

Phospho-signaling couples polar asymmetry and proteolysis within a membraneless microdomain in *Caulobacter crescentus*.

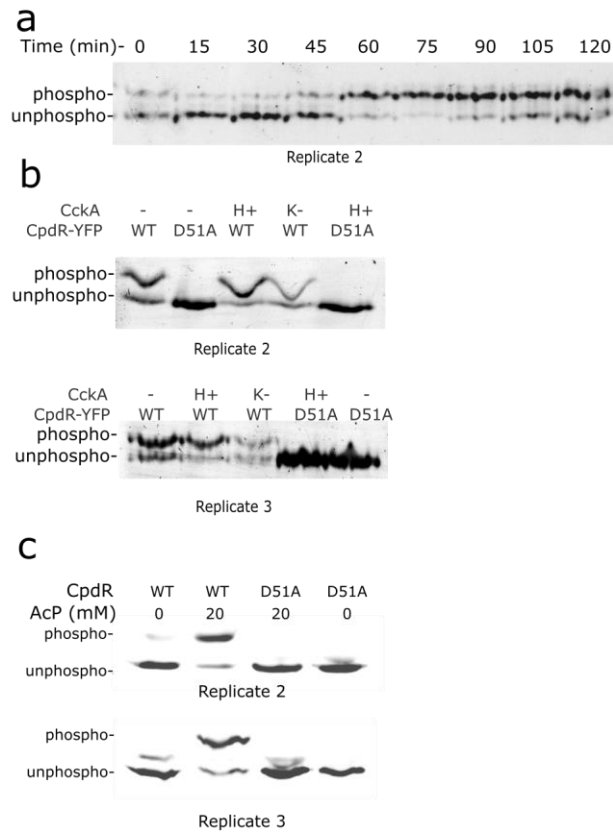
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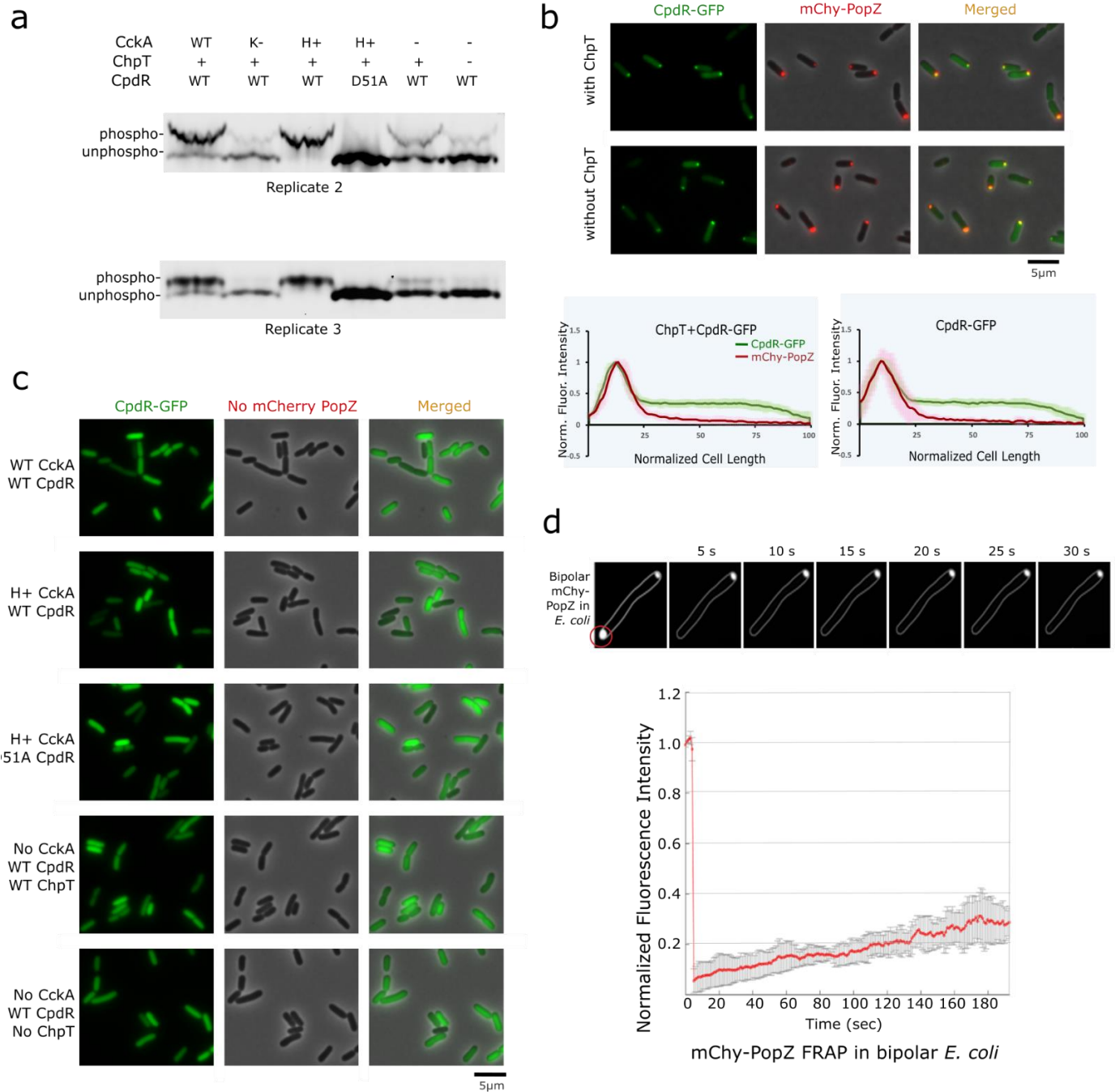
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Supplementary Figures



Supplementary Fig. 1 | Phos-tag gel replicates for *C. crescentus* and *in vitro* experiments.

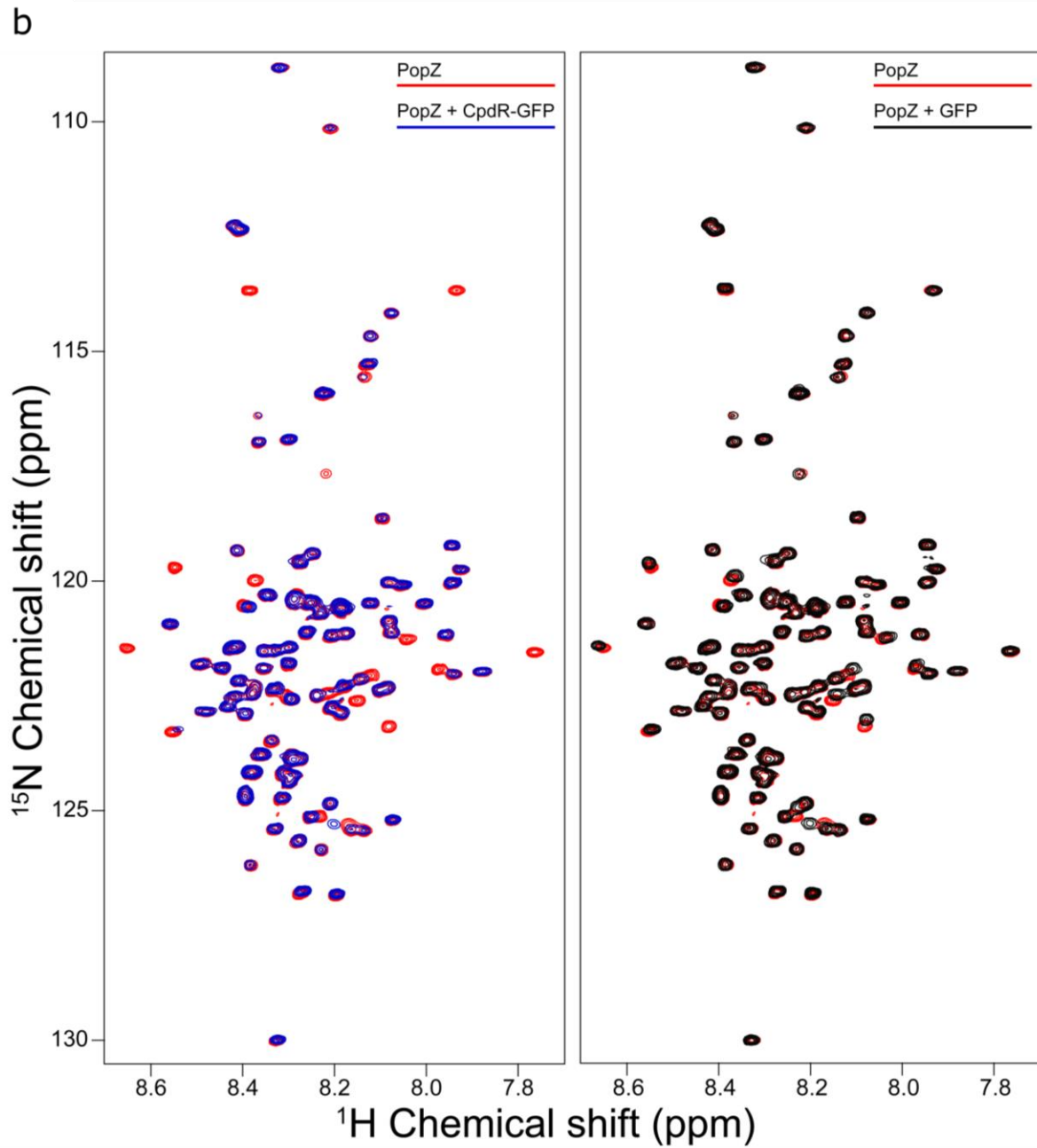
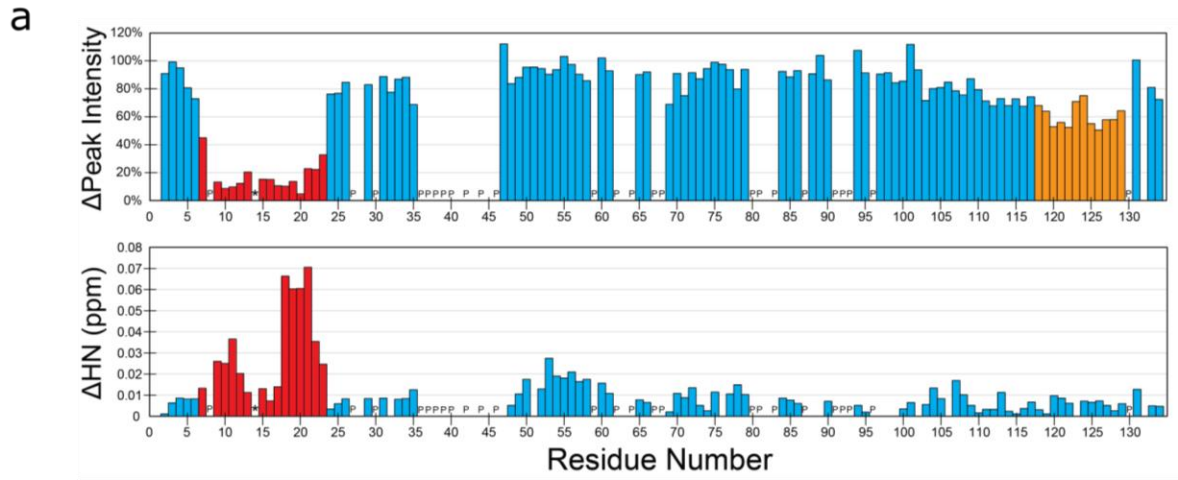
a, Additional replicate for Fig. 1c. **b**, Additional replicates for Fig. 1f. **c**, Additional replicates for Fig. 3c. Source data are provided as a Source Data file.



Supplementary Fig. 2 | Protein localization and dynamics in *E. coli*.

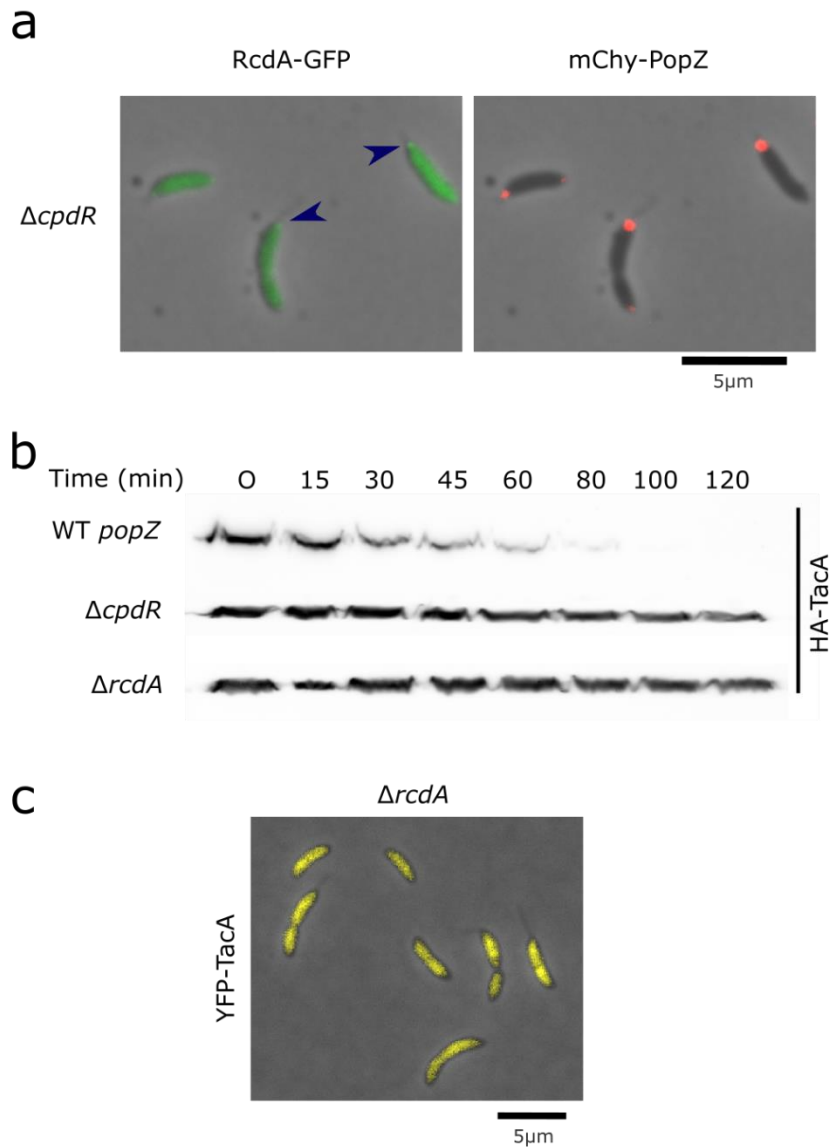
a, Additional replicates for Fig. 2b. **b**, *E. coli* co-expression assay, with mChy-PopZ and CpdR-GFP expressed in the presence or absence of the intermediary phosphotransferase ChpT. mChy-PopZ and CpdR-GFP were observed by microscopy and normalized fluorescence intensities were plotted against cell length (graphs). **c**, *E. coli* co-expression assay, with different CckA, ChpT and

CpdR-GFP variants expressed in absence of mChy-PopZ. Images were taken in mChy and GFP channel. **d**, FRAP analysis of mChy-PopZ in *E. coli* cells with bipolar foci. Recovery of fluorescence was plotted against time in seconds. Source data are provided as a Source Data file.



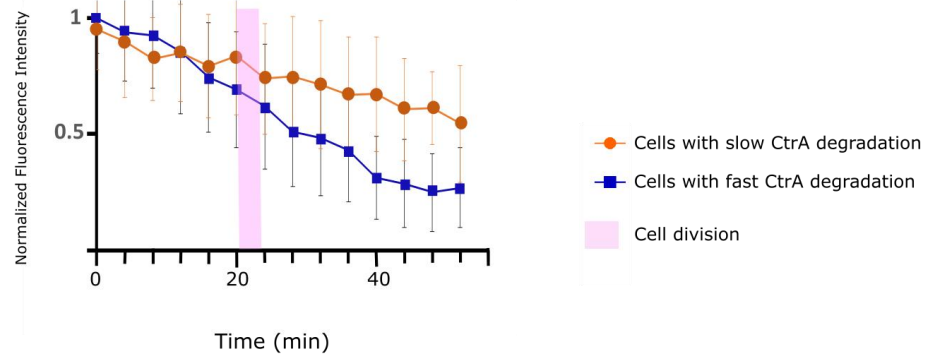
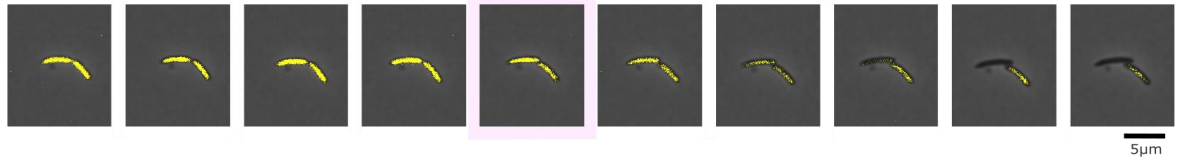
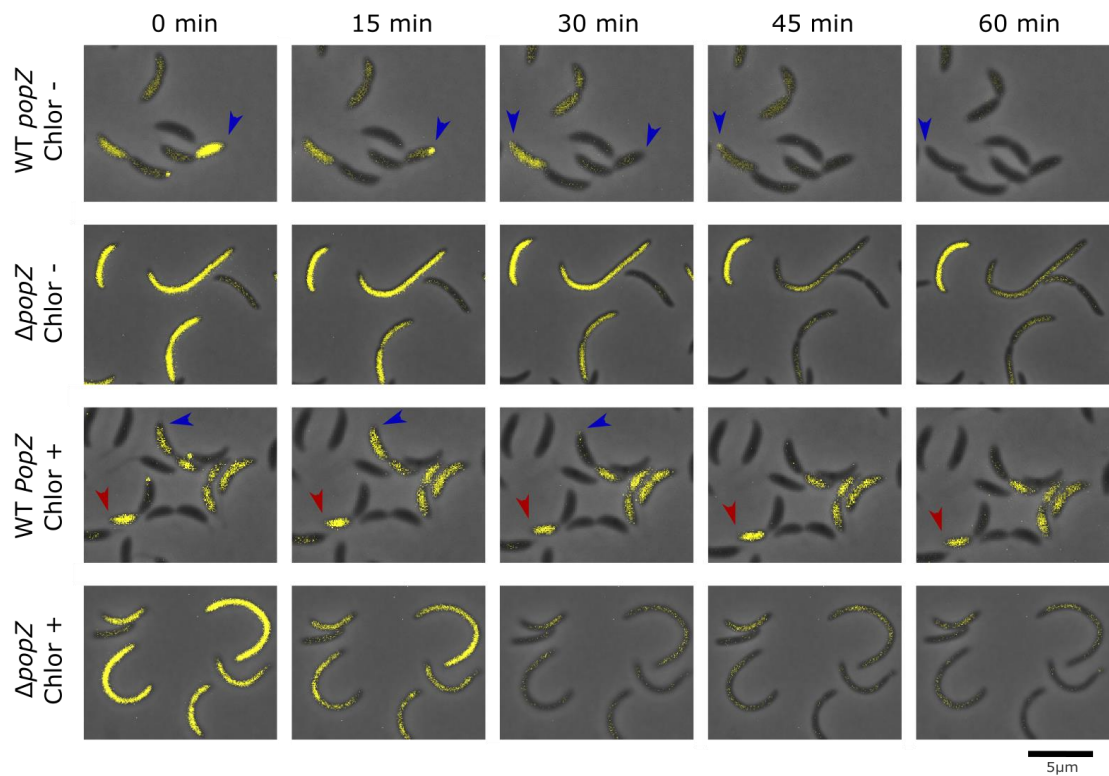
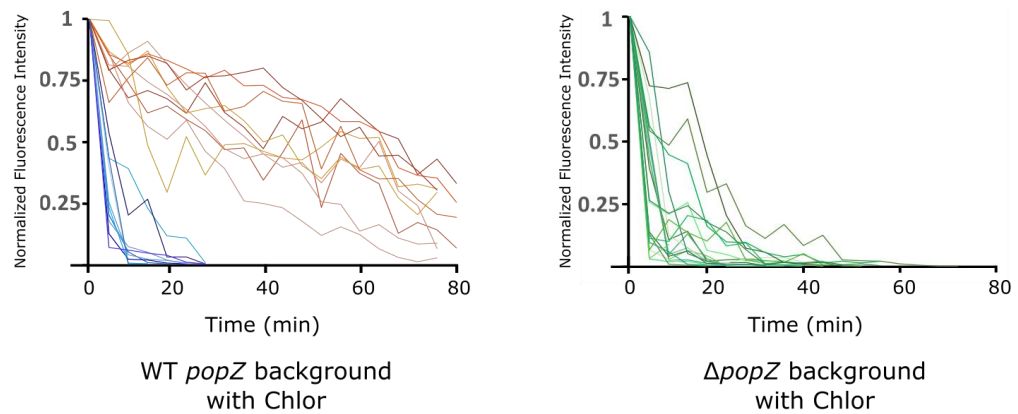
Supplementary Fig. 3 | Chemical shift perturbations of PopZ $\Delta^{134-177}$ upon binding to CpdR-GFP.

a, Top graph: Signal attenuation resulting from the addition of 750 μM CpdR-GFP to 50 μM PopZ $\Delta^{134-177}$. The changes in peak intensities were calculated as percentages relative to the peak intensities at the 0 μM CpdR-GFP titration point (i.e., PopZ $\Delta^{134-177}$ peak intensity in the absence of binding protein). Bottom graph: ΔHN combined chemical shift perturbations of PopZ $\Delta^{134-177}$ (50 μM) upon binding to 750 μM CpdR-GFP as calculated by Equation 1. The most pronounced shifts, indicated in red, align well with the previously determined binding region of PopZ $\Delta^{134-177}$. A potential secondary weak binding region is highlighted in orange in the top spectrum, where the peak intensity attenuation slightly exceeded one standard deviation, however no significant ΔHN was observed for these residues. Note that Pro residues cannot be observed in ^1H - ^{15}N HSQC spectra and are indicated with a "P" on the x-axis in both graphs. A few other resonances were either overlapped (indicated with an asterisk), could not be assigned, or were missing under the buffer conditions. **b**, Left panel: ^1H - ^{15}N TROSY-HSQC NMR spectra overlay of 50 μM ^{15}N -enriched PopZ $\Delta^{134-177}$ with and without its binding partner, CpdR-GFP: PopZ $\Delta^{134-177}$ only (i.e., 0 μM CpdR-GFP) (red spectrum) and PopZ $\Delta^{134-177}$ with 750 μM CpdR-GFP (blue spectrum). Right panel: In a control experiment, 750 μM GFP was added to PopZ $\Delta^{134-177}$ (black spectrum) and overlaid with PopZ $\Delta^{134-177}$ spectrum (i.e., no binding partner, red spectrum). While PopZ $\Delta^{134-177}$ exhibits large chemical shift perturbations for selected residues upon the addition of CpdR-GFP, only minor changes were observed in the spectrum upon the addition of the same concentration of GFP, indicating that CpdR is the primary binding partner of PopZ $\Delta^{134-177}$.



Supplementary Fig. 4 | TacA requires CpdR and RcdA adaptors for proteolysis and polar localization.

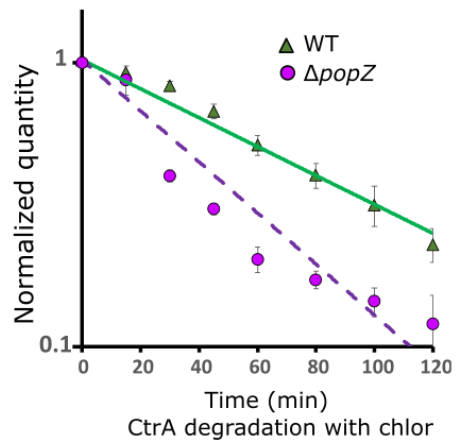
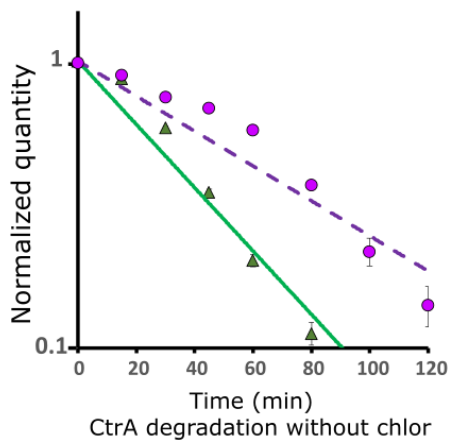
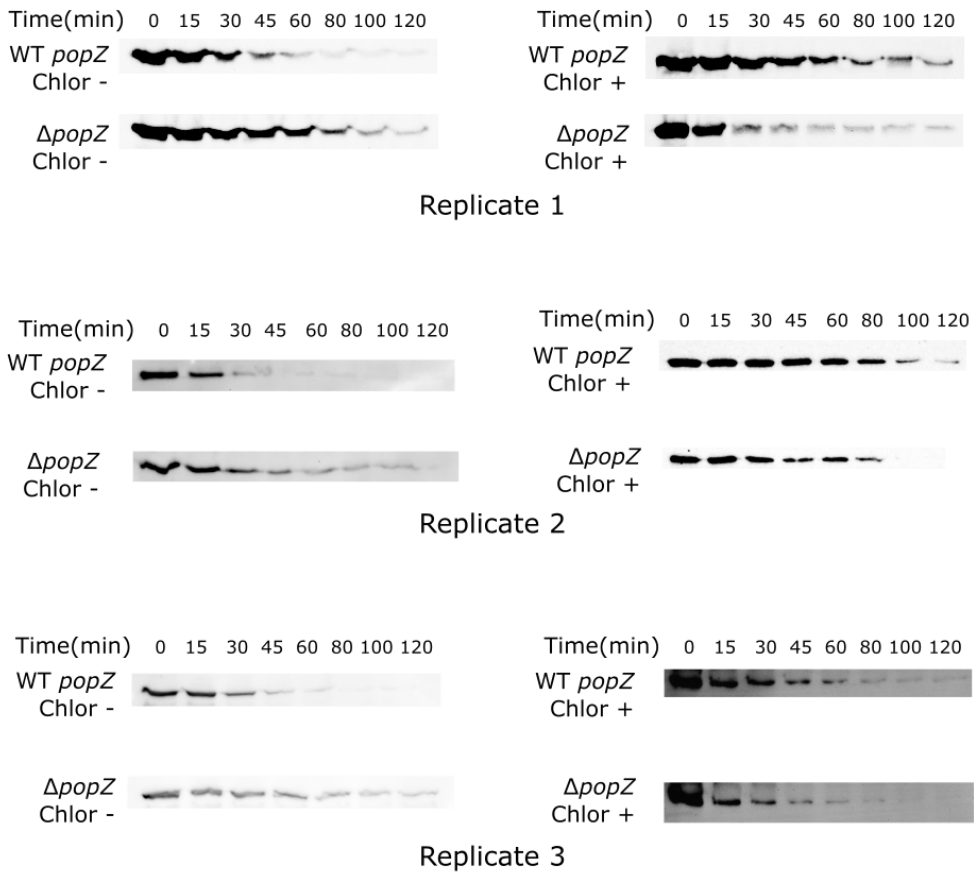
a, Faint foci of RcdA-GFP in $\Delta cpdR$ strain (arrowheads) are difficult to discern and quantify. **b**, Degradation of HA-TacA following inducer wash-out in $\Delta popZ$, $\Delta cpdR$, and $\Delta rcdA$ *C. crescentus* strain backgrounds, observed by western blotting with α -HA antibody. **c**, YFP-TacA localization in $\Delta rcdA$ *C. crescentus* strain background. Source data are provided as a Source Data file.

aYFP-CtrA RD+15
in $\Delta popZ$ background**b****c**

Supplementary Fig. 5 | Substrate degradation in individual cells, in the presence and absence of chloramphenicol.

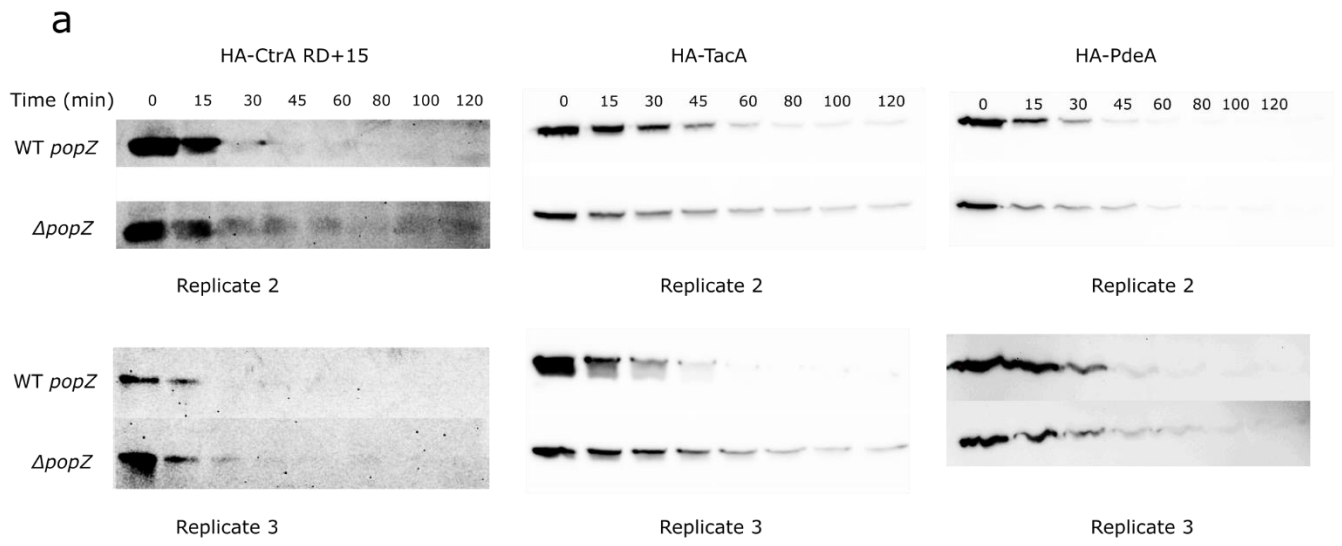
a, Time-lapse images of YFP-tagged substrate localization in a $\Delta popZ$ *C. crescentus* background, at 4 minute intervals. Pink bar indicates the time of cell separation. After accounting for photobleaching and temporally aligning the cells with respect to the time of cell separation (n=20), average fluorescence intensities for the faster and slower YFP-CtrA RD+15 degrading cells, normalized to maximum fluorescence intensity, were plotted against time (line graphs, bar = standard deviation). **b**, YFP-CtrA RD+15 distribution in WT and $\Delta popZ$ *C. crescentus* stain backgrounds with and without chloramphenicol (chlor) treatment. Blue arrowheads mark cells that exhibit YFP-CtrA RD+15 polar foci and degradation. Red arrows mark cells that do not exhibit YFP-CtrA RD+15 polar foci or degradation. **c**, Average YFP fluorescence intensities of different cell bodies at 4 minute intervals, normalized to maximum fluorescence intensity, were plotted against time (line graphs), after accounting for photobleaching. Blue lines trace fluorescence intensity in WT cells that exhibit polar YFP foci during degradation (n=10), orange lines trace fluorescence intensity in WT cells that do not exhibit polar foci (n=10), and green lines trace fluorescence intensity in $\Delta popZ$ cells (n=20). Source data are provided as a Source Data file.

a



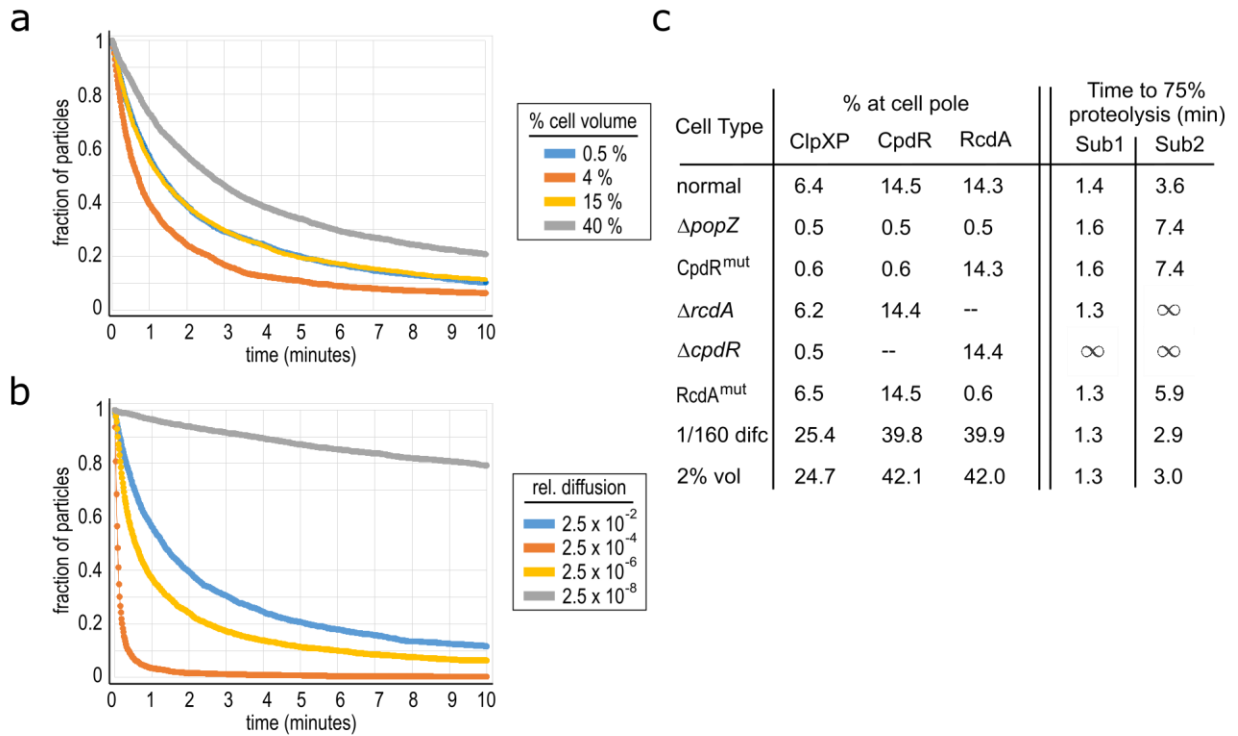
Supplementary Fig. 6 | Substrate degradation at the population level, in the presence and absence of chloramphenicol.

a, Degradation of YFP-CtrA RD+15 following inducer wash-out in wildtype and $\Delta popZ$ strain backgrounds in the presence or absence of chloramphenicol treatment. Western blotting was performed with α -GFP antibody (GeneTex GTX113617) at 1:3000. Three replicates are presented, and the average band intensities are plotted against time (bar=standard deviation). Source data are provided as a Source Data file.



Supplementary Fig. 7 | Degradation of HA-tagged proteolysis substrates following inducer wash-out.

a, Additional replicates for Fig. 5c. Source data are provided as a Source Data file. Source data are provided as a Source Data file.



Supplementary Fig. 8 | Conceptual models of substrate proteolysis in polar microdomains.

a-b, Three-dimensional reaction-diffusion simulations, as shown in Fig. 5a-b, except using different parameters. **a**, Cells with different sizes of polar microdomains, expressed as a percentage of total cell volume. 0.5% approximates the physiological size of PopZ microdomains in *C. crescentus*. At extremely large microdomain volumes, the reaction slows because particles are less concentrated in a large compartment with a relatively slow particle diffusion rate. **b**, Cells with polar microdomains that have different particle diffusion rates. 2.5×10^{-2} (or 1/40) approximates the physiological difference in protein diffusion rates in PopZ microdomains versus bulk cytoplasm in *C. crescentus*. Up to a point, slower diffusion rates lead to higher particle concentration and faster reaction rates. However, when particle diffusion in polar microdomains is extremely slow, most particles become stuck just below the microdomain surface and their collision frequency is low. **c**, Performance of the *C. crescentus* substrate proteolysis model, presented in Fig. 5c, under different conditions. The chart columns show the polar concentration of ClpXP, CpdR, and RcdA, expressed as the average percentage of total particles in polar microdomains over the course of the simulation, and the time needed to degrade 50% of substrates Sub1 and Sub2. “Normal” reports on a simulation that includes all components, with microdomain size, diffusion rates, and binding affinities at baseline values that approximate physiological conditions. $\Delta popZ$, $\Delta cpdR$, $\Delta rcdA$, report on

simulations run in the absence of these components. CpdR^{mut} and RcdA^{mut} report on the effects of selectively removing the interaction between the indicated adaptor protein and PopZ, by assigning them the rapid cytoplasmic rate of diffusion when that are located in polar microdomains. 1/160th difc and 2% vol report on simulations with slower polar microdomain diffusion rates or larger polar microdomain sizes, as described in Fig. 5b and 5a, respectively. Source data are provided as a Source Data file.

Supplementary Tables

Supplementary Table 1

Strain name	Genotype / Background	Plasmid description		Source
		Replicating	Integrating	
GB#1194	<i>Caulobacter</i> wildtype synchronizable strain NA1000 CB15N			1
GB#1081	<i>Caulobacter</i> <i>popZ::specR</i>			2
GB#1007	<i>Caulobacter</i> <i>popZ::mChy-popZ</i>			3
GB#264	<i>Caulobacter</i> WT; GB#1194	pMR10 YFP-CtrA RD+15		4
GB#228	<i>Caulobacter</i> WT; GB#1194	pMR11 pCpdR-CpdR-YFP		5
GB#944	<i>E. coli</i> BL21 DE3	pBad-mChy PopZ		6
GB#169	<i>E. coli</i> Rosetta	pET28a-6XHis-PopZ		2
JH#66	<i>E. coli</i> DH5 α	pBAD-6XHis-GFP		7
GB#1969		pACYC-CpdR-TEV-msfGFP-6XHis		this study
GB#1970		pACYC-CpdR _{D51A} -TEV-msfGFP-6XHis		this study
GB#2022	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>			this study
GB#1971	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP-ChpT-CckA WT + pBAD-mCherry PopZ		this study
GB#1972	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP-ChpT-CckA H+ + pBAD-mCherry PopZ		this study
GB#1973	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP-ChpT-CckA K- + pBAD-mCherry PopZ		this study

GB#1974	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-Cpd _{D51A} GFP-ChpT- CckA H+ + pBAD-mCherry PopZ		this study
GB#1975	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP-ChpT + pBAD- mCherry PopZ		this study
GB#1976	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP + pBAD- mCherry PopZ		this study
GB#1977	<i>E. coli</i> MG1655 DE3 <i>clpXP::kanR</i>	pACYC-CpdRGFP + pBAD- mCherry ΔN term PopZ		this study
GB#1978	<i>Caulobacter</i> <i>popZ::mChy-popZ</i> ; GB#1007		pMCS5-pCpdR CpdR-YFP	this study
GB#1979	<i>Caulobacter</i> <i>popZ::mChy-popZ</i> ; GB#1007		pMCS5-pCpdR CpdR _{D51A} - YFP	this study
GB#1980	<i>Caulobacter</i> <i>popZ::mChy-popZ</i> ; GB#1007	pBXMCS2-CckA H+	pMCS5-pCpdR CpdR-YFP	this study
GB#1981	<i>Caulobacter</i> <i>popZ::mChy-popZ</i> ; GB#1007	pBXMCS2-CckA K-	pMCS5-pCpdR CpdR-YFP	this study
GB#1982	<i>Caulobacter</i> <i>popZ::mChy-popZ</i> ; GB#1007	pBXMCS2-CckA H+	pMCS5-pCpdR CpdR _{D51A} - YFP	this study
GB#1983	<i>Caulobacter</i> WT, GB#1194		pXMCS5-YFP-CtrA RD+15	this study
GB#1984	<i>Caulobacter</i> WT, GB#1194		pXMCS5-YFP-TacA	this study
GB#1985	<i>Caulobacter</i> WT, GB#1194		pXMCS5-YFP-PdeA	this study
GB#1986	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-YFP-CtrA RD+15	this study

GB#1987	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-YFP-TacA	this study
GB#1988	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-YFP-PdeA	this study
GB#1989	<i>Caulobacter</i> WT, GB#1194		pXMCS5-HA-CtrA RD+15	this study
GB#1990	<i>Caulobacter</i> WT, GB#1194		pXMCS5-HA-TacA	this study
GB#1991	<i>Caulobacter</i> WT, GB#1194		pXMCS5-HA-PdeA	this study
GB#1992	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-HA-CtrA RD+15	this study
GB#1993	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-HA-TacA	this study
GB#1994	<i>Caulobacter</i> <i>popZ::specR</i> , GB#1081		pXMCS5-HA-PdeA	this study
GB#1995	<i>Caulobacter</i> <i>cpdR::specR</i> ; <i>popZ::mChy-popZ</i>			this study
GB#1996	<i>Caulobacter</i> Δ <i>rcdA</i> , GB#1106 ⁸		pMCS5-pCpdR CpdR-YFP	this study
GB#1997	<i>Caulobacter</i> <i>cpdR::specR</i> , <i>popZ::mChy-popZ</i> ; GB#1995		pVMCS6-ClpX-msfGFP	this study
GB#2002	<i>Caulobacter</i> <i>cpdR::specR</i> , <i>popZ::mChy-popZ</i> ; GB#1995		pVMCS6-RcdA-msfGFP	this study

GB#2007	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995		pXMCS5-YFP-CtrA RD+15	this study
GB#2008	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995		pXMCS5-YFP-TacA	this study
GB#2009	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995		pXMCS5-YFP-PdeA	this study
GB#2014	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pCpdR CpdR	pVMCS6-ClpX-GFP	this study
GB#2015	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pCpdR CpdR _{D51A}	pVMCS6-ClpX-GFP	this study
GB#2016	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pXyl-CckA H+ pCpdR CpdR	pVMCS6-ClpX-GFP	this study
GB#2017	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pXyl-CckA H+ pCpdR CpdR _{D51A}	pVMCS6-ClpX-GFP	this study
GB#2018	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pCpdR CpdR	pVMCS6-RcdA-GFP	this study
GB#2019	<i>Caulobacter</i> <i>cpdR::specR,</i> <i>popZ::mChy-popZ;</i> GB#1995	pBXMCS2-pCpdR CpdR _{D51A}	pVMCS6-RcdA-GFP	this study
GB#2020	<i>Caulobacter</i> <i>cpdR::specR,</i>	pBXMCS2-pXyl-CckA H+ pCpdR CpdR	pVMCS6-RcdA-GFP	this study

	<i>popZ::mChy-popZ</i> ; GB#1995			
GB#2021	<i>Caulobacter</i> <i>cpdR::specR</i> , <i>popZ::mChy-popZ</i> ; GB#1995	pBXMCS2-pXyl-CckA H+ pCpdR CpdR _{D51A}	pVMCS6-RcdA-GFP	this study

Supplementary Table 2

Plasmid name	Vector backbone	Description	Sequence <small>*where present, ellipsis correspond to vector backbone sequence</small>
pGB1945	pCDF-duet	pCDF-CckA WT	<p>gagatataaccATGGCCGACTTGCAGCTCCAGGACAAGGTTTCGACCGGCGCCCCGCGTCGGCGGTTT GATCCATGGCTGGTGGCGCGGCGGTGTTTTTCGTGGCTGCGGCGGCCCTCTCGGCGGCGCCGG CGCTCAAGGCCGGACCGACCACTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCGTGGC TGTGTTGGCCTTGTGCGCATTGCGGGCTCAGCGCTTTCGCGCGGCGACGCCAGCAGGCTGAG GGGTTTCATCGAGGCGCTGGCCGAGCCGGCCCTGGCCGCCGCGACGGTTCGCGTCTGGCCG CCAACGGGCCCTGGCGCGAAGTCATGGGCGAACAGCGCCCTGCCAAGGGCGTGGCGGGCT CCAGCCTGTTTGGCGCCCTGGTCCAGGCGCGCAGGGGCGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACCGCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCATCGTTGTGCTGAGCCGTTGTGGAAGACGCGTCGCCGGCCCCGGTCCCGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCCTTCGCCGAGCCTCGCCGTTGGCGCGGCCCTGCTGG AAGCCTGGAGCCGTTACCTCGCGGTGCTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCCTCGCGCGCCGAGGCCGAGACG CGCTGAACGAAGGCCGCGCCGTTCCCTACGAGGTGCGGTTGGCGCGCGATCCGTCGCGCATCG CTCACCTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCAGGCCAGAAAGATGCAGGCCATCGCCAGCTGGCCGGCGG CGTCGCGCACGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCGTGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTCAGACGGGCGTGCAGCGCCG CCGACCTCGTGCAGCAAGCTCTTGGCTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGTGCGCCGCTGCTGCGCGAAGACGTCAAGC TGATCACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCCGTCAACGCCCGCGACCCGTGCGCGCGGCCAAGGGCGGCGGCGTCTGT GCGCATCCGCACCGCGCGCCTGACCCGCGACGAGGCATCCAGCTGGGTTTCCCGGCCCGGAC GGCGACACGGCCTTCATTGAGGTGAGTACGATGGTCCGGGCATTCCGCCGACGTATGGGCAA GATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCGAACGAAGGCCGCG GCCTTCCGATCTTCTGCCGTTATGAAGCGCCCGCGGCGGTCGCGCTCCAGGCCGTCGCG CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGGCCGATCCTGTTGTCGAG GACGAGGACCGCTGCGCAGCGTCGCCGCCGCTGCTGCGCGCCGTTGGTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTCTT GATCAGCGACGTGATCATGCCGGCATCGACGGCCGACCTTGTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTATGTTTCATCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTCTGGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGTCA AGCAGCAGCTGCAGGCGGCGTAGgcgccgcat</p>
pGB1946	pCDF-duet	pCDF-CckA H+	<p>gagatataaccATGGCCGACTTGCAGCTCCAGGACAAGGTTTCGACCGGCGCCCCGCGTCGGCGGTTT GATCCATGGCTGGTGGCGCGGCGGTGTTTTTCGTGGCTGCGGCGGCCCTCTCGGCGGCGCCGG CGCTCAAGGCCGGACCGACCACTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCGTGGC TGTGTTGGCCTTGTGCGCATTGCGGGCTCAGCGCTTTCGCGCGGCGACGCCAGCAGGCTGAG GGGTTTCATCGAGGCGCTGGCCGAGCCGGCCCTGGCCGCCGCGACGGTTCGCGTCTGGCCG CCAACGGGCCCTGGCGCGAAGTCATGGGCGAACAGCGCCCTGCCAAGGGCGTGGCGGGCT CCAGCCTGTTTGGCGCCCTGGTCCAGGCGCGCAGGGGCGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACCGCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCATCGTTGTGCTGAGCCGTTGTGGAAGACGCGTCGCCGGCCCCGGTCCCGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCCTTCGCCGAGCCTCGCCGTTGGCGCGGCCCTGCTGG AAGCCTGGAGCCGTTACCTCGCGGTGCTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCCTCGCGCGCCGAGGCCGAGACG CGCTGAACGAAGGCCGCGCCGTTCCCTACGAGGTGCGGTTGGCGCGCGATCCGTCGCGCATCG CTCACCTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCAGGCCAGAAAGATGCAGGCCATCGCCAGCTGGCCGGCGA AGTCGCGCACGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCGTGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTCAGACGGGCGTGCAGCGCCG CCGACCTCGTGCAGCAAGCTCTTGGCTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT</p>

			<p>CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGCTGCGCCGCTGCTGCGCGAAGACGTCAAGC TGATACCGACTATGGCCGCGACCTGCCGACGGTGCAGCGCCGACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCCGTCAACGCCC GCGACGCCGTGCGCGCGGCCAAGGGCGGCGGCGTCTGT GCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCCGCGAC GGCGACACGGCCTTCATTGAGGTCAGTGACGATGGTCCGGGATTCCGCCGACGTCATGGGCAA GATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAAGGCGCG GCCTTCCGCATCTTCTGCCGGTCTATGAAGCGCCCGCCGGCGCGGTGCGCGTCCAGGCCGTGCG CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCCGGGCGCCGCGCCGATCCTGTTCTGTCGAG GACGAGGACGCCGTGCGCAGCGTCCGCCCGCCGCTGCTGCGCGCCCGTGGCTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTTT GATCAGCGACGTGATCATGCCCGCATCGACGGCCCGACCTTGCTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTGTATGTTTCATCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTTTGGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGTCA AGCAGCAGCTGCAGGCGGCGTAGGcgggccgcat</p>
<p>pGB1947</p>	<p>pCDF-duet</p>	<p>pCDF-CckA K-</p>	<p>gagatataccATGGCCGACTTGCAGTCCAGGACAAGGTTTCGACCGGCGCCCGCGTGGCGGTTT GATCCATGGCTGGTCCGCGCGGCGGTGTTTTTCGTGGCTGCGCGGCCCTCTCGCGGCGCGCCG CGCTCAAGGCCGGACCGACACCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCCGCGGCGTGGC TGTGTTGGGCTTGTCCGATTCCGCGCTCAGCGCTTCCGGCGGCGACGCCGACAGGCTGAG GGTTCATCGAGGCGTGGCCGAGCCGGCCGCTGGCCGCCGACGGTCCGCTCTGGCCG CCAACGGGCCCTGGCGGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGGCGGGCT CCAGCCTGTTGCGGCCCTGGTCCAGGCGCCAGGGGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACGCCAAGGTCTCGGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCATCGTTGTCGCTGAGCCGTTGTGGAAGACGCGTCCCGGCCCGGCGCGGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCCTTCCGGGAGCCTCGCCGTTGGCGCGGCCCTGCTGG AAGCCTGGAGCCGTTACCTCGCGGTGCTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCCAAGGCCGGTGTGCTGTTCCGGGATCTGATCGACGCCCTCGCGCGCCGAGGCCGAGACG CGCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGGATCCGTCGCGCATCG CTCACCTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCAGGCCAGAAAGATGCAGGCCATCGGCCAGCTGGCCGGCGG CGTCCGCGCAGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCGTCCGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTGACGCGGCGTCCGCGCCG CCGACCTCGTCCGCAAGCTCTTGGCTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGCTGCGCCGCTGCTGCGCGAAGACGTCAAGC TGATACCGACTATGGCCGCGACCTGCCGACGGTGCAGCGCCGACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCCGTCAACGCCC GCGACGCCGTGCGCGCGGCCAAGGGCGGCGGCGTCTGT GCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCCGCGAC GGCGACACGGCCTTCATTGAGGTCAGTGACGATGGTCCGGGATTCCGCCGACGTCATGGGCAA GATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAAGGCGCG GCCTTCCGCATCTTCTGCCGGTCTATGAAGCGCCCGCCGGCGCGGTGCGCGTCCAGGCCGTGCG CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCCGGGCGCCGCGCCGATCCTGTTCTGTCGAG GACGAGGACGCCGTGCGCAGCGTCCGCCCGCCGCTGCTGCGCGCCCGTGGCTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTTT GATCAGCGACGTGATCATGCCCGCATCGACGGCCCGACCTTGCTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTGTATGTTTCATCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTTTGGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGTCA AGCAGCAGCTGCAGGCGGCGTAGGcgggccgcat</p>

pGB1948	pACYC-duet	pACYC-CpdR GFP-ChpT-CckAWT	<p>gagatataaccGTGGCCCGCATCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCGCTGGAACGCGCCGGCTTCAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGGGACCTGCTGCTGACCGACATCGTCATGCCCGGCATGGACGGCATCGAGGTGGCCCGCCAGGCCCGCCCGCGACCCGTCCCTGCGCATCATGTTTCATCACCGGCTTCGCCCGCGTGGCCCTCTCGGCCAGGACCGCGCGCCCGCGCCGCAAGGTGCTGTCCAAGCCCGTGCACCTGCGCGACCTCGTCGCGAGGTGCAAAAAGATGATGGCGGCCCTCGAGAGCGGCGGCGGCGGAGTAAAGGTGAAGAACTGTTACCCGGTGTGTTCCGATCCTGTTGAACTGGATGGTGTAAACGGCCACAAATTCTCTGTTCTGTTGAAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTCATCTGCACTACCGGTAAACTGCCGGTTCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTCAGTGTTCCTCGTTACCCGGATCACATGAAGCAGCATGATTTCTCAAATCTGCAATGCCGGAAGGTTATGTACAGGAGCGCACCATTTCTTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAAATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCAACATCTGGGCCACAACTGGAATATAACTCAACTCCATAACGTTTACATCACCGCAGACAAACA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGGCGGACACTACCAGCAGAACTCCGATCGGTGATGGTCCGGTTCTGCTGCCGATAACCACTACCTGTCCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTGTCTGTGGAGTTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAATGAgcgccgcat.....agatatacatGTGACCGAGACCGTCACCGAGACCACCGCCCCCGCTCCCCGAAGCCGACGTCCAGGGTCCCGATTTCCCGCCATGCTGGCCGCGCCTGTGTACGACTTCATCAGTCCCGCCAGCGCCATC GTCTCGGGCCTGGATCTGCTGGAAGACCCCTCGGCCAGGACATGCGCGACGACGCCATGAACCTGATCGCCTCCTCGGCCGCAAGCTGGCGGACCTCTTGCACTTCACCCGAGTGGCCTTCGGCGCCTCGGCCTCGGCCGAGAACTCGACTCGCGCAACTGAAAAGCTGGCCAGGGCGTCTTTGCCCATGTCCGCCCGACCCTGGACTGGCAGATCGAGCCGAGGCGATGAACAAGCCCTCGTCGCGCGCGGTGCTGAACATCGCCAGATCGCCGACGCGCCTGCCGCGCGCGCGCTGGCCACCCTCAAGGGCGTGGCCGCGGACGGGCGCTTCTCGATCATGCGCGACCCAAGGGCCCGCGCGCGCCTGCGTCCGGAGGTGCTGGCGGGCTAAAGGGCGAGCCGCTGGCCGAGGGCCTGGGCGGTCCGTGGGTGCAGGCGCCTATCTGAACGCCCTGGTGCAGCGCGCCGGCGGCGCAGATCGCCGTCGAGATCGGCGAGGACCGCGCCTCGATCGCCGCTGGGTCCCGCGTAAActcgagctg.....tcagcgctagttagcgactcctgcattaggaaattaatacactcactataggggaattgtgagcggataacaattcccctgtagaataattttgttaactttaaaggagatataaccATGGCCGACTTGACGCTCCAGGACAAGTTTTGACCGGCGCCCCGCGTCCGGCGGTTTATCCATGGCTGGTCCGGCGGGCGGTGTTTTCTGTGGCTGCGGCGGCCCTCTCGCGGGCCGGCGCTCAAGGCCGACCGACCCCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCCGGGGCTGGCTGTGTTGGGCCTGTGCGCATTGCGGGCTCAGCGCTTTCGGGCGGCGACGCCGACAGGCTGAGGGGTTTCATCGAGGCGTGGCCGAGCCGGCCCTGGCCCGCCGACGGTCCGCTCTGGCCCAACGGGCCCTGGCGGGAAGTTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGGCGGCTCCAGCCTGTTGCGGCCCTGGTCCAGGCGCGCCAGGGGAGATGGCCGAGGGCATGCTGAGCGCTGGAGGAACCGACTATACCGCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGGCTTGCGCCATCGTTGTGCTGAGCCGTTGTGGAAGACGCGTCCCGGCCCGGTGCGCCGAGCGCGCCCGCCACCCAGCTCGCTGGACGCCTTCGCCGAGCCTCGCCGTTGGCGCGGCCCTGCTGGAAGCCTGGAGCCGTTACCTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATGACCGGCGCAAGGCCGGTGTGCTGTTCCGGGATCTGATCGACGCCCTCGCGCGCCGAGGCCGAGACGCGCCTGAACGAAGGCCGCGCCGTTCCCTACGAGGTGCGGTTGGCGCGGATCCGTCCGCGCATCGCTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGAAGCAGATCGAGCTGCAGCTGCCAGGCCAGAAGATGCAGGCCATCGCCAGCTGGCCGGCGGCTCGCGCACGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCGCCATCCCGTCCGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTGACAGGGCGTGC GCGCCCGGACCTCGTGCGAAGCTCTTGCTTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGATCTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGCTGCGCCGCTGCTGCGCGAAGACGTCAAGCTGATCACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCGAGACGGCGGTTCATGAACCTGGCCGTCAACGCCGCGACGCCGTGCGCGCGGCCAAGGGCGGCGCGTCTGCGCATCCGACCCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCCCGACGGCGACACGGCCTTATTGAGGTGAGTACGATGGTCCGGGATTCCGCCGACGTCATGGGCAAGATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCGTAAGCGGTCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAGGCGCGCCTTCCGCATCTTCTGCCGGTCTATGAAGCGCCCGCCGGCGGGTCCGGTCCAGG</p>
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			<p>CCGTCGCCGAGCCCGCCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGGCCGCATCCTGTTCTCGAGGACGAGGACGCCGTGCGCAGCGTCGCCGCCCGCTGCTGCGCGCCCGTGGCTACGAGGTGCTTGAGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTTGATCAGCGACGTGATCATGCCGGCATCGACGGCCGACCTTGCTGAAGAAGGCGCGTGGCTATCTGGGGACCGCGCCGGTGTGTTTCATCTCCGGCTATGCCGAGGCCGAGTTACGCGACCTCTGGAAGGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCTCAAGCAGCAGCTGCAGGCGCGTAGcggagtgat</p>
<p>pGB1949</p>	<p>pACYC-duet</p>	<p>pACYC-CpdRGFP-ChpT-CckA H+</p>	<p>gagatataccGTGGCCCGCATCCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCGCTGGAACGCGCCGGCTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGGGACTGCTGCTGACCGACATCGTCATGCCGGCATGGACGGCATCGAGGTGGCCCGCCAGGCCGCGCCCGGACCCGTCCTGCGCATCATGTTTCATCACCGGCTTCGCCCGGTGGCCCTCTCGGCCAGGACCGCGCGCCCGCGGCCAAGGTGCTGTCAAAGCCCGTGCACCTGCGCGACCTCGTCGCCGAGTGCAAAAGATGATGGCGCCCTCGAGAGCGGGCGGGCGGCAGTAAAGGTGAAGAACTGTTACCGGTGTTGTTCCGATCCTGTTGAACTGGATGGTGTGTTAACGCCACAAATTCTGTTCTGTTGTAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTCATCTGCACTACCGGTAACTGCCGTTCCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTCAGTGTTCCTGTTACCGGATCACATGAAGCAGCATGATTTCTCAAATCTGCAATGCCGGAAGTTATGTACAGGAGCGCACCATTCTTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAAATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCAACATCCTGGGCCACAACTGGAATATAACTCAACTCCCATAACGTTTACATCACCGCAGACAAACA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGGCGGACACTACCAGCAGAACAACCTCCGATCGGTGATGGTCCGGTTCGCTGCCGATAACCACTACCTGTCCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTGTCTGGAGTTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAATGAgcgccgcat.....agatatacatGTGACCGAGACCGTACCAGAGACCACCGCCCCCGCTCCCCGAAGCCGACGTCCAGGGTCCCGATTCGCCGCCATGCTGGCCGCGCCTGTGTACGACTTCATCAGTCCGGCCAGCGCCATC GTCTCGGGCCTGGATCTGCTGGAAGACCCCTCGGCCAGGACATGCGCGACGACGCCATGAACCTGATCGCCTCTCGGCCGCAAGCTGGCGGACCTTTGCAAGTTACCCGAGTGGCCTTCGGCGCCTCGGCCTCGGCCGAGAACTCGACTCGCGCGAACTGGAAGAGCTGGCCAGGGCGTCTTTGCCCA TGTCGCCCGACCCCTGGACTGGCAGATCGAGCCGAGGCGATGAACAAGCCCTCGTCGCGCGCGGTGCTGAACATCGCCAGATCGCCGCCAGCGCCCTGCCGGCCGGCGGCGTGGCCACCCTCAAGG GCCTGGCCCGACGGGCGCTTCTCGATCATCGCCGACGCCAAGGGCCCGCGCGCGCCTGCC TCCGGAGGTGCTGGCGGGCCTAAAGGGCGAGCCGCTGGCCGAGGGCCTGGGCGGTCCGTGGGTGCAGGGCGCCTATCTGAACGCCCTGGTGCAGCGCGCCGGCGGCCAGATCGCCGTCGAGATCGGC GAGGACCGCGCCTCGATCGCCGCTGGGTCCCGCGTAAActcagtgctg.....tcagcgctagtatgagac tctctgattagaaattaatacactcactataggggaattgtgagcggataacaattccccttagaataatttggtaactt aataaggagatataccATGGCCGACTTGACGCTCCAGGACAAGTTTTGACCGGCGCCCGGCTCGGC GGTTTGATCCATGCTGGTGGCGCGGGCGGTGTTTTCTGGCTGCGCGGCCCTCTCGCGGGCG CCGGCGCTCAAGGCCGACCGACACCCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCCGGGGCG TGCTGTGTTGGCCTTGTGCCATTGCGGCTCAGCGCTTTCGGCGGCGACGCCGACAGGCT GAGGGTTCATCGAGGCGCTGGCCGAGCCGGCCCTGGCCGCCGCCGACGGTCCGCTCCTGG CCGCAACGGGCCCTGGCGCGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGGCGG GCTCCAGCCTGTTGCGGCCCTGGTCCAGGCGCGCCAGGGGACAGATGGCCGAGGGCATGCTGAG CGCTGGAGGAACCGACTATACGCCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGG CTGCGCCATCGTTGTCGCTGAGCCGTTGTGGAAGACGCGTCCCGGCCCGGTCGCCGAGC GCGCCGCCCGCCACCCAGCTCGCTGGACGCTTCCCGGAGCCTCGCGGTTCCGGCGCGGCCCT GCTGGAAGGCCTGGAGCCGTTACCTCGCGGGTGTGGAAGACCAATCCGGCGCTGACCACGATG ACCGGCGCAAGGCCGGTGTGCTGTTCCGGCATCTGATCGACGCCGCTCGCGCGCCGAGGCCG AGACGCGCCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGCATCCGTCCG CATCGCTCACCTTTACCTTATCGCGCCGAAGGCCGCTGGTGGCTACATGATCGACGTGCCGA GCAGAAGCAGATCGAGCTGCAGCTGTCCAGGCCGAGAAGATGCAGGCCATCGGCCAGCTGGCC</p>

			<p>GCGGAAGTCGCGCAGACTTCAACAACCTCTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCGCCATCCCCTCGGTGATCCGTCGTACGAGGGTCTCAACGAGATCCGTCAGACGGCGTGC GCGCCGCCGACCTCGTGCAGCAAGCTCTTGCTTTCTCGCGCAAGCAGACCGTGCAGCGCAGGT GCTGGATCTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGCTGCGCCGCTGCTGCGCGAAGAC GTCAAGCTGATCACCGACTATGGCCGCGACCTGCCGACGGTGCAGCGCCGACAAGAGCCAGCTCG AGACGGCGGTATGAACCTGGCCGTCAACGCCGCGACGCCGTGCGCGCGGCCAAGGGCGGCG GCGTCGTGCGCATCCGACCGCGCGCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCC GCCGACGGCGACACGGCCTTATTGAGGTCAAGTACGATGGTCCGGGCATTCCGCCGACGTCAT GGGCAAGATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTA GCCACGGTCTATGGCATCGTTAAGCAGAGCGACGGTGGATTACGTCCACAGCCGTCCGAACGA AGGCGCGCCTTCCGCATCTTCTGCGGTCTATGAAGCGCCCGCGCGGGTTCGCCGTCCAGG CCGTCGCCGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCCGGCGCCGGCCGCATCCTGTTC GTCGAGGACGAGGACGCCGTGCGCAGCGTCCGCCCGCCCTGCTGCGCGCCCGTGGTACGAGG TGCTTGAGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGA CCTTTGATCAGCGACGTGATCATGCCCGGCATCGACGGCCGACCTTGTGAAGAAGGCGCGTG GCTATCTGGGGACCGCGCCGGTATGTTTCATCTCCGGCTATGCCGAGGCCGAGTTTCAGCGACCTT TGGAAGGCGAGACGGCGGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCG CGTCAAGCAGCAGCTGCAGGCGGCTAGcggagtgtat</p>
pGB1950	pACYC-duet	pACYC-CpdR GFP-ChpT-CckA K-	<p>gagatataccGTGGCCCGCATCCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCGCG CGCTGGAACGCGCCGGCTTCGAAGTCCAGGCCTGCGCCGACGCGGAAGAGGCCGTCCAGCACCT GGACCATCCCTGGGACCTGCTGCTGACCGACATCGTCATGCCCGCATGGACGGCATCGAGGTGG CCCGCCAGGCCGCGCCGCGACCCGTCCTGCGCATCATGTTTCATCACCGGCTTCGCCCGGTGG CCCTCTCGGCCAGGACCGCGCGCCGCGCGCCGCAAGGTGCTGTCCAAGCCCGTGCACCTGCG CGACCTCGTCGCGAGGTGCAAAAAGATGATGGCGGCCCTCGAGAGCGGCGGCGGCGGAGTAA AGGTGAAGAACTGTTACCCGGTGTGTTCCGATCCTGTTGAAGTGGATGGTATGTTAACGGCC ACAAATTCTGTTCGTGGTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTC ATCTGCACTACCGTAAACTGCCGTTCCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTC AGTGTTTTTCTCGTTACCCGGATCACATGAAGCAGCATGATTTCTTCAAATCTGCAATGCCGGAAGG TTATGTACAGGAGCGACCATTCTTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAA ATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCA ACATCCTGGGCCACAACTGGAATATAACTTCAACTCCATAACGTTTACATCACCGCAGACAAACA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGG CGGACCACTACCAGCAGAACACTCCGATCGGTGATGGTCCGGTCTGCTGCCGATAACCACTACC TGTCCACCCAGTCTAACTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTCTGCTGGAG TTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAATGAgcggccgcat.....agat atacatGTGACCGAGACCGTCACCGAGACCACCGCCCCCGCTCCCCGAAGCCGACGTCCAGGGT CCCGATTTCCGCCCATGCTGGCCGCGCGCCTGTGTACGACTTCATCAGTCCGGCCAGCGCCATC GTCTCGGGCCTGGATCTGCTGGAAGACCCTCGGCCAGGACATGCGCGACGACGCCATGAACCT GATCGCCTCCTCGCCCCGAAGCTGGCGGACCTCTTGCAAGTTCACCCGAGTGGCCTTCGGCGCCT CGGCCTCGGCCGAGAACTCGACTCGCGCGAACTGGAAAAGCTGGCCAGGGCGTCTTTGCCCA TGTCCGCCGACCCCTGGACTGGCAGATCGAGCCGAGGCGATGAACAAAGCCCTGTCGCGCGCG GTGCTGAACATCGCCAGATCGCCGACGCGCCCTGCCGGCCGCGGCGTGGCCACCGTCAAAG GCGTGGCCGCGACGGGCGCTTCTGATCATCGCCGACGCCAAGGGCCCGCGCGCGCCTGCG TCCGGAGGTGCTGGCGGCCCTAAAGGGCGAGCCGCTGGCCGAGGGCCTGGGCGGTCCGTGGGT GCAGGCGGCCTATCTGAACGCCCTGGTGCAGCGCGCCGGCGGCCAGATCGCCGTCGAGATCGGC GAGGACCGCGCCTCGATCGCCGCTGGGTCCCGCGTAActcagtgctg.....tcagcgctagtatgcgac tcctgcattaggaattaatacactcactataggggaattgtgagcggataacaattccctgtagaataattttgttaacttt aataaggagatataccATGGCCGACTTGACGCTCCAGGACAAGGTTTCGACCGGCGCCCCGCGTCCGGC GGTTCGATCCATGGCTGGTCCGGCGCGCGGTGTTTTCTGTTGCTGCGGCGGCCCTCTCGGCGGCG CCGGCGCTCAAGGCCGACCGACCCCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCCGCGGCGG TGCTGTGTTGGCCTGTGCGCATTGCGGGCTCAGCGCTTCCGGCGGCGACGCCGACCGAGCT</p>

			<p>GAGGGGTTTCATCGAGGCGCTGGCCGAGCCGGCCGCCCTGGCCGCCGCCGACGGTTCGCGTCTCG CCGCAACGGGCCCTGGCGCGAAGTTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGCGG GCTCCAGCCTGTTTGGCGCCCTGGTCCAGGCGCGCCAGGGGACAGATGGCCGAGGGCATGCTGAG CGCTGGAGGAACCGACTATACCGCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGG CTTGGCGCCATCGTTGTCGCTGAGCCGGTGTGGAAGACCGCTCGCCGGCCCGGTTCGCCGAGC GCGCCGCCCGCCACCCAGCTCGCTGGACGCCTTCGCCGGAGCCTCGCCGTTGGCGCGGCCCT GCTGGAAGGCCTGGAGCCGTTACCTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATG ACCGGCGCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCGCTCGCGCGCCGAGGCCG AGACGCGCCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGCATCCGTCGCG CATCGCTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCTACATGATCGACGTGTCCGA GCAGAAGCAGATCGAGCTGCAGCTGTCCCAGGCCAGAAGATGCAGGCCATCGGCCAGCTGGCC GGCGCGTTCGCCGGGACTTCAACAACCTCTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCT GCATCGCCATCCCGTCCGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTCAGACGGGCGTGC GCGCCGCCGACCTCGTGCAGCAAGCTCTTGCTTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGT GCTGGATCTGGGCGAGCTGATCAGCGAGTTCGAGTCTTGCTGCGCCGCTGCTGCGCGAAGAC GTCAAGCTGATCACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCG AGACGGCGGTTCATGAACCTGGCCGTCAACGCCGCGACGCCGTGCGCGCGGCCAAGGGCGGCG GCGTCTGCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCC GCCGACGGCGACACGGCCTTATTGAGGTGAGTACGATGGTCCGGGATTCCGCCGACGTCAT GGGCAAGATCTTCGACCGTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTA GCCACGGTCTATGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCGAACGA AGGCGCGCCTTCCGCATCTTCTGCGGTCTATGAAGCGCCCGCGCGGTCGCCGTCCAGG CCGTCGCCGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGCGCATCCTGTT GTCGAGGACGAGGACGCCGTGCGCAGCGTCCGCCCGCCTGCTGCGCGCCGTGGTACGAGG TGCTTGAGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGA CCTTTGATCAGCGACGTGATCATGCCCGCATCGACGGCCGACCTTGTGAAGAAGGCGCGTG GCTATCTGGGGACCGCGCCGGTATGTTTCATCTCCGGCTATGCCGAGGCCGAGTTCAGCGACCTT TGGAAGGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCG CGTCAAGCAGCAGCTGCAGGCGCGTAGcggagtgtat</p>
pGB1951	pACYC- duet	pACYC- CpdR _{D51A} GFP-ChpT- CckA H+	<p>gagatataccATGGCCGCATCCTCCTCGCCGAAGACGATGATTCCTGCGCGGCTTCTGGCCGCG CGCTGGAACGCGCCGGTTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCAGCACCT GGACCATCCCTGGGACCTGCTGCTGACCGCCATGTCATGCCGGCATGGACGGCATCGAGGTGG CCCGCCAGGCCCGCCGCCGACCCGTCCTGCGCATATGTTTCATCACCGGCTTCGCCCGGTGG CCCTCTCGGCCAGGACCGCGCGCCCGCGCCGCAAGGTGCTGTCCAAGCCCGTGCACCTGCG CGACCTCGTCGCCGAGGTGCAAAAAGATGATGGCGCCCTCGAGAGCGGCGGCGGCGGAGTAA AGGTGAAGAACTGTTACCGGTGTTGTTCCGATCCTGTTGAAGTGGATGGTATGTTAACGGCC ACAAATTCTGTTCTGTTGTTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTC ATCTGCACTACCGTAAACTGCCGGTTCATGGCCGACTCTGGTACTACCTGACCTATGGTGTTC AGTGTCTTCTCGTTACCCGGATCACATGAAGCAGCATGATTTCTCAAATCTGCAATGCCGGAAGG TTATGTACAGGAGCGACCATTCTTTCAAAGACGATGGCACCTACAAAACCCGTCAGAGGTTAA ATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCA ACATCCTGGGCCACAACTGGAATATAACTTCAACTCCATAACGTTTACATCACCGCAGACAAACA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGG CGGACCACTACCAGCAGAACTCCGATCGGTGATGGTCCGGTTCGCTGCCGATAACCACTACC TGTCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTCTGCTGGAG TTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAATGAgcggccgcat.....agat atacatGTGACCGAGACCGTCACCGAGACCACCGCCCCCGCTCCCCGAAGCCGACGTCCAGGGT CCCGATTTCCCGCCATGCTGGCCGCGCGCCTGTGTCACGACTTCATCAGTCCGGCCAGCGCCATC GTCTCGGGCCTGGATCTGCTGGAAGACCCTCGGCCAGGACATGCGCGACGACGCCATGAACCT GATCGCCTCCTCGGCCGCAAGCTGGCGGACCTCTTGCAGTTACCCGAGTGGCCTTCGGCGCCT CGCCTCGGCCGAGAACTCGACTCGCGCGAACTGGAAAAGCTGGCCAGGGCGTCTTTGCCCA TGTCCGCCGACCCCTGGACTGGCAGATCGAGCCGAGGCGATGAACAAGCCCTCGTCGCGCGCG GTGCTGAACATCGCCAGATCGCCGCCAGCGCCCTGCCGGCCGGCGGCGTGGCCACCGTCAAGG GCGTGGCCCGACGGGCGCTTCTGATCATCGCCGACGCCAAGGGCCCGCGCGCGCCTGCG TCCGGAGGTGCTGGCGGGCTAAAGGGCGAGCCGCTGGCCGAGGGCCTGGGCGGTCCGTGGGT</p>

			<p>GCAGGCGGCCTATCTGAACGCCCTGGTGC GCGCGGCCGGCGGCCAGATCGCCGTCGAGATCGGC GAGGACCGCGCCTCGATCGCCGCTGGTCCCGGCGTAActcagagctg.....tcagcgctagttagcgac tcctgcattaggaattaatacactcactataggggaattgtgagcggataacaattccctgtagaataattttgttaacttt aataaggagataaccATGGCCGACTTGCAGCTCCAGGACAAGTTTCGACCGGCGCCCCGCGTCGGC GGTTTGATCCATGGCTGGTCGGCGCGCGGTGTTTTCTGTGGCTGCGGCGGCCCTCTCGGCGGCG CCGGCGCTCAAGGCCGACCGACCACCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCG TGGCTGTGTTGGGCCTGTGCGCATTGCGGGCTCAGCGCTTTCGGCGGCGACGCCGACAGGCT GAGGGGTTTCATCGAGGCGCTGGCCGAGCCGGCCGCTGGCCGCGCCGACGGTCGCGTCTG CCGCAACGGGCCCTGGCGGGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGCGG GCTCCAGCCTGTTTGCGGCCCTGGTCCAGGCGCGCCAGGGGACAGATGGCCGAGGGCATGCTGAG CGCTGGAGGAACCGACTATACCGCAAGGTCTCGCGCTTTCGGGCGGACGGCTGATGATCCGG CTTGCGCCATCGTTGTCGCTGAGCCGTTGTGGAAGACGCGTCGCCGGCCCCGGTTCGCCGAGC GCGCCGCCCGCCACCCAGCTCGCTGGACGCCTTCGCCGAGCCTCGCCGTTGGCGCGGCCCT GCTGGAAGCCTGGAGCCGTTCACTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATG ACCGCGCCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCGCTCGCGCGCCGAGGCCG AGACGCGCTGAACGAAGGCCGCGCCGTTCCCTACGAGGTGCGGTTGGCGCGGATCCGTCGCG CATCGCTCACTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCTACATGATCGACGTGTCCGA GCAGAAGCAGATCGAGCTGCAGCTGTCCCAGGCCAGAAGATGCAGGCCATCGGCCAGCTGGCC GGCGAAGTCGCGCAGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCT GCATCGCCATCCGTCGGTATCCGTCGTACGAGGGTCTCAACGAGATCCGTCAGACGGGCGTGC GCGCCGCCGACCTCGTGCGAAGCTCTTGCTTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGT GCTGGATCTGGGCGAGCTGATCAGCGAGTTCGAGGTTGCTGCGCCGCTGCTGCGCAAGAC GTCAAGCTGATCACCAGCTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCG AGACGGCGGTATGAACCTGGCCGTCACGCCGCGACGCCGTGCGCGCGGCCAAGGGCGGCG GCGTCTGCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCC GCCGACGGCGACACGGCCTTATTGAGGTGAGTACGATGGTCCGGGATTCCGCCGACGTCAT GGGCAAGATCTTCGACCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTA GCCACGGTCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGA AGGCGCGCCTTCCGCATCTTCTGCGGTCTATGAAGCGCCCGCCGGCGCGGTGCGCGTCCAGG CCGTCGCCGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGGCCGATCCTGTTT GTCGAGGACGAGGACGCCGTGCGCAGCTGCGCCCGCCTGCTGCGCGCCGTTGGTACGAGG TGCTTGAGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGA CCTTTGATCAGCGACGTGATCATGCCGGCATCGACGGCCGACCTTGTGAAGAAGGCGCGTG GCTATCTGGGGACCGCGCCGGTATGTTTCTCCGGCTATGCCGAGGCCGAGTTTACGCGACCTCT TGGAAGGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCG CGTCAAGCAGCAGCTGCAGGCGCGTAGcggagtgat</p>
pGB1952	pACYC- duet	pACYC- CpdRGFP- ChpT	<p>gagatataaccGTGGCCGCATCCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGC CGTGGAACGCGCCGGCTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCT GGACCATCCCTGGGACCTGCTGCTGACCGACATCGTCATGCCGGCATGGACGGCATCGAGGTGG CCCGCCAGGCCGCCGCCGCGACCCGTCCTGCGCATCATGTTTATCACCGGCTTCGCCCGGTGG CCCTCTCGGCCAGGACCGCGCGCCCGCGCGCAAGGTGCTGTCCAAGCCGTCACCTGCG CGACCTCGTCGCCGAGTTCGAAAAGATGATGGCGCCCTCGAGAGCGGCGGCGGCGGCGAGTAA AGGTGAAGAACTGTTACCGGTGTTGTTCCGATCCTGGTTGAACTGGATGGTATGTTAACGCC ACAAATTCTCTGTTGTTGTTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTC ATCTGCACTACCGTAAACTGCCGTTCCATGCGCCGACTCTGGTACTACCTGACCTATGGTGTTC AGTGTTTTTCTGTTACCGGATCACATGAAGCAGCATGATTTCTTCAAATCTGCAATGCCGGAAGG TTATGTACAGGAGCGCACCATTTCTTTCAAAGACGATGGCACCTACAAAACCCGTGACAGGTTAA ATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCA ACATCCTGGGCCAAAACCTGGAATATAACTTCAACTCCATAACGTTTACATCACCGCAGACAAA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGG CGGACCACTACCAGCAGAACAACCTCCGATCGGTGATGGTCCGGTCTGCTGCCGATAACCACTACC TGTCCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGCGACCATGGTGTGCTGCTGGAG TTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTTCAAATGAgcggccgcat.....agat atacatGTGACCGAGACCGTCACCGAGACCACCGCCCCCGTCCCCGAAGCCGACGTCCAGGGT CCCGATTTCCCGCCATGCTGGCCGCGCGCCTGTGTACGACTTTCATCAGTCCGGCCAGCGCCATC</p>

			GTCTCGGGCCTGGATCTGCTGGAAGACCCCTCGGCCAGGACATGCGCGACGACGCCATGAACCT GATCGCCTCCTCGGCCCGAAGCTGGCGGACCTCTTGCAAGTTACCCGAGTGGCCTTCGGCGCCT CGGCCTCGGCCGAGAACTTCGACTCGCGGAACTGGAAAAGCTGGCCCAGGGCGTCTTTGCCCA TGTCCGCCGACCCCTGGACTGGCAGATCGAGCCGAGGCGATGAACAAGCCCTCGTCGCGCGCG GTGCTGAACATCGCCAGATCGCCGCCAGCGCCCTGCCGGCCGCGGCGTGGCCACCGTCAAGG GCGTGGCCCGACGGGCGCTTCTCGATCATCGCCGACGCCAAGGGCCCGCGCGCGCCTGCG TCCGGAGGTGCTGGCGGGCTAAAGGGCGAGCCGCTGGCCGAGGGCCTGGGCGGTCCGTGGGT GCAGGCGGCTATCTGAACGCCCTGGTGCAGCGGCCGGCGGCCAGATCGCCGTCGAGATCGGC GAGGACCGCGCTCGATCGCCGCTGGGTCCCGCGTAAactcagagtctg
pGB1953	pACYC- duet	pACYC- CpdRGFP	gagatataccGTGGCCCGCATCCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCG CGCTGGAACGCGCCGGCTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACT GGACCATCCCTGGGACTGCTGCTGACCGACATCGTCATGCCCGGCATGGACGGCATCGAGGTGG CCCGCAGGCCGCGCCCGGACCCGTCCTGCGCATCATGTTTCATACCCGGCTTCGCCCGGTGG CCCTCTCGGCCAGACCGCGCGCCCGCGGCCAAGGTGCTGTCAAAGCCCGTGCACCTGCG CGACCTCGTCGCCGAGTGCAAAAGATGATGGCGCCCTCGAGAGCGGCGGCGGCGGCAGTAA AGGTGAAGAACTGTTACCGGTGTTGTTCCGATCCTGGTGAAGTGGATGGTATGTTAACGCC ACAAATCTCTGTTCTGTTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCTGAAATTC ATCTGCACTACCGTAAACTGCCGTTCCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTC AGTGTTCCTCGTTACCCGATCACATGAAGCAGCATGATTTCTCAAATCTGCAATGCCGGAAGG TTATGTACAGGAGCGACCATTTCCTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGTTAA ATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCA ACATCCTGGGCCACAACTGGAATATAACTCAACTCCATAACGTTTACATCACCGCAGACAAACA GAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGG CGGACCACTACCAGCAGAACTCCGATCGGTGATGGTCCGGTTCGCTGCCGATAACCACTACC TGTCCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGGACCATGGTGTGCTGGAG TTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAATGagcgccgat
pGB1954	pBAD	pBAD- mCherry ΔN term PopZ	ggaattaaccATGGTGAGCAAGGGCGAGGAGGATAACATGGCCATCATCAAGGAGTTCATGCGCTTC AAGGTGCACATGGAGGGCTCCGTGAACGGCCACGAGTTCGAGATCGAGGGCGAGGGCGAGGGC CGCCCTACGAGGGCACCCAGACCGCAAGCTGAAGGTGACCAAGGGTGGCCCTGCTTCG CCTGGGACATCCTGTCCCTCAGTTCATGTACGGCTCCAAGGCTACGTGAAGCACCCCGCAGACA TCCCGACTACTTGAAGCTGCTTCCCGAGGGCTTCAAGTGGGAGCGCGTATGAACTTCGAG GACGGCGGCGTGGTACCCTGACCCAGGACTCCTCCTGCAGGACGGCGAGTTCATCTACAAGG TGAAGCTGCGCGCACCAACTTCCCTCCGACGGCCCGTAATGCAGAAGAAGACCATGGGCTG GGAGGCCTCCTCCGAGCGGATGTACCCGAGGACGGCGCCCTGAAGGGCGAGATCAAGCAGAG GCTGAAGCTGAAGGACGGCGCCACTACGACGCTGAGGTCAAGACCACCTACAAGGCCAAGAA GCCCGTGCAGCTGCCGGCGCCTACAACGTCAACATCAAGTTGGACATCACCTCCACAACGAGG ACTACACCATCGTGAACAGTACGAACGCGCCGAGGGCCGCACTCCACCGCGGCATGGACGA GCTGTACAAGcctcagggccttaattaatgcatggtaccGATGACGCGCCGGCGGAGCCTGCGGCCGA AGCGGGCCCCCGCCCGCCGGAACCCGAACCTGAACCGGTGTCGTTTCGACGACGAGGTTCTG GAATTGACGGATCCGATCGCGCCGAGCCGAGCTGCCCGCTGGAGACTGTCGGCGACATCG ACGCTATTCCCGCCGGAACCTGAGTCGGAACCGGCCTACACGCGCCCGCCGCGGCTCCGGTG TTTGATCGGACGAAGTCGCCGAGCAGCTGGTCCGGCTTTCGGCCGCTTCGGCCGCGGCGAGCG CCTTCGGCAGCCTGAGCTCGCCCTGCTGATGCCAAGGACGGTCCGACGCTGGAAGACGTCGT ACGCGAGCTGCTGCGCCGCTGCTCAAGGAGTGGCTGGACCAGAACCTGCCGCGATCGTCGAG ACCAAGGTTGAGGAAGAAGTGCAGCGTATCTCTCGGGGACGCGGCGCTAAactcagagatct
pGB1955	pMCS5 (NdeI, KpnI)	pMCS5- pCpdR CpdR YFP	ccaattgcatGGTCGCCGTCGAACATCGCCGGTCCAGCTCCAGGGCTCACGGTTCAGATCCACATA GGCGCGGGCGAAGCGGGCGCGCACACGCGGCCCCAGGGCGGGCGCGCCGCGATGATGC GGTGCACAAACGCGTCTCGACGCGCGCAGGGTCTCGAGCGGCAGGCGGACCCGCGGCGACCA TGTCTCCGGATAGAGGTGCGCCGAGTGCGGCGAGGCGAACCAAGGCGGTCCGGCGCGGCG CCCCGGCCGGACCGCGCGCAGCACCTCGAACGCTGGCCCGCAAAGGTCTCCAGCGCGGGG ACGAAAGCTCTTCGCTCGAAAGGGGCCCGCACGCGCTCATGCCGATCATGAAAGCGTCGCGGCG CGGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCAGCCGCGACGTTAGGTTTCATCCCCGAT TTACGGACGGGGCGATAAGGTGGATCCTTATCGACGATCTTAATCGGACAGGTGACCCCATGGCC CGCATCCTCCTCGCCGAAGACGATGATTCCTGCGCGGCTTCTGGCCCGCGGCTGGAACGCGC

			<p>CGGCTTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGG GACCTGCTGCTGACCGACATCGTCATGCCCGGCATGGACGGCATCGAGGTGGCCCGCCAGGCCG CGCCCGGACCCGTCCTGCGCATCATGTTTCATACCCGGTTCGCGCCGTGGCCCTCTCGGCCA GGACCGCGCGCCCGCGCGCCAAGGTGCTGTCCAAGCCCGTGCACCTGCGCGACCTCGTCGCC GAGGTCGAAAAGATGATGGCGGCCCGGTACCGCGGGCCCGGGATCCACATGGTGAGCAAGGGC GAGGAGCTGTTACCCGGGGTGGTGCCATCCTGGTTCGAGCTGGACGGCGACGTAAACGGCCACA AGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGAAGTTCAT CTGCACCACCGGCAAGCTGCCCGTGCCTGGCCACCCTCGTGACCACCTTCGGCTACGGCCTGC AGTGCTTCGCCCGTACCCCGACCACATGAAGCAGCAGACTTCTTCAAGTCCGCCATGCCCGAAG GCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGACGGCAACTACAAGACCCGCGCCGAGGT GAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGAC GGCAACATCCTGGGGCACAAGCTGGAGTACAACACTACAACAGCCACAACGTCTATATCATGGCCGA CAAGCAGAAGAACGGCATCAAGGTGAACCTTCAAGATCCGCCACAACATCGAGGACGGCAGCGTG CAGCTCGCCGACCACTACCAGCAGAACACCCCATCGGCGACGGCCCCGTGCTGCTGCCCGACAA CCACTACCTGAGTACCAGTCCGCCCTGAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCC TGCTGGAGTTCGTGACCGCCGCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTAGggtacctt aa</p>
pGB1956	pMCS5	pMCS5- pCpdR CpdR _{D51A} YFP	<p>ccaattgcatGGTCGCCGTGCAACATCGCCGGGTCCAGTCCCAGGGCTCACGGTTCAGATCCACATA GGCGCGGGCGAAGCGGGCGCGCACACCGCGGCCCCAGGGCGGGCGCGCCGCGATGATGC GGTCGACAAACCGTCTCGGACGCGCGCAGGGTCTCGAGCGCAGGCGACCGCGCGACCA TGTCTCCGGATAGAGGTGCGCCGAGTGCGGCGAGGCGAACCAAGGCGTTCGGCGCGGGC CCCCGCGGGACCGCGCGCAGCACCTCGAACGCTGGCCCGCAAAGGTCTCCAGCGCGGGG ACGAAAAGCTTTCGCTCGAAAGGGGCGCCACGCGCTCATGCCGCATCATGAAGCGTCGCGGG CGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCGACCGCGACGTTTAGGTTTCATCCCCGAT TTACGGACGGGGCGATAAGGTGGATCCTCTATCGACGATCTTAATCGGACACGTGACCCATGGCC CGCATCCTCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCGCTGGAACGCGC CGGCTTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGG GACCTGCTGCTGACCGCATCGTCATGCCCGGCATGGACGGCATCGAGGTGGCCCGCCAGGCCG CGCCCGGACCCGTCCTGCGCATCATGTTTCATACCCGGTTCGCGCCGTGGCCCTCTCGGCCA GGACCGCGCGCCCGCGCGCCAAGGTGCTGTCCAAGCCCGTGCACCTGCGCGACCTCGTCGCC GAGGTCGAAAAGATGATGGCGGCCCGGTACCGCGGGCCCGGGATCCACATGGTGAGCAAGGGC GAGGAGCTGTTACCCGGGGTGGTGCCATCCTGGTTCGAGCTGGACGGCGACGTAAACGGCCACA AGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGAAGTTCAT CTGCACCACCGGCAAGCTGCCCGTGCCTGGCCACCCTCGTGACCACCTTCGGCTACGGCCTGC AGTGCTTCGCCCGTACCCCGACCACATGAAGCAGCAGACTTCTTCAAGTCCGCCATGCCCGAAG GCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGACGGCAACTACAAGACCCGCGCCGAGGT GAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGAC GGCAACATCCTGGGGCACAAGCTGGAGTACAACACTACAACAGCCACAACGTCTATATCATGGCCGA CAAGCAGAAGAACGGCATCAAGGTGAACCTTCAAGATCCGCCACAACATCGAGGACGGCAGCGTG CAGCTCGCCGACCACTACCAGCAGAACACCCCATCGGCGACGGCCCCGTGCTGCTGCCCGACAA CCACTACCTGAGTACCAGTCCGCCCTGAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCC TGCTGGAGTTCGTGACCGCCGCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTAGggtacctt aa</p>
pGB1959	pBXMCS2 (NdeI, EcoRI)	pBXMCS2- CckA H+	<p>agacgacatATGGCCGACTTGACGCTCCAGGACAAGGTTTCGACCGCGCCCCGCTCGGCGGTTT GATCCATGGCTGGTCGGCGCGCGGTGTTTTTCGTGGCTGCGGCGCCCTCTCGGCGGCGCCGG CGCTCAAGGCCGACCGACCACCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCGTGCC TGTGTTGGGCTTGTGCCATTGCGGCTCAGCGCTTTCGGCGGCGACCCGACCGAGGCTGAG GGTTCATCGAGGCGCTGGCCGAGCCGGCCCTGGCCGCCGACGGTCGCTCCTGGCCG CCAACGGGCCCTGGCGGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGCGGGCT CCAGCCTGTTTGGCGCCCTGGTCCAGGCGGCCAGGGGCGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACCGCAAGTCTCGGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCATCGTTGTGCTGAGCCGTTGTGGAAGACGCGTCGCCGGCCCCGGTCCCGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCTTTCGCCGAGCCTCGCCGTTGGGCGCGGCCCTGCTGG AAGGCTGGAGCCGTTACCTCGCGGTGCTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCAAGGCCGGTGTGCTTTCGGCGATCTGATCGACGCGCCCTCGCGCGCCGAGGCCGAGACG</p>

			<p>CGCCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGGATCCGTGCGCATCG CTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCCAGGCCAGAAAGATGCAGGCCATCGGCCAGCTGGCCGGCGA AGTCGCGCACGACTTCAACAACCTCTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCCTCGGTGATCCGTCTGACGAGGGTCTCAACGAGATCCGTGACAGCGGGCGTGCAGCGCCG CCGACCTCGTGCAGCAAGCTCTTGGCTTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGTGCGCCGCTGCTGCGCAAGACGTCAAGC TGATACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCCGTCAACGCCCGCGACGCCGTGCGCGCGGCCAAGGGCGGGCGGCTCGT GCGCATCCGCACCGCGCGCCTGACCCGCGACGAGGGCATCCAGCTGGGTTTCCCGGCCGCGAC GGCGACACGGCCTTCATTGAGGTCAAGTACGATGGTCCGGGATTCCGCCGACGTGATGGGCAA GATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAAGGCCGCG GCCTTCCGATCTTCTGCCGGTCTATGAAGCGCCCGCGCGGGTCCGGTCCAGGCCGTGCG CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTGCGGCGCCGGCCGATCCTGTTCTGTCGAG GACGAGGACCGGTGCGCAGCGTCCCGCCCGCTGCTGCGCGCCCGTGGTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGCGACGATCGACCTCTT GATCAGCGACGTGATCATGCCCGCATCGACGGCCCGACCTTGCTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTGTATGTTTCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTCTTGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGT AAGCAGCAGCTGCAAGCAGCATAGgaattctgc</p>
pGB1960	pBXMCS2	pBXMCS2- CckA K-	<p>agacgaccatATGGCCGACTTGCAGCTCCAGGACAAGGTTTCGACCGCGCCCGCGTGGCGGTTT GATCCATGGCTGGTGGCGCGCGGGTGTGTTTTCTGGCTGCGCGGCCCTCTCGCGCGCGCCGG CGCTCAAGGCCGACCGACCCCTGGCCGGCCTGCTGCTGCTTCTGGGCGTGCAGGGCGTGGC TGTGTTGGCCTTGTGCGCATTGCGGCTCAGCGCTTCCGGCGCGACGCCGACAGGCTGAG GGGTTTCATCGAGGCGTGGCCGAGCCGGCCGCTGGCCGCGCCGACGGTGCAGTCTGGCCG CCAACGGGCCCTGGCGCAAGTCAAGGCGAAGAGCGCCGCTGCCAAGGGCGTGGCGGGCT CCAGCCTGTTTGGGCCCTGGTCCAGGCGCGCAGGGGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACCGCAAGGTCTCGGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCATCGTTGTGCTGAGCCGGTGTGGAAGACGCGTCCCGGCCCGGTCGCCGAGCGCGC CGCCCCGCCACCCAGCTCGTGGACGCCTTCCGCGAGCCTCGCCGTTGGCGCGGCCCTGCTGG AAGGCTGGAGCCGTTACCTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCCAAGGCCGGTGTGCTGTTCCGCGATGATCGACGCGCCTCGCGCGCCGAGGCCGAGACG CGCCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGGATCCGTGCGCATCG CTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCCAGGCCAGAAAGATGCAGGCCATCGGCCAGCTGGCCGGCGG CGTGCAGGGCGGACTTCAACAACCTCTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATC GCCATCCCCTCGGTGATCCGTCTGACGAGGGTCTCAACGAGATCCGTGACAGCGGGCGTGCAGCGC GCCGACCTCGTGCAGCAAGCTTGGCTTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGG ATCTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGTGCGCCGCTGCTGCGCAAGACGTCAA GCTGATACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCGAGACG GCGGTGATGAACCTGGCCGTCAACGCCCGCGACGCCGTGCGCGCGGCCAAGGGCGGGCGGCTC GTGCGCATCCGCACCGCGCGCCTGACCCGCGACGAGGGCATCCAGCTGGGTTTCCCGGCCGCG ACGGCGACACGGCCTTCATTGAGGTCAAGTACGATGGTCCGGGATTCCGCCGACGTGATGGG AAGATCTTCGACCCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCAC GGTCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAAGGGC CGCCTTCCGCATCTTCTGCCGGTCTATGAAGCGCCCGCGGGTCCGGTCCAGGCCGTC GCCGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTGCGGCGCCGGCCGATCCTGTTCTGTCG AGGACGAGGACGCCGTGCGCAGCGTCCCGCCCGCTGCTGCGCGCCCGTGGTACGAGGTGCT TGAGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGCGACGATCGACCTC TTGATCAGCGACGTGATCATGCCCGCATCGACGGCCGACCTTGCTGAAGAAGGCGCGTGGCTA TCTGGGGACCGCGCCGGTGTATGTTTCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTCTTGG AAGGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGT CAAGCAGCAGCTGCAAGCAGCATAGgaattctgc</p>

pGB1961	pXMCS5 (NdeI, KpnI)	pXMCS5- YFP-CtrA RD+15	<p>agacgaccatATGAGCAAGGGCGAGGAGCTGTTACCGGGGTGGTGCCCATCTGGTTCGAGCTGGA CGGCGACGTAAACGGCCACAAGTTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGC AAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCTGGCCACCCTCGTGAC CACCTTCGGCTACGGCCTGCAGTGCTTCGCCCCTACCCGACCACATGAAGCAGCAGACTTCTT CAAGTCCGCCATGCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTCAAGGACGACGGCAACT ACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGG GCATCGACTTCAAGGAGGACGGCAACATCTGGGGCACAAGCTGGAGTACAACACAACAGCCA CAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAACTTCAAGATCCGCCACA ACATCGAGGACGGCAGCGTGCAGCTCGCCGACCACTACCAGCAGAACACCCCATCGGCGACGG CCCCGTGCTGCTGCCGACAACCACTACCTGAGCTACCAGTCCGCCCTGAGCAAAGACCCCAACG AGAAGCGCGATCACATGGTCTGCTGGAGTTCGTGACCGCCGCGGGGATCACTCTCGGCATGGAC GAGCTGTACAAGggaagtagcggTGCgCGCTACTGTTGATCGAGGATGACAGCGCGACGGCGCAGA CCATCGAACTGATGCTGAAGTCTGAAGGCTTCAACGTCTATACGACGGATCTGGGTGAAGAAGGC GTCGATCTGGGCAAGATCTACGACTACGATCTTATCCTGCTCGACCTCAATCTCCGGACATGAGCG GCATCGATGTTCTGCGCACCTGCGGGTTCGGAAGATCAACACGCCCATCATGATCTGTCGGGCT CGTCGGAAATCGACACCAAGGTCAAGACCTTCGCCGGCGCGCCGACGACTACATGACCAAGCC GTTCCACAAGGACGAAATGATCGCCCGCATCCACGCGGTGGTCCGTGGCTATGTCTGCGCGACC CGAACGAGCAGGTTAACGCCGCTGAggtaccacgt</p>
pGB1962	pXMCS5	pXMCS5- YFP-TacA	<p>agacgaccatATGAGCAAGGGCGAGGAGCTGTTACCGGGGTGGTGCCCATCTGGTTCGAGCTGGA CGGCGACGTAAACGGCCACAAGTTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGC AAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCTGGCCACCCTCGTGAC CACCTTCGGCTACGGCCTGCAGTGCTTCGCCCCTACCCGACCACATGAAGCAGCAGACTTCTT CAAGTCCGCCATGCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTCAAGGACGACGGCAACT ACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGG GCATCGACTTCAAGGAGGACGGCAACATCTGGGGCACAAGCTGGAGTACAACACAACAGCCA CAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAACTTCAAGATCCGCCACA ACATCGAGGACGGCAGCGTGCAGCTCGCCGACCACTACCAGCAGAACACCCCATCGGCGACGG CCCCGTGCTGCTGCCGACAACCACTACCTGAGCTACCAGTCCGCCCTGAGCAAAGACCCCAACG AGAAGCGCGATCACATGGTCTGCTGGAGTTCGTGACCGCCGCGGGGATCACTCTCGGCATGGAC GAGCTGTACAAGGGAAGTAGCGGTGCGACAAAACGGTCTTGTCTGTCGATGACGACCCGACAC AACGTGCGTTGATTCAAGCGGTGCTCGAGCGCGACGGGTTGCGGGTCTCGCACGCGGAAGGCGG CGACGCGGCGATCGCGACCTGACGTCCGGCGCGCCGCGGATGTCATCCTGCTGGATCTGTCAT GCCTGGCCTCAACGGTCAGGACGCCCTGAAGGAAATGCGCGCCCGCGGTTCAACCAGCCCGTG ATCGTGCTGACGGCCAGCGGTGGCGTGCACACCGTGGTCAAGGCCATGCAGGCCGGCGCCTGCG ACTTCTCATCAAGCCCGCCTCGCCGAGCGGATCACCGTGTGATCCGCAACGCCCTGTCGATGG GCGACCTCAAGGGCGAGGTGAGCGGGTGACCAAGCGCGGGGCGGAAGACCCTTCGCGG ACCTGATCGGCGCCTCGCCGTCATGACCATGGTCAAGCGCATGGGCGAGCGGGCCGCAAGAG CGGTATCCCGGTGCTGATACCGGCGAAAAGCGGCGTCCGCAAGGAGCTGATCGCCGCGCCGTC CACGGCTCTCCGACCGCGCCGGAAGCCGTTTGTGCGGGTCAACTGCGGCGGATCCCGAGAA CCTCGTCGAGTCGATCCTGTTGCGCCACGAGAAGGGCTCGTTACCGGCGCCACCAGACAAGCATC TGGGCAAGTTCAAGGAGGCCGACGGCGGACCCGTTCCTCGATGAGGTGCGCGAGCTGCCGCT CGACATGCAGGTCAAGCTGCTGCGGCCCTGCAGGAGGGCGAGATCGACCCGATCGGCTCCAAG CGCTCGATCAAGGTGATGTCGGATCGTGTGCGGACCAATCGCGATCTGCAGCAGGCCGTTTC GGGCGGCCGTTCCGCGAAGACCTGTTTATCGCCTGAACGTGTTCCGATCGAGCGCCGTCCTC TGCGGAGCGTTCGCGAGGACATCCCGCCCTCGTCGAGGCGTTCATCCGCCGTTCAACGTCGAA GAAGGCAAGCGCGTATCGGCGCCTCGCCGAGACGATGCAACTGCTGACCAGCTTCGACTGGC CCGGCAATGTGCGCAACTGAAAAACACCGTCTATCGCGCCATCGTGTGCGCGATGCGCCCTATC TGCAGCCGTTGACTTCCCGGCGATCTCGGGCTGGCCGCGCCGATCGAGGCCGTCGATCTCGC CCTCGCCGCCCTGCAGCCCTGTTGCAAGCCACGCATGCGGCGATGGCCGCCCGCGTGCAGAG GCGCCTGTGCGATCCTCGACGATCGCGGTACCTGCGGACCCTGGAGGAGATCGAGCGCGACCT CATCCAGCATGCGATCGACTTATGCCGCCACATGAGCGAGGTGCGCGGGGTTGGGCATCG GTCGCTGACCCCTATCGCAAGGTTGCGGAGCAGGGCATCGAAGTGCATGAAGGAAAGCGGG CTGAggtaccacgt</p>

pGB1963	pXMCS5	pXMCS5-YFP-PdeA	<p>agacgaccatATGAGCAAGGGCGAGGAGCTGTTACCGGGGTGGTGCCCATCTGGTTCGAGCTGGA CGGCGACGTAAACGGCCACAAGTTTACGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGC AAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCTGGCCACCCTCGTGAC CACCTTCGGCTACGGCCTGCAGTGCTTCGCCCGCTACCCCGACCACATGAAGCAGCAGACTTCTT CAAGTCCGCCATGCCGAAGGCTACGTCCAGGAGCGACCATCTTCTTCAAGGACGACGGCAACT ACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGG GCATCGACTTCAAGGAGGACGGCAACATCTGGGGCACAAGCTGGAGTACAACATAACAGCCA CAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAAGTCAAGATCCGCCACA ACATCGAGGACGGCAGCGTGCAGCTCGCCGACACTACCAGCAGAACACCCCATCGGCGACGG CCCCGTGCTGCTGCCGACAACACTACCTGAGCTACCAGTCCGCCCTGAGCAAAGACCCCAACG AGAAGCGCGATCACATGGTCTCTGCTGGAGTTCTGTGACCGCCGCGGGGATCACTCTCGGCATGGAC GAGCTGTACAAGGGAAGTAGCGGTGCGTCTTTTCGGACAGGGCAACGACGAATCTGGGACGCGA CGGCCACGCTTGAGGGCGCTGGGCGCGGGACGTCGCCCTGTGGATCTGGGAGCCCGAAACCG ACAGTTTGCCTGTAACGGCGCGGCGCGCCTTGGGCCTTGGGCCGCTGGCGCCTGAATGCTC GTCGGCCGCTTCCGCGCCCTGGCCCTGCCGAGGATCGCGCCAGGCCGAAGAGGTCTGAAG CCGCGTGAACCGGGCAGCGAAGTCTGTCGCCGTTTCCGCGTGCAGCGCGGGCAGACTGCTCT GGCGCGCGTCTGGCTGGAAGAGGGCGTGCAGCGCCGCGCGTCTGGCGCCGAAACGAAT TCTCCGCTCCGAGCTTTCGACCTGACCGGACTTCTGGACCGTGCAGCTTCTCGCCCGCGCC GCGAGCGCTGGCGCAGGAGGGGACCCACAGTTTGGTCTGCGCCGACCTCGACCGACTGCGTCC CCTGAACGAGGGCGTGGTTCACGAGCGCGGACCTAGTCTGGCGGGCTGGGCTCGCGCCTG GCGGCGCGTTCGCCGCCAGTCGATCCTGGGCCGATCGGCGAGGACGAGTTCGCCGTTCTCT GCCAGCCGCTCGGCTACGAACCTCCGATGTGCTGCGCAGCGCGTGGAGCAGCCGCTGCGCGT GGCCGCTTTGATATTCACCCGACCCTGTGATCGGCGCGGTCTCGGCCGAAGCGCGCCTGGACG CGCCGACGCGCCGAAGTCTGCGCCGCGCGAAGTGGCGTGCAGGCCCGCCGCGCCGCGG GCCGAGGCGCGCGGCCGCTATGGCCGGCGATGGAGACCGACGGCTGTGCGCCTGGCGC TGGAGGCTGATCTGCGCGCGCCATTGGTTCGGGGCGAGATCACGCCCTACTCCAGCCGATCGTG CGGCTGTGACCGGGCGCCCTGTCCGGCTTCGAGGCCCTGGCCGCTGGATCCATCCGCGCCGGG GCATGCTGCCGCCGGACGAGTTCTGCCGCTGATCGAAGAGATGGGGCTGATGAGCGAGCTCGG CGCGCATGATGCACGCCGCCGCCAGCAGCTGTGACCTGGCGCGCCGCTACCCGGCGATGG GGAACCTGACTGTCAGCGTCAACCTGTCGACCGGCGAGATCGACCGCCCGGCTGGTCCGCGA CGTGCCGAGACCCTGCGGGTCAATCGCTGCCGCGCGGCCCTGAAGCTGGAAGTACCAGAA AGCGACATCATGCGGATCCCGAACGGGCCCGGTGATCCTGAAGACGCTGCGCGACGCGGGCG CAGGGCTTGCCTGGACGACTTCGGCACCGGCTTCTGTCGCTGTGATCCTGACGCGCCTGCCG TTCGACACGCTGAAGATCGACCGCTACTTCTGCCACCATGGGCAATAACGCCGGCTCGGCCAA GATCGTCCGCTCGGTGGTCAAGCTGGGCCAGGATCTGGATCTGGAAGTCTGCGCGAAGGGGTC GAGAACGCCGAGATGGCGCATGCGCTGCAATCGTGGGCTGTGACTATGGCCAAGGCTTTGGCTA TGCGCCGGCCCTGTGCGCCGAGGAGGCCGAGGTCTATCTGAACGAGGCCTATGTGACGGCGCC GCGCCGGTGAAGGCGCGGGTTAAggtaccacgt</p>
pGB1964	pXMCS5	pXMCS5-HA-CtrA RD+15	<p>agacgaccatATGTACCCATACGATGTTCCAGATTACGCAGGAAGTTCGCTACTGTTGATCGAGGATG ACAGCGCGACGGCGCAGACCATCGAAGTATGCTGAAGTCTGAAGGCTTCAACGTCTATACGACG GATCTGGGTGAAGAAGGCGTCGATCTGGGCAAGATCTACACTACGATCTTATCCTGCTCGACCTC AATCTCCGGACATGAGCGGCATCGATGTTCTGCGCACCTGCGGGTTCGGAAGATCAACACGCC CATCATGATCCTGTGCGGCTCGTCGAAATCGACACCAAGGTCAAGACCTTCGCCGGCGGGCGCCG ACGACTACATGACCAAGCCGTTCCACAAGGACGAAATGATCGCCCGCATCCACGCGGTGGTCCGT GGCTATGTGCTGCGCGACCCGAACGAGCAGGTTAACGCCGCTGAggtaccacgt</p>
pGB1965	pXMCS5	pXMCS5-HA-TacA	<p>agacgaccatATGTACCCATACGATGTTCCAGATTACGCAGGAAGTACCAAAACGGTCTTGTGCTCG ATGACGACCCGACACAACGTCGGTTGATTCAAGCGGTGCTCGAGCGCGACGGGTTCCGGTCTC GCACGCGGAAGGCGGCGACGCGGCGATCGCGCACCTGACGTCCGGCGCGCCCGCCGATGTCATC CTGCTGGATCTCGTATGCTGCTCAACGGTTCAGGACGCCCTGAAGGAAATGCGCGCCCGCGG CTTCAACCAGCCCGTATCGTGTGACGCGCCAGCGGTGGCGTGCACACCGTGGTCAAGGCCATGC AGGCCGGCGCCTGCGACTTCTTATCAAGCCCGCCTCGCCGAGCGGATCACCGTGTGATCCGC AACGCCCTGTGATGGGCGACCTCAAGGGCGAGGTTCGAGCGGCTGACCAAGCGCGCGGGCGGC AAGACCACCTTCGCGGACCTGATCGGCGCCTCGCCGGTTCATGACCATGGTCAAGCGCATGGGCGA GCGGGCCGCAAGAGCGGTATCCCGGTGCTGATACCGGCGAAAGCGGCGTGGCAAGGAGCT GATCGCCCGCGCCGTCACGGCTTCTCCGACCGCGCCGCAAGCCGTTTGTGCGGGTCAACTGCG</p>

			<p>GCGCGATCCCCGAGAACCTCGTCGAGTCGATCCTGTTTCGGCCACGAGAAGGGCTCGTTCACCGGC GCCACCGACAAGCATCTGGGCAAGTTCAAGGAGGCCGACGGCGGCACCCTGTTCTCGATGAGG TCGGCGAGCTGCCGCTCGACATGCAGGTCAAGCTGCTGCGCGCCTGCAGGAGGGCGAGATCGA CCCGATCGGCTCCAAGCGCTCGATCAAGGTCGATGTCGGGATCGTGTGCGGACCAATCGCGATCT GCAGCAGGCCGTTTCGGGCGGCCGTTCCGCGAAGACCTGTTTTATCGCCTGAACGTGTTCCCGA TCGAGGGCGCCGTCCCTGCGCGAGCGTGCAGGACATCCCGGCCCTCGTCGAGGGCTTATCCGC CGTTCAACGTGAAGAAGGCAAGCGCGTGCAGGCGCTCGCCGAGACGATGCAACTGCTGA CCAGCTTCGACTGGCCCGCAATGTGCGCAACTGAAAAACACCGTCTATCGCGCCATCGTGTG GCCGATGCGCCCTATCTGCAGCCGTTGACTTCCCGGCGATCTCGGGCCTGGCCGCGCCGATCGA GGCCGTATCGATCTGCCCTCGCCGCCGCTGCAGCCCTGTTGCAAGCCACGCATGCGGGCATGG CCGCCGCGTGCAGAGGGCGCTGTGCGCATCTCGACGATCGCGGTACCTGCGGACCCTGGAG GAGATCGAGCGGACCTCATCCAGCATGCGATCGACGTCTATGCCGGCCACATGAGCGAGGTGCG GCGGCTTTGGGCATCGGTGCTCGACCTCTATCGCAAGGTTGCGGAGCAGGGCATCGAAGTCG ACATGAAGGAAGCGGGCTGAaggtaccagt</p>
pGB1966	pXMCS5	pXMCS5-HA-PdeA	<p>agacgaccatATGTACCCATACGATGTTCCAGATTACGCAGGAAGTTCTTTTCGGACAGGCCAAGCAGC GAATCTGGGACGCGACGGCCACGCTTGAGGCGCTGGGCGCGGGACGTCGCCCTGTGGATCTG GGAGCCCGAAACCGACAGGTTGCGTCTGAACGGCGCGGCGCGCCTTGGGCCTTGGGCCGCT GGCGCCTGAATGCTCGTGGCCGCTTCCGCGCCTGGCCCTGCCGAGGATCGCGCCAGGCCG AAGAGTCTGAAGCCGCGTGAACGGGCGAGCGAAGTCGTCGCCGTTTCCGCGTGCAGGGCG GCGAGACTGCCTTGGCGCGCGTCTGGCTGGAAGAGGGCGTGCAGCGCCGCGGCGTCTGCG CGCCGAAACGAAATCTCCGCGTCCGAGCTTTCGACCTGACCGGACTTCTGGACCGTGCAGC TTCTCGCCCGCGCCCGGAGCGCCTGGCGCAGGAGGGGACCCACAGTTGGTCTGCGCCGACC TCGACCGACTGCGTGCCTGAACGAGGCGTGGGTACGAGCGCGCGGACCTAGTCTGGCGGC GCTGGGCTCGCGCCTGGCGGCGGCTTCCCGGCCAGTCGATCCTGGGCCGATCGGCGAGGAC GAGTTCGCCGTTCTTCCAGCCGCTCGGCTACGAACCCTCCGATGTGCTGCGCAGCGCGTGA GCAGCCGCTGCGCGTGGCCGGCTTTGATATCACCCGACCCTGTCGATCGGCGCGGTCTCGGCCG AAGCGGCCTGGACGCGCCGACGCCGCCAACTGCTGCGCCGCGCGAACTGGCCGTCGAGG CCGCCGCGCCGCGGCGGAGGCGCGCGGCCGCTATGGCCGGGCGATGGAGACCGACGGCC TGTCGCGCCTGGCGTGGAGGCTGATGTCGCGGCGCCATTGGTGGGGCGAGATCACGCCCTAC TTCCAGCCGATCGTGCAGGCTGTCGACCGGCGCCCTGTCCGGCTTCGAGGCCCTGGCCGCTGGAT CCATCCGCGCCGGGGCATGCTGCCGCGGACGAGTTCTGCCGCTGATCGAAGAGATGGGGCTG ATGAGCGAGCTCGGCGCGCACATGATGCACGCCGCCAGCAGCTGTCGACCTGGCGCGCCG CTCACCCGGCGATGGGGAACCTGACTGTGACGCTCAACCTGTCGACCGGCGAGATCGACCGGCC GGCCTGGTCCCGACGTGGCCGAGACCCTGCGGGTCAATCGCCTGCCGCGCGGCGCCCTGAAGC TGGAAGTACCAGAAAGCGACATCATGCGGATCCCGAACGGGCGCCGCTGATCCTGAAGACGCTG CGGACGCGGGCGCAGGGCTTGCCTGGACGACTTCGGCACCGGCTTCTGTCGCTGTCGTACCT GACGCGCCTGCCGTTTCGACACGCTGAAGATCGACCGCTACTTCGTCGCCACCATGGGAATAACG CCGGCTCGGCCAAGATCGTCCGCTCGGTGGTCAAGCTGGGCCAGGATCTGGATCTGGAAGTCGTC GCCGAAGGGTTCGAGAACGCCGAGATGGCGCATGCGCTGCAATCGCTGGGCTGTGACTATGGCC AAGGCTTTGGCTATGCGCCGCCCTGTGCGCGAGGAGGCCGAGGTCTATCTGAACGAGGCCTAT GTCGACGGCGCCGCGCGGTTAAGGCGCGGGTTAAaggtaccagt</p>
pGB1967	pVMCS6 (NdeI, KpnI)	pVMCS6-ClpX-GFP	<p>ggaaacgcatATGACGAAAGCCGCGAGCGGCGACACGAAAAGCACCCCTGTACTGCTTTTCTGCGG AAAGAGCCAACATGAGGTGCGCAAGCTCATCGCGGACCGACGGTGTTCATTTGCGATGAATGCG TCGAGCTCTGCATGGACATCATCCGCGAAGAGCACAAGATCGCCTTCGTAAGTCTAAGGACGCG GTCCCGACGCCGCGCAAACTGCGAAGTCTGGATGATTACGTGATCGGTCAAGGTCACGCCAA GAAGTCTTCGCGGTGCGAGTGCACAATCACTACAAGCGGTGAACCACGCTTCAAGAATAACG ACGTCGAACTGGCCAAGTGAACATCCTGCTGGTCCGTTCCGACCGGTACGGGTAAGACCCTGCTG GCGCAGACGCTGGCCGAATCATCGACGTTCCGTTACGATGGCGGACGCCACGACGCTGACCGA AGCCGTTACGTCGGCGAAGACGTCGAGAATCATGCTGTAAGCTGCTGAGGCCGCCGACTAC AACGTCGAGCGCGCCAGCGCGGCATCGTCTACATCGACGAAATCGACAAGATCAGCCGCAAGTC CGACAACCCGTCGATCACTCGCGACGTGTCGGGCGAGGGCGTGCAGCAGGCTCTGCTGAAGATC ATGGAAGGCACGGTCCCTCCGTGCCGCCGAGGGCGGGCGCAAGCATCCTCAGCAGGAGTTCC TGCAGGTCGACACGACGAACATCTGTTTATCTGTGGCGGCGCCTTCGCTGGCCTGGAGAAGATC ATCTCGGCGCGCGGCGGCCAAGTCGATCGGCTTCGGCGCAAGGTGACCGATCCCGAAGAGC GCCGACGGGCGAGATCCTTCGGAACGTCGAGCCCGACGACTGCAGCGTTTCGGCCTGATCCC</p>

			<p>GGAGTTCATCGGCCGCTGCGCGTGGTCGCCACGCTGGAGGATCTGGACGAGGCCGCCCTGGTC AAGATCCTGACCGAGCCGAAGAACGCCTTCGTCAAGCAGTATCAGCGCCTGTTTCGAGATGGAGAA CATCGGCCTGACCTTACCGAAGACGCTCTGCATCAGGTGGCCAAGAAGGCTATCGCGCGAAGA CCGGCGCGCGGCCTGCGCTCGATCATGGAAGGCATCCTGCTGGAGACCATGTTTGAAGTCCG ACCTACGAGGGCGTCGAGGAAGTGGTGGTCAACGCCGAGGTCGTCGAAGGCCGGGCTCAGCCG CTGCTGATCTATGCCGAGAAAAAGGGTGGGGCGGCATCGGCCGGAAGTAGTAAAGGTGAAGAAC TGTTACCCGGTGTGTTCCGATCCTGGTTGAACTGGATGGTATGTTAACGGCCACAAATTCTCTGT TCGTGGTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTCATCTGCACTACCG GTAAACTGCCGGTCCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTCAGTGTTCCTCTCG TTACCCGGATCACATGAAGCAGCATGATTTCTTCAAATCTGCAATGCCGGAAGGTTATGTACAGGA GCGCACCATTTCTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAAATTTGAAGGTG ATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCAACATCCTGGGC CACAAACTGGAATATAACTCAACTCCCATAACGTTTACATCACCGCAGACAAACAGAAGAACGGT ATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGGCGGACCACTAC CAGCAGAACACTCCGATCGGTGATGGTCCGGTTCTGCTGCCGGATAACCACTACCTGTCACCCAG TCTAAACTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTGCTGCTGGAGTTCGTTACTGC AGCAGGTATCACGCACGGCATGGATGAACTCTACAAATAGggtaccacgt</p>
pGB1968	pVMCS6	pVMCS6- RcdA-GFP	<p>ggaaacgcatATGACCGAAGTGAACGCGTTCGCGGACACGCTTGGCGCGCTGGAGTATCCAGGA TTTCGCGCGATCGGAACTGTTCCGACCGGACGTTTCGAGGAAGGCATGCAACTGGTAGAAGAGACC GCCGCTATCTCGACGGGGCCGGACGCCATGACAGCAAGGTCCTCTCAGCAACGCCGCCCTGGG CTACGCCACCGAAAGCATGCGCCTGACCACGCGCCTGATGCAGGTCGCTCCTGGCTTTTGGTGC AGCGCGCCGTACGTGAAGGCGAGATGCCGCCGAAGCCGCTGCGTGAAGCCTATCGCCTGGC CGAAGAGGCCCGCCGATGGTCCGGCCGTCGAGGAAGTCCGTTTGGCCTGATGAACCTGCTG CAGCGCTCCGAGCGCCTGTACGAGCGCGTCCGCCACCTGGACCGCCGATGATGTCGAGTCGCC GAACGAAGAAGCGCCGCGTCCGGTTCAGAACCAGCTCGATCGCTTACGCGCGCGTTCGGAGGC AGCGGCGCGCGCGCAGTAAAGGTGAAGAAGTTCACCCGGTGTGTTCCGATCCTGGTTGAAC TGGATGGTATGTTAACGGCCACAAATCTCTGTTCTGTTGGTGAAGGTGAAGGTGATGCAACCAAC GGTAAACTGACCCTGAAATTCATCTGCACTACCGGTAAGTCCCGGTTCCATGGCCGACTCTGGTG ACTACCCTGACCTATGGTGTTCAGTGTTCCTGTTACCCGGATCACATGAAGCAGCATGATTTCTT CAAATCTGCAATGCCGGAAGGTTATGTACAGGAGCGCACCATTTCTTCAAAGACGATGGCACCTA CAAAACCCGTGCAGAGGTTAAATTTGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCA TTGATTTCAAAGAGGACGGCAACATCCTGGGCCACAACTGGAATATAACTTCAACTCCCATAACG TTTACATCACCGCAGACAAACAGAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTG AAGACGGTAGCGTACAGCTGGCGGACCACTACCAGCAGAACACTCCGATCGGTGATGGTCCGGTT CTGCTGCCGGATAACCACTACCTGTCCACCCAGTCTAAACTGTCAAAGACCCGAACGAAAAGCGC GACCACATGGTGCTGCTGGAGTTCGTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTAC AAATAGggtaccacgt</p>
pGB1969	pACYC- duet (NcoI, XhoI)	pACYC- CpdR-TEV- GFP-6XHis	<p>gagatataccATGGCAAGAATTCTCTCGTGAAGATGATGATTCTCTGAGAGGATTCTGGCTAGAG CTCTGGAAAGAGCTGGATTGAAGTCCAGGCTTGCCTGATGGAGAAGAAGCTGTCCAGCACCT GGATCATCCTTGGGATCTGCTGCTGACAGATATTGTCATGCTGGAATGGATGGAATTGAAGTGGC TAGACAGGCTGCTGCTAGAGATCCGAGTCTGAGAATTATGTTTATTACAGGATTGCTGCTGTGGCT CTCTCGGCTCAGGATAGAGCTCCTGCTGGAGCTAAGGTGCTGAGTAAGCCTGTGCACCTGAGAGA TCTCGTCTGTAAGTCGAAAAGATGATGGCTGCTGAAAACCTGTATTTTACGGGTAGCAGTAAAG GTGAAGAACTGTTACCCGGTGTGTTCCGATCCTGGTTGAACTGGATGGTATGTTAACGGCCACA AATTCCTGTTCGTGGTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTCATCT GCACTACCGGTAAACTGCCGGTCCATGGCCGACTCTGGTACTACCCTGACCTATGGTGTTCAGT GTTTTCTCGTTACCCGGATCACATGAAGCAGCATGATTTCTTCAAATCTGCAATGCCGGAAGGTTA TGTACAGGAGCGCACCATTTCTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAAAT TGAAGGTGATACTCTGGTGAACCGTATTGAACTGAAAAGGCATTGATTTCAAAGAGGACGGCAACA TCCTGGGCCACAACTGGAATATAACTTCAACTCCCATAACGTTTACATCACCGCAGACAAAACAGA AGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAGACGGTAGCGTACAGCTGGCG GACCACTACCAGCAGAACACTCCGATCGGTGATGGTCCGGTTCTGCTGCCGGATAACCACTACCTG TCCACCCAGTCTaaaCTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTGCTGCTGGAGTTC GTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAACACCATACCATACCATAGc tcgagctcg</p>

pGB1970	pACYC- duet	pACYC- CpdR _{D51A} - TEV-GFP- 6XHis	<p>gagatataccATGGCAAGAATTCTCTCGCTGAAGATGATGATTCTCTGAGAGGATTCTGGCTAGAGCTCTGGAAAGAGCTGGATTTGAAGTCCAGGCTTGCCTGATGGAGAAGAAGCTGTCCAGCACCTGGATCATCCTTGGGATCTGCTGCTGACAGCCATTGTCATGCCTGGAATGGATGGAATTGAAGTGCC TAGACAGGCTGCTGCTAGAGATCCGAGTCTGAGAATTATGTTTATTACAGGATTTGCTGCTGTGGCTCTCTCGGCTCAGGATAGAGCTCCTGCTGGAGCTAAGGTGCTGAGTAAGCCTGTGCACCTGAGAGATCTCGCTGAAGTCGAAAAGATGATGGCTGCTGAAAACCTGTATTTTCAGGGTAGCAGTAAAGGTGAAGAACTGTTACCCGGTGTGTTCCGATCCTGTTGAACTGGATGGTGTGTTAACGGCCACA AATTCTCTGTTCTGTTGAAGGTGAAGGTGATGCAACCAACGGTAAACTGACCCTGAAATTCATCTGCACTACCCGTAACCTGCCGTTCCATGGCCGACTCTGGTGACTACCTGACCTATGGTGTTCAGTGTGTTTCTCGTTACCCGGATCAGATGAAGCAGCATGATTTCTTCAAATCTGCAATGCCGGAAGGTTA TGACAGGAGCGCACCATTTCTTTCAAAGACGATGGCACCTACAAAACCCGTGCAGAGGTTAAATTGAAAGTGATACTCTGGTGAACCGTATTGAACTGAAAGGCATTGATTTCAAAGAGGACGGCAACA TCCTGGGCCACAACTGGAATATAACTTCAACTCCATAACGTTTACATCACCGCAGACAAAACAGAAGAACGGTATCAAAGCTAACTTCAAATTCGCCATAACGTTGAAAGACGGTAGCGTACAGCTGGCGGACCACTACCAGCAGAACTCCGATCGGTGATGGTCCGTTCTGCTGCCGATAACCACTACCTGTCCACCCAGTCTaaaCTGTCAAAGACCCGAACGAAAAGCGCGACCACATGGTGCTGCTGGAGTTCTTACTGCAGCAGGTATCACGCACGGCATGGATGAACTCTACAAACACCATCACCATCACCATTAGc</p> <p>tcgagtctg</p>
pGB2010		pBXMCS2- pCpdR CpdR	<p>agacgaccatTCACGGTTCAGATCCACATAGGCGCGGGCGAAGCGGGCGCGCACCCACGGCGGCCCCAGGGCGGGCGCGCCGCGGATGATGCGGTCGACAAACGCGTCTCGGACGCGCGCAGGGTCTC GAGCGGCAGGCGGACCGCGGCGACCATGTCTCCGGATAGAGGTCGCCGAGTGCGGCGAGGC GAACACCAAGGCGGTGCGCGGGCGCCCGGCCGGGACCGCGCGCAGCACCTGAAACGCTGG CCCGCCAAAGGTCTCAGCGGCGGGGACGAAAGCTCTTCGCTCGAAAGGGGCCACGCGCTC ATGCCGCATCATCGAAGCGTCCGCGCGGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCC AGCCGCGACGTTTAGGTTTACCCGATTTACGGACGGGGCGATAAGGTGGATCCTCTATCGACGA TCTTAATCGGACACGTGACCCatgGCCCGCATCTCTCGCCGAAGACGATGATTCCTGCGCGGC TTCCTGGCCCCGCGCTGGAACGCGCCGGTTCGAAAGTCCAGGCCTGCGCCGACGGCGAAGAGG CCGTCCAGCACCTGGACCATCCCTGGGACCTGCTGCTGACCGACATCGTCATGCCGGCATGGACG GCATCGAGGTGGCCCGCAGGCCCGCCCGCGACCCGTCCCTGCGCATCATGTTTATCACCGGC TTCGCCCGGTGGCCCTCTCGGCCAGGACCGCGCGCCCGGCCGCGCAAGGTGCTGTCCAAGC CCGTGCACCTGCGCGACCTCGTCGCCGAGGTGCGAAAAGATGATGGCGGCCtgagaattcctgc</p>
pGB2011		pBXMCS2- pCpdR CpdR _{D51A}	<p>agacgaccatTCACGGTTCAGATCCACATAGGCGCGGGCGAAGCGGGCGCGCACCCACGGCGGCCCCAGGGCGGGCGCGCCGCGGATGATGCGGTCGACAAACGCGTCTCGGACGCGCGCAGGGTCTC GAGCGGCAGGCGGACCGCGGCGACCATGTCTCCGGATAGAGGTCGCCGAGTGCGGCGAGGC GAACACCAAGGCGGTGCGCGGGCGCCCGGCCGGGACCGCGCGCAGCACCTGAAACGCTGG CCCGCCAAAGGTCTCAGCGGCGGGGACGAAAGCTCTTCGCTCGAAAGGGGCCACGCGCTC ATGCCGCATCATCGAAGCGTCCGCGCGGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCC AGCCGCGACGTTTAGGTTTACCCGATTTACGGACGGGGCGATAAGGTGGATCCTCTATCGACGA TCTTAATCGGACACGTGACCCatgGCCCGCATCTCTCGCCGAAGACGATGATTCCTGCGCGGC TTCCTGGCCCCGCGCTGGAACGCGCCGGTTCGAAAGTCCAGGCCTGCGCCGACGGCGAAGAGG CCGTCCAGCACCTGGACCATCCCTGGGACCTGCTGCTGACCGCCATCGTCATGCCGGCATGGACG GCATCGAGGTGGCCCGCAGGCCCGCCCGCGACCCGTCCCTGCGCATCATGTTTATCACCGGC TTCGCCCGGTGGCCCTCTCGGCCAGGACCGCGCGCCCGGCCGCGCAAGGTGCTGTCCAAGC CCGTGCACCTGCGCGACCTCGTCGCCGAGGTGCGAAAAGATGATGGCGGCCtgagaattcctgc</p>

pGB2012		<p>pBXMCS2- pXyl-CckA H+ pCpdR CpdR</p>	<p>agacgaccatATGGCCGACTTGCAGCTCCAGGACAAGGTTTCGACCGGCGCCCCGCGTCGGCGGTTT GATCCATGGCTGGTCGGCGCGGCGGTGTTTTTCGTGGCTGCGGCGGCCCTCTCGGCGGCGCCGG CGCTCAAGGCCGGACCGACCACCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCGTGCC TGTGTTGGGCCTTGTGCGCATTGCGGGCTCAGCGCTTTCGGCGGGCGACGCCGACCAGGCTGAG GGGTTTCATCGAGGCGCTGGCCGAGCCGGCCGCTGGCCGCCGACGGTTCGCTCCTGGCCG CCAACGGGCGCTGGCGCGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGCCGGGCT CCAGCCTGTTTGGCGCCCTGGTCCAGGCGCGCCAGGGGCGAGATGGCCGAGGGCATGCTGAGCGC TGGAGGAACCGACTATACCGCCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCCATCGTTGTGCTGAGCCGGTTGTGGAAGACGCGTCGCCGGCCCCGGTCCGCGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCCTTCCGCGGAGCCTCGCCGTTGGGCGCGGCCCTGCTGG AAGGCTTGAGCCGTTACCTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCGCTCGCGCGCCGAGGCCGAGACG CGCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGCGATCCGTCGCGCATCG CTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCAGGCCAGAAATGCAGGCCATCGCCAGCTGGCCGGCGG CGTCGCGCACGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCGTCGGTGATCCGTGTCGACGAGGTCTCAACGAGATCCGTGACGCGGGCGTGCGCGCCG CCGACCTCGTGCGAAGCTCTTGGCTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGTGCGCCGCTGCTGCGCGAAGACGTCAAGC TGATCACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCGTCAACGCCCGCGACCGCTGCGCGCGGCCAAGGGCGGCGGCGTCTGT GCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCATCCAGCTGGGTTTCCCGGCCCGGAC GGCGACACGGCCTTCATTGAGGTCAGTGACGATGGTCCGGGATTCCGCCGACGTCATGGGCAA GATCTTCGACCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCCGAACGAAGGCGCG GCCTTCCGATCTTCTGCGGTCTATGAAGCGCCCGCGGCGGTCGCGTCCAGGCCGTCGC CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGGCCGATCCTGTTCTGTCGAG GACGAGGACCGCTGCGCAGCGTCGCCGCCGCTGCTGCGCGCCGTTGGCTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTCTT GATCAGCGACGTGATCATGCCCGCATCGACGCCCCGACCTTGTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTGTGTTTCATCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTCTTGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCCTGGCCGAGCGCGTCA AGCAGCAGCTGCAAGCAGCATAGtctgtgtatttaacgaatcttgattcgTACGGTTCAGATCCACATAG GCGCGGGCGAAGCGGGCGCGCACACGGCGGCCCCAGGGCGGGCGCGCCGCGGATGATGCG GTCGACAAACGCGTCTCGGACGCGCGCAGGGTCTCGAGCGGCGAGGCGGACCGCGGCGACCAT GTCCTCCGGATAGAGGTGCGCCGAGTGCGGCGAGGCGAACACCAAGGCGGTGCGCGGCGGCGC CCCGGCCGGGACCGCGCGCAGCACCTCGAACGCTGGCCCGCCAAAGGTCTCCAGCGGCGGGGA CGAAAGCTCTTCTGTCGAAAGGGGCCGACGCGCTCATGCCGATCATCGAAGCGTCGCGGCGC GGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCCAGCCGCGACGTTTAGGTTTCATCCCGATT TACGAGCGGGGCGATAAGGTGGATCCTCTATCGACGATCTTAATCGGACACGTGACCCCatgGCC GCATCCTCCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCGCGCTGGAACGCGCC GGCTTCGAAGTCCAGGCCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGGG ACCTGCTGCTGACCGACATCGTCATGCCGGCATGGACGGCATCGAGGTGGCCCGCAGGCCGCGC GCCCGCGACCCGTCCTGCGCATCATGTTTCATCACCGCTTCCCGCCGTGGCCCTCTCGGCCAG GACCGCGCGCCCGCGGCGCCAAGGTGCTGTCCAAGCCGTGCACCTGCGCGACCTGTCGCGC AGGTCGAAAAGATGATGGCGGCCtgagaattcctgc</p>
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pGB2013		<p>pBXMCS2- pXyl-CckA H+ pCpdR CpdR_{D51A}</p>	<p>agacgaccatATGGCCGACTTGCAGCTCCAGGACAAGGTTTCGACCGGCGCCCCGCGTCGGCGGTTT GATCCATGGCTGGTTCGGCGCGGCGGTGTTTTTCGTGGCTGCGGCGGCCCTCTCGGCGGCGCCGG CGCTCAAGGCCGGACCGACCAACCTGGCCGGCCTGCTGCTGCTTCTGGGCGTCGCGGGCGTGCC TGTGTTGGGCCTTGTGCGCATTGCGGGCTCAGCGCTTTCGGCGGGCGACGCCGACCAAGGCTGAG GGGTTTCATCGAGGCGCTGGCCGAGCCGGCCGCTGGCCGCCGACGGTTCGCTCCTGGCCG CCAACGGGCCCTGGCGCGAAGTCATGGGCGAACAGCGCCGCTGCCAAGGGCGTGCCGGGGCT CCAGCCTGTTTTCGGCCCTGGTCCAGGCGCGCAGGGGCGAGATGGCCGAGGGCGATGCTGAGCGC TGGAGGAACCGACTATACCGCAAGGTCTCGCGCCTTGGGGCGGACGGCTGATGATCCGGCTTG CGCCCATCGTTGTGCTGAGCCGGTTGTGGAAGACGCGTCGCCGGCCCCGGTTCGCCGAGCGCGC CGCCCCGCCACCCAGCTCGCTGGACGCCTTCCGGGAGCCTCGCCGTTGGGCGCGGCCCTGCTGG AAGGCTTGAGCCGTTACCTCGCGGGTGTGGAGACCAATCCGGCGCTGACCACGATGACCGG CGCCAAGGCCGGTGTGCTGTTCCGGCGATCTGATCGACGCCGCTCGCGCGCCGAGGCCGAGACG CGCTGAACGAAGGCCGCGCCGGTCCCTACGAGGTGCGGTTGGCGCGCGATCCGTCGCGCATCG CTCACCTTTACCTCTATCGCGCCGAAGGCCGCTGGTGGCCTACATGATCGACGTGTCCGAGCAGA AGCAGATCGAGCTGCAGCTGTCCAGGCCAGAAATGCAGGCCATCGCCAGCTGGCCGGCGG CGTCGCGCACGACTTCAACAACCTTTGACCGCCATCCAGCTGCGTCTGGACGAGTTGCTGCATCG CCATCCCGTCGGTGATCCGTGTCACGAGGGTCTCAACGAGATCCGTGACAGGGCGTGCAGCGCCG CCGACCTCGTGCAGCTCTTGGCTTCTCGCGCAAGCAGACCGTGCAGCGCGAGGTGCTGGAT CTGGGCGAGCTGATCAGCGAGTTCGAGGTCTTGTGCGCCGCTGCTGCGCGAAGACGTCAAGC TGATCACCGACTATGGCCGCGACCTGCCGAGGTGCGCGCCGACAAGAGCCAGCTCGAGACGGC GGTCATGAACCTGGCGTCAACGCCCGCGACCGCTGCGCGCGGCCAAGGGCGCGGCGTCTG GCGCATCCGACCGCGCGCCTGACCCGCGACGAGGCGATCCAGCTGGGTTTCCCGGCCCGGAC GGCGACACGGCCTTCATTGAGGTCAGTGACGATGGTCCGGGATTCCGCCGACGTCATGGGCAA GATCTTCGACCGTTCTTACCACCAAGCCGGTGGGCGAGGGTACGGGCTAGGCCTAGCCACGG TCTATGGCATCGTTAAGCAGAGCGACGGCTGGATTACGTCCACAGCCGTCGAACGAAGGCCGCG GCCTTCCGATCTTCTGCCGTCTATGAAGCGCCCGCGCGCGGTGCGCGTCCAGGCCGTCGCG CGAGCCCGCAAGCCGCGCGCCGCTCGCGACCTGTCGGGCGCCGGCCGATCCTGTTCTGTCGAG GACGAGGACCGCTGCGCAGCGTCGCCGCCGCTGCTGCGCGCCGTTGGCTACGAGGTGCTTG AGGCGGCCGACGGCGAAGAGGCCCTGATCATCGCCGAGGAAAACGCCGGCACGATCGACCTCTT GATCAGCGACGTGATCATGCCCGCATCGACGCCCCGACCTTGTGAAGAAGGCGCGTGGCTATC TGGGGACCGCGCCGGTGTGTTTCATCTCCGGTATGCCGAGGCCGAGTTCAGCGACCTCTTGAA GGCGAGACGGGCGTGACCTTCTCCCAAGCCGATCGACATCAAGACCTGGCCGAGCGCGTCA AGCAGCAGCTGCAAGCAGCATAGtctgtgtatttcaacgaatcttgattcgTACGGTTCAGATCCACATAG GCGCGGGCGAAGCGGGCGCGCACACGGCGGCCCCAGGGCGGGCGCGCCGCGGATGATGCG GTCGACAAACGCGTCTCGGACGCGCGCAGGGTCTCGAGCGGCGAGGCGGACCGCGGCGACCAT GTCCTCCGGATAGAGGTGCGCCGAGTGCGGCGAGGCGAACACCAAGGCGGTGCGCGGCGGCGC CCCGGCCGGGACCGCGCGCAGCACCTCGAACGCTGGCCCGCCAAAGGTCTCCAGCGGCGGGGA CGAAAGCTCTTCTCGTAAAGGGGCCGACGCGCTCATGCCGATCATGAAGCGTGCAGGCGC GGGGTCAAATCTCAATCGCCGCTGACGAAACATCCCCAGCCGCGACGTTTAGGTTTCATCCCGATT TACGACGGGGCGATAAGGTGGATCCTCTATCGACGATCTTAATCGGACACGTGACCCCatgGCC GCATCCTCCTCGCCGAAGACGATGATTCCCTGCGCGGCTTCTGGCCCGCGCGTGAACGCGCC GGCTTCGAAGTCCAGGCTGCGCCGACGGCGAAGAGGCCGTCCAGCACCTGGACCATCCCTGGG ACCTGCTGCTGACCGCCATCGTCATGCCGGCATGGACGGCATCGAGGTGGCCCGCAGGCCGCGC GCCCGCGACCCGTCCTGCGCATCATGTTTCATCACCAGGCTTCGCCCGCGTGGCCCTCTCGCCAG GACCGCGCGCCCGCGGCCAAGGTGCTGTCCAAGCCGTGACCTGCGCGACCTGTCGCGC AGGTCGAAAAGATGATGGCGGCCtgagaattcctgc</p>
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Supplementary Table 3

File #	Diffusion Coefficients								PopZ Microdomain Size	
	Top Cell				Bottom Cell				Top Cell	Bottom Cell
	Y_cyto	R_cyto	Y_pole	R_pole	Y_cyto	R_cyto	Y_pole	R_pole		
1	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	0.125%
2	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	2.000%
3	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	0.125%
4	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	2.000%
5	20	20	20	20	20	20	5	5	0.50%	0.50%
6	20	20	20	20	20	20	2	2	0.50%	0.50%
7	20	20	0.5	0.5	20	20	0.125	0.125	0.50%	0.50%
8	20	20	0.5	0.5	20	20	0.05	0.05	0.50%	0.50%
9	20	20	0.05	0.05	20	20	0.005	0.005	0.50%	0.50%
10	20	20	0.0005	0.0005	20	20	0.00005	0.00005	0.50%	0.50%
11	20	20	0.000005	0.000005	20	20	0	0	0.50%	0.50%
12	20	20	0.000005	0.000005	20	20	5E-07	5E-07	0.50%	0.50%
13	20	20	5E-08	5E-08	20	20	5E-09	5E-09	0.50%	0.50%
15	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	4.000%
16	20	20	0.5	0.5	20	20	0.5	0.5	15.00%	40.000%
17	0.5	0.5	0.5	0.5	0.5	0.5	20	20	100.00%	60.000%
18	20	20	0.5	0.5	20	20	0.5	0.5	0.50%	0.000%
19	20	20	2	2	20	20	0.125	0.125	0.50%	0.50%

Particle diffusion and PopZ microdomain size parameters for Smoldyn files. Each file includes simulations for two different cells, labeled top and bottom. Y and R denote yellow and red colored particles, respectively, in bulk cytoplasm (cyto) and in PopZ microdomains (pole). PopZ microdomain size is expressed as a percentage of total cell volume.

Supplementary Table 4

<u>File Name</u>	<u>Top Cell</u>	<u>(description)</u>	<u>Bottom Cell</u>	<u>(description)</u>
9E	$\Delta popZ$	All Difcs at pole = Difc in cytoplasm	normal	Models wildtype cell No Sub1-PopZ interaction
9I	$\Delta popZ$	All Difcs at pole = Difc in cytoplasm	normal	Models wildtype cell + Sub1-PopZ interaction
9J	RcdA ^{mut}	RcdA Difc at pole = RcdA Difc in cytoplasm	CpdR ^{mut}	CpdR Difc at pole = CpdR Difc in cytoplasm
9K	$\Delta cpdR$	Zero CpdR particles	$\Delta rcdA$	Zero RcdA particles
9L	2% pole volume	Pole occupies 2% of total cell volume	1/160 Difc	All Difcs at pole = 1/160 Difc in cytoplasm

Descriptions of Smoldyn files associated with Fig. 6c and Supplementary Fig. 8c. Each file includes simulations for two different cells, labeled top and bottom. 9J, 9K, and 9L variants are changed relative to the Normal cell in File 9I, which is described in the right-hand panel in Fig. 6c. The parameters used for the Normal cell are described in Methods.

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