

Table S1. Strains and plasmids used in this study.

	Description of strains and plasmids	Source
<i>S. oneidensis</i>		
MR-1	Wild-type	ATCC
$\Delta ygfY$	MR-1 derivative with deletion of SO_1339	This study
$\Delta ygfX$	MR-1 derivative with deletion of SO_1340	This study
$\Delta ygfYX$	MR-1 derivative with double deletion of SO_1339 and SO_1340	This study
Δsdh	MR-1 derivative with deletion of SO_1927, SO_1928 and SO_1929	This study
<i>E. coli</i>		
JM109	General cloning host for plasmid manipulation	Lab stock
WM3064	Auxotrophic to DAP; used for conjugation	[16]
MG1655	Wild type	ATCC
BL21	Expression host carrying the T7 RNA polymerase	Novagen
BTH101	F ⁻ , cya-99, araD139, galE15, galK16, rpsL1 (Str ^r), hsdR2, mcrA1, mcrB1.	Euromedex
Plasmid		
pRE112	Suicide vector, Cm ^r	[15]
pRE-ygfY	pRE112 derivative to delete ygfY	This study
pRE-ygfX	pRE112 derivative to delete ygfX	This study
pRE-sdh	pRE112 derivative to delete sirCD	This study
pBBP1	Constitutive expression vector in <i>Shewanella</i>	This study
pBBP1-ygfY ^{G16R/E19A}	pBBP1 derivative to expression ygfY	This study
pBBP1-ygfY	pBBP1 derivative to expression ygfY	This study
pKT25	C-terminal fusion of the target protein to the T25 fragment of adenylate cyclase	Euromedex
pKNT25	N-terminal fusion of the target protein to the T25 fragment	Euromedex
pUT18	N-terminal fusion of the target protein to the T18 fragment of adenylate cyclase	Euromedex
pUT18C	N-terminal fusion of the target protein to the T18 fragment	Euromedex
pKNT25-ygfX	pKNT25 derivative to express YgfX fused with T25 in its N-terminal	This study
pKT25-ygfX	pKT25 derivative to express YgfX fused with T25 in its C-terminal	This study
pUT18-mreB	pUT18 derivative to express MreB fused with T18 in its N-terminal	This study
pUT18C-mreB	pUCT18 derivative to express MreB fused with T18 in its C-terminal	This study
pUT18-ftsZ	pUT18 derivative to express FtsZ fused with T18 in its N-terminal	This study
pUT18C-ftsZ	pUT18 derivative to express FtsZ fused with T18 in its C-terminal	This study
pUT18-ygfY	pUT18 derivative to express YgfY fused with T18 in its N-terminal	This study
pUT18C-ygfY	pUCT18 derivative to express YgfY fused with T18 in its C-terminal	This study
pET-28a(+)	Expression vector in <i>E. coli</i> under induction of IPTG	Novagen
pBAD24	Expression vector in <i>E. coli</i> under induction of L-arabinose	[17]
pET-ygfY	pET-28a(+) derivative to express YgfY	This study
pBAD-ygfX	pBAD24 derivative to express YgfX	This study

Table S2. Primers used in this study

Primers	DNA sequence
pRE- <i>ygfY</i> -F1	tgaactgcatgaattcccggggagcaaggccaactattgatcc
pRE- <i>ygfY</i> -R1	agcggacccgagcaatattc
pRE- <i>ygfY</i> -F2	gaatattgctcgggtccgctcagatcctgagcttgcccgtat
pRE- <i>ygfY</i> -R2	cgatcccaagcttcttctagaatccgagcacaccgattagg
check- <i>ygfY</i> -F	gcgggtgagtcgcttaaatatc
check- <i>ygfY</i> -R	cgctaccgaccattttgcaa
pRE- <i>ygfX</i> -F1	tgaactgcatgaattcccgggttcacgctactcgcatcg
pRE- <i>ygfX</i> -R1	gcaagaccatgtcctcagcc
pRE- <i>ygfX</i> -F2	ggctgaggacatggcttgcctaatacgggtgtgctcggatt
pRE- <i>ygfX</i> -R2	cgatcccaagcttcttctagatcgcttgccagtaactcac
check- <i>ygfX</i> -F	gagcgaatgatccagcatcctg
check- <i>ygfX</i> -R	gcgtcatgactgacctacatgg
pRE- <i>ygfYX</i> -F1	tgaactgcatgaattcccgggggtgagtggtggcgtgagtt
pRE- <i>ygfYX</i> -R1	atccgagcacaccgattaggcaacgaaaggctggaacaaca
pRE- <i>ygfYX</i> -F2	cctaatacgggtgtgctcggatt
pRE- <i>ygfYX</i> -R2	cgatcccaagcttcttctagatcgcttgccagtaactcac
check- <i>ygfYX</i> -F	ttgctctcgggtgtgcctaata
check- <i>ygfYX</i> -R	tcgctgcttagaactcgggtatc
pRE112-F	aatcgtgttgaggccaacgc
pRE112-R	ttcaggttcacatgccgtctg
pBBP1- <i>ygfY</i> -F	tttgagatagagtatctagattggagttaatgaatattgctcggg
pBBP1- <i>ygfY</i> -R	atcgaattcctgcagcccgggctaaaactatggcgccgctc
check-pBBP1-F	atgctctgctataggctctgtttg
check-pBBP1-R	gtgagcggataacaatttcacac
pRE- <i>sdh</i> -F1	tgaactgcatgaattcccgggctttacttcttctgctgcagct
pRE- <i>sdh</i> -R1	tcagcggaggctaaagatgaat
pRE- <i>sdh</i> -F2	tcattcttagcctccgctgagcagccagctcgtgaacat
pRE- <i>sdh</i> -R2	cgatcccaagcttcttctagagccgcccttagaataatccagat
check- <i>sdh</i> -F	ctggcaactctatcgagtcgt
check- <i>sdh</i> -R	cgcttcaggcgctctttaga
pKNT25- <i>ygfX</i> -F	gaccatgattacccaagcttggtcggttttgtgtttg
pKNT25- <i>ygfX</i> -R	ggatcccggggatcctctagagtaataccgagcacaccgattag
pKT25- <i>ygfX</i> -F	ggctgcagggtcgactctagaggctgtttgtgtttgtgttgc
pKT25- <i>ygfX</i> -R	ttagtacttaggtaccggggaatccgagcacaccgattag
pUT18- <i>mreB</i> -F	gaccatgattacccaagctgttcaagaagctgcgtggc
pUT18- <i>mreB</i> -R	ggatcccggggatcctctagagtttctcggaacagatcgc
pUT18C- <i>mreB</i> -F	ggaacgccactgcaggtcgactttcaagaagctgcgtggca
pUT18C- <i>mreB</i> -R	gagctcgggtaccggggatcctcggtttcttcggagaacagat
pUT18- <i>ftsZ</i> -F	gaccatgattacccaagcttggttgagatcatggacactcact
pUT18- <i>ftsZ</i> -R	ggatcccggggatcctctagagtgtcagcttgcttacgaaa
pUT18C- <i>ftsZ</i> -F	ggaacgccactgcaggtcgactttgagatcatggacactcact
pUT18C- <i>ftsZ</i> -R	gagctcgggtaccggggatcctcgctcagcttgcttacgcaa
pUT18- <i>ygfY</i> -F	gaccatgattacccaagcttggttgagttaatgaatattgctcgggt
pUT18- <i>ygfY</i> -R	ggatcccggggatcctctagagttggcgccgctcgtc
pUT18C- <i>ygfY</i> -F	ggaacgccactgcaggtcgactgagttaatgaatattgctcgggtc
pUT18C- <i>ygfY</i> -R	gagctcgggtaccggggatcctctggcgccgctcgt
check-pNT25-F	gcgcaacgcaattaatgtgag
check-pNT25-R	tggcgaaggaaaaaacgcc
check-pKT25-F	gtcaaggtgatcggcaatgc
check-pKT25-R	ggcgaagaactccagcatga

check-pUT18-F	agcgcaacgcaattaatgtga
check-pUT18-R	attttcgtcgtatcgccac
check- pUT18C-F	ggaaaagcctgttcgacgatg
check- pUT18C-R	cgcttacagacaagctgtgac
pET- <i>ygfY</i> -F	ctgccgcgcggcagccatatgttggagttaatgaatattgctcggg
pET- <i>ygfY</i> -R	gtgggtgggtgggtgctcgagctatggcgccgctcgtc
check- pET-F	catgagcccgaagtggcg
check- pET-R	agtgtagcggtcacgctg
pBAD- <i>ygfX</i> -F	gaattcaccatggtaccgggttggtcgttttgtgtgttc
pBAD- <i>ygfX</i> -R	tccgcaaaacagccaagcttcaaattcgagcacaccgattag
check-pBAD24-F	cactgcgtctttactggctc
check-pBAD24-R	gcgttcaccgacaaacaacag
RT-16S-F	gtattcaccgtggcattctgat
RT-16S-R	cgtgtcacaatggcgagtac
RT-0226-F	tcgtacatcggcgggtgaagg
RT-0226-R	taacacgaccaccacggatcaa
RT-0232-F	gtggcgggtggcgtaacttc
RT-0232-R	cgtaccagctcagacagaatgc
RT-0234-F	gcggatgggtgagcgtcgta
RT-0234-R	gcagtggcattgcgttacgg
RT-0240-F	cgccaagtgaacaccaatct
RT-0240-R	gcttcgtcatgtgcatggatct
RT-1357-F	cattcgtttagctcgtgggtggc
RT-1357-R	cgttacggctgtcagcaacaa
RT-4247-F	gcaagaagccgatggttggtaa
RT-4247-R	ggcacgaagttcagcaacaaca
RT-3980-F	gtcctgacgtgcctcgctta
RT-3980-R	ccaccttcgcccacttacct

Table S3. Genes differentially expressed and discussed in this study.

Locus tag	Gene	Log ₂ FC ^a
Translation		
SO_0220	<i>rplK</i>	-1.942166546
SO_0221	<i>rplA</i>	-2.049792715
SO_0222	<i>rplJ</i>	-1.600958625
SO_0223	<i>rplL</i>	-1.028621152
SO_0226	<i>rpsL</i>	-3.517487594
SO_0227	<i>rpsG</i>	-1.792918536
SO_0230	<i>rpsJ</i>	-2.190586402
SO_0231	<i>rplC</i>	-1.590129805
SO_0232	<i>rplD</i>	-3.436693728
SO_0233	<i>rplW</i>	-0.904612056
SO_0234	<i>rplB</i>	-2.885597056
SO_0235	<i>rpsS</i>	-0.151719993
SO_0236	<i>rplV</i>	-1.319492831
SO_0237	<i>rpsC</i>	-1.800592037
SO_0238	<i>rplP</i>	-2.052906829
SO_0239	<i>rpmC</i>	-2.072734307
SO_0240	<i>rpsQ</i>	-3.669224847
SO_0241	<i>rplN</i>	-1.837570793
SO_0242	<i>rplX</i>	-0.655077486
SO_0243	<i>rplE</i>	-0.799852018
SO_0244	<i>rpsN</i>	-1.217068952
SO_0245	<i>rpsH</i>	-1.435998834
SO_0255	<i>rpsD</i>	-0.124712594
SO_0257	<i>rplQ</i>	-2.786801737
SO_0007	<i>rpmH</i>	-2.222923507
SO_1207	<i>rpsO</i>	-0.988565105
SO_1357	<i>rpsP</i>	-3.457547484
SO_1360	<i>rplS</i>	-2.083647562
SO_1629	<i>rpsB</i>	-0.054292953
SO_2301	<i>rpmI</i>	-2.931052646
SO_2302	<i>rplT</i>	-2.540746334
SO_2402	<i>rpsA</i>	-0.775620622
SO_2780	<i>rpmF</i>	-Inf
SO_2112	<i>rplY</i>	-3.661559819
SO_3651	<i>rpmA</i>	-2.765186899
SO_3652	<i>rplU</i>	-2.443500718
SO_3927	<i>rplI</i>	-2.322583716
SO_3928	<i>rpsR</i>	-0.697311358
SO_3930	<i>rpsF</i>	-1.486817506
SO_3537	<i>rpsT</i>	-1.644519769
SO_3939	<i>rpsI</i>	-1.281579528
SO_3940	<i>rplM</i>	-1.86936537
SO_4120	<i>rpmE</i>	-2.567067813
SO_4246	<i>rpmG</i>	-3.660546991
SO_4247	<i>rpmB</i>	-3.679349642
SO_0228	<i>fusA</i>	-1.617400249
SO_0229	<i>tufa</i>	-1.26182418
SO_1630	<i>Tsf</i>	-1.035723907
SO_1204	<i>infB</i>	-2.025350479

Transcription		
SO_0224	<i>rpoB</i>	-1.295594742
SO_0225	<i>rpoA</i>	-1.791716277
SO_0256	<i>rpoC</i>	-1.375418571
SO_0360	<i>rpoZ</i>	-2.268383885
SO_1191	<i>greA</i>	-1.592524
SO_1342	<i>rpoE</i>	0.736553
SO_3210	<i>fliA</i>	0.2519989
SO_3551	<i>rpoD</i>	1.0957651
SO_3432	<i>rpoS</i>	1.8089838
SO_4583	<i>rpoH</i>	-0.244422251
Cell wall synthesis and cell division		
SO_4217	<i>ftsQ</i>	-1.275213
SO_4218	<i>murC</i>	-1.642149
SO_4219	<i>murG</i>	-1.727472
SO_4220	<i>ftsW</i>	-2.281396
SO_4221	<i>murD</i>	-1.764096
SO_4222	<i>mraY</i>	-1.344993
SO_4225	<i>ftsI</i>	-1.274609
Nitrite reduction		
SO_0045	<i>nsrR</i>	-1.435095152
SO_3980	<i>nrfA</i>	-1.193113409

^a, FC indicates fold change of transcription in $\Delta ygfY$ compared with wild-type.

Figure S1

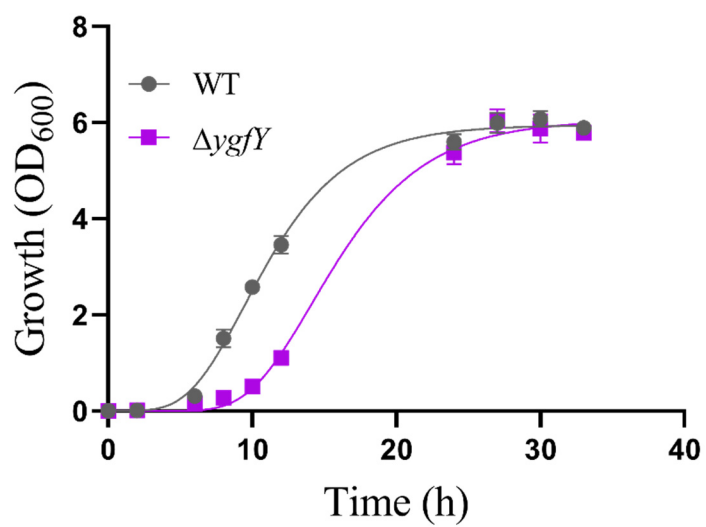


Figure S1. Growth of *ygfY* mutant and wild-type strains at 30 °C. The data are the mean \pm SD ($n = 3$).

Figure S2

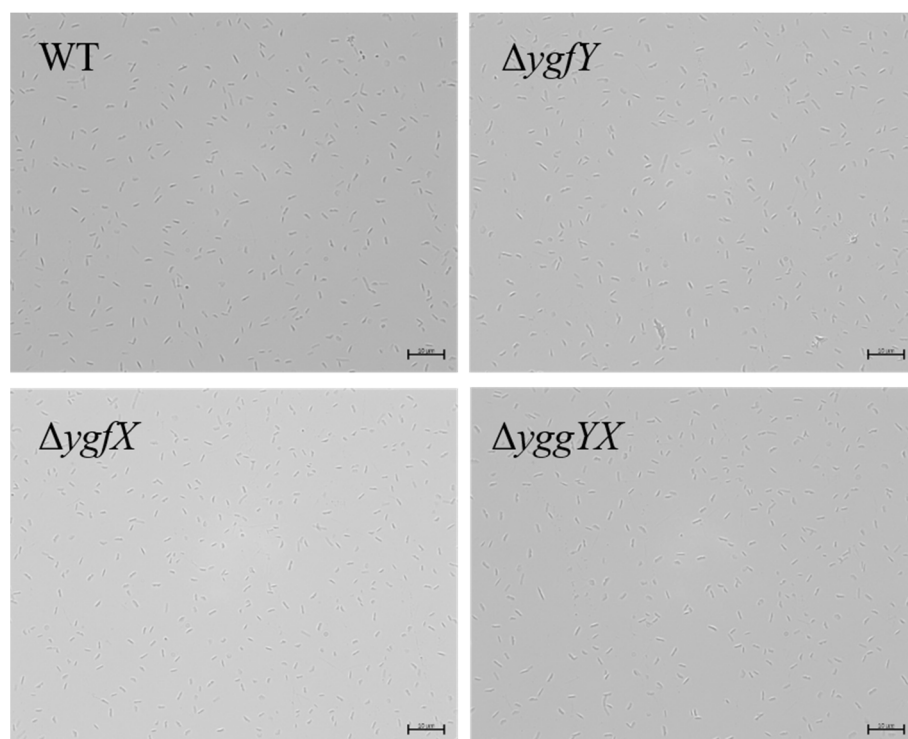


Figure S2. Cell morphology of $\Delta ygfY$, $\Delta ygfX$, $\Delta ygfYX$ and WT. Strains were cultured in LB at 16 °C for 48 h and subjected to observation under a microscope.

Figure S3

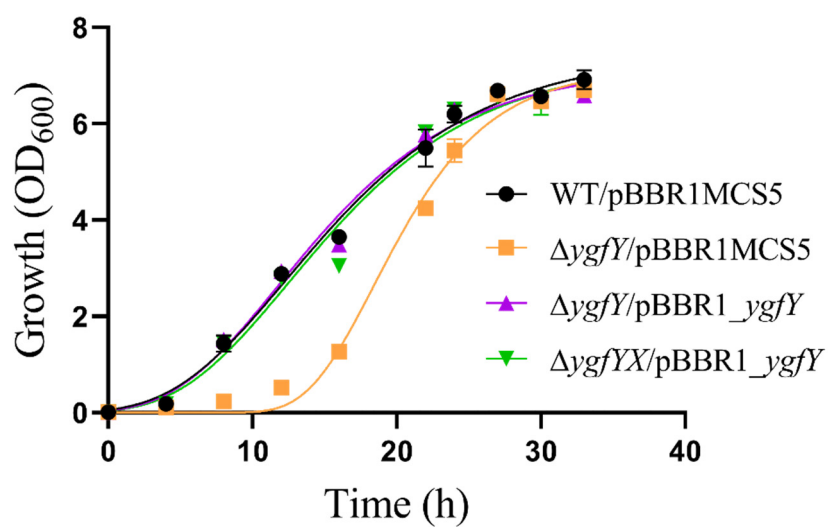


Figure S3. YgfY expressed from its native promoter reversed the growth defect of $\Delta ygfY$. Region containing *ygfY* coding sequence and 285 bp upstream was cloned into pBBP1MCS5 to express *ygfY* from its native promoter. Resulted plasmid pBBR1_ygfY was then transformed into strains of *Shewanella*. Strains transformed with the empty vector pBBP1MCS5 were set as controls. The data are the mean \pm SD ($n = 3$).

Figure S4



Figure S4. Expression of YgfY and YgfY^{G16R/E19A}. YgfY and YgfY^{G16R/E19A} were fused with GST, and were expressed in $\Delta ygfY$ using pBBP1. Strains were cultured at 16 °C for 48 h, and collected for the analysis of western blotting. Blank control indicated sample of $\Delta ygfY$ /pBBP1.