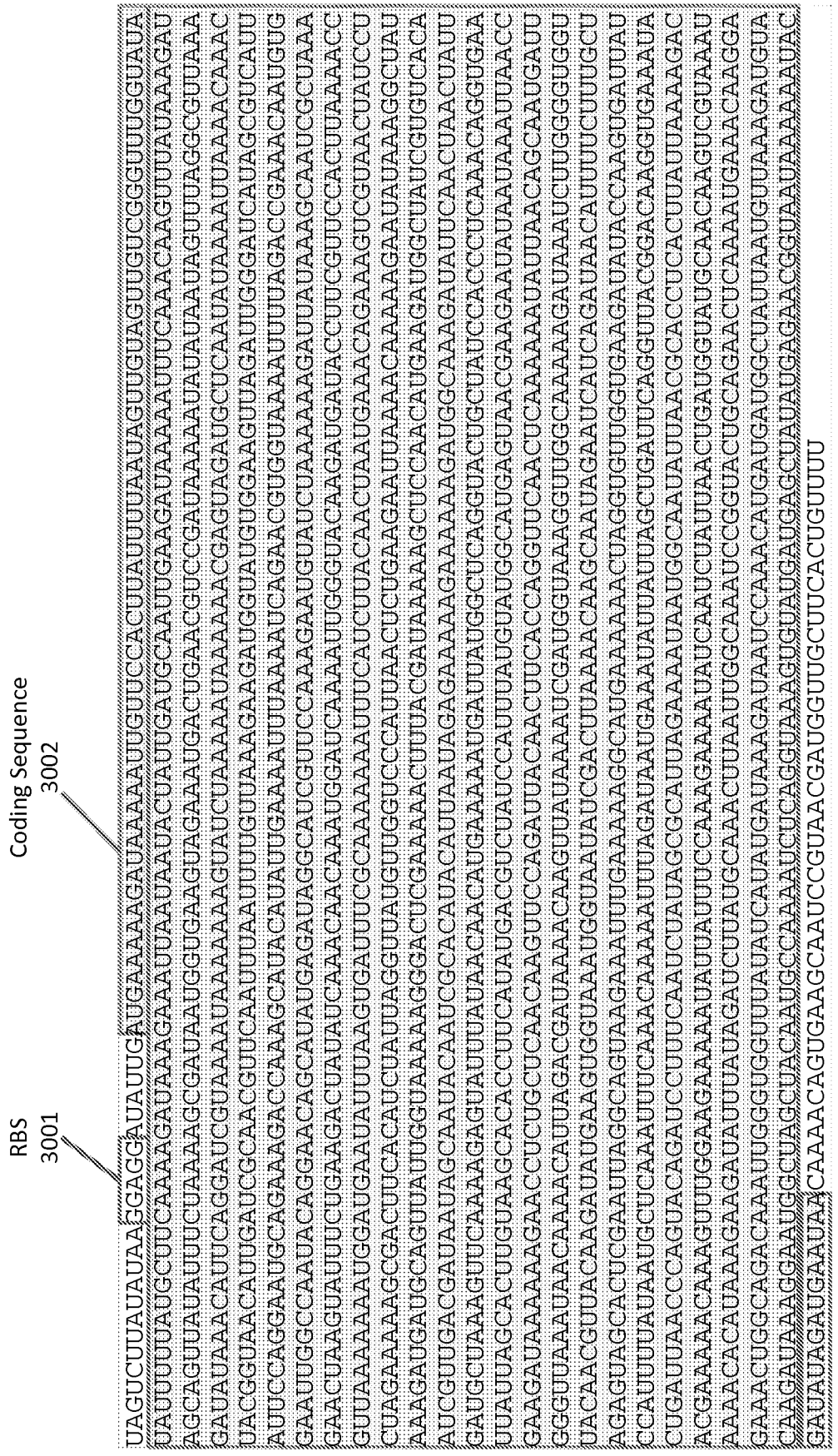


FIGURE 30

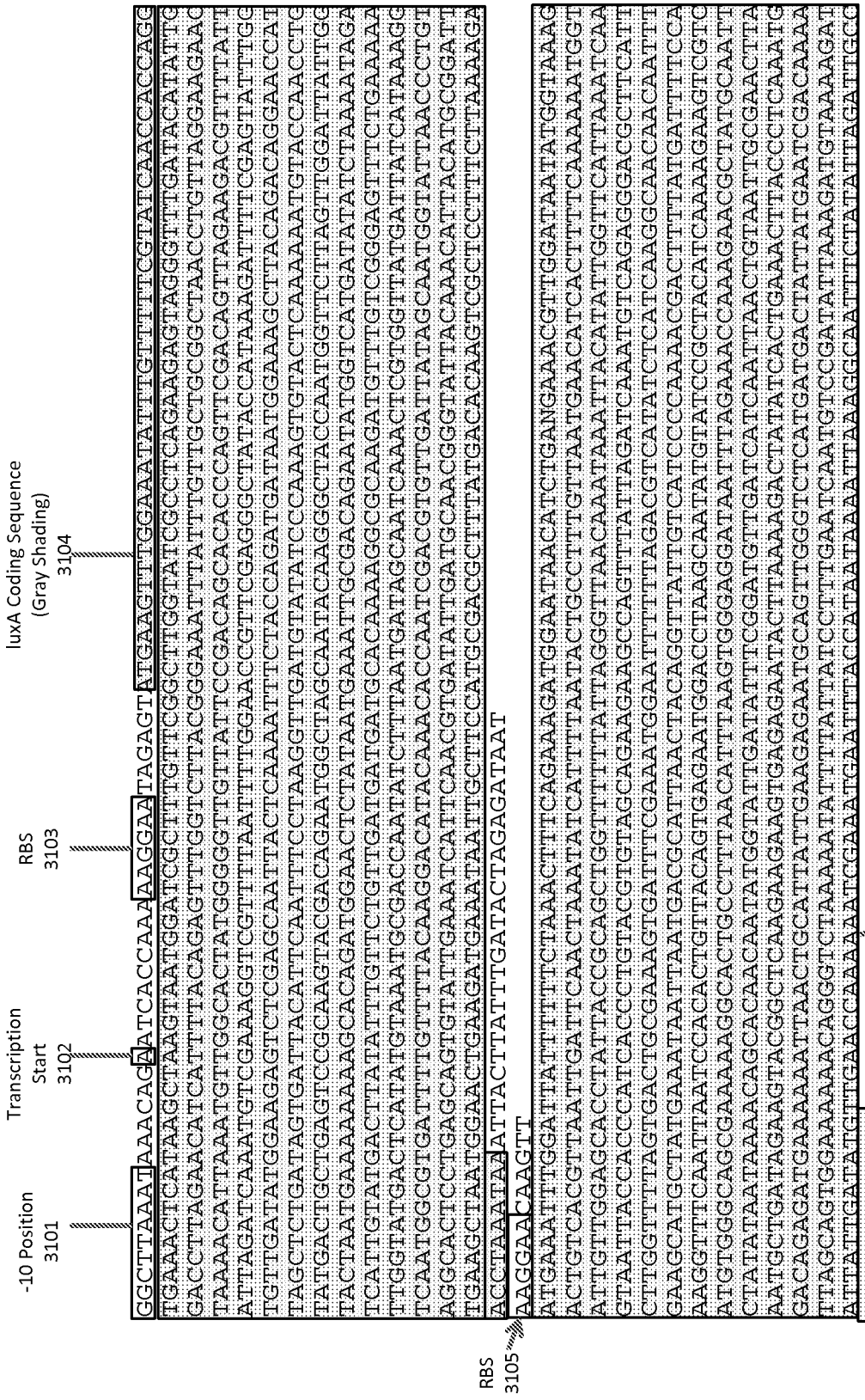

-10 Position
3101
Transcription Start
3102
RBS
3103
luxA Coding Sequence
(Gray Shading)
3104
RBS
3105
luxB Coding Sequence
(Gray Shading)
3106

FIGURE 31


RBS
3201
luxA Coding Sequence
(Gray Shading)
3202
RBS
3203
luxB Coding Sequence
(Gray Shading)
3204

FIGURE 32


Cis-Repressing Sequence
Dotted Line
3301
luxA Coding Sequence
(Gray Shading)
3303
RBS
3302
RBS
3304
luxB Coding Sequence
(Gray Shading)
1305

FIGURE 33

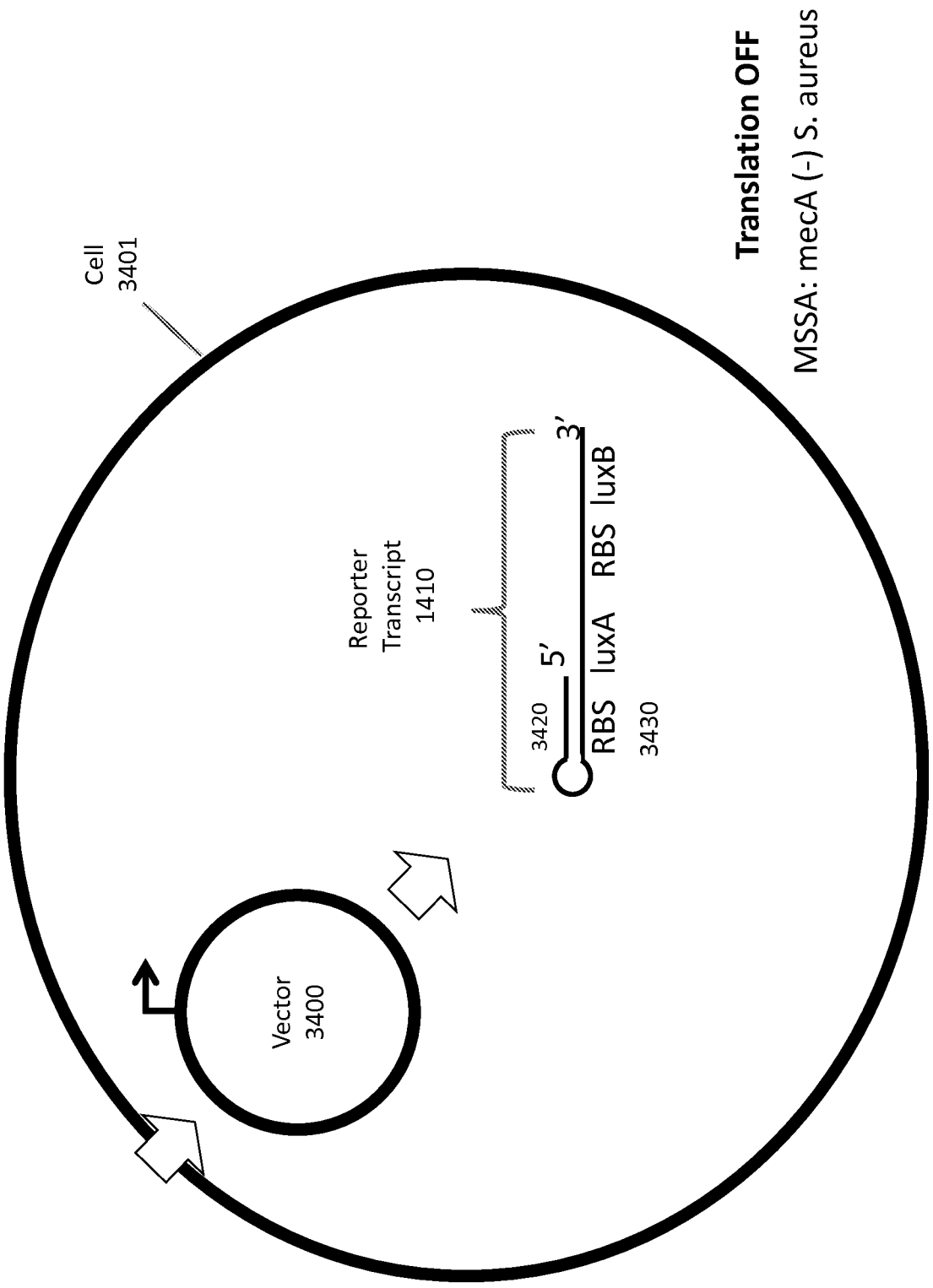

Translation OFF
MSSA: mecA (-) S. aureus
Cell
3401
Vector
3400
Reporter
Transcript
1410
3420
5'
3'
RBS
luxA
RBS
luxB
3430

FIGURE 34

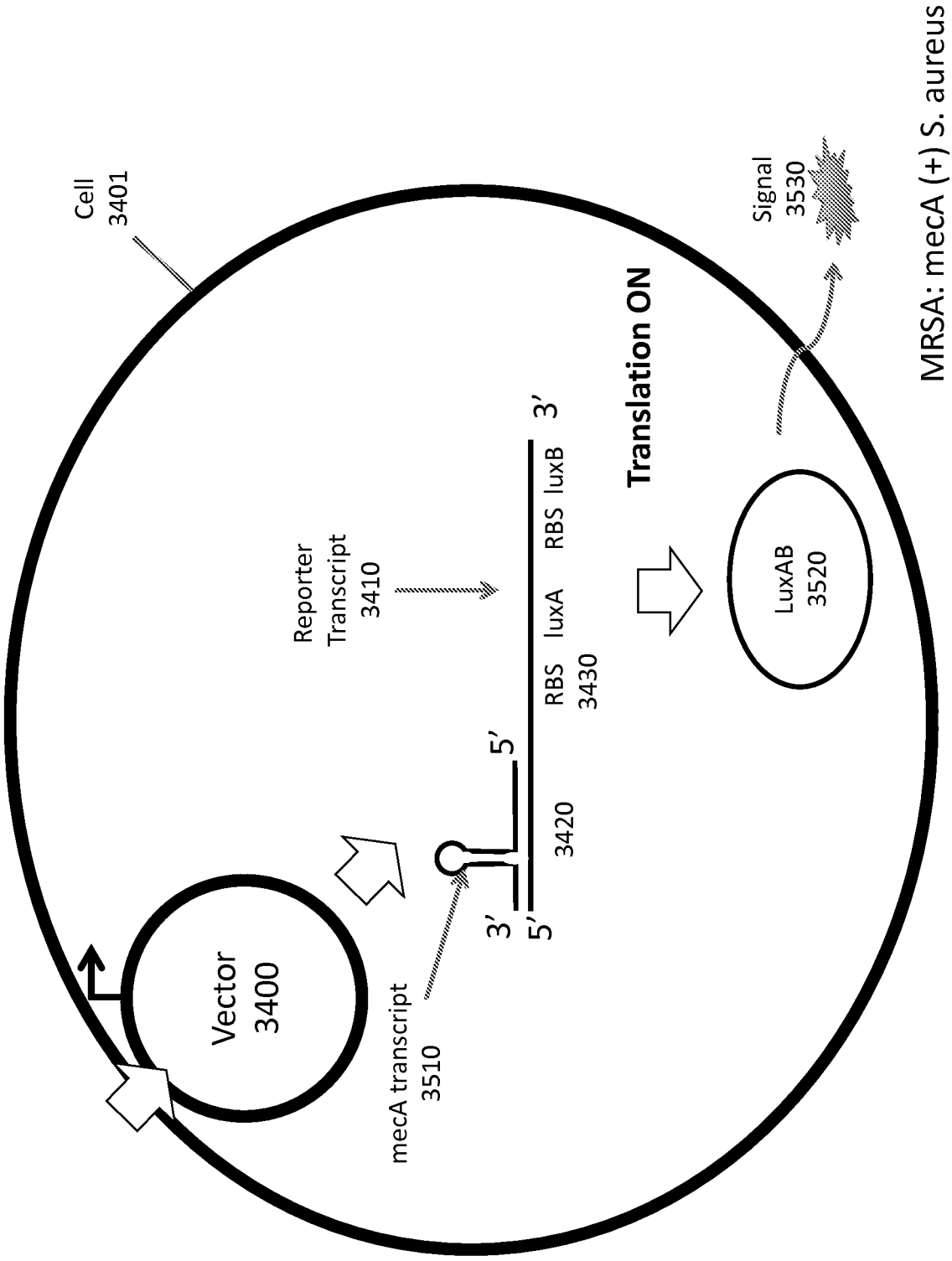

Cell
3401
Vector
3400
mecA transcript
3510
3'
5'
5'
3420
RBS
luxA
RBS
luxB
3'
3430
Reporter
Transcript
3410
Translation ON
LuxAB
3520
Signal
3530
MRSA: mecA (+) S. aureus

FIGURE 35