

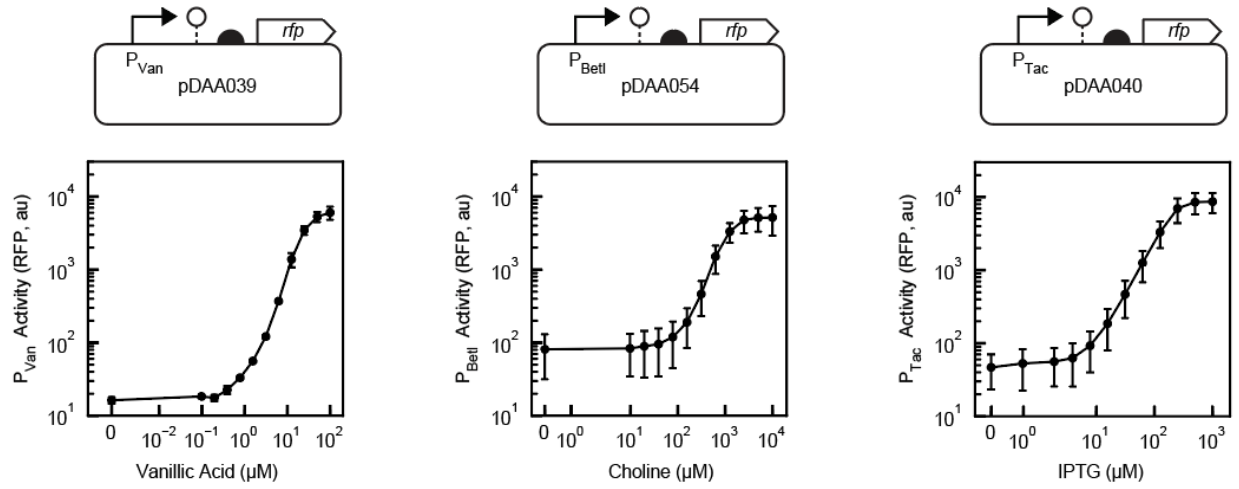
Appendix for:

Competitive dCas9 binding as a mechanism for transcriptional control

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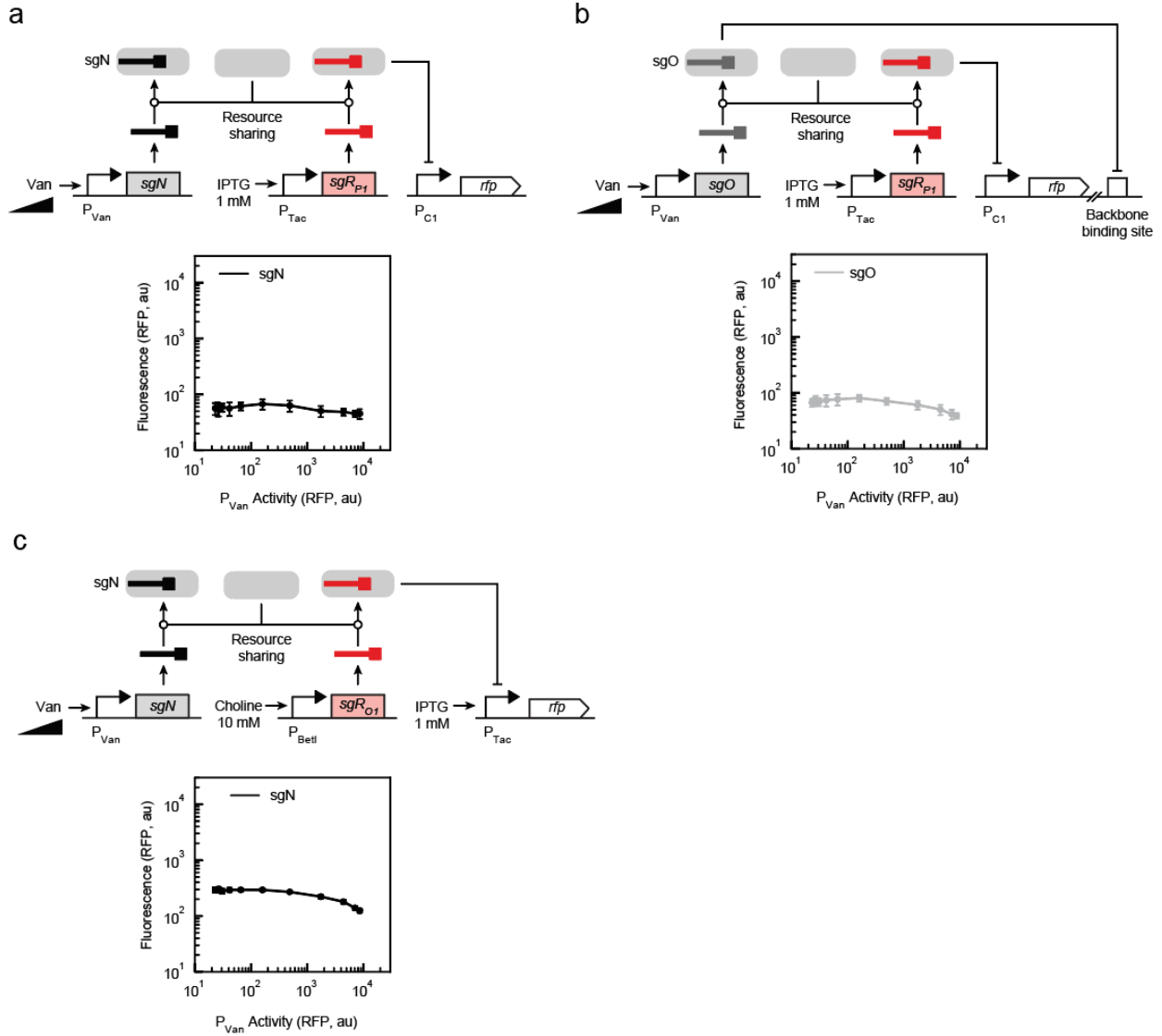
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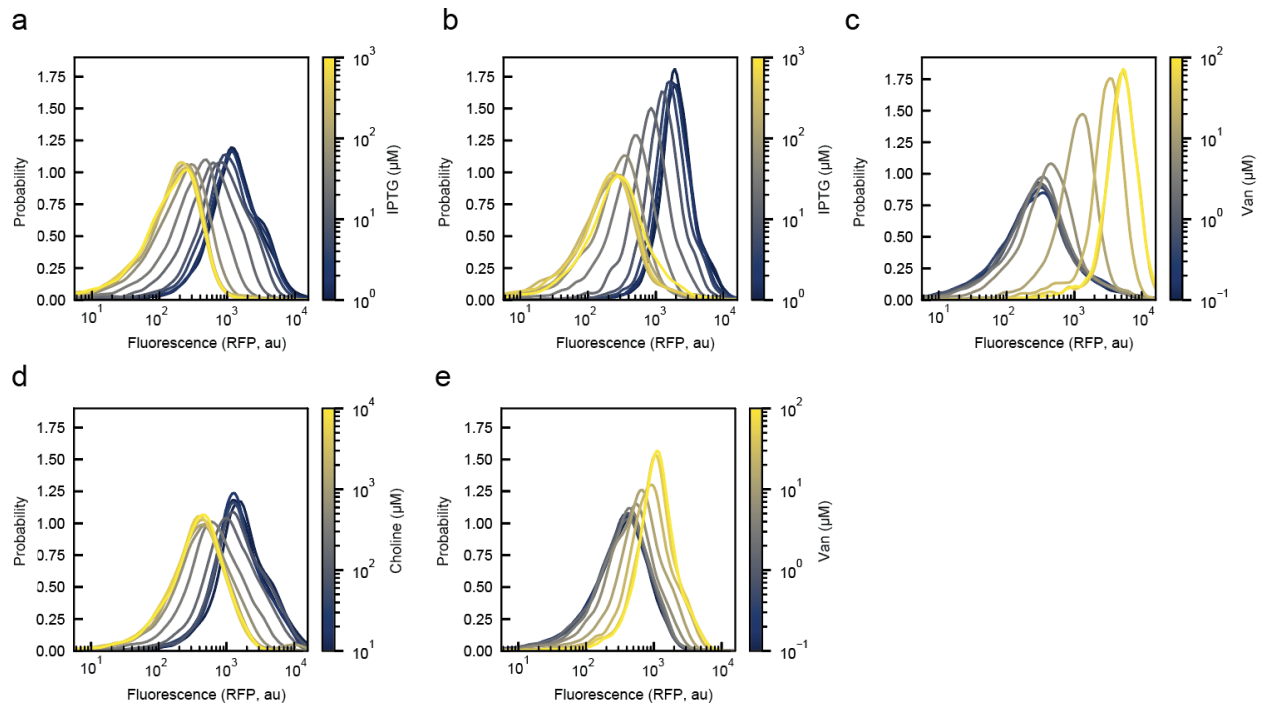
Appendix Figure S1: Response functions for inducible promoters.

The plasmids are based on the pDAA038 backbone and the parts are provided in Appendix Table S2. These data were used to convert inducer concentrations into promoter activities for the response functions. Inducer concentrations used for each induction curve were: Van (μM) = [0, 0.1, 0.2, 0.4, 0.8, 1.6, 3.1, 6.3, 12.5, 25, 50, 100]; Chol (μM) = [0, 9.8, 19.5, 39, 78, 160, 310, 625, 1250, 2500, 5000, 10000]; IPTG (μM) = [0, 1, 2, 4, 8, 16, 31, 63, 125, 250, 500, 1000]. The points are means of three replicates performed on different days and the error bars are the standard deviations of those measurements.



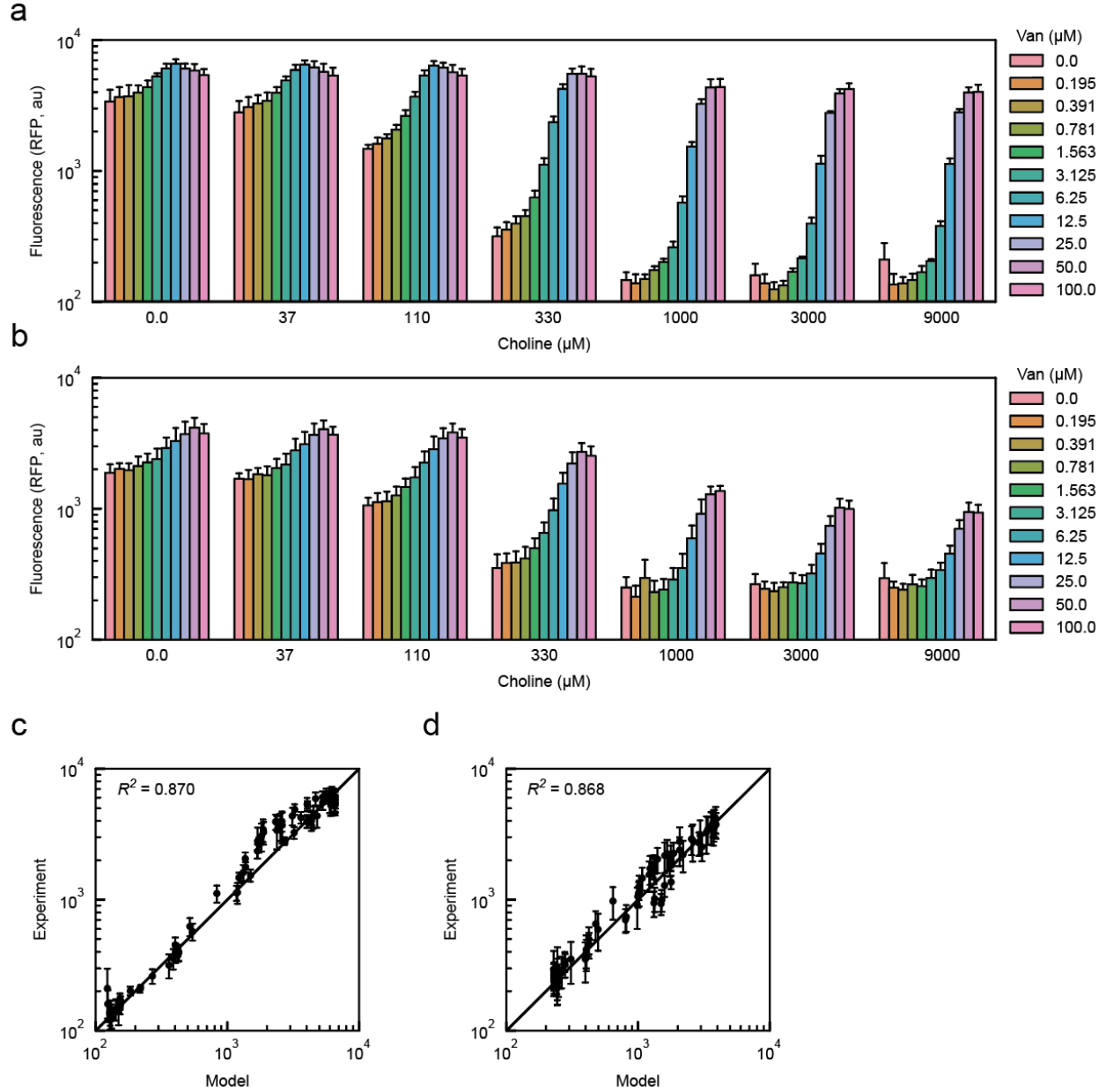
Appendix Figure S2: Experiments to determine the impact of dCas9 depletion.

The expression of one sgRNA can titrate dCas9 from a second sgRNA, thus creating the illusion of derepression activity. (a) The genetic system to assess the impact of the expression of a non-targeting sgRNA (sgN) that does not target the plasmid or genome is shown. The data show the impact on repression by sgR_{P1} expression (1 mM IPTG) as sgN is expressed by increasing vanillic acid concentration. (b) The genetic system for the expression of an off-target sgRNA (sgO) that targets a location in the plasmid that has no functional effect and its impact on repression by sgR_{P1} expression (1 mM IPTG). (c) The genetic system to evaluate the impact of sgN expression (Van) on elongation repression by sgR_{O1} (10 mM Chol). The plasmids used to generate these data are described in Appendix Table S1. Inducer concentrations used for each induction curve were: Van (μ M) = [0, 0.1, 0.2, 0.4, 0.8, 1.6, 3.1, 6.3, 12.5, 25, 50, 100]. The points are means of three replicates performed on different days and the error bars are the standard deviations of these measurements.



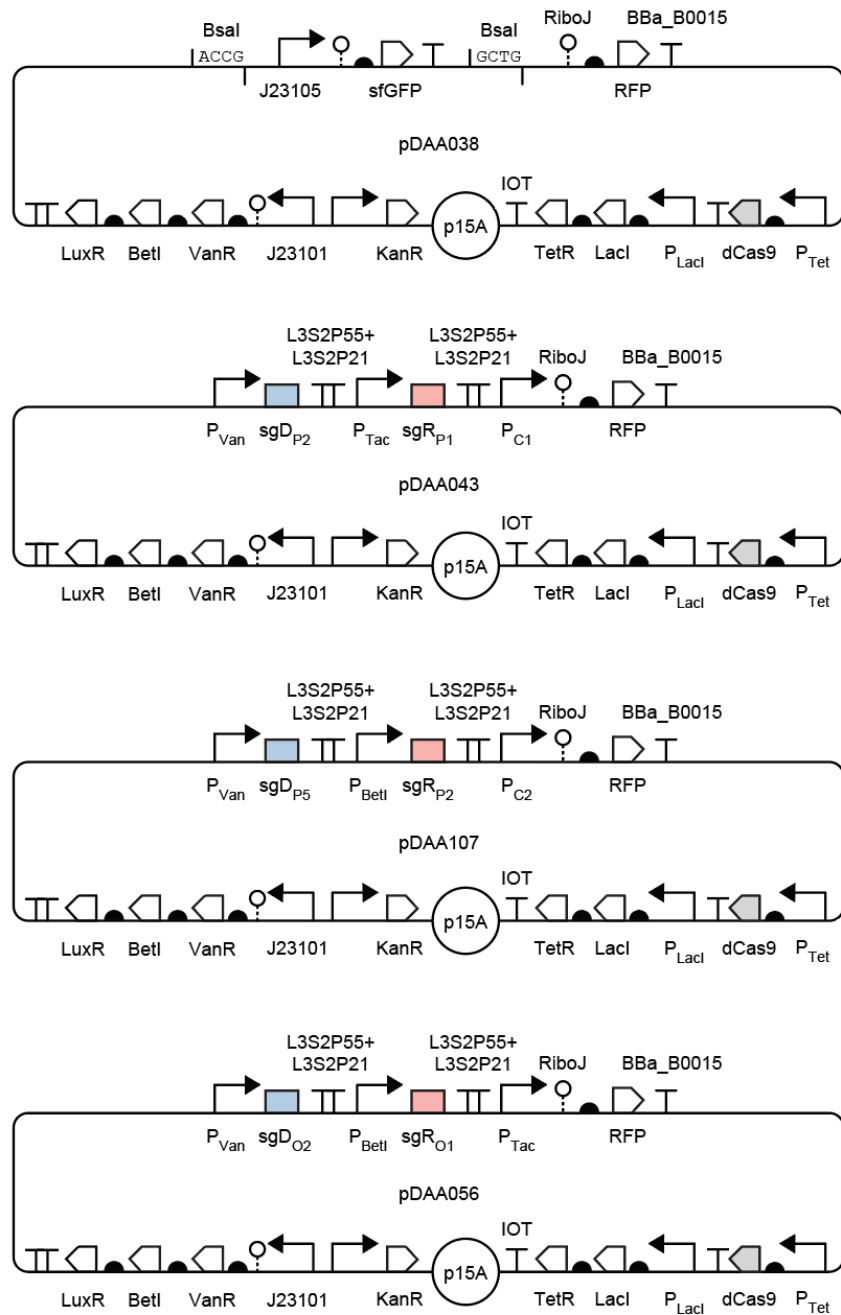
Appendix Figure S3: Representative cytometry distributions.

Distributions are shown for: (a) Figure 2c (sgR_{P1}) (b) Figure 2c (sgR_{P2}) (c) Figure 2g, (d) Figure 4d, (e) Figure 4g. All distributions are representative of three experiments performed on different days.



Appendix Figure S4: Standard deviations and model fits for the 2D response functions.

(a) Output of the promoter repression / derepression circuit (pDAA107) for all 60 experimental conditions. The bars represent the mean values of three replicates performed on different days and correspond to the colored circles in Figure 2h. (b) Output of the elongation repression / derepression circuit (pDAA056) for all 60 experimentally-sampled conditions. The bars represent the mean values of three replicates performed on different days and correspond to the colored circles in Figure 4h. (c) Comparison of the fit to Equation 9 (Table 1) and the experimental data. These data correspond to Figure 2h. A reference line is drawn at $y = x$. (d) Comparison of the fit to Equation 9 (Table 1) and the experimental data. These data correspond to Figure 4h. A reference line is drawn at $y = x$. The data are the means of three replicates performed on different days and the error bars are the standard deviations of these measurements.



Appendix Figure S5: Plasmid maps

Key plasmid maps used in this study. pDAA038: plasmid backbone used to build all circuits. pDAA043: initial promoter repression and derepression α testing construct. pDAA107: final promoter repression / derepression circuit. pDAA056: final elongation repression / derepression circuit.

Appendix Tables

Appendix Table S1: Plasmids used in this study.

Name	Mechanism	sgR	sgD	sgR Inducer	sgD Inducer	Promoter ^a
Circuits						
pDAA042	Initiation	sgR _{P1}	sgD _{P1}	IPTG	Van	P _{C1}
pDAA043	Initiation	sgR _{P1}	sgD _{P2}	IPTG	Van	P _{C1}
pDAA050	Initiation	sgR _{P1}	sgD _{P3}	IPTG	Van	P _{C1}
pDAA051	Initiation	sgR _{P1}	sgD _{P4}	IPTG	Van	P _{C1}
pDAA654	Initiation	sgR _{P1}	sgD _{P5}	IPTG	Van	P _{C2}
pDAA052	Initiation	sgR _{P1}	sgD _{P6}	IPTG	Van	P _{C1}
pDAA044	Initiation	sgR _{P1}	sgD _{P7}	IPTG	Van	P _{C1}
pDAA656	Initiation	sgR _{P2}	sgD _{P2}	IPTG	Van	P _{C1}
pDAA107	Initiation	sgR _{P2}	sgD _{P5}	Chol	Van	P _{C2}
pDAA057	Elongation	sgR _{O1}	sgD _{O1}	Chol	Van	P _{Tac}
pDAA056	Elongation	sgR _{O1}	sgD _{O2}	Chol	Van	P _{Tac}
pDAA055	Elongation	sgR _{O1}	sgD _{O3}	Chol	Van	P _{Tac}
pDAA047	Initiation	sgR _{P1}	sgO	IPTG	Van	P _{C1}
pDAA048	Initiation	sgR _{P1}	sgN	IPTG	Van	P _{C1}
pDAA080	Elongation	sgR _{O1}	sgN	Chol	Van	P _{Tac}
Promoter Activity Profiling						
pDAA039	N/A	N/A	N/A	N/A	N/A	P _{Van}
pDAA040	N/A	N/A	N/A	N/A	N/A	P _{Tac}
pDAA054	N/A	N/A	N/A	N/A	N/A	P _{BetI}
Cloning						
pDAA038	N/A	N/A	N/A	N/A	N/A	N/A

a. P_{C2} is the P_{C1} promoter with a 3 base pair mutation from -62 to -60.

Appendix Table S2: Genetic part sequences

Name	Sequence
Promoters ^a	
P _{Van}	ATTGGATCCAATTGACAGCTAGCTCAGTCCTAGGTACCATTGGATCCAAT
P _{Tac}	TGTTGACAATTAATCATCGGCTCGTATAATGTGTGAATTGTGAGCGCTCACAAAT
P _{Betl}	AGCGCGGGTGAGAGGGATTTCGTTACCAATAGACAATTGATTGGACGTTCAATATAATGCTAGC
P _{Tet}	TACTCCACCGTTGGCTTTTTCCCTATCAGTGATAGAGATTGACATCCCTATCAGTGATAGAGATAATGAGCAC
P _{C1}	GTCTCGAACACCTATCAGTTAAGATGTGGTCTCTCACGATCGTAGCCTTCTTACGAGAATGGGGCTTAAGGAAACAACCAGATCCTTGGGCGGCTCGACTTTACAC CACTAGCTAGAGGGGTATTATGCTAGC
P _{C2}	GTCTCGAACACCTATCAGTTAAGATGTGGTCTCTCACGATCGTAGCCTTCTTACGAGAATGGGGCTTAAGGATGGAACCAGATCCTTGGGCGGCTCGACTTTACAC CACTAGCTAGAGGGGTATTATGCTAGC
J23101	TTTACAGCTAGCTCAGTCCTAGGTATTATGCTAGC
P _{LacI}	GCGGCGGCCATCGAATGGCGAAAACCTTTCGCGGTATGGCATGATAGCGCCC
Ribosome Binding Sites	
lac1	GGAAGAGAGTCAATTTCAGGGTGGTGAAT
tet3	TAATCCAGGAGGAAAAAA
van2	GGAAGAGAGTCAATTTCAGGGGGTGAATA
phl3	CTATGGACTATGTTTGAAAGGGAGAAATACTAG
BBa_B0032	TACTAGAGTCACACAGGAAAGTACTAG
BBa_B0034	TTCAAAAGATCTAAAGAGGAGAAAGGATCT
Terminators	
L3S2P55	CTCGGTACCAAAGACGAACAATAAGACGCTGAAAAGCGTCTTTTTTCGTTTTGGTCC
L3S2P21	CTCGGTACCAAATTCCAGAAAAGAGGCCTCCCGAAAGGGGGCCTTTTTTCGTTTTGGTCC
BBa_B0015	CCAGGCATCAAATAAAACGAAAGGCTCAGTCGAAAGACTGGGCCTTTCGTTTTATCTGTTGTTGTCGGTGAACGCTCTCTACTAGAGTCACACTGGCTCACCTTCG GGTGGGCCTTCTGCGTTTATA
IOT	TAATTGGTAACGAATCAGACAATTGACGGCTCGAGGGAGTAGCATAGGGTTTGCAGAATCCCTGCTTCGTCCATTTGACAGGCACATTATGCATCGATGATAAGCTG TCAAAACATGAGCAGATCCTCTACGCCGACGCATCGTGGCCGCATCACCGGCGCCACAGGTGCGGTTGCTGGCGCCTATATCGCCGACATCACCAGTGGGGAAGAT CGGGCTCGCCACTTCGGGCTCATGAGCAATATTTTATCTG
Ribozymes	
RiboJ	AGCTGTCACCGGATGTGCTTTCGGTCTGATGAGTCCGTGAGGACGAAACAGCCTCTACAAATAATTTGTTTAA
LtsvJ	AGTACGTCTGAGCGTGATACCCGCTCACTGAAGATGGCCCGGTAGGGCCGAAACGTACCTCTACAAATAATTTGTTTAA
sgRNAs ^b	
sgR _{P1}	<u>ATAATACCCCTCTAGCTAGT</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCCTTTTTT
sgR _{P2}	<u>GTGTAAAGTCGAGCCCA</u> GTTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCCTTTTTT

sgD _{P1}	<u>GTGTAAGTCGAGCCGCCAGT</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P2}	<u>AGTCGAGCCGCCAAGGATCG</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P3}	<u>GATGGAACCAGATCCTTGGG</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P4}	<u>TAAGGATGGAACCAGATCCT</u> CTTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P5}	<u>ACGAGAATGGGGCTTAAGGA</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P6}	<u>TCTTACGAGAATGGGGCTTA</u> GTTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{P7}	<u>TAAGCCCCATTCTCGTAAAG</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgR _{O1}	<u>TTTGGTAACTTTTCAGT</u> TTTAGTTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{O1}	<u>GTGGTCCGCTGCCGTTCCG</u> TTTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{O2}	<u>GGTGAAGGTCTCCGTACGA</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgD _{O3}	<u>GAAATCGAAGGTGAAGGTGA</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgO	<u>GTGCAGCGAGTCAGTGAGCG</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT
sgN	<u>CTCGTTCGCTGCCACCTAAG</u> TTTTAGAGCTAGAAATAGCAAGTTAAAATAAGGCTAGTCCGTTATCAACTTGAAAAAGTGGCACCGAGTCGGTGCTTTTTTT

Genes

<i>lacI</i>	ATGAAACCAGTAACGTTATACGATGTCGCAGAGTATGCCGCTGTCTCTTATCAGACCGTTTCCCGCGTGGTGAACCAGGCCAGCCACGTTTCTGCGGAAAACGCGGGA AAAAGTGGGAAGCGGCGATGGCGGAGCTGAATTACATTCCCAACCGCGTGGCACAACAACCTGGCGGGGCAAAACAGTCGTTGCTGATTGGCGTTGCCACCTCCAGCTCTGG CCCTGCGACGCGCCGTCGCAAAATTGTCGCGGCGGATTAATATCTCGCGCCGATCAACTGGGTGCCAGCGTGGTGGTGCATGGTAGAACGGAAGCGGCGTCGAAGCCTGT AAAGCGGGCGGTGCACAATCTTCTCGCGCAACGCGCTCAGTGGGCTGATCATTAACATATCCGCTGGATGACAGGATGCCATTGTGTGGGAAGCTGCCCTGCACATTAATGT TCCGGCGTTATTTCTTGATGTCTCTGACCAGACACCCATCAACAGTATTATTTTCTCCCATGAGGACGGTACGCGACTGGGCGTGGAGCATCTGTGTCGATTTGGGTGTC ACAGCAAAATCGCGCTGTTAGCGGGGCCATTAAAGTTCTGTCTCGGCGGCTCGCGCTGGCTGGCTGGCATAAAATATCTCACTCGCAATCAAAATTCAGCCGATAGCG GAACGGGAAGCGCAGTCGGAGTGCATGTCCGGTTTTCAACAACCAATGCAAAATGCTGAATGAGGGCATCGTCCCAGTCGCGAGTCTGGTGGCAACGATCAGATGGC CTGGGCGCAATGCGCGCCATTACCGAGTCCGGGCTGCGCGTTGGTGCGGATATCTCGGTAGTGGGATACGACGATACCGGAAGATAGCTCATGTTATATCCCGCGCT TAACCACCATCAACAGGATTTTCGCCCTGCTGGGGCAAACAGCGTGGAGCCGTTGCTGCAACTCTCTCAGGGCCAGGCGGTGAAGGGCAATCAGCTGTTGCCAGTCT TCACTGGTGAAGAAAAAACCCCTGGCGCCCAATAGCAAACCGCCTCTCCCCGCGGTTGGCGGATTCTTAATCGAGCTGGCAGCAGAGGTTTCCGACTGGGA AAGCGGGCAGTGA
<i>betI</i>	ATGCCGAAACTGGGTATGCAGAGCATTCTGCTGCTGCTGAGCTGATTGATGCAACCCCTGGAAGCAATTAATGAAGTTGGTATGCATGATGCAACCATTGCAAGATTGC ACGTCGTCGCCGTGTTAGCACCCGTTATTTAGCCATTATTTCCGCGATAAAACCGGTCTACTGGAAGCAACCATGCGTGATATTACCAGCCAGCTCGCTGATGCGAG TTCTGAATCGTCTGCATGCATGCCAGGGTAGCGCAGAACAGCGCTGTCAGGCAATTGTTGGTGGTAATTTTGATGAAACCCAGGTTAGCAGCGCAGCAATGAAA GCATGGCTGGCAATTTGGGCAATCAGCATGCATCAGCCGATGCTGTATCGTCTGCAGCAGGTTAGCAGTCTGCTGCTCTGCTGAGCAATCTGCTTAGCGAATTTCTGCTG TGAATGCTCTGTAACAGGCAACAGAGGCAAGTTATGGTCTGGCAGCAGTGAATGATGTTCTGTGGCTGCGTGCAGCACTGAGCGGTAAACCGCTGGATAAAACCC GTCAAAATAGCCTGACCCGTCATTTTATCACCCAGCATCTGCGCAGCGATTGA
<i>tetR</i>	ATGTCCAGATTAGATAAAAGTAAAGTGATTAAACAGCGCATTAGAGCTGCTTAATGAGGTCGGAATCGAAGGTTTAAACAACCCGTAACCTCGCCAGAAAGCTAGGTGT AGAGCAGCCTACATTGTATTGGCATGTAAAAATAAGCGGGCTTTGCTCGACGCCTTAGCCATTGAGATGTTAGATAGGCACCATACTCACTTTTGCCCTTTAGAAG GGGAAGCTGGCAAGATTTTTTACGTAATAACGCTAAAAGTTTATAGATGTGCTTTTACTAAGTCATCGGATGGAGCAAAAGTACATTTAGTAGACAGCCCTACAGAA AAACAGTATGAAACTCTCGAAAATCAATTAGCCTTTTTATGCCAACAAAGTTTTTCACTAGAGAATGCATTATATGCATCAGCCGCTGTGGGCAATTTTACTTTAGG TTGCGTATTGGAAGATCAAGAGCATCAAGTCGCTAAAGAAGAAAGGGAACACCTACTACTGATAGTATGCCCCATTATTACAGCAAGCTATCGAATATTATTGATC ACCAAGGTGCAGAGCCAGCCTCTTATTTCGCCCTTGAATTGATCATATGCGGATTAGAAAAACAACCTTAAATGTGAAGTGGGTCTCTAA
<i>vanR</i>	ATGGACATGCCTCGTATTAAACCGGGTCAGCGTGTATGATGGCACTGCGTAAAAATGATTGCAAGCGTGAAATCAAAAGTGGTGAACGTATTGCAGAAATCCGCAC CGCAGCAGCACTGGGTGTTAGCCGTATCCGGTTTCGATATCGCACTGCGTTCACTGGAAACAAGAAGGCTCGGTTGTTCTGCTGGGTGCACGTGGTTATGCAGCCCGTG GTGTTAGCAGCGATCAGATTCTGTGATGCAATTGAAGTTCGTGGTGTCTGGAAGGTTTTGCAGCAGCTGCTGTGGCAGAACCTGGTATGACCCGAGAAACCCATGCA CGTTTTGTTGTACTGATTGCAGAAGGTGAAGCACTGTTTGCAGCGGTCGCGCTGAATGGTGAAGATCTGGATCGTTATGCCGCATATAATCAGGCATTTTATGATAC CCTGTTTAGCCAGCAGGTAATGGTGCAGTTGAAAGCGCACTGGCAGCTAATGGTTTTGAACCGTTTGCAGCAGCCGCTGCATGGCCCTGGATCTGATGGACCTGT CTGCGGAATATGAACATCTGCTGGCAGCACATCTGCAGCATCAGGCAGTTAGCTGTGGTGATGCCAAGGTCGACAGCACTTATATGCGTGATCAT GCACTGGCAGCAATTCTGTAATGCAAAAGTTTTTGAAGCAGCAGCAAGCGCAGGCGCACCGCTGGGTGCAGCATGGTCAATTCTGTCGAGATTGA
<i>dcas9</i>	ATGGATAAGAAAATACTCAATAGGCTTAGCTATCGGCACAAATAGCGTCGGATGGCGGTTGATCACTGATGAATATAAGGTTCCGCTCAAAAAGTTCAAGGTTCTGGG AAATACAGACGCCACAGTATCAAAAAAATCTTATAGGGGCTCTTTTATTTGACAGTGGAGAGACAGCGGAAGCGACTCGTCTCAACCGGACAGCTCGTAGAAGGT ATACAGCTCGGAAGAAATCGTATTTGTTATCTACAGGAGATTTTTTCAAAATGAGATGGCGAAAGTAGATGATAGTTTCTTTTCACTCACTGAAGAGTCTTTTTTGGTG GAAGAAGCAAGAAGCATGAACGTCATCCTATTTTGGAAATATAGTAGATGAAGTGTCTTATCATGAGAAATATCCCACTATCTATCATCTGCGAAAAAATTTGGT AGATTCTACTGATAAAGCGGATTTGCGCTTAATCTATTGCGCTTAGCGCATATGATTAACTTTTCTGCTGGTCATTTTGGTGAAGGAGATTAAATCTCTGATAATTA GTGATGTGGCAAACTATTATCCAGTTGGTACAAACCTACAATCAATTATTTGAAGAAAACCCATTAAACGCAAGTGGAGTAGATGCTAAAGCGATTCTTTCTGCA CGATTGAGTAAATCAAGACGATTAGAAAATCTCATTGCTCAGCTCCCGGTCGAGAGAAAAATGGCTTATTGGGAATCTCATTGCTTTGTCTATTGGGTTTGACCCC TAATTTTAAATCAAAATTTTGATTGGCAGAAGATGCTAAATTACAGCTTTCAAAAGATACTTACGATGATGATTTAGATAATTTATTTGGCGCAAAATTTGGAGATCAAT ATGCTGATTTGTTTTTGGCAGCTAAGAATTTATCAGATGCTATTTTACTTTTTCAGATATCCTAAGAGTAAATCTGAAATAACTAAGGCTCCCTATCAGCTCTCAATG ATTAACGCTACGATGAACATCATCAAGACTTGACTCTTTTAAAGCTTTAGTTTCGACAACAACCTTCCAGAAAAAGTATAAGAAATCTTTTTTGTATCAATCAAAAA CGGATATCAGGTTATATTGATGGGGAGCTAGCCAAAGAAGAAATTTTATAAATTTTATCAAAACCAATTTAGAAAAAATGGATGGTACTGAGGAATATTGGTGAAC TAAATCGTGAAGATTTGCTGCGCAAGCAACGGACCTTTGACAACGGCTCTATTCCCCATCAAAATTCATTTGGGTGAGCTGCATGGCTATTTTGAAGAAGCAAGAAGAC TTTTATCCATTTTAAAGACAATCCGTGAGAAGATTGAAAAATCTTGACTTTTCCGAATTCCTTATTATGTTGGTCCATTGGCGCGTGGCAATAGTCGTTTTGCATG GATGACTCGGAAGTCTGAAGAAACAATTACCCCATGGAAATTTTGAAGAAGTTGTCGATAAAGGTGCTTCAGCTCAATCATTTATTGAACGCATTGACAACAACTTTGATA AAAATCTTCAAAATGAAAAGTACTACCAAAACAATAGTTTGCTTTATGAGTATTTTACGGTTTATAACGAATTGACAAAGGTCAAAATATGTTTGAAGGAATGCGGA AAACAGCATGTTCTTTCAGGTGAACAGAAGAAAGCCATTGTTGATTACTCTTCAAAACAAATCGAAAAGTAAACGTTAAGCAATTTAAAGAAAGATTATTTCAAAAA AATAGATGTTTTGATAGTGTGAAATTTCAAGAGTTGAAGATAGATTTAATGCTTCATTAGGTACCTACCATGATTGTGCTAAAAATTTATTAAGATAAAGATTTTTT TGGATAATGAAGAAAATGAAGATATCTTAGAGGATATTGTTTTAACATTGACCTTATTTGAAGATAGGAGATGATTGAGGAAAGACTTAAACATATGCTCACCTC

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rfp

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kanR

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 ATTGATGTTGGACGAGTCGGAATCGCAGACCGATACCAGGATCTTGCCATCCTATGGAACCTGCTCGGTGAGTTTCTCCTCTATTACAGAAACGGCCTTTTCAAAA
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Plasmid Origins

p15A

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 GCCATTTCCGCTCGCGCAGTGAACGACCGAGCGTAGCGAGTCAGTGAGCGAGGAAGCGGAATATATCTCTGATACATATTTCTGCTGACGACCGGTGACGCTT
 TTTTCTCTGCCATGAAGCACTTCACTGACACCCCTCATCAGTGCCAACATAGTAAGCCAGTATACACTCCGCTAGCGCTGAGGTC

- The three base pair mutation used to convert P_{C1} to P_{C2} is underlined.
- The variable spacer regions for each sgRNA are underlined

Appendix Table S3: Full plasmid sequences

[illegible]

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sgR_{P2} + sgD_{P5}
RNAP Binding
Repression /
Derepression Circuit
(pDAA107)

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sgR_{O1} + sgD_{O2}
RNAP Elongation
Repression /
Derepression Circuit
(pDAA056)

13

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