Supplementary Data:

Figure S1. Construct design. A. Schematic diagram of repressor and promoter elements and spacing measurements. B. Upper strands of 89.5-bp DNA loop constructs are shown with reference positions underlined in top case. Promoter and operator elements are color-coded as in A. Single operator control cases are indicated by shading.

Figure S2. Construct design. A. Schematic diagram of repressor and promoter elements and spacing measurements. B. Upper strands of 100.5-bp DNA loop constructs are shown with reference positions underlined in top case. Promoter and operator elements are color-coded as in A. Single operator control cases are indicated by shading.

Table S1: plasmid constructs used to generate reporter episomes

89.5 bp repression loop

spacing (a)	plasmid	strains			
38	pJ2093	BL1139	BL1140		
40	pJ2094	BL1141	BL1141		
42	pJ2095	BL1143	BL1144		
44	pJ2089	BL1145	BL1146		
45	pJ2107	BL1167	BL1168		
46	pJ2096	BL1147	BL1148		
47	pJ2108	BL1169	BL1170		
48	pJ2090	BL1149	BL1150		
50	pJ2097	BL1151	BL1152		

100.5 bp repression loop

spacing (a)	plasmid	strains			
44	pJ2098	BL1153	BL1154		
45	pJ2110	BL1171	BL1172		
46	pJ2099	BL1155	BL1156		
47	pJ2111	BL1173	BL1174		
48	pJ2102	BL1181	BL1182		
50	pJ2091	BL1159	BL1160		
52	pJ2100	BL1161	BL1162		
54	pJ2092	BL1163	BL1164		
56	pJ2101	BL1165	BL1166		

Single operator controls (b)

Loop size (c)	operator	plasmid	strain		
89.5	Osym	pJ2112	BL1175	BL1176	
89.5	O1	pJ2113	BL1177	BL1178	
100.5	Osym	pJ2114	BL1157	BL1158	
100.5	O1	pJ2115	BL1179	BL1180	

(a) Indicates distance in bp from center of O1 to center of UV5 promoter.

(b) Each single operator was based on 48 bp center O1 to center UV5 construct.

(c) Indicates spacing in bp from center of functional operator to center of dead operator.

Table S2: Quantitative Chromatin Immunoprecipitation

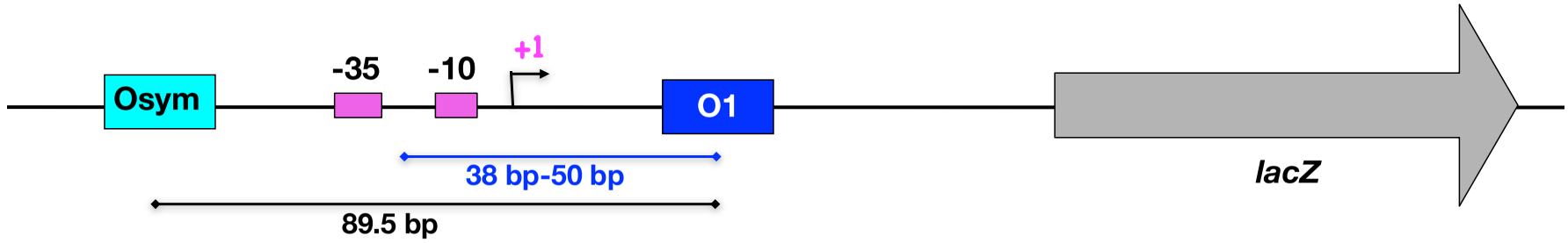
89.5 bp repression loop				IgG		RNA pol α		σ 70		LacI	
spacing (a)	plasmid	strain	IPTG (b)	average	sd	average	sd	average	sd	average	sd
42	pJ2095	BL1144	-	0.015	0.012	0.124	0.059	0.256	0.064	0.252	0.084
			+	0.016	0.005	0.181	0.019	0.361	0.106	0.068	0.023
45	pJ2107	BL1167	-	0.017	0.004	0.169	0.080	0.225	0.078	0.134	0.037
			+	0.021	0.007	0.200	0.121	0.359	0.158	0.156	0.040
50	pJ2097	BL1151	-	0.015	0.004	0.190	0.137	0.292	0.117	0.313	0.151
			+	0.020	0.013	0.173	0.077	0.449	0.141	0.078	0.031
Osym (48)	pJ2112	BL1175	-	0.022	0.004	0.329	0.071	0.588	0.173	0.277	0.100
			+	0.030	0.020	0.807	0.175	1.314	0.422	0.061	0.007
O1 alone	pJ2113	BL1177	-	0.022	0.014	0.562	0.149	1.664	0.544	0.379	0.190
			+	0.018	0.009	0.634	0.151	1.366	0.347	0.045	0.022

Data report fraction of input DNA co-precipitated with the indicated antibody.

(a) Indicates distance in bp from center of O1 to center of UV5 promoter.

(b) Indicates presence or absence of 2 mM IPTG

A

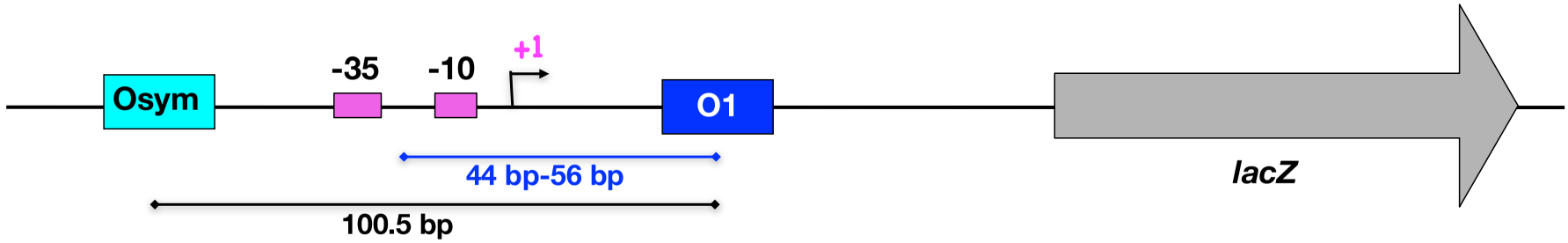


B

	spacing	plasmid	strain	
AATTGTGAGCGCTCACAATTGGATCCTAATCTATAGACGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGGGCAATTGTGAGCGGATAACAATT	38	pJ2093	BL1139	BL1140
AATTGTGAGCGCTCACAATTGGATCCTAATCTATACGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGAGGGCAATTGTGAGCGGATAACAATT	40	pJ2094	BL1141	BL1141
AATTGTGAGCGCTCACAATTGGATCCTAATCTACGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGATAGGGCAATTGTGAGCGGATAACAATT	42	pJ2095	BL1143	BL1144
AATTGTGAGCGCTCACAATTGGATCCTAATACGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGGGCAATTGTGAGCGGATAACAATT	44	pJ2089	BL1145	BL1146
AATTGTGAGCGCTCACAATTGGATCCTAATAGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGCGGCAATTGTGAGCGGATAACAATT	45	pJ2107	BL1167	BL1168
AATTGTGAGCGCTCACAATTGGATCCTAATGACTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGACGGCAATTGTGAGCGGATAACAATT	46	pJ2096	BL1147	BL1148
AATTGTGAGCGCTCACAATTGGATCCTAATGCTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAACGAGGCAATTGTGAGCGGATAACAATT	47	pJ2108	BL1169	BL1170
AATTGTGAGCGCTCACAATTGGATCCTAATCTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGACGAGGCAATTGTGAGCGGATAACAATT	48	pJ2090	BL1149	BL1150
AATTGTGAGCGCTCACAATTGGATCCTAATCTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCATAGGAGCTCTGGCGAACTACATCCTCCGCTAGGT	48 (Osym)	pJ2112	BL1175	BL1176
ACCTCGAGCTCAACGCAATTGGATCCTAATCTCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGACGAGGCAATTGTGAGCGGATAACAATT	48 (O1)	pJ2113	BL1177	BL1178
AATTGTGAGCGCTCACAATTGGATCCTAATCAGATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGACGACTGGCAATTGTGAGCGGATAACAATT	50	pJ2097	BL1151	BL1152

figure S1

A



B

	spacing	plasmid	strain
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTATAGACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGAGCTCTGGCAATTGTGAGCGGATAACAATT	44	pJ2098	BL1153 BL1154
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTATGACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACACGAGCTCTGGCAATTGTGAGCGGATAACAATT	45	pJ2110	BL1171 BL1172
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTATACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCAGGAGCTCTGGCAATTGTGAGCGGATAACAATT	46	pJ2099	BL1155 BL1156
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTAACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCTGAGAGCTCTGGCAATTGTGAGCGGATAACAATT	47	pJ2111	BL1173 BL1174
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCATAGGAGCTCTGGCAATTGTGAGCGGATAACAATT	48	pJ2102	BL1157 BL1158
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCGCTATAGACGAGGCGAACTACATCCTCCGCTAGGT	48 (Osym)	pJ2114	BL1179 BL1180
ACCTCGAGCTCAACGCAATTGGATCCTAATCCCGGGACTACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCATAGGAGCTCTGGCAATTGTGAGCGGATAACAATT	48 (O1)	pJ2115	BL1181 BL1182
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGAACGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCCTATAGGAGCTCTGGCAATTGTGAGCGGATAACAATT	50	pJ2091	BL1159 BL1160
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGAGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCCTATAGACGAGCTCTGGCAATTGTGAGCGGATAACAATT	52	pJ2100	BL1161 BL1162
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACTCATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCCTATAGACGAGAGCTCTGGCAATTGTGAGCGGATAACAATT	54	pJ2092	BL1163 BL1164
AATTGTGAGCGCTCACAATTGGATCCTAATCCCGGGACATTTACACTTTATGCTTCCGGCTCGTATAATGTGTCGACCCTATAGACGACTGAGCTCTGGCAATTGTGAGCGGATAACAATT	56	pJ2101	BL1165 BL1166

figure S2