

Supporting Information

CRISPRi-sRNAs transcriptional-translational regulation of extracellular electron transfer of *Shewanella oneidensis*

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SUPPORTING FIGURES & FIGURE CAPTIONS

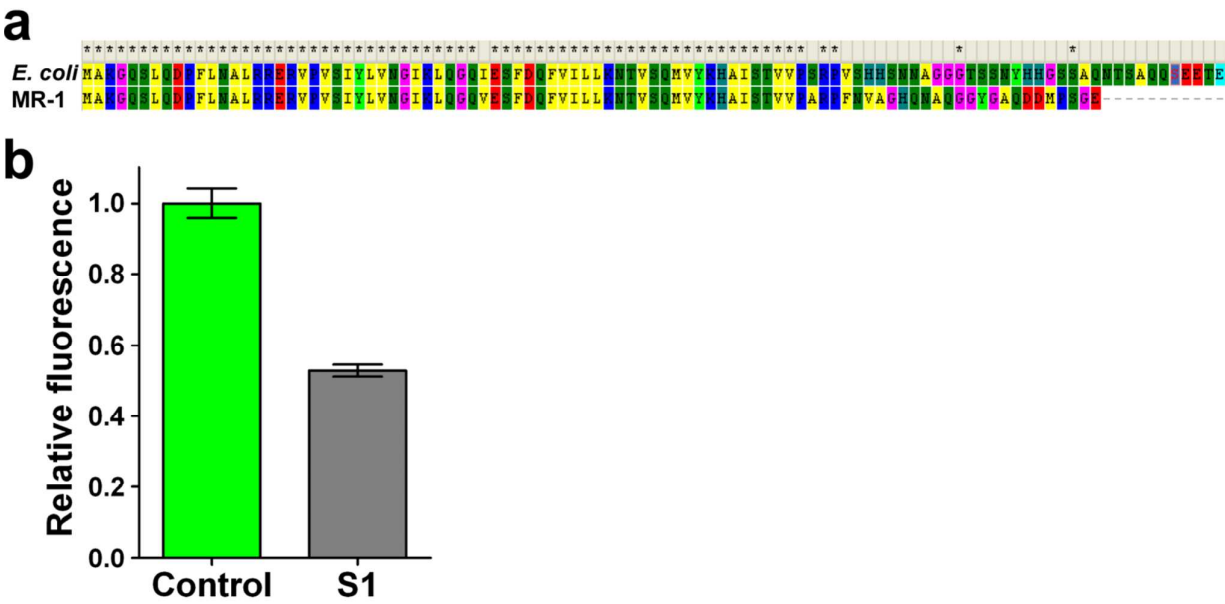


Figure S1. Reasons that the inherent Hfq protein in *S. oneidensis* did not function very well in sRNAs (a) The amino acid sequence of Hfq in *S. oneidensis* was different with that of the Hfq in *E.coli*. (b) The S₁ with the endogenous Hfq from *S. oneidensis* showed a 1.9-fold repression of the GFP expression in *S. oneidensis*. Fluorescence results represent average and SD of at least three biological replicates.

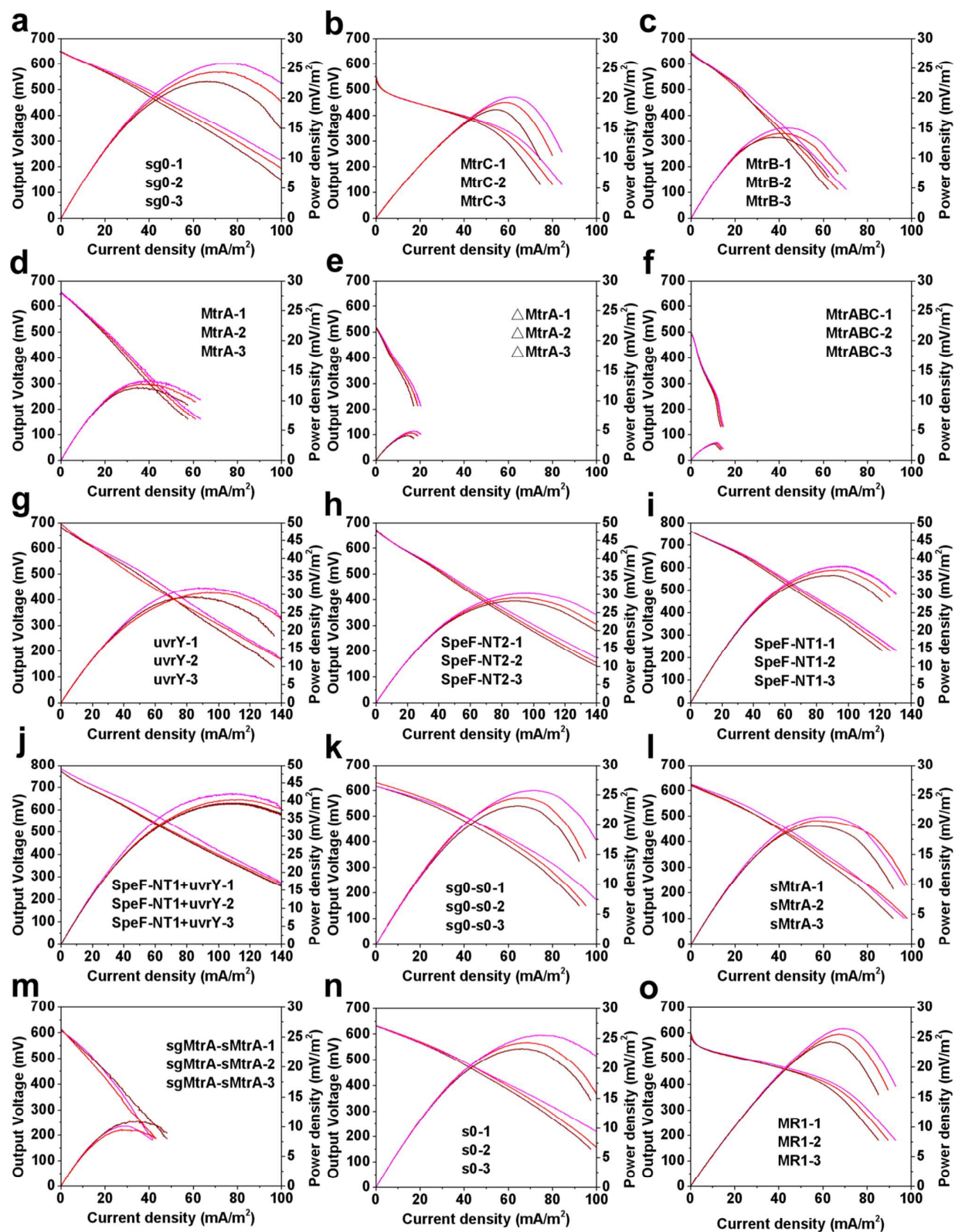


Figure S2. Independent triplicates of the polarization discharge curves of MFCs via LSV (-0.1 mV/s) and power density output curves from three independent reactors. *S. oneidensis* strains: sg0 (a), MtrC (b), MtrB (c), MtrA (sgMtrA) (d), Δ MtrA (e), MtrABC (f), uvrY(g), SpeF-NT2 (h), SpeF-NT1 (i), SpeF-NT1+uvrY (j), sg0-so (k), sMtrA (l), sgMtrA-sMtrA (m), so (n) and

MR-1 (o).

SUPPORTING TABLES & TABLE LEGANDS.

Table S1. Strains and plasmids used in the study

strain	description	source
<i>S. oneidensis</i> MR-1	Wild type	Lab stock
$\Delta mtrA$	$\Delta mtrA$ is a <i>mtrA</i> deletion mutant of <i>S. oneidensis</i> MR-1	Lab stock
<i>E. coli</i> WM3064	A DPA auxotroph of <i>E. coli</i> could transfer plasmid into <i>S. oneidensis</i> MR-1 by conjugation	Lab stock
<i>E. coli</i> BL21(DE3)	Cloning strain	TransGen
<i>E. coli</i> Trans1 T1	Cloning strain	TransGen
plasmid	description	source
pHG102	KanR, <i>oriT</i> , <i>rep^{BBR1}</i> , Mob	Lab stock
pHG11	KanR without PstI restriction site, <i>oriT</i> , <i>rep^{BBR1}</i> , Mob without BsaI restriction site	Lab stock
pYYDT	KanR, <i>oriT</i> , <i>rep^{BBR1}</i> , Mob, an IPTG inducible promoter element (<i>PlacIq-lacIq-Ptac</i>)	Lab stock
pUC57-Amp-dCas9	<i>E. coli</i> cloning vector with <i>dcas9</i>	GENEWIZ
pUC57-Amp-GFP	<i>E. coli</i> cloning vector with <i>gfp</i>	GENEWIZ
pUC57-Amp-sgRNA	<i>E. coli</i> cloning vector with sgRNA assembly	GENEWIZ
pUC57-Amp-sRNAs	<i>E. coli</i> cloning vector with sRNAs assembly	GENEWIZ
pUC57-Amp-sg0	<i>E. coli</i> cloning vector with sg0 assembly	GENEWIZ
pUC57-Amp-s0	<i>E. coli</i> cloning vector with s0 assembly	GENEWIZ
pYYDT-hfq	pYYDT with <i>hfq</i> gene	Lab stock
pYYDT-dCas9	pYYDT with <i>dcas9</i> gene	This study
pHG11-sgRNA	pHG11 with sgRNA assembly	This study
pHG11-sgRNA-dCas9	pHG11 with sgRNA assembly and <i>dcas9</i>	This study
pHG11-sgRNA-dCas9-GFP	pHG11 with sgRNA assembly, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-sg0-dCas9	pHG11 with sg0 assembly and <i>dcas9</i>	This study
pHG11-sg0-dCas9- GFP	pHG11 with sg0 assembly, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-dCas9- GFP	pHG11 with gfp-NT1 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11- gfp-NT2-dCas9- GFP	pHG11 with gfp-NT2 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT3-dCas9- GFP	pHG11 with gfp-NT3 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT4-dCas9- GFP	pHG11 with gfp-NT4 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11- gfp-P1-dCas9- GFP	pHG11 with gfp-P1 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-P2-dCas9- GFP	pHG11 with gfp-P2 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-T1-dCas9-GFP	pHG11 with gfp-T1 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-T2-	pHG11 with gfp-T2 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study

dCas9- GFP		
pHG11-gfp-T3- dCas9- GFP	pHG11 with gfp-T3 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-10- dCas9- GFP	pHG11 with gfp-NT1-10 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-12- dCas9-GFP	pHG11 with gfp-NT1-12 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-14- dCas9- GFP	pHG11 with gfp-NT1-14 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-16- dCas9- GFP	pHG11 with gfp-NT1-16 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-18- dCas9- GFP	pHG11 with gfp-NT1-18 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-19- dCas9- GFP	pHG11 with gfp-NT1-19 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-21- dCas9- GFP	pHG11 with gfp-NT1-21sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-22- dCas9- GFP	pHG11 with gfp-NT1-22 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-23- dCas9- GFP	pHG11 with gfp-NT1-23 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-24- dCas9- GFP	pHG11 with gfp-NT1-24 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-25- dCas9- GFP	pHG11 with gfp-NT1-25 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-30- dCas9- GFP	pHG11 with gfp-NT1-30 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1-40- dCas9- GFP	pHG11 with gfp-NT1-40 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis2-dCas9- GFP	pHG11 with gfp-NT1-mis2 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis4-dCas9- GFP	pHG11 with gfp-NT1-mis4 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis6-dCas9- GFP	pHG11 with gfp-NT1-mis6 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis8-dCas9- GFP	pHG11 with gfp-NT1-mis8 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis10-dCas9- GFP	pHG11 with gfp-NT1-mis10 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis12-dCas9- GFP	pHG11 with gfp-NT1-mis12 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-gfp-NT1- mis14-dCas9-GFP	pHG11 with gfp-NT1-mis14 sgRNA, <i>dcas9</i> and <i>gfp</i>	This study
pHG11-mtrA-NT1	pHG11 with mtrA-NT1 sgRNA and <i>dcas9</i>	This study

-dCas9		
pHG11-mtrB-NT1	pHG11 with mtrB-NT1 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-mtrC-NT1	pHG11 with mtrC-NT1 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-speF-NT1	pHG11 with speF-NT1 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-speF-NT2	pHG11 with speF-NT2 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-uvrY-NT1	pHG11 with uvrY-NT1 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-mtrA-NT1-mtrB-NT1-mtrC-NT1	pHG11 with mtrA-NT1 sgRNA, mtrB-NT1 sgRNA, mtrC-NT1 sgRNA and <i>dcas9</i>	This study
-dCas9		
pHG11-speF-NT1-uvrY-NT1-dCas9	pHG11 with speF-NT1 sgRNA, uvrY-NT1 sgRNA and <i>dcas9</i>	This study
pHG11-sRNAs	pHG11 with sRNAs assembly	This study
pHG11-sRNAs-GFP	pHG11 with sRNAs assembly and <i>gfp</i>	This study
pHG11-sRNAs-GFP-hfq	pHG11 with sRNAs assembly, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-GFP-hfq	pHG11 with gfp-S1 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S2-GFP-hfq	pHG11 with gfp-S2 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S3-GFP-hfq	pHG11 with gfp-S3 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S4-GFP-hfq	pHG11 with gfp-S4 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S5-GFP-hfq	pHG11 with gfp-S5 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-14-GFP-hfq	pHG11 with gfp-S1-14 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-16-GFP-hfq	pHG11 with gfp-S1-16 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-18-GFP-hfq	pHG11 with gfp-S1-18 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-20-GFP-hfq	pHG11 with gfp-S1-20 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-22-GFP-hfq	pHG11 with gfp-S1-22 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-26-GFP-hfq	pHG11 with gfp-S1-26 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-28-GFP-hfq	pHG11 with gfp-S1-28 sRNAs, <i>gfp</i> and <i>hfq</i>	This study

pHG11-gfp-S1-30-GFP-hfq	pHG11 with gfp-S1-30 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-40-GFP-hfq	pHG11 with gfp-S1-40 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis2-GFP-hfq	pHG11 with gfp-S1-mis2 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis4-GFP-hfq	pHG11 with gfp-S1-mis4 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis6-GFP-hfq	pHG11 with gfp-S1-mis6 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis8-GFP-hfq	pHG11 with gfp-S1-mis8 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis10-GFP-hfq	pHG11 with gfp-S1-mis10 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis12-GFP-hfq	pHG11 with gfp-S1-mis12 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-gfp-S1-mis14-GFP-hfq	pHG11 with gfp-S1-mis14 sRNAs, <i>gfp</i> and <i>hfq</i>	This study
pHG11-sRNAs-hfq	pHG11 with sRNAs assembly and <i>hfq</i>	This study
pHG11-s0-hfq	pHG11 with s0 assembly and <i>hfq</i>	This study
pHG11-mtrA-S1-hfq	pHG11 with mtrA-S1 sRNAs and <i>hfq</i>	This study
pHG11-mtrA-NT1-dCas9-mtrA-S1-hfq	pHG11 with mtrA-NT1 sgRNA, <i>dcas9</i> , mtrA-S1 sRNAs and <i>hfq</i>	This study
pHG11-sg0-dCas9-s0-hf	pHG11 with sg0 assembly, <i>dcas9</i> , s0 assembly and <i>hfq</i>	This study

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Table S2. Primer sequences

Primers for pHG11 construction	
pHG11-1_For	CGGGCCGCTCTTTGGGCTTGAT
pHG11-1_Rev	ACCGGTTATTGACTACCGG
pHG11-2_For	CCGGTAGTCAATAAACCGGTTGAATTCGCCTCTGCAGACCGGTAAACCAGCAATAGAC
pHG11-2_Rev	AAGACGAGGCAGCGCGGCTAT
pHG11-3_For	ATAGCCGCGCTGCCTCGTCTTGCAGTTCATTACAGGGCACC
pHG11-3_Rev	ATCAAGCCCAAGAGACGGCCCGCAGCTTCGGGAGCGCCTGAA
Primers for Golden Gate assembly	
gfp-P1_F	TTGCATAACAATTGACATTGTGAG
gfp-P1_R	AAACCTCACAATGTCAATTGTTAT
gfp-P2_F	TTGCAATTTTGTTTAACTTTAAGA
gfp-P2_R	AAACTCTTAAAGTTAAACAAAATT
gfp-T1_F	TTGCCCAATTCTTGTTGAATTAGA
gfp-T1_R	AAACTCTAATTCAACAAGAATTGG
gfp-T2_F	TTGCCTTAAATTTATTTGCACTAC
gfp-T2_R	AAACGTAGTGCAAATAAATTTAAG

gfp-T3_F	TTGCGTTAATAGAATCGAGTTAAA
gfp-T3_R	AAACTTTAACTCGATTCTATTAAC
gfp-NT1_F	TTGCCATCTAATTCAACAAGAATT
gfp-NT1_R	AAACAATTCTTGTTGAATTAGATG
gfp-NT2_F	TTGCAGTAGTGCAAATAAATTTAA
gfp-NT2_R	AAACTTAAATTTATTTGCACTACT
gfp-NT3_F	TTGCTTAACTCGATTCTATTAACA
gfp-NT3_R	AAACTGTTAATAGAATCGAGTTAA
gfp-NT4_F	TTGCTTGGAGTATTTTGTGATAA
gfp-NT4_R	AAACTTATCAACAAAAATACTCCAA
gfp-NT1-10_F	TTGCAACAAGAATT
gfp-NT1-10_R	AAACAATTCTTGTT
gfp-NT1-12_F	TTGCTCAACAAGAATT
gfp-NT1-12_R	AAACAATTCTTGTTGA
gfp-NT1-14_F	TTGCATTCAACAAGAATT
gfp-NT1-14_R	AAACAATTCTTGTTGAAT
gfp-NT1-16_F	TTGCTAATTCAACAAGAATT
gfp-NT1-16_R	AAACAATTCTTGTTGAATTA
gfp-NT1-18_F	TTGCTCTAATTCAACAAGAATT
gfp-NT1-18_R	AAACAATTCTTGTTGAATTAGA
gfp-NT1-19_F	TTGCATCTAATTCAACAAGAATT
gfp-NT1-19_R	AAACAATTCTTGTTGAATTAGAT
gfp-NT1-21_F	TTGCCCATCTAATTCAACAAGAATT
gfp-NT1-21_R	AAACAATTCTTGTTGAATTAGATGG
gfp-NT1-22_F	TTGCACCATCTAATTCAACAAGAATT
gfp-NT1-22_R	AAACAATTCTTGTTGAATTAGATGGT
gfp-NT1-23_F	TTGCCACCATCTAATTCAACAAGAATT
gfp-NT1-23_R	AAACAATTCTTGTTGAATTAGATGGTG
gfp-NT1-24_F	TTGCTCACCATCTAATTCAACAAGAATT
gfp-NT1-24_R	AAACAATTCTTGTTGAATTAGATGGTGA
gfp-NT1-25_F	TTGCATCACCATCTAATTCAACAAGAATT
gfp-NT1-25_R	AAACAATTCTTGTTGAATTAGATGGTGAT
gfp-NT1-30_F	TTGCTTAACATCACCATCTAATTCAACAAGAATT
gfp-NT1-30_R	AAACAATTCTTGTTGAATTAGATGGTGATGTAA
gfp-NT1-40_F	TTGCTTTGTGCCCATTAACATCACCATCTAATTCAACAAGAATT
gfp-NT1-40_R	AAACAATTCTTGTTGAATTAGATGGTGATGTTAATGGGCACAAA
gfp-NT1-mis2_F	TTGCGTTCTAATTCAACAAGAATT
gfp-NT1-mis2_R	AAACAATTCTTGTTGAATTAGAAC
gfp-NT1-mis4_F	TTGCGTAGTAATTCAACAAGAATT
gfp-NT1-mis4_R	AAACAATTCTTGTTGAATTACTAC
gfp-NT1-mis6_F	TTGCGTAGATATTCAACAAGAATT
gfp-NT1-mis6_R	AAACAATTCTTGTTGAATATCTAC
gfp-NT1-mis8_F	TTGCGTAGATTATCAACAAGAATT
gfp-NT1-mis8_R	AAACAATTCTTGTTGATAATCTAC

gfp-NT1-mis10_F	TTGCGTAGATTAAGAACAAGAATT
gfp-NT1-mis10_R	AAACAATTCTTGTTCTTAATCTAC
gfp-NT1-mis12_F	TTGCGTAGATTAAGTTCAAGAATT
gfp-NT1-mis12_R	AAACAATTCTTGAACCTTAATCTAC
gfp-NT1-mis14_F	TTGCGTAGATTAAGTTGTAGAATT
gfp-NT1-mis14_R	AAACAATTCTACAACCTTAATCTAC
mtrA-NT1_F	TTGCTGATGGTAAGTGCCGGCAGT
mtrA-NT1_R	AAACACTGCCGGCACTTACCATCA
mtrB-NT1_F	TTGCACCATAACCATCAGCAGCGA
mtrB-NT1_R	AAACTCGCTGCTGATGGTTATGGT
mtrC-NT1_F	TTGCGCCGGTTAAGGCCATTGTGA
mtrC-NT1_R	AAACTCACAATGGCCTTAACCGGC
speF-NT1_F	TTGCACCCACATCGCAAAAATCAG
speF-NT1_R	AAACCTGATTTTTCGATGTGGGT
speF-NT2_F	TTGCCAGCAAACCTGATACGAAAAT
speF-NT2_R	AAACATTTTCGTATCAGTTTGCTG
uvrY-NT1_F	TTGCCCCGCTCATCTTCTAAGATA
uvrY-NT1_R	AAACTATCTTAGAAGATGAGCGGG
gfp-S1_F	TTGCGAAAAGTTCTTCTCCTTACGCAT
gfp-S1_R	GAAAATGCGTAAAGGAGAAGAAGTTTC
gfp-S2_F	TTGCTTGATCACCTTACCCTCTCCAC
gfp-S2_R	GAAAGTGGAGAGGGTGAAGGTGATGCAA
gfp-S3_F	TTGCCAAAGCATTGAACACCATAACCGA
gfp-S3_R	GAAATCGGTTATGGTGTTCAATGCTTTG
gfp-S4_F	TTGCGTATCACCTTCAAACCTTGACTTCA
gfp-S4_R	GAAATGAAGTCAAGTTTGAAGGTGATAC
gfp-S5_F	TTGCTTGTCTGCCATGATGTATACATTG
gfp-S5_R	GAAACAATGTATACATCATGGCAGACAA
gfp-S1-14_F	TTGCTCTCCTTTACGCAT
gfp-S1-14_R	GAAAATGCGTAAAGGAGA
gfp-S1-16_F	TTGCCTTCTCCTTTACGCAT
gfp-S1-16_R	GAAAATGCGTAAAGGAGAAG
gfp-S1-18_F	TTGCTTCTTCTCCTTTACGCAT
gfp-S1-18_R	GAAAATGCGTAAAGGAGAAGAA
gfp-S1-20_F	TTGCAGTTCTTCTCCTTTACGCAT
gfp-S1-20_R	GAAAATGCGTAAAGGAGAAGAACT
gfp-S1-22_F	TTGCAAAGTTCTTCTCCTTTACGCAT
gfp-S1-22_R	GAAAATGCGTAAAGGAGAAGAACTTT
gfp-S1-26_F	TTGCGTGAAAAGTTCTTCTCCTTTACGCAT
gfp-S1-26_R	GAAAATGCGTAAAGGAGAAGAACTTTTCAC
gfp-S1-28_F	TTGCCAGTGAAAAGTTCTTCTCCTTTACGCAT
gfp-S1-28_R	GAAAATGCGTAAAGGAGAAGAACTTTTCACTG
gfp-S1-30_F	TTGCTCCAGTGAAAAGTTCTTCTCCTTTACGCAT
gfp-S1-30_R	GAAAATGCGTAAAGGAGAAGAACTTTTCACTGGA

gfp-S1-40_F	TTGCTTGGGACAACTCCAGTGAAAAGTTCTTCTCCTTTACGCAT
gfp-S1-40_R	GAAAATGCGTAAAGGAGAAGAAGCTTTTCACTGGAGTTGTCCCAA
gfp-S1-mis2_F	TTGCCTAAAAGTTCTTCTCCTTTACGCAT
gfp-S1-mis2_R	GAAAATGCGTAAAGGAGAAGAAGCTTTAG
gfp-S1-mis4_F	TTGCCTTTAGTTCTTCTCCTTTACGCAT
gfp-S1-mis4_R	GAAAATGCGTAAAGGAGAAGAAGCTAAAG
gfp-S1-mis6_F	TTGCCTTTTCTTCTTCTCCTTTACGCAT
gfp-S1-mis6_R	GAAAATGCGTAAAGGAGAAGAAGAAAAG
gfp-S1-mis8_F	TTGCCTTTTCAACTTCTCCTTTACGCAT
gfp-S1-mis8_R	GAAAATGCGTAAAGGAGAAGTTGAAAAG
gfp-S1-mis10_F	TTGCCTTTTCAAGATCTCCTTTACGCAT
gfp-S1-mis10_R	GAAAATGCGTAAAGGAGATCTTGAAAAG
gfp-S1-mis12_F	TTGCCTTTTCAAGAAGTCCTTTACGCAT
gfp-S1-mis12_R	GAAAATGCGTAAAGGACTTCTTGAAAAG
gfp-S1-mis14_F	TTGCCTTTTCAAGAAGAGCTTTACGCAT
gfp-S1-mis14_R	GAAAATGCGTAAAGCTCTTCTTGAAAAG
mtrA-S1_F	TTGCTTTCATTTTTAGGCAGTTCTTCAT
mtrA-S1_R	GAAAATGAAGAACTGCCTAAAAATGAAA
Primers for RT-PCR	
gyrB-F	GGAACGACGGCTACCAAGA
gyrB-R	GTCAACGCACTACGGAAACC
mtrA-F	CAGTTATGGCATTAGTCGTCAC
mtrA-R	GGCACATCAAGCAAGAATCG
mtrB-F	TGATTATACCGATACTGTGATTGG
mtrB-R	GTGCTGTAATTGCTGCTACC
mtrC-F	CGGCAATGATGGTAGTGATG
mtrC-R	TGTCGGCTTCGTTAGTGG
speF-F	GCCTCCACCAGCCACTTC
speF-R	GCTTCACGCCACAGATAACG
uvrY-F	CCTGAAATAGCCCAACAAATG
uvrY-R	AATAAGCGGTAACGGTAACTG