

Simulation parameters for Fig. 5 (including Figure supplement)

Parameter	Value	Note
Stall site identity	CTA, CTC, CTT, TCG	
Stall site locations (codon number along <i>yfp</i>)	15 (2), 46 (6), 68 (10), 141 (14), 201 (18)	Different combinations of these sites were chosen as indicated along X-axis.
tRNA accommodation rate at CTA68 (TJ model)	0.0617s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA141 (TJ model)	0.1s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA201 (TJ model)	0.0876s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA15 (TJ model)	0.0567s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA46 (TJ model)	0.0837s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC68 (TJ model)	0.267s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC141 (TJ model)	0.286s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC201 (TJ model)	0.284s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC15 (TJ model)	0.137s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC46 (TJ model)	0.205s ⁻¹	Fit from experiment
tRNA accommodation rate at CTT68 (TJ model)	0.139s ⁻¹	Fit from experiment
tRNA accommodation rate at CTT141 (TJ model)	0.27s ⁻¹	Fit from experiment
tRNA accommodation rate at CTT201 (TJ model)	0.246s ⁻¹	Fit from experiment
tRNA accommodation rate at CTT15 (TJ model)	0.125s ⁻¹	Fit from experiment
tRNA accommodation rate at CTT46 (TJ model)	0.172s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA68 (SAT model)	0.26s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA141 (SAT model)	0.513s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA201 (SAT model)	0.404s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA15 (SAT model)	0.266s ⁻¹	Fit from experiment
tRNA accommodation rate at CTA46 (SAT model)	0.376s ⁻¹	Fit from experiment
tRNA accommodation rate at CTC68 (SAT model)	3.06s ⁻¹	Fit from experiment

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Parameter	Value	Note
tRNA accommodation rate at CTC141 (SAT model)	$4.4s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC201 (SAT model)	$4.6s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC15 (SAT model)	$0.764s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC46 (SAT model)	$1.59s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT68 (SAT model)	$0.777s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT141 (SAT model)	$3.94s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT201 (SAT model)	$2.85s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT15 (SAT model)	$0.649s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT46 (SAT model)	$1.09s^{-1}$	Fit from experiment
tRNA accommodation rate at CTA68 (CSAT model)	$0.0769s^{-1}$	Fit from experiment
tRNA accommodation rate at CTA141 (CSAT model)	$0.147s^{-1}$	Fit from experiment
tRNA accommodation rate at CTA201 (CSAT model)	$0.123s^{-1}$	Fit from experiment
tRNA accommodation rate at CTA15 (CSAT model)	$0.0726s^{-1}$	Fit from experiment
tRNA accommodation rate at CTA46 (CSAT model)	$0.113s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC68 (CSAT model)	$0.6s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC141 (CSAT model)	$0.817s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC201 (CSAT model)	$0.754s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC15 (CSAT model)	$0.193s^{-1}$	Fit from experiment
tRNA accommodation rate at CTC46 (CSAT model)	$0.379s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT68 (CSAT model)	$0.213s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT141 (CSAT model)	$0.69s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT201 (CSAT model)	$0.582s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT15 (CSAT model)	$0.171s^{-1}$	Fit from experiment
tRNA accommodation rate at CTT46 (CSAT model)	$0.285s^{-1}$	Fit from experiment

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Parameter		Value	Note
tRNA accommodation rate at TCG28 (TJ model)		0.263s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG30 (TJ model)		0.266s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG86 (TJ model)		0.281s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG147 (TJ model)		0.273s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG202 (TJ model)		0.252s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG205 (TJ model)		0.29s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG28 (CSAT model)		0.488s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG30 (CSAT model)		0.509s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG86 (CSAT model)		0.725s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG147 (CSAT model)		0.767s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG202 (CSAT model)		0.601s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG205 (CSAT model)		0.935s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG28 (SAT model)		2.19s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG30 (SAT model)		2.13s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG86 (SAT model)		3.82s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG147 (SAT model)		4.59s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG202 (SAT model)		3.22s ⁻¹	Fit from experiment
tRNA accommodation rate at TCG205 (SAT model)		5.15s ⁻¹	Fit from experiment

All other parameters have values shown in Supplementary File 6.