

Table S1 The primers of site-directed mutagenesis

	Primer name	Primer sequence (5'-3')
YjiC-mut	YjiC-H16A-F	GTACGGAG <u>CAG</u> TCAATCCTACGCTTGCTTTAGTAG A
	YjiC-H16A-R	GATTGACT <u>TG</u> CTCCGTACGCCGGGATATTG
	YjiC-D106A-F	ATG <u>CAT</u> TTTGTTCGCTGGCTGGT
	YjiC-D106A-R	CCAGCGCAACAAAT <u>TG</u> CATAGATGATCAGATCAGG CTGATCA
	YjiC-S277A-F	ACCATTTCGCCAAG <u>CAG</u> TGCCGCAGCTTGAGGTG
	YjiC-S277A-R	ACT <u>TG</u> CTTGCGGAATGGTAAAGTTAGCA
	YjiC-Q280A-F	AAAGTGTGCCG <u>GCA</u> CTTGAGGTGTTAGAGAAAGC TGATTT
	YjiC-Q280A-R	AAGT <u>TGCC</u> GGCACACTTTGGCGAAT
	YjiC-H293A-F	TTG <u>CAC</u> ATCTCTCATGGCGGGATGA
	YjiC-H293A-R	GCCATGAGAGATGT <u>TG</u> CAAATCAGCTTTCTCTAAC ACCTCA
	YjiC-S298A-F	GATGAAC <u>GCA</u> ACGATGGAAGCGATGAACGC
	YjiC-S298A-R	CCATCGT <u>TG</u> CGTTCATCCCGCCATGAGAGA
	YjiC-E317A-F	ATGTATG <u>CAC</u> AGGAGCTCACTGCAAATCGG
	YjiC-E317A-R	GAGCTCCTGT <u>TG</u> CATACATTTGCGGAATGACGAC
	YjiC-Q318A-F	GTATGAGG <u>CAG</u> AGCTCACTGCAAATCGGGT
	YjiC-Q318A-R	TGAGCTCT <u>TGC</u> CTCATACATTTGCGGAATGACG
YojK-mut	Yojk-H14A-F	GAAGGGG <u>GCA</u> ATTAATCCCTCTATCGGTGTGATGA
	Yojk-H14A-R	GGATTAATT <u>TGCC</u> CTTCACCGGGGAAACC
	Yojk-D107A-F	ATG <u>CAC</u> ACCATCTTCTCGCGGGTAA
	Yojk-D107A-R	CGAGAAGATGGTGT <u>TG</u> CATATATGACATAATCATA CGATTCATGTT
	Yojk-Y288A-F	ATTGTACGCCCCG <u>GCA</u> GTCCCTCAGCTTGAGATCTT GAA
	Yojk-Y288A-R	ACT <u>TGCC</u> GGGCGTACAATGAAATTCTCC
	Yojk-Q291A-F	TGTCCCT <u>TGCA</u> CTTGAGATCTTGAAAAGAGCCAGC
	Yojk-Q291A-R	TCTCAAGT <u>TG</u> CAGGGACATACGGGCGTACAA
	YojK-H304A-F	TATTTGTGACC <u>GCA</u> GGCGGAATGAACAGCACAAG
	YojK-H304A-R	GCCT <u>TGC</u> GGTCACAAATAAGCTGGCTCTTTT
	YojK-S309A-F	GGAATGAAC <u>GCA</u> ACAAGTGAAGGTTTGTATTTG AAACC
	YojK-S309A-R	CTTGTT <u>TGC</u> GTTTCATTCCGCCGTGGGT
	Yojk-D328A-F	GGAGGCG <u>CA</u> CAATTTGTTGTTCGCAGATCAGG
	Yojk-D328A-R	AACAAATTGT <u>TG</u> CGCCTCCCATCGGAATGA
	Yojk-Q329A-F	AGGCGAC <u>GCA</u> TTTGTGTTGTTCGCAGATCAGGTAGA
	Yojk-Q329A-R	ACAACAAAT <u>TGC</u> GTCGCCTCCCATCGGAAT

UGT109	UGT109A3-	GTACGGT <u>GC</u> AGTCAACCCTACGCTTGCTTTAGT
A3-mut	H16A-F	
	UGT109A3-	GGTTGACT <u>GA</u> ACCGTACGCCGGGATATTG
	H16A-R	
	UGT109A3-	TCTATG <u>CA</u> TTTGTCTGCGCTGGCTGGA
	D106A-F	
	UGT109A3-	GCGCGACAAAT <u>TG</u> CATAGATGATCAGATCAGGCTG
	D106A-R	ATCA
	UGT109A3-	ACCATTTCGCCAA <u>GCA</u> GTGCCCCAGCTTGAGGTGT
	S277A-F	
	UGT109A3-	ACT <u>TGCT</u> TGGCGAATGGTAAAGTGAGC
	S277A-R	
	UGT109A3-	CC <u>GCA</u> CTTGAGGTGTTAGAGAAAGCTGATTT
	Q280A-F	
	UGT109A3-	TAACACCTCAAGT <u>TGC</u> GGGCACGCTTTGGCGAAT
	Q280A-R	
	UGT109A3-	TTGTTTCATCTCC <u>GCA</u> GGCGGGATGAACAGTACGA
	H293A-F	TG
	UGT109A3-	CCT <u>TGCG</u> GAGATGAACAAATCAGCTTTCTCT
	H293A-R	
	UGT109A3-	GATGAAC <u>GCA</u> ACGATGGAAGCGATGAATGC
	S298A-F	
	UGT109A3-	CCATCGTT <u>TGCG</u> TTCATCCCGCCATGGGA
	S298A-R	
	UGT109A3-	AATGTAT <u>GCA</u> CAGGAGCTCACCGCAAAGC
	E317A-F	
	UGT109A3-	GCTCCTGT <u>TGC</u> ATACATTTGCGGAATGACGACA
	E317A-R	
	UGT109A3-	GTATGAG <u>GCA</u> GAGCTCACCGCAAAGCGTG
	Q318A-F	
	UGT109A3-	TGAGCTCT <u>TGC</u> CTCATACATTTGCGGAATGACG
	Q318A-R	

Note: Underlined base pairs indicate mutation sites.