

Supporting Information

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Table S1. Primers used in this study

Purpose	Primer	Primer sequence
Creation of $\Delta upaZ$	Left flank forward	TCCAGGATCCGGGAATGCTTTACTACATTGACCT
	Left flank reverse	ATACACGCGTTGCAGATTTTGGACTTGATTGACATA
	Right flank forward	CCTAACGCGTGCACAATGGAAGATAATCGGTATCC
Creation of $\Delta upeZ$	Left flank forward	TCTAGGATCCAGGATAAAAAGGGTCCACTACCATCT
	Left flank reverse	TTCGGGATCCTTATGCTTCATTAGAGGAACAGCTT
	Right flank forward	ATGAACGCGTCTCATGAATCTGGGTCATAAGAGTA
Creation of $\Delta uphZ$	Right flank reverse	CAGAACGCGTCTTTATCGATAGATGAGCAGGAGAC
	Left flank forward	TTGGGGATCCTAATTATCTCGCTCTGTGAATGGTT
	Left flank reverse	TTTCGGATCCCTTCCGTATATTTTCATCAGCCTTT
Creation of $\Delta pupaZ$	Right flank forward	AAGACATATGTTGTACAAAGCGGTAATTTGAGAA
	Right flank reverse	TATTCATATGCGCAGTCTTGAAGAGAATCCTTAT
	Right flank reverse	CCTAGGATCCACAATGAATTTCTTCTCAAATCC
Creation of $pupaZ$	Forward	ATGCGGATCCCGTATTCTTTCAGCGTAATTCGTA
	Reverse	AAAAGGATCCAAGAAGGTAGAAAAATTCATCCTAAAAA
Creation of $pupbZ$	Forward	ATTGGGATCCAGCGTCAAAGTTCCTAAAAGTTA
	Reverse	GAAAGGATCCGCATAGAGAGCCAAAACGTAAG
Creation of $pupcZ$	Forward	TTTCGGATCCCGACGAATCATAATTCATTCCTTT
	Reverse	CTTTGGATCCCCACCTGCTAAAAACAATACCTTTC
Creation of $pupdZ$	Forward	AAATGGATCCGTGGTGCATATTCGAATACGTA
	Reverse	TCTAGGATCCACCTAAAACATGTAGAACAACAATCT
Creation of $pupeZ$	Forward	ATAAGGATCCATTCTCGCACCGTAATCAGTAATA
	Reverse	AGTTGGATCCAAAAATACACGCTTTTCATTTTGA
Creation of $pupfZ$	Forward	CAATGGATCCCGAACCTGTCATCGAAAAAATAAC
	Reverse	TAACGGATCCGCCAAGACAATACCTTTCATCAAT
Creation of $pupgZ$	Forward	GATAGGATCCGCCACTATTACCCTGATCTTATAG
	Reverse	AACCGGATCCGCATATTATCTTTCGTTTCATCCAA
Creation of $puphZ$	Forward	AAAAGGATCCCGCTCGATCTTTAAACAGTAAAA
	Reverse	AAAAGGATCCACAGTGTGTGTCGAAAAAGAAAA
PSG promoter orientation	PSG-promF	TTTGCTTGTGTCCGTTTTG
	PSG-promR	TCGAAGTCACCACCTGTAATAC
$xylE$ probe	Forward	CAGCTGCGTGTACTGGACAT
	Reverse	ACGGTCATGAATCGTTCGTT
$upaY$ probe	Forward	CCGAAAGTAACCTCTCGACTTTTA
	Reverse	TGCAGATTTTGGACTTGATTCATA
$upeY$ probe	Forward	AAATCACTCAGGAATATATCCTTCTAAATG
	Reverse	TATTACTGATTACGGTGCGAGAAT
$upcY$ probe	Forward	TTGGAGACAACAGATAGCGATAAAC
	Reverse	TTTTTATTTCTTTCCGGACGTA
High expression promoter	Forward	AGATAGATCTCAGCATCATGAAGAAGATAAAAATAGA
	Reverse	AACAGGATCCAACGTTCTGTTCAATGGAACAA
pMCL115	$upeY$ forward	GTAAGGATCCAAATCACTCAGGAATATATCCTTCTAAATG
	$upeY$ reverse	TTACACGCGTACGCACCCCGTATTCATT
	$upaY$ forward	CATAACGCGTCTTTATTATATGAAGGATCTCTATACCCATAC
	$upaY$ reverse	ATACGGATCCTGCAGATTTTGGACTTGATTGACATA
pMCL116	BamHI deletion forward	CCAATGAATACGGGGTGCCTTTATTATATGAAGGATCTC
	BamHI deletion reverse	GAGATCCTTCATATAATAAAGACGCACCCCGTATTCATTGG
	$upaY$ forward2	ATTTGGATCCCGAAAGTAACCTCTCGACTTTTA
	Hybrid reverse	TTACACGCGTACGCACCCCGTATTCATT
	$upeY$ forward2	CACAACGCGTCTTTTCTATATGCGTGATTTTGACAC
	$upeY$ reverse2	TAAGGGATCCTATTACTGATTACGGTGCGAGAAT
BamHI deletion forward2	BamHI deletion forward2	CAATGAATACGGGGTGCCTTTTCTATATGCGTGATT
	BamHI deletion reverse2	AATCACGCATATAGAAAAGACGCACCCCGTATTCATTG

Restriction sites are underlined.