Supplementary material

Efficient sex-hormone biosensors in *Saccharomyces cerevisiae* cells to evaluate human aromatase activity and inhibition

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Supplementary Figures

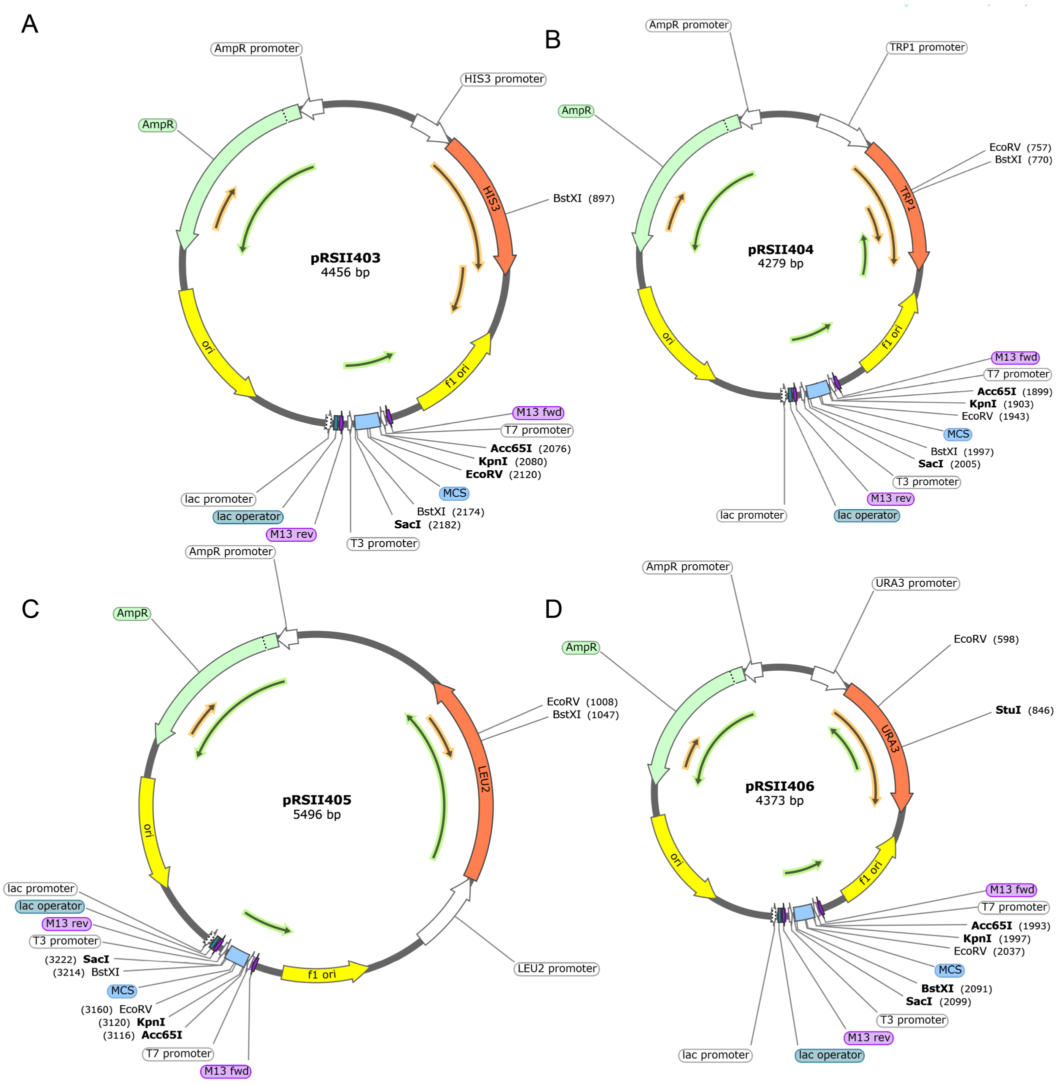

Figure S1. Integrative plasmids. **(A-D)** Map of the four backbones (*E. coli-S. cerevisiae* shuttle vectors) used to construct all plasmids in this work.

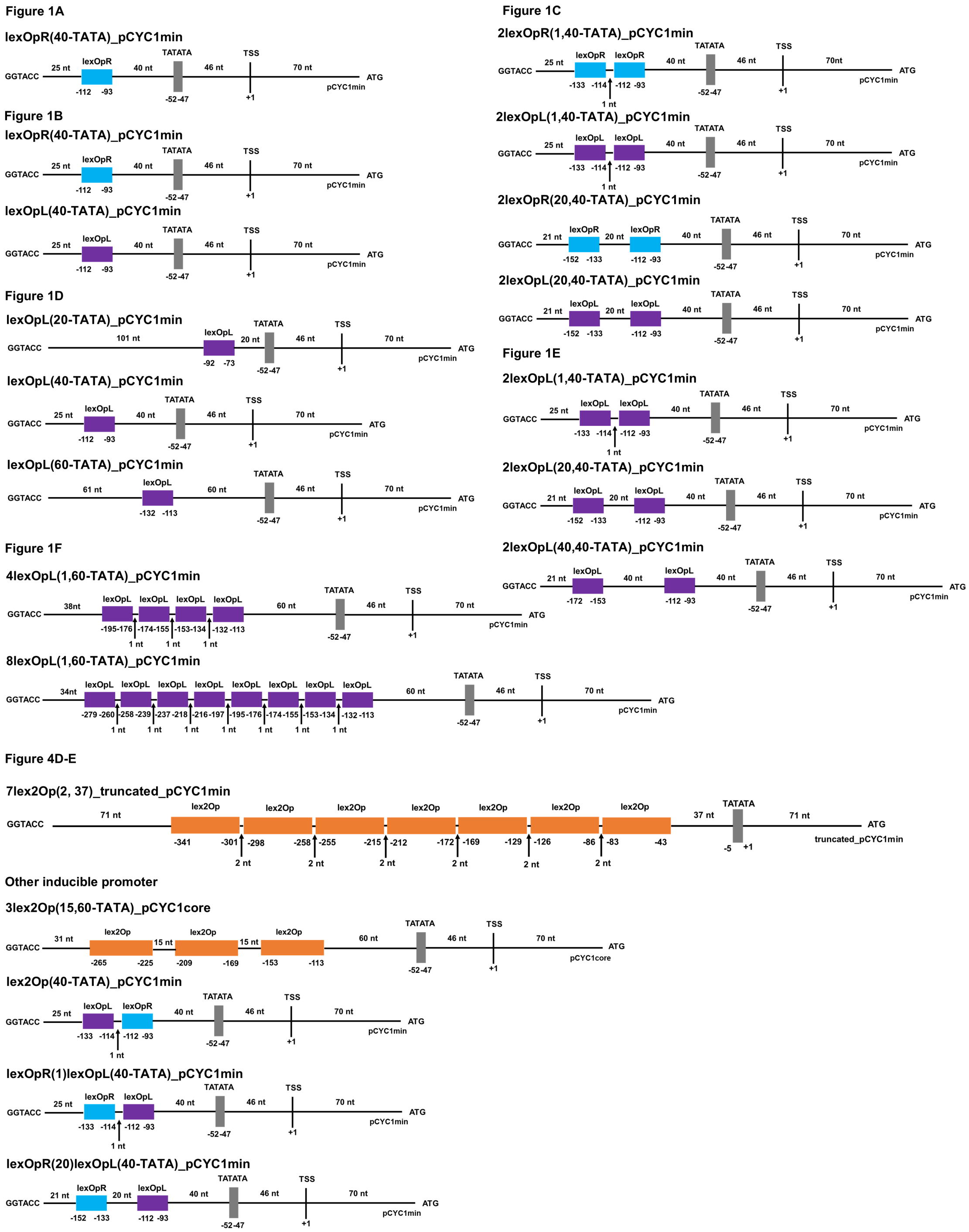

Figure S2. Structure of the inducible promoters used in this work.

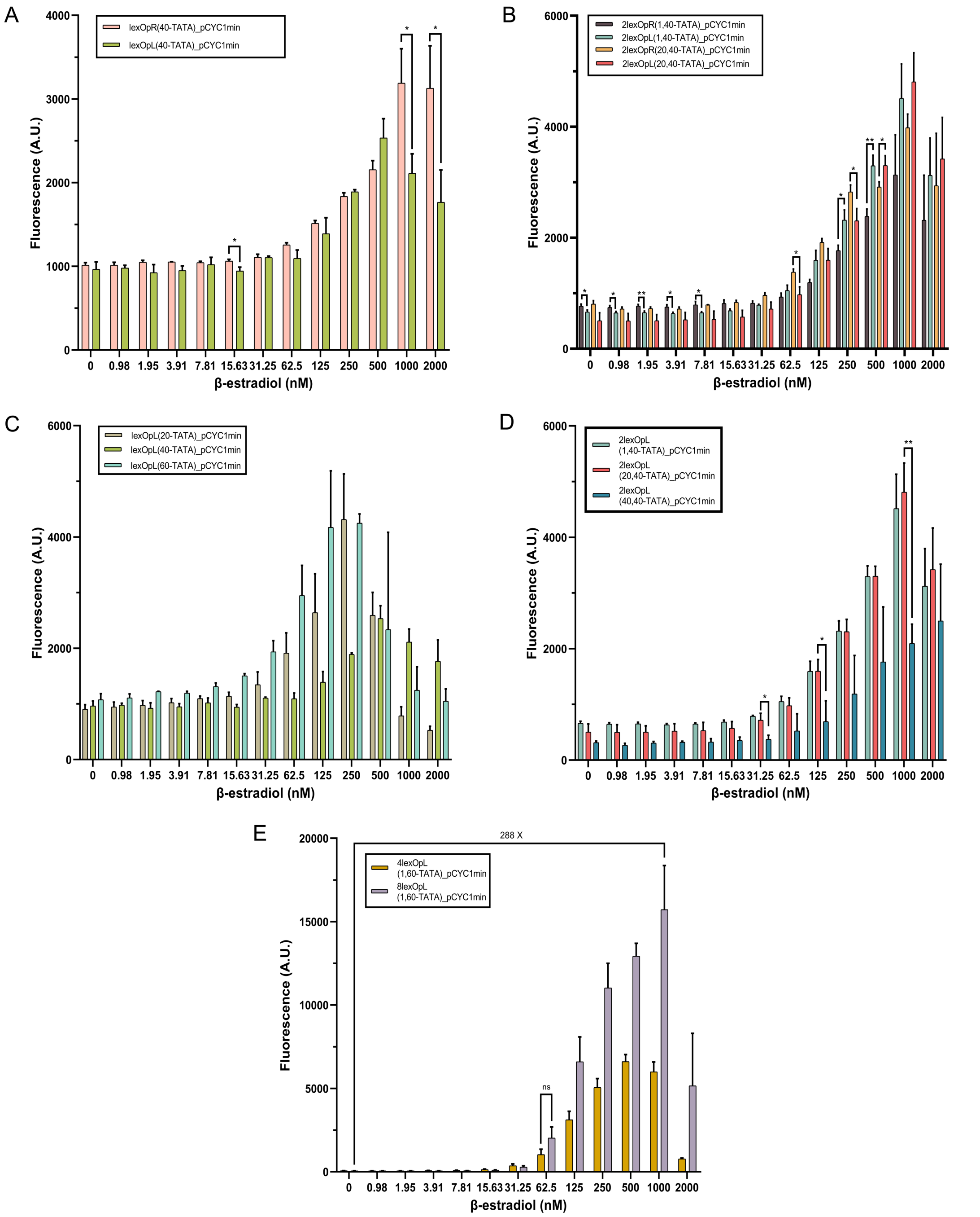

Figure S3. Circuits hosting pGPD-B42 in the receptor part. **(A)** A single lexOpL and lexOpR have comparable performance up to 500 nM β-estradiol (except for 15.63 nM). At higher concentrations, lexOpR outperforms lexOpL (see Table S10). Moreover, lexOpR is also associated with a higher Hill coefficient (n = 1.54). **(B)** The performance of 2lexOpL and 2lexOpR are similar when the distance between two short lex operators is 1 nt and β-estradiol concentration is higher than 15.63 nM (apart from the interval 250-500 nM, where 2lexOpL returns higher fluorescence). In contrast, when the distance between two short lex operators is 20 nt, lexOpL and lexOpR are significant different only for 62.5, 250, and 500 nM (see Table S11). **(C)** A distance of 40 nt between a single lexOpL and $TATA_{-52}$ is the only configuration free form toxicity effects. The highest fluorescence value is reached at 500 nM β-estradiol. **(D)** A distance of 1 or 20 nt between two lexOpL guarantees higher fluorescence expression (no significant difference between them is present at any concentration of β-estradiol). The fluorescence output by 2lexOpL(40,40-TATA)_pCYC1min is significantly lower than the other two receptors for 31.25, 125, and 1000 nM β-estradiol (see Table S12). **(E)** The maximum fluorescence of the reporter 8lexOpL(1,60-TATA)_pCYC1min is 288-fold higher than its basal fluorescence (see Table S13—ns: p-value > 0.05; *: p-value ≤ 0.05; **: p-value ≤ 0.01; two-sided Welch's t test).

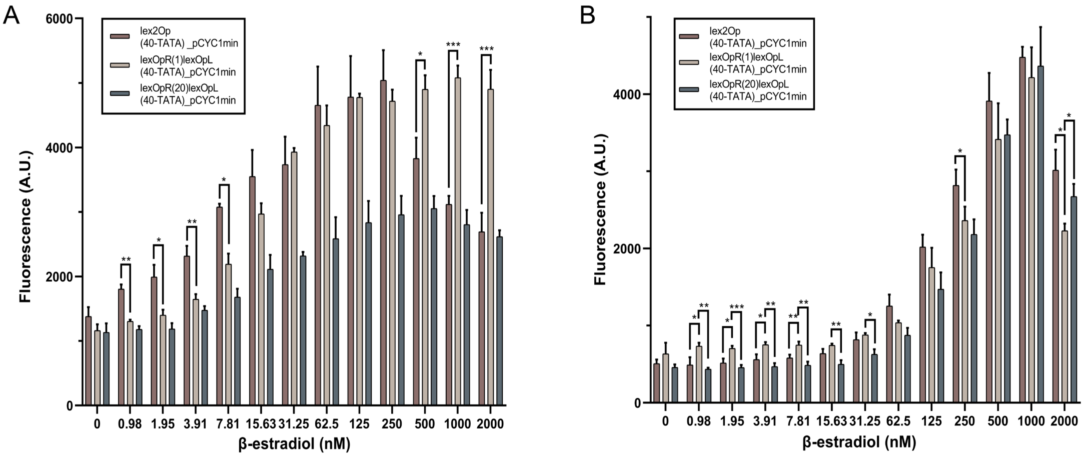

Figure S4. Inverse position of lexOpL and lexOpR compared to the original lex2Op. **(A)** When the receptor is DEG1t_pCYC1noTATA-VP64, lexOpR(1)lexOpL(40-TATA)_pCYC1min reporter displays a lower fluorescence level than lex2Op between 0.98 and 7.81 nM β-estradiol. However, its fluorescence overcomes that from lex2Op between 500 and 2000 nM β-estradiol. Increasing the distance between lexOpR and lexOpL from 1 to 20 nt results in a lower fluorescence expression in the interval 0.98-2000 nM β-estradiol (see Table S14). **(B)** When the receptor is pGPD-B42, lexOpR(1)lexOpL(40-TATA)_pCYC1min reporter shows, in contrast, a higher fluorescence than lex2Op between 0.98 and 7.81 nM β-estradiol and a lower one at 250 and 2000 nM β-estradiol. Increasing the distance between lexOpR and lexOpL from 1 to 20 nt results in a lower fluorescence level in the interval 0.98-31.25 nM β-estradiol and higher at 2000 nM (see Table S15—ns: p-value > 0.05; *: p-value ≤ 0.05; **: p-value ≤ 0.01; two-sided Welch's t test).

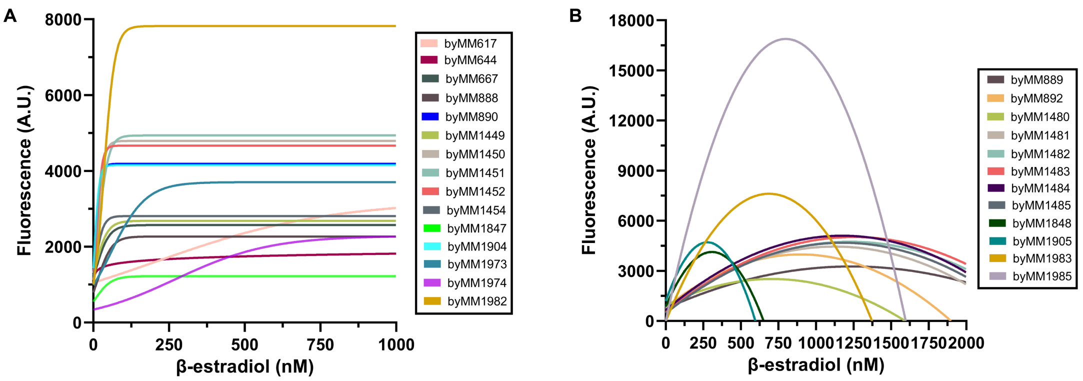

Figure S5. Transfer functions. **(A)** Plot of the transfer function in Table S23. Most of these functions contain an exponential term. **(B)** Plot of the transfer function in Table S24. All these functions are written in a quadratic form. For every transfer function, R^2 is greater than 0.95.

Supplementary Tables

Table S1. Plasmids used/constructed in this work.

Plasmid name	Construction	Marker
pMM197	pRSII405-pGPD(extra A)-LexA-HBD-VP64-CYC1t	LEU2
pMM220	pRSII406-7lex2Op(2, 37)_truncated_pCYC1min-yEGFP-CYC1t	URA3
pMM229	pRSII405-pGPD-LexA-HBD-mDR521_805-CYC1t	LEU2
pMM363	pRSII405-DEG1t_pCYC1noTATA-LexA-HBD-VP64-CYC1t	LEU2
pMM403	pRSII405-pGPD-LexA-HBD-B42-CYC1t	LEU2
pMM527	pRSII406-3lex2Op(15,60-TATA)_pCYC1core-yEGFP-CYC1t	URA3
pMM555	pRSII405-pCMVc-LexA-HBD-VP64-CYC1t	LEU2
pMM802	pRSII406-lexOpR(40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM857	pRSII406-2lexOpR(1,40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM858	pRSII406-2lexOpR(20,40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1201	pRSII406-lexOpR(1)lexOpL(40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1209	pRSII406-2lexOpL(20,40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1215	pRSII406-lexOpL(40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1216	pRSII406-2lexOpL(1,40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1323	pRSII406-lexOpL(1)lexOpR(40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1324	pRSII406-lexOpR(20)lexOpL(40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1540	pRSII406-pGPD-CPR-Tsynth6	URA3
pMM1541	pRSII405-pGPD-CYP2C9-CYC1t_ATC	LEU2
pMM1542	pRSII405-pGPD-CYP5A1-CYC1t_ATC	LEU2
pMM1543	pRSII405-pGPD-CYP19A1-CYC1t_ATC	LEU2
pMM1544	pRSII405-pGPD-CYP1B1-CYC1t_ATC	LEU2
pMM1549	pRSII406-lexOpL(20-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1551	pRSII406-lexOpL(60-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1594	pRSII403-pGPD-CPR-Tsynth6	HIS3
pMM1595	pRSII404-pGPD-CYP19A1-CYC1t_ATC	TRP1
pMM1607	pRSII406-2lexOpL(40,40-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1612	pRSII406-4lexOpL(1,60-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3
pMM1613	pRSII406-8lexOpL(1,60-TATA)_pCYC1min-yEGFPgg-Tsynth24	URA3

Table S2. Operator sequences.

DNA fragments	Sequence
lex2Op	TGCTGTATATACTCACAGCATAACTGTATATACACCCAGGG
lexOpL	TGCTGTATATACTCACAGCA
lexOpR	AACTGTATATACACCCAGGG

Table S3. Promoter sequences.

DNA fragments	Sequence
pGPD(extra A)	CAGTTCGAGTTTATCATTATCAATACTGCCATTTCAAAGAATACGTAAATAATTAATAGTAGTGATTTTCCTAACTTT ATTTAGTCAAAAAATTAGCCTTTTAATTCTGCTGTAACCCGTACATGCCCAAAATAGGGGGCGGGTTACACAGAATA TATAACATCGTAGGTGTCTGGGTGAACAGTTTATTCCTGGCATCCACTAAATATAATGGAGCCCGCTTTTTAAGCTGG CATCCAGAAAAAAAAAAGAATCCCAGCACCAAAATATTGTTTTCTTCACCAACCATCAGTTCATAGGTCCATTCTCTTA GCGCAACTACAGAGAACAGGGGCACAAACAGGCAAAAAACGGGCACAACCTCAATGGAGTGATGCAACCTGCCTG GAGTAAATGATGACACAAGGCAATTGACCCACGCATGTATCTATCTCATTTTCTTACACCTTCTATTACCTTCTGCTCT CTCTGATTTGGAAAAAGCTGAAAAAAAAGGTTGAAACCAGTTCCCTGAAATTATTCCCCTACTTGACTAATAAGTAT ATAAAGACGGTAGGTATTGATTGTAATTCTGTAAATCTATTTCTTAAACTTCTTAAATTCTACTTTTATAGTTAGTCTT TTTTTTAGTTTTAAAACACCAAGAACTTAGTTTCGAATAAACACACATAAACAAACAAAA
pGPD	CAGTTCGAGTTTATCATTATCAATACTGCCATTTCAAAGAATACGTAAATAATTAATAGTAGTGATTTTCCTAACTTT ATTTAGTCAAAAAATTAGCCTTTTAATTCTGCTGTAACCCGTACATGCCCAAAATAGGGGGCGGGTTACACAGAATA TATAACATCGTAGGTGTCTGGGTGAACAGTTTATTCCTGGCATCCACTAAATATAATGGAGCCCGCTTTTTAAGCTGG CATCCAGAAAAAAAAAAGAATCCCAGCACCAAAATATTGTTTTCTTCACCAACCATCAGTTCATAGGTCCATTCTCTTA GCGCAACTACAGAGAACAGGGGCACAAACAGGCAAAAAACGGGCACAACCTCAATGGAGTGATGCAACCTGCCTG GAGTAAATGATGACACAAGGCAATTGACCCACGCATGTATCTATCTCATTTTCTTACACCTTCTATTACCTTCTGCTCT CTCTGATTTGGAAAAAGCTGAAAAAAAAGGTTGAAACCAGTTCCCTGAAATTATTCCCCTACTTGACTAATAAGTAT ATAAAGACGGTAGGTATTGATTGTAATTCTGTAAATCTATTTCTTAAACTTCTTAAATTCTACTTTTATAGTTAGTCTT TTTTTTAGTTTTAAAACACCAAGAACTTAGTTTCGAATAAACACACATAAACAAACAAA
pCMVc	AATTGCATGAAGAATCTGCTTAGGGTTAGGCGTTTTGCGCTGCTTCGCGATGTACGGGCCAGATATACGCGTTGACAT TGATTATTGACTAGTTATTAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACA TAACTTACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCCATTGACGTCAATAATGACGTATGTTCC CATAGTAACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGACTATTTACGGTAAACTGCCCACTTGGCAGTAC ATCAAGTGTATCATATGCCAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCCGCCTGGCATTATGCCCAG

	TACATGACCTTATGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTT GGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGG AGTTTGTTTTGGCACCAAAATCAACGGGACTTTCCAAAATGTCGTAACAACTCCGCCCCATTGACGCAAATGGGCGG TAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCTCTGGCTAACTAGAGAACCCACTGCTTACTGGCTTATCG AAATTAATACGACTCACTATAGGGAGACCCAAGCTGGCTAGTT
DEG1t_pCYC1noTATA	AATAATATATAAACCTGTATAATATAACCTTGAAGACTATATTTCTTTTCttcTTTCCTTATACATtAGGACCTTTGCAGC ATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
truncated_pCYC1min	GAAGACAAGAGCGGAGTGCGCTTGCCTTGTCTTCGCATGCATGTcCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTT TTCTCTAAATATTCTTTCCTTATACATtAGGACCTTTGCAGCATAAATTACa
pCYC1min	CAGATCCGCCAGGCGTGTATATATAGCGTGGATGGCCAGGCAACTTTAGTGCTGACACATACGACGACACATGATCA TATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATtAGG ACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
pCYC1core	CAGATCCGCCAGGCGTGTATATATAGCGTGGATGGCCAGGCAACTTTAGTGCTGACACATACAGGCATATATATATG TGTGCGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAAT ATTCTTTCCTTATACATtAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACT AAATTAATA
lexOpL(1)lexOpR(40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATATGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGCGACGACACAT GATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATAC ATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
3lex2Op(15,60-TATA)_pCYC1core	CAGATCCGCCAGGCGTGTATATATAGCGTGGTGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGATGGC CAGGCAACTTTGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGTAGTGCTGACACATATGCTGTATATAC TCACAGCATAACTGTATATACACCCAGGGCAGGCATATATATATGTGTGCGACGACACATGATCATATGGCATGCAT GTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATtAGGACCTTTGCAGCA TAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
7lex2Op(2, 37)_truncated_pCYC1min	GAAGACAAGAGCGGAGTTGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGGTTGCTGTATATACTCACA GCATAACTGTATATACACCCAGGGGTTGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGGTTGCTGTATA TACTCACAGCATAACTGTATATACACCCAGGGGTTGCTGTATATACTCACAGCATAACTGTATATACACCCAGGGGTT GCTGTATATACTCACAGCATAACTGTATATACACCCAGGGGTTGCTGTATATACTCACAGCATAACTGTATATACACC CAGGGGCGCTTGCCTTGTCTTCGCATGCATGTcCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATT CTTTCCTTATACATtAGGACCTTTGCAGCATAAATTACa
lexOpR(40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATAAACTGTATATACACCCAGGGCGACGACACATGATCATATGGCATGCATGTGC TCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATTAGGACCTTTGCAGCATAA ATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
2lexOpR(1,40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATAAACTGTATATACACCCAGGGTAACTGTATATACACCCAGGGCGACGACACAT GATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATAC ATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
2lexOpR(20,40-TATA)_pCYC1min	CAGATCCGCCAGGCGTGAAAAAACTGTATATACACCCAGGGAACTTTAGTGCTGACACATAAACTGTATATACACCC AGGGCGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAA TATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACA CTAAATTAATA
lexOpR(1)lexOpL(40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATAAACTGTATATACACCCAGGGTTGCTGTATATACTCACAGCACGACGACACAT GATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATAC ATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
lexOpR(20)lexOpL(40-TATA)_pCYC1min	CAGATCCGCCAGGCGTGAAAAAACTGTATATACACCCAGGGAACTTTAGTGCTGACACATATGCTGTATATACTCAC AGCACGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAA TATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACA CTAAATTAATA
lexOpL(20-TATA)_pCYC1min	CAGATCCGCCAGGCGTGTATATATAGCGTGGATGGCCAGGCAACTTTAGTGCTGACACATACAGGCATATATATATG TGTGCGACGACACATGATCATATGTGCTGTATATACTCACAGCAGCATGCATGTGCTCTGTATG**TATATA**AAACTCTT GTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACA CAAACACAAATACACACACTAAATTAATA
lexOpL(40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATATGCTGTATATACTCACAGCACGACGACACATGATCATATGGCATGCATGTGC TCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATTAGGACCTTTGCAGCATAA ATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
lexOpL(60-TATA)_pCYC1min	CAGATCCGCCAGGCGTGTATATATAGCGTGGATGGCCAGGCAACTTTAGTGCTGACACATATGCTGTATATACTCAC AGCACAGGCATATATATATGTGTGCGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCT TGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACAC ACAAACACAAATACACACACTAAATTAATA
2lexOpL(1,40-TATA)_pCYC1min	CAGGCAACTTTAGTGCTGACACATATGCTGTATATACTCACAGCATTGCTGTATATACTCACAGCACGACGACACAT GATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATAC ATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
2lexOpL(20,40-TATA)_pCYC1min	CAGATCCGCCAGGCGTGAAAATGCTGTATATACTCACAGCAAACTTTAGTGCTGACACATATGCTGTATATACTCAC AGCACGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAA TATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACA CTAAATTAATA
2lexOpL(40,40-TATA)_pCYC1min	CAGATCCGCCAGGCGTGTATATGCTGTATATACTCACAGCATATAGCGTGGATGGCCAGGCAACTTTAGTGCTGACA CATATGCTGTATATACTCACAGCACGACGACACATGATCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTT

	GTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATTAGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACA CAAACACAAATACACACACTAAATTAATA
4lexOpL(1,60-TATA)_pCYC1min	CAGATCCGCCAGGCGTGTATATATAGCGTGGATGGCCATGCTGTATATACTCACAGCAGTGCTGTATATACTCACAG CAGTGCTGTATATACTCACAGCACTGCTGTATATACTCACAGCAAACTTTAGTGCTGACACATACGACGACACATGA TCATATGGCATGCATGTGCTCTGTATG**TATATA**AAACTCTTGTTTTCTTCTTTTCTCTAAATATTCTTTCCTTATACATT AGGACCTTTGCAGCATAAATTACTATACTTCTATAGACACACAAACACAAATACACACACTAAATTAATA
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Table S4. Protein sequences.

DNA fragments	Sequence
CPR	ATGATCAACATGGGTGATAGTCATGTCGATACTTCCTCTACTGTATCTGAAGCTGTTGCTGAAGAAGTCTCTCTATTCTCTATGACTGAC ATGATTCTGTTCTCACTGATTGTTGGACTGTTGACATACTGGTTCTTATTCCGCAAAAAGAAAGAGGAAGTACCAGAATTCACCAAGAT CCAAACACTTACCAGTTCTGTACGTGAAAGTTCCTTTGTTGAGAAAATGAAGAAAACAGGTCGAAACATCATTGTGTTCTACGGTTCTC AAACAGGTACTGCAGAAGAATTCGCTAATCGACTTTCCAAAGATGCTCATCGTTATGGAATGAGAGGTATGAGTGCTGATCCTGAAGA ATACGACTTAGCCGATTTATCGAGTCTTCCAGAAATCGACAATGCTTTGGTTGTGTTCTGTATGGCTACTTATGGAGAAGGAGATCCTA CTGATAACGCTCAAGACTTCTACGATTGGTTACAGGAAACTGATGTCGATTTATCTGGCGTAAAGTTTGCAGTGTTTGGACTAGGTAAC AAGACTTACGAGCATTTCAATGCTATGGGTAAATACGTGGACAAAAGGTTGGAGCAATTAGGTGCACAACGCATTTTCGAGTTAGGTT TAGGAGATGATGACGGAAATCTAGAAGAGGACTTCATCACTTGGAGAGAACAGTTTTGGTTAGCAGTATGTGAACACTTTGGAGTTGA AGCAACTGGTGAAGAAAGCTCTATTCGACAGTATGAACTAGTCGTTCATACTGACATTGATGCTGCAAAGGTGTATATGGGAGAAATG GGAAGACTGAAATCTTACGAGAATCAGAAACCACCTTTTGACGCAAAGAATCCCTTCTTAGCAGCTGTTACAACCAATCGCAAACTGA ACCAAGGTACAGAACGTCATCTTATGCACTTAGAACTGGACATTTCAGACTCGAAGATTCGTTACGAATCTGGTGATCATGTTGCTGTT TATCCTGCAAATGACTCTGCTTTAGTCAACCAATTGGGTAAGATTCTTGGTGCAGACTTAGATGTCGTAATGAGTCTGAACAATTTGGA TGAAGAATCTAACAAGAAACACCCTTTTCCATGTCCAACTTCCTATAGGACTGCTTTGACCTACTATCTGGATATCACGAATCCACCTC GTACAAACGTCCTTTATGAACTAGCTCAATACGCTTCTGAACCTTCTGAACAAGAGCTATTGCGAAAAATGGCATCATCTTCTGGTGAA GGAAAGGAGTTGTATCTGTCTTGGGTAGTTGAAGCAAGACGACATATACTTGCCATTCTGCAAGATTGTCCTTCATTACGACCACCTAT AGATCACCTATGCGAATTACTTCCCAGATTACAAGCACGTTACTATTCCATAGCAAGTTCTAGCAAAGTTCATCCAAACTCAGTTCACA TTTGTGCTGTTGTTGTTGAATACGAGACTAAAGCTGGTCGTATCAACAAAGGTGTTGCTACGAATTGGTTACGTGCTAAAGAACCTGTT GGTGAAAATGGTGGTCGTGCTTTAGTCCCAATGTTTGTTCGTAAGAGCCAATTCAGGTTACCTTTCAAAGCAACAACTCCTGTGATTAT GGTAGGTCCTGGTACTGGTGTTGCACCTTTCATTGGCTTCATCCAAGAAAGAGCATGGTTACGTCAACAAGGAAAGGAAGTTGGTGAA ACCCTACTTTACTATGGATGTCGTCGTTCAGATGAAGATTACTTGTATCGAGAAGAGTTAGCTCAGTTTCATCGTGATGGTGCTTTAACG CAACTTAACGTGGCTTTTTCTCGTGAACAATCGCACAAAGTTTACGTTCAGCATTTGCTTAAGCAAGATCGTGAACACTTATGGAAGCT AATCGAAGGAGGTGCTCACATCTATGTCTGTGGTGATGCTAGGAATATGGCTCGTGATGTACAGAACACATTCTACGACATAGTTGCTG AATTAGGTGCTATGGAACATGCTCAAGCTGTTGATTACATCAAGAAACTGATGACGAAAGGAAGATACTCTCTGGATGTTTGGAGCTA A
CYP19A1	ATGGTCCTTGAAATGCTTAACCCTATCCACTACAATATCACCTCTATTGTCCCTGAAGCTATGCCTGCTGCTACTATGCCTGTTTTATTA CTTACCGGTCTTTTCCTTCTTGTCTGGAATTATGAAGGCACTTCTTCTATTCCAGGTCCTGGTTATTGCATGGGTATTGGTCCTTTAATTT CTCATGGTCGTTTTCTTTGGATGGGCATTGGTTCTGCTTGCAATTATTACAATCGTGTTTACGGTGAGTTCATGCGTGTTTGGATTTCTGG TGAAGAAACCCTTATCATCTCCAAGTCCTCTTCTATGTTCCACATTATGAAGCACAACCACTACTCTTCTCGTTTCGGTTCTAAACTTGG ACTTCAATGTATTGGCATGCATGAGAAGGGCATTATCTTTAACAACAACCCTGAACTTTGGAAAACTACCCGTCCATTTTTCATGAAGG CTTTATCTGGTCCTGGTCTTGTTCGTATGGTTACTGTTTGTGCTGAATCTCTTAAGACCCATCTTGATCGTTTAGAAGAGGTTACCAATG AGTCTGGTTACGTTGATGTTCTTACTCTTTTACGTCGTGTTATGCTTGATACCTCTAACACCCTTTTTTTGCGTATTCCTCTTGATGAGTCT GCTATTGTCGTTAAGATTCAAGGTTACTTTGATGCTTGGCAAGCCCTTCTTATTAAGCCTGATATTTTCTTCAAGATCTCCTGGCTTTACA AGAAGTACGAGAAATCTGTTAAGGACCTTAAGGACGCTATTGAGGTTCTTATTGCTGAAAAACGTCGTCGTATTTCTACCGAAGAAAA GCTTGAAGAGTGCATGGATTTTGCTACCGAACTTATTTTAGCTGAAAAGCGTGGTGATCTTACCCGTGAAAATGTTAATCAATGCATCC TTGAGATGTTGATTGCTGCTCCTGATACAATGTCTGTCTCTCTTTTTTTCATGTTGTTCCTTATTGCTAAGCACCCTAACGTTGAAGAGGC TATTATCAAAGAAATTCAGACCGTTATTGGTGAGCGCGACATTAAGATTGATGACATCCAAAAGCTAAAGGTCATGGAAAACTTCATC TACGAGTCTATGCGTTACCAACCTGTTGTTGATCTTGTTATGCGTAAGGCTCTTGAGGATGATGTTATTGATGGTTACCCTGTTAAGAAA GGCACCAACATCATTCTTAACATTGGTCGTATGCATCGTCTTGAGTTTTCCCAAAACCTAACGAGTTTACCCTTGAGAACTTTGCTAAG AATGTTCCCTACCGTTACTTTCAACCTTTTGGTTTTGGTCCTCGTGGATGTGCTGGTAAGTATATTGCTATGGTTATGATGAAGGCCATC CTTGTTACTTTGCTTCGTCGTTTTCATGTCAAAACCCTTCAAGGTCAATGCGTTGAGTCCATTCAAAAGATTCATGACTTGTCTCTTCATC CCGATGAGACTAAGAATATGCTTGAGATGATTTTCACCCCTCGTAATTCTGATCGTTGCCTTGAACATTAA
CYP1B1	ATGGGAACTTCTCTTTCTCCTAATGATCCTTGGCCTCTTAACCCTCTTTCTATTCAACAAACTACCCTTCTTCTTTTGTTGTCCGTTCTTGC TACTGTTCATGTTGGTCAACGTTTATTACGTCAACGTCGTCGTCAATTACGTTCTGCTCCTCCTGGTCCTTTTGCTTGGCCTTTAATTGGT AATGCTGCTGCTGTTGGACAAGCTGCTCATTTGTCTTTTGCTCGTTTAGCTCGTCGTTACGGTGATGTTTTTCAAATTCGTTTAGGTTCTT GCCCTATCGTTGTTCTTAATGGTGAACGTGCTATTCATCAAGCTCTTGTTCAACAAGGTTCTGCTTTTGCTGATCGTCCAGCTTTTGCTTC TTTTCGTGTTGTTTCTGGTGGTCGTTCTATGGCTTTTGGTCATTATTCTGAACATTGGAAAGTTCAAAGACGTGCTGCACATTCTATGAT GCGTAACTTTTTTACTCGTCAACCTCGTTCTCGTCAAGTTTTAGAAGGTCATGTTTTATCTGAAGCTCGTGAGCTTGTTGCTTTATTAGTT CGTGGTTCTGCTGATGGTGCTTTTTTAGATCCTCGTCCTTTAACTGTTGTTGCTGTTGCTAATGTTATGTCCGCTGTTTGTTTTGGTTGCC GTTATTCTCATGATGATCCTGAGTTTCGTGAGTTGCTTTCTCATAACGAAGAATTTGGTCGTACTGTTGGTGCTGGTTCTTTAGTTGATGT TATGCCTTGGCTTCAGTACTTCCCTAATCCTGTTAGAACTGTTTTTCGTGAATTCGAGCAACTTAACCGCAACTTCTCTAACTTCATTCTT GACAAGTTTCTTCGTCACTGCGAATCTTTACGTCCTGGTGCTGCTCCTCGTGATATGATGGATGCTTTCATTCTTTCTGCTGAGAAAAAA GCTGCTGGTGATTCTCATGGTGGTGGTGCTCGTCTTGATCTTGAAAATGTTCCTGCTACCATTACCGATATTTTCGGTGCTTCTCAAGAT ACTCTTTCTACTGCTTTACAGTGGCTTCTTTTGCTTTTTACCCGTTATCCTGATGTTCAAACTCGTGTTCAAGCTGAGTTAGATCAAGTTG TTGGTCGTGATCGTTTACCTTGTATGGGTGATCAACCTAATCTTCCTTATGTTCTTGCTTTCTTGTACGAGGCTATGCGTTTTTCTAGTTT TGTTCCTGTTACTATTCCTCACGCTACTACTGCTAATACTTCTGTTCTTGGTTACCACATTCCTAAGGATACCGTTGTTTTCGTTAATCAG TGGTCTGTTAACCACGATCCTCTTAAATGGCCTAATCCAGAAAATTTTGATCCCGCTCGTTTTCTTGATAAGGACGGTCTTATTAACAAG GACCTTACTTCCCGTGTCATGATTTTTTCTGTTGGTAAACGTCGTTGCATTGGCGAAGAACTTTCTAAGATGCAACTTTTCTTGTTCATCT CCATTCTTGCTCATCAATGCGATTTTCGTGCTAATCCTAATGAACCTGCCAAGATGAATTTCTCTTACGGCCTTACTATTAAGCCCAAGT CTTTCAAGGTTAACGTTACTCTTCGTGAGTCCATGGAATTACTTGATTCTGCTGTTCAAAACCTTCAGGCTAAAGAAACATGCCAGTAA
CYP2C9	ATGGACTCCTTAGTTGTACTTGTGTTGTGCTTATCTTGCTTACTGTTGCTATCGTTATGGAGACAAAGTTCTGGAAGAGGTAAACTTCCT CCTGGTCCAACACCATTACCTGTCATTGGCAACATCCTTCAAATCGGCATTAAAGACATCTCGAAAAGTTTGACGAATCTAAGCAAAGT TTATGGACCTGTATTTACCCTGTATTTTGGCTTGAAACCTATTGTCGTACTTCATGGTTATGAAGCTGTTAAGGAAGCTTTAATCGACTT AGGTGAAGAGTTTTCTGGTAGAGGAATCTTTCCTTTAGCAGAACGTGCAAATCGTGGATTTGGCATTGTATTCTCCAATGGAAAGAAAT GGAAGGAAATACGTCGATTTTCACTGATGACATTACGCAACTTTGGAATGGGTAAACGATCTATCGAAGATCGAGTTCAAGAAGAAGC ACGTTGTTTAGTCGAAGAACTTCGAAAGACCAAAGCTTCTCCTTGTGATCCAACGTTCATATTAGGTTGTGCTCCATGCAATGTTATATG

	CTCCATTATTTCCACAAACGTTTTGACTACAAAGATCAACAGTTCTTGAATCTGATGGAAAAGCTGAACGAAAACATCAAGATCCTTT CATCTCCTTGGATACAGATCTGTAACAATTTCAGTCCTATCATTGATTACTTTCCAGGTACTCACAATAAGCTGTTAAAAAACGTAGCAT TCATGAAGAGCTACATTTTGGAGAAAGTTAAGGAACATCAAGAGTCTATGGACATGAACAATCCTCAAGACTTCATTGACTGTTTCCTG ATGAAAATGGAGAAAGAAAAGCACAATCAACCTTCTGAATTCACCATTGAATCACTTGAGAATACAGCTGTTGATTTGTTTGGTGCTG GTACTGAAACCACATCTACTACACTACGTTATGCCTTACTGTTGCTACTTAAGCATCCAGAAGTTACTGCAAAAGTTCAGGAAGAAATC GAGAGAGTAATTGGTCGTAATCGTTCACCTTGTATGCAAGATCGAAGTCACATGCCTTATACTGATGCTGTTGTACATGAAGTACAACG TTACATCGACTTACTACCTACTAGTTTACCTCATGCAGTTACTTGCGATATCAAGTTTCGCAACTACTTGATACCAAAAGGTACTACCAT ACTTATCTCACTAACTTCTGTCTTACACGATAACAAGGAGTTTCCAAATCCTGAAATGTTTGATCCTCACCATTTCCTAGATGAAGGAG GTAACTTCAAGAAAAGCAAGTATTTCATGCCTTTTTCAGCTGGAAAACGTATTTGTGTTGGTGAAGCTTTAGCTGGTATGGAACTATTC CTGTTCTTAACGTCTATCTTGCAAAACTTCAACCTGAAGAGTTTAGTCGATCCTAAAAACCTGGACACTACACCAGTTGTGAATGGTTTT GCTTCAGTTCCTCCATTTTACCAGCTTTGTTTCATACCCGTTTAA
CYP5A1	ATGATGGAAGCTCTTGGTTTCCTTAAGCTTGAAGTTAATGGTCCTATGGTTACCGTTGCTTTATCTGTTGCTTTACTTGCTCTTTTGAAGT GGTACTCTACCTCTGCTTTTTCCCGTCTTGAAAAACTTGGTTTGCGTCATCCTAAACCTTCTCCATTCATTGGTAACCTTACATTCTTTCG TCAAGGTTTCTGGGAGTCTCAAATGGAACTTCGTAAACTTTATGGTCCTCTTTGCGGTTATTATCTTGGTCGTCGTATGTTCATTGTCATT TCTGAACCTGACATGATCAAGCAAGTTCTTGTTGAGAACTTCTCCAACTTTACCAATCGTATGGCTTCTGGTCTTGAGTTTAAGTCTGTT GCTGATTCCGTTCTTTTCCTTCGTGACAAACGTTGGGAAGAAGTTAGAGGCGCTTTAATGTCAGCTTTTTCTCCCGAAAAACTTAACGA GATGGTCCCTTTAATTTCTCAAGCTTGCGATCTTCTTTTGGCTCATCTTAAACGTTATGCTGAATCTGGTGATGCTTTCGATATTCAACGT TGCTACTGCAACTACACTACTGATGTTGTTGCTTCAGTTGCTTTTGGTACTCCTGTTGATTCTTGGCAAGCTCCTGAAGATCCTTTTGTTA AGCACTGCAAGCGTTTTTTCGAATTCTGTATTCCTCGTCCTATCCTTGTCTTGTTGCTTTCTTTTCCCTCTATTATGGTTCCCCTTGCTCGT ATTCTTCCTAACAAAAATCGTGATGAGCTTAACGGCTTCTTCAACAAGCTTATTCGTAACGTTATTGCTTTGCGTGATCAACAAGCAGCT GAAGAACGTCGTCGTGATTTTTTACAAATGGTTCTTGATGCTCGTCATTCTGCTTCTCCAATGGGTGTTCAAGATTTTGATATTGTCCGT GACGTTTTCTCTTCTACTGGTTGTAAACCTAATCCTTCTCGTCAACATCAACCTTCACCTATGGCTCGTCCTTTAACTGTTGATGAGATA GTTGGTCAGGCCTTCATTTTTCTTATTGCTGGCTACGAGATTATCACCAACACTTTGTCTTTTGCCACTTACCTTTTGGCTACTAATCCTG ATTGTCAAGAGAAGCTTTTGCGTGAGGTTGACGTTTTTAAAGAAAAACACATGGCCCCTGAGTTTTGCTCATTAGAAGAAGGTTTGCCT TACCTTGACATGGTTATTGCTGAAACTCTTCGTATGTATCCTCCTGCTTTTCGTTTTACTCGTGAAGCTGCTCAAGATTGTGAAGTTTTAG GTCAACGTATTCCTGCTGGTGCTGTTTTAGAAATGGCTGTTGGTGCTTTACATCATGATCCTGAACATTGGCCTTCTCCAGAAACTTTTA ATCCTGAACGTTTTACAGCTGAAGCTCGTCAGCAACATCGTCCTTTTACTTATTTGCCTTTTGGTGCTGGTCCTCGTTCTTGTTTAGGTGT TCGTTTAGGTCTTTTGGAGGTTAAGCTTACCCTTCTTCATGTTCTTCATAAGTTCCGTTTTCAAGCTTGTCCTGAAACTCAAGTTCCTCTT CAACTTGAATCTAAGTCTGCTCTTGGTCCTAAGAATGGCGTTTACATTAAGATTGTCTCCCGCTAA
LexA-ER-VP64	ATGAAAGCGTTAACGGCCAGGCAACAAGAGGTGTTTGATCTCATCCGTGATCACATCAGCCAGACAGGTATGCCGCCGACGCGTGCGG AAATCGCGCAGCGTTTGGGGTTCCGTTCCCCAAACGCGGCTGAAGAACATCTGAAGGCGCTGGCACGCAAAGGCGTTATTGAAATTGT TTCCGGCGCATCACGCGGGATTCGTCTGTTGCAGGAAGAGGAAGAAGGGTTGCCGCTGGTAGGTCGTGTGGCTGCCGGTGAACCACTT CTGGCGCAACAGCATATTGAAGGTCATTATCAGGTCGATCCTTCCTTATTCAAGCCGAATGCTGATTTCCTGCTGCGCGTCAGCGGGAT GTCGATGAAAGATATCGGCATTATGGATGGTGACTTGCTGGCAGTGCATAAAACTCAGGATGTACGTAACGGTCAGGTCGTTGTCGCA CGTATTGATGACGAAGTTACCGTTAAGCGCCTGAAAAAACAGGGCAATAAAGTCGAACTGTTGCCAGAAAATAGCGAGTTTAAACCAA TTGTCGTTGACCTTCGTCAGCAGAGCTTCACCATTGAAGGGCTGGCGGTTGGGGTTATTCGCAACGGCGACTGGCTGTCATCTGCTGGA GACATGAGAGCTGCCAACCTTTGGCCAAGCCCGCTCATGATCAAACGCTCTAAGAAGAACAGCCTGGCCTTGTCCCTGACGGCCGACC AGATGGTCAGTGCCTTGTTGGATGCTGAGCCCCCCATACTCTATTCCGAGTATGATCCTACCAGACCCTTCAGTGAAGCTTCGATGATG GGCTTACTGACCAACCTGGCAGACAGGGAGCTGGTTCACATGATCAACTGGGCGAAGAGGGTGCCAGGCTTTGTGGATTTGACCCTCC ATGATCAGGTCCACCTTCTAGAATGTGCCTGGCTAGAGATCCTGATGATTGGTCTCGTCTGGCGCTCCATGGAGCACCCAGTGAAGCTA CTGTTTGCTCCTAACTTGCTCTTGGACAGGAACCAGGGAAAATGTGTAGAGGGCATGGTGGAGATCTTCGACATGCTGCTGGCTACATC ATCTCGGTTCCGCATGATGAATCTGCAGGGAGAGGAGTTTGTGTGCCTCAAATCTATTATTTTGCTTAATTCTGGAGTGTACACATTTCT GTCCAGCACCCTGAAGTCTCTGGAAGAGAAGGACCATATCCACCGAGTCCTGGACAAGATCACAGACACTTTGATCCACCTGATGGCC AAGGCAGGCCTGACCCTGCAGCAGCAGCACCAGCGGCTGGCCCAGCTCCTCCTCATCCTCTCCCACATCAGGCACATGAGTAACAAAG GCATGGAGCATCTGTACAGCATGAAGTGCAAGAACGTGGTGCCCCTCTATGACCTGCTGCTGGAGATGCTGGACGCCCACCGCCTACA TGCGCCCACTAGCCGTGGAGGGGCATCCGTGGAGGAGACGGACCAAAGCCACTTGGCCACTGCGGGCTCTACTTCATCGGACGCGCTG GACGATTTCGATCTCGACATGCTGGGTTCTGATGCCCTCGATGACTTTGACCTGGATATGTTGGGAAGCGACGCATTGGATGACTTTGA TCTGGACATGCTCGGCTCCGATGCTCTGGACGATTTCGATCTCGATATGTTATAAGCTT
LexA-ER-mDR521_805	ATGAAAGCGTTAACGGCCAGGCAACAAGAGGTGTTTGATCTCATCCGTGATCACATCAGCCAGACAGGTATGCCGCCGACGCGTGCGG AAATCGCGCAGCGTTTGGGGTTCCGTTCCCCAAACGCGGCTGAAGAACATCTGAAGGCGCTGGCACGCAAAGGCGTTATTGAAATTGT TTCCGGCGCATCACGCGGGATTCGTCTGTTGCAGGAAGAGGAAGAAGGGTTGCCGCTGGTAGGTCGTGTGGCTGCCGGTGAACCACTT CTGGCGCAACAGCATATTGAAGGTCATTATCAGGTCGATCCTTCCTTATTCAAGCCGAATGCTGATTTCCTGCTGCGCGTCAGCGGGAT GTCGATGAAAGATATCGGCATTATGGATGGTGACTTGCTGGCAGTGCATAAAACTCAGGATGTACGTAACGGTCAGGTCGTTGTCGCA CGTATTGATGACGAAGTTACCGTTAAGCGCCTGAAAAAACAGGGCAATAAAGTCGAACTGTTGCCAGAAAATAGCGAGTTTAAACCAA TTGTCGTTGACCTTCGTCAGCAGAGCTTCACCATTGAAGGGCTGGCGGTTGGGGTTATTCGCAACGGCGACTGGCTGTCATCTGCTGGA GACATGAGAGCTGCCAACCTTTGGCCAAGCCCGCTCATGATCAAACGCTCTAAGAAGAACAGCCTGGCCTTGTCCCTGACGGCCGACC AGATGGTCAGTGCCTTGTTGGATGCTGAGCCCCCCATACTCTATTCCGAGTATGATCCTACCAGACCCTTCAGTGAAGCTTCGATGATG GGCTTACTGACCAACCTGGCAGACAGGGAGCTGGTTCACATGATCAACTGGGCGAAGAGGGTGCCAGGCTTTGTGGATTTGACCCTCC ATGATCAGGTCCACCTTCTAGAATGTGCCTGGCTAGAGATCCTGATGATTGGTCTCGTCTGGCGCTCCATGGAGCACCCAGTGAAGCTA CTGTTTGCTCCTAACTTGCTCTTGGACAGGAACCAGGGAAAATGTGTAGAGGGCATGGTGGAGATCTTCGACATGCTGCTGGCTACATC ATCTCGGTTCCGCATGATGAATCTGCAGGGAGAGGAGTTTGTGTGCCTCAAATCTATTATTTTGCTTAATTCTGGAGTGTACACATTTCT GTCCAGCACCCTGAAGTCTCTGGAAGAGAAGGACCATATCCACCGAGTCCTGGACAAGATCACAGACACTTTGATCCACCTGATGGCC AAGGCAGGCCTGACCCTGCAGCAGCAGCACCAGCGGCTGGCCCAGCTCCTCCTCATCCTCTCCCACATCAGGCACATGAGTAACAAAG GCATGGAGCATCTGTACAGCATGAAGTGCAAGAACGTGGTGCCCCTCTATGACCTGCTGCTGGAGATGCTGGACGCCCACCGCCTACA TGCGCCCACTAGCCGTGGAGGGGCATCCGTGGAGGAGACGGACCAAAGCCACTTGGCCACTGCGGGCTCTACTTCATCGGAATTGTTC CCAGACAACAAGAACAACGACTTGTACTCTATCATGAGAAACTTGGGTATCGACTTCGAAGACATCAGATCTATGCAAAACGAAGAAT TTTTCAGAACTGACTCTACTGCTGCTGGTGAAGTTGACTTCAAGGACATCGACATCACTGACGAAATCTTGACTTACGTTCAAGACTCT TTGAACAACTCTACTTTGTTGAACTCTGCTTGTCAACAACAACCAGTTACTCAACACTTGTCTTGTATGTTGCAAGAAAGATTGCAATTG GAACAACAACAACAATTGCAACAACCACCACCACAAGCTTTGGAACCACAACAACAATTGTGTCAAATGGTTTGTCCACAACAAGACT TGGGTCCAAAGCACACTCAAATCAACGGTACTTTCGCTTCTTGGAACCCAACTCCACCAGTTTCTTTCAACTGTCCACAACAAGAATTG AAGCACTACCAATTGTTCTCTTCTTTGCAAGGTACTGCTCAAGAATTTCCATACAAGCCAGAAGTTGACTCTGTTCCATACACTCAAAA CTTCGCTCCATGTAACCAACCATTGTTGCCAGAACACTCTAAGTCTGTTCAATTGGACTTCCCAGGTAGAGACTTCGAACCATCTTTGCA CCCAACTACTTCTAACTTGGACTTCGTTTCTTGTTTGCAAGTTCCAGAAAACCAATCTCACGGTATCAACTCTCAATCTGCTATGGTTTC TCCACAAGCTTACTACGCTGGTGCTATGTCTATGTACCAATGTCAACCAGGTCCACAAAGAACTCCAGTTGACCAAACTCAATACTCTT CTGAAATCCCAGGTTCTCAAGCTTTCTTGTCTAAGGTTCAATCTTAA
LexA-ER-B42	ATGAAAGCGTTAACGGCCAGGCAACAAGAGGTGTTTGATCTCATCCGTGATCACATCAGCCAGACAGGTATGCCGCCGACGCGTGCGG AAATCGCGCAGCGTTTGGGGTTCCGTTCCCCAAACGCGGCTGAAGAACATCTGAAGGCGCTGGCACGCAAAGGCGTTATTGAAATTGT TTCCGGCGCATCACGCGGGATTCGTCTGTTGCAGGAAGAGGAAGAAGGGTTGCCGCTGGTAGGTCGTGTGGCTGCCGGTGAACCACTT CTGGCGCAACAGCATATTGAAGGTCATTATCAGGTCGATCCTTCCTTATTCAAGCCGAATGCTGATTTCCTGCTGCGCGTCAGCGGGAT GTCGATGAAAGATATCGGCATTATGGATGGTGACTTGCTGGCAGTGCATAAAACTCAGGATGTACGTAACGGTCAGGTCGTTGTCGCA CGTATTGATGACGAAGTTACCGTTAAGCGCCTGAAAAAACAGGGCAATAAAGTCGAACTGTTGCCAGAAAATAGCGAGTTTAAACCAA TTGTCGTTGACCTTCGTCAGCAGAGCTTCACCATTGAAGGGCTGGCGGTTGGGGTTATTCGCAACGGCGACTGGCTGTCATCTGCTGGA

	GACATGAGAGCTGCCAACCTTTGGCCAAGCCCGCTCATGATCAAACGCTCTAAGAAGAACAGCCTGGCCTTGTCCCTGACGGCCGACC AGATGGTCAGTGCCTTGTTGGATGCTGAGCCCCCCATACTCTATTCCGAGTATGATCCTACCAGACCCTTCAGTGAAGCTTCGATGATG GGCTTACTGACCAACCTGGCAGACAGGGAGCTGGTTCACATGATCAACTGGGCGAAGAGGGTGCCAGGCTTTGTGGATTTGACCCTCC ATGATCAGGTCCACCTTCTAGAATGTGCCTGGCTAGAGATCCTGATGATTGGTCTCGTCTGGCGCTCCATGGAGCACCCAGTGAAGCTA CTGTTTGCTCCTAACTTGCTCTTGGACAGGAACCAGGGAAAATGTGTAGAGGGCATGGTGGAGATCTTCGACATGCTGCTGGCTACATC ATCTCGGTTCCGCATGATGAATCTGCAGGGAGAGGAGTTTGTGTGCCTCAAATCTATTATTTTGCTTAATTCTGGAGTGTACACATTTCT GTCCAGCACCCTGAAGTCTCTGGAAGAGAAGGACCATATCCACCGAGTCCTGGACAAGATCACAGACACTTTGATCCACCTGATGGCC AAGGCAGGCCTGACCCTGCAGCAGCAGCACCAGCGGCTGGCCCAGCTCCTCCTCATCCTCTCCCACATCAGGCACATGAGTAACAAAG GCATGGAGCATCTGTACAGCATGAAGTGCAAGAACGTGGTGCCCCTCTATGACCTGCTGCTGGAGATGCTGGACGCCCACCGCCTACA TGCGCCCACTAGCCGTGGAGGGGCATCCGTGGAGGAGACGGACCAAAGCCACTTGGCCACTGCGGGCTCTACTTCATCGATCAATAAA GATATCGAGGAGTGCAATGCCATCATTGAGCAGTTTATCGACTACCTGCGCACCGGACAGGAGATGCCGATGGAAATGGCGGATCAGG CGATTAACGTGGTGCCGGGCATGACGCCGAAAACCATTCTTCACGCCGGGCCGCCGATCCAGCCTGACTGGCTGAAATCGAATGGTTT TCATGAAATTGAAGCGGATGTTAACGATACCAGCCTCTTGCTGAGTGGAGATTAAGCTT
yEGFP	ATGTCTAAAGGTGAAGAATTATTCACTGGTGTTGTCCCAATTTTGGTTGAATTAGATGGTGATGTTAATGGTCACAAATTTTCTGTCTCC GGTGAAGGTGAAGGTGATGCTACTTACGGTAAATTGACCTTAAAATTTATTTGTACTACTGGTAAATTGCCAGTTCCATGGCCAACCTT AGTCACTACTTTCGGTTATGGTGTTCAATGTTTTGCGAGATACCCAGATCATATGAAACAACATGACTTTTTCAAGTCTGCCATGCCAG AAGGTTATGTTCAAGAAAGAACTATTTTTTTCAAAGATGACGGTAACTACAAGACCAGAGCTGAAGTCAAGTTTGAAGGTGATACCTT AGTTAATAGAATCGAATTAAAAGGTATTGATTTTAAAGAAGATGGTAACATTTTAGGTCACAAATTGGAATACAACTATAACTCTCAC AATGTTTACATCATGGCTGACAAACAAAAGAATGGTATCAAAGTTAACTTCAAAATTAGACACAACATTGAAGATGGTTCTGTTCAATT AGCTGACCATTATCAACAAAATACTCCAATTGGTGATGGTCCAGTCTTGTTACCAGACAACCATTACTTATCCACTCAATCTGCCTTATC CAAAGATCCAAACGAAAAGAGGGACCACATGGTCTTGTTAGAATTTGTTACTGCTGCTGGTATTACCCATGGTATGGATGAATTGTACA AATAA

Table S5. Terminator sequences.

DNA fragments	Sequence
CYC1t	CATGTAATTAGTTATGTCACGCTTACATTCACGCCCTCCCCCCACATCCGCTCTAACCGAAAAGGAAGGAGTTAGACAACCTGAAGTCTAGGT CCCTATTTATTTTTTTATAGTTATGTTAGTATTAAGAACGTTATTTATATTTCAAATTTTTCTTTTTTTTCTGTACAGACGCGTGTACGCATGTA ACATTATACTGAAAACCTTGCTTGAGAAGGTTTTGGGACGCTCGAAGGCTTTAATTTGCAAGCT
CYC1t_ATC	CATGTAATTAGTTATGTCACGCTTACATTCACGCCCTCCCCCCACATCCGCTCTAACCGAAAAGGAAGGAGTTAGACAACCTGAAGTCTAGGT CCCTATTTATTTTTTTATAGTTATGTTAGTATTAAGAACGTTATTTATATTTCAAATTTTTCTTTTTTTTCTGTACAGACGCGTGTACGCATGTA ACATTATACTGAAAACCTTGCTTGAGAAGGTTTTGGGACGCTCGAAGGCTTTAATTTGCAAGCTATC
Tsynth24	TGGGTGGTATGTTATATAACTGTCTAGAAATAAAGAGTATCATCTTTCAAA
Tsynth6	TATATATTTAATAAAGAGTATCATCTTTCAAA

Table S6. Yeast strains engineered in this work.

Strain name	Strain genotype
byMM2	FY1679-08A (MATa; ura3-52; leu2Δ1; trp1Δ63; his3Δ200; GAL2)
byMM584	CEN.PK2-1C (MATa; his3D1; leu2-3_112; ura3-52; trp1-289; MAL2-8c; SUC2)
byMM109	byMM2 pMM220::URA3 pMM197::LEU2
byMM125	byMM2 pMM220::URA3 pMM229::LEU2
byMM381	byMM2 pMM527::URA3 pMM363::LEU2
byMM617	byMM584 pMM802::URA3 pMM403::LEU2
byMM635	byMM584 pMM802::URA3 pMM197::LEU2
byMM644	byMM584 pMM802::URA3 pMM555::LEU2
byMM667	byMM584 pMM802::URA3 pMM363::LEU2
byMM888	byMM584 pMM857::URA3 pMM363::LEU2
byMM889	byMM584 pMM857::URA3 pMM403::LEU2
byMM890	byMM584 pMM858::URA3 pMM363::LEU2
byMM892	byMM584 pMM858::URA3 pMM403::LEU2
byMM1449	byMM584 pMM1215::URA3 pMM363::LEU2
byMM1480	byMM584 pMM1215::URA3 pMM403::LEU2
byMM1450	byMM584 pMM1201::URA3 pMM363::LEU2
byMM1481	byMM584 pMM1201::URA3 pMM403::LEU2
byMM1451	byMM584 pMM1216::URA3 pMM363::LEU2
byMM1482	byMM584 pMM1216::URA3 pMM403::LEU2
byMM1452	byMM584 pMM1209::URA3 pMM363::LEU2
byMM1483	byMM584 pMM1209::URA3 pMM403::LEU2
byMM1453	byMM584 pMM1323::URA3 pMM363::LEU2
byMM1484	byMM584 pMM1323::URA3 pMM403::LEU2
byMM1454	byMM584 pMM1324::URA3 pMM363::LEU2
byMM1485	byMM584 pMM1324::URA3 pMM403::LEU2
byMM1847	byMM584 pMM1549::URA3 pMM363::LEU2
byMM1848	byMM584 pMM1549::URA3 pMM403::LEU2
byMM1904	byMM584 pMM1551::URA3 pMM363::LEU2
byMM1905	byMM584 pMM1551::URA3 pMM403::LEU2
byMM1973	byMM584 pMM1607::URA3 pMM363::LEU2
byMM1974	byMM584 pMM1607::URA3 pMM403::LEU2
byMM1982	byMM584 pMM1612::URA3 pMM363::LEU2
byMM1983	byMM584 pMM1612::URA3 pMM403::LEU2
byMM1984	byMM584 pMM1613::URA3 pMM363::LEU2
byMM1985	byMM584 pMM1613::URA3 pMM403::LEU2
byMM1709	byMM584 pMM1540::URA3
byMM1710	byMM584 pMM1541::URA3 pMM1541::LEU2
byMM1711	byMM584 pMM1542::URA3 pMM1542::LEU2
byMM1712	byMM584 pMM1543::URA3 pMM1543::LEU2
byMM1713	byMM584 pMM1544::URA3 pMM1544::LEU2
byMM1894	byMM2 pMM527::URA3 pMM363::LEU2 pMM1594::HIS3
byMM1906	byMM2 pMM527::URA3 pMM363::LEU2 pMM1594::HIS3 pMM1595::TRP1

byMM1979	byMM2 pMM220::URA3 pMM197::LEU2 pMM1594::HIS3 pMM1595::TRP1
byMM1987	byMM2 pMM220::URA3 pMM229::LEU2 pMM1594::HIS3 pMM1595::TRP1

Table S7. OD_{600} data for growth curve.

Sample name	OD (first measurement)	OD (second measurement)	OD (third measurement)	Mean	Standard deviation
byMM1712-0 hour	0.0432	0.0412	0.0395	0.0413	0.0015
byMM1712-7 hour	0.5364	0.5836	0.5186	0.5462	0.0274
byMM1712-14 hour	4.9641	5.2764	5.1097	5.1167	0.1276
byMM1712-21 hour	8.3328	8.7875	8.0469	8.3891	0.3050
byMM1712-28 hour	9.3056	9.8765	9.1342	9.4388	0.3173

Table S8. *S. cerevisiae* biosensor library based on short lex operator. "Max fl." stands for maximum fluorescence—A.U. means arbitrary units; "Conc. at Max fl." is the concentration of β-estradiol at which the maximum fluorescence was reached; "% pGPD" is the ratio between the maximum fluorescence and that of the strong *GPD* promoter (18390.48 A.U.); "Basal fl." is the basal fluorescence, i.e., the fluorescence measured in the absence of β-estradiol; "Max fl. /Basal fl." is the ON/OFF ratio; "LOD" is the limit of detection, i.e., the lowest β-estradiol concentration that is statistically significantly different from and at least two-fold higher than the basal fluorescence; "Tolerance" is the maximal β-estradiol concentration that induces proper fluorescence expression without toxicity effects (the concentration interval between LOD and Tolerance represents the detection range); n is the Hill coefficient; EC50 is the half-maximal effective concentration of β-estradiol, i.e., the concentration of β-estradiol at which the fluorescence output is equal to one half of the maximal (steady-state) fluorescence. n and EC50 were obtained from the linearized empirical Hill functions in Table S9.

Strain	Receptor	Reporter	Max fl. (A.U.)	Conc. at Max fl. (nM)	% pGPD	Basal fl. (A.U.)	Max fl. /Basal fl.	LOD (nM)	Tolerance (nM)	n	EC50 (nM)
byMM617	pGPD-B42	lexOpR(40-TATA)_pCYC1min	3189.26	1000	17.34%	1013.45	3.15	500	2000	1.54	223.25
byMM635	pGPD-VP64	lexOpR(40-TATA)_pCYC1min	5525.92	15.6	30.05%	2441.99	2.26	15.6	31.25	1.33	7.24
byMM644	pCMV-VP64	lexOpR(40-TATA)_pCYC1min	1868.25	1000	10.16%	1210.18	1.54	-	-	1.00	72.46
byMM667	DEG1t_pCYC1noTATA-VP64	lexOpR(40-TATA)_pCYC1min	2686.88	250	14.61%	1151.80	2.33	125	2000	1.32	23.53
byMM1847	DEG1t_pCYC1noTATA-VP64	lexOpL(20-TATA)_pCYC1min	1262.79	1000	6.87%	503.46	2.51	62.5	2000	1.19	26.33
byMM1449	DEG1t_pCYC1noTATA-VP64	lexOpL(40-TATA)_pCYC1min	2828.21	500	15.38%	1195.68	2.37	62.5	2000	1.34	24.99
byMM1904	DEG1t_pCYC1noTATA-VP64	lexOpL(60-TATA)_pCYC1min	4607.45	250	25.05%	1447.73	3.18	15.6	2000	1.37	11.79
byMM1453	DEG1t_pCYC1noTATA-VP64	lex2Op(40-TATA)_pCYC1min	5040.43	250	27.41%	1380.96	3.65	7.8	1000	1.00	9.20
byMM1450	DEG1t_pCYC1noTATA-VP64	lexOpR(1)lexOpL(40-TATA)_pCYC1min	5082.48	1000	27.64%	1162.50	4.37	15.6	2000	1.02	24.31
byMM1454	DEG1t_pCYC1noTATA-VP64	lexOpR(20)lexOpL(40-TATA)_pCYC1min	3055.83	500	16.62%	1135.17	2.69	31.25	2000	1.05	17.72
byMM888	DEG1t_pCYC1noTATA-VP64	2lexOpR(1,40-TATA)_pCYC1min	2352.42	500	12.79%	786.69	2.99	62.5	2000	1.64	32.03
byMM1451	DEG1t_pCYC1noTATA-VP64	2lexOpL(1,40-TATA)_pCYC1min	5078.57	2000	27.62%	1169.79	4.34	15.6	2000	1.45	17.80
byMM890	DEG1t_pCYC1noTATA-VP64	2lexOpR(20,40-TATA)_pCYC1min	4691.35	125	25.51%	1286.57	3.65	15.6	2000	1.37	14.23
byMM1452	DEG1t_pCYC1noTATA-VP64	2lexOpL(20,40-TATA)_pCYC1min	5088.86	250	27.67%	1044.01	4.87	15.6	2000	1.33	16.63
byMM1973	DEG1t_pCYC1noTATA-VP64	2lexOpL(40,40-TATA)_pCYC1min	4042.06	2000	21.98%	917.75	4.40	62.5	2000	1.05	96.78
byMM1982	DEG1t_pCYC1noTATA-VP64	4lexOpL(1,60-TATA)_pCYC1min	8449.45	2000	45.94%	655.81	12.88	7.8	2000	1.32	38.13
byMM1984	DEG1t_pCYC1noTATA-VP64	8lexOpL(1,60-TATA)_pCYC1min	25488.84	500	138.60%	553.91	46.02	1.9	2000	1.37	19.84
byMM1484	pGPD-B42	lex2Op(40-TATA)_pCYC1min	4479.33	1000	24.36%	506.67	8.84	62.5	2000	1.39	169.29
byMM1481	pGPD-B42	lexOpR(1)lexOpL(40-TATA)_pCYC1min	4215.73	1000	22.92%	633.41	6.66	125	2000	1.33	232.55
byMM1485	pGPD-B42	lexOpR(20)lexOpL(40-TATA)_pCYC1min	4364.54	1000	23.73%	457.75	9.53	125	2000	1.36	291.64
byMM1848	pGPD-B42	lexOpL(20-TATA)_pCYC1min	4313.59	250	23.46%	905.94	4.76	62.5	500	0.87	189.70
byMM1480	pGPD-B42	lexOpL(40-TATA)_pCYC1min	2533.58	500	13.78%	964.74	2.63	500	1000	1.17	393.95
byMM1905	pGPD-B42	lexOpL(60-TATA)_pCYC1min	4248.42	250	23.10%	1076.35	3.95	62.5	500	1.26	57.73
byMM889	pGPD-B42	2lexOpR(1,40-TATA)_pCYC1min	3131.58	1000	17.03%	769.07	4.07	250	2000	1.30	358.66
byMM1482	pGPD-B42	2lexOpL(1,40-TATA)_pCYC1min	4514.64	1000	24.55%	662.26	6.82	125	2000	1.47	291.17
byMM892	pGPD-B42	2lexOpR(20,40-TATA)_pCYC1min	3982.74	1000	21.66%	806.14	4.94	125	2000	1.22	206.19
byMM1483	pGPD-B42	2lexOpL(20,40-TATA)_pCYC1min	4809.83	1000	26.15%	505.04	9.52	125	2000	1.32	312.16
byMM1974	pGPD-B42	2lexOpL(40,40-TATA)_pCYC1min	2498.98	2000	13.59%	312.91	7.99	125	2000	1.38	338.72
byMM1983	pGPD-B42	4lexOpL(1,60-TATA)_pCYC1min	6610.81	500	35.95%	59.29	111.50	15.6	2000	2.01	140.65
byMM1985	pGPD-B42	8lexOpL(1,60-TATA)_pCYC1min	15723.06	1000	85.50%	54.58	288.07	31.25	2000	2.57	155.51

Table S9. Linearized empirical Hill functions—and corresponding R^2—describing the relation between input (β-estradiol concentration) and output (fluorescence) for each *S. cerevisiae* biosensor in our library. The empirical linearized Hill function is: $y = -nx + n\log_{10}(EC50)$, where $y = \log_{10}((F_{max}-F)/(F-F_{basal}))$ and $x = \log_{10}$(β-estradiol concentration). n is the Hill cooperativity coefficient, EC50 the half-maximal effective concentration of β-estradiol, F_{max} the maximum fluorescence, F_{basal} the basal fluorescence, F the fluorescence measured at any given concentration of β-estradiol concentration, and R^2 the goodness of the fit.

Strain	Receptor	Reporter	Function	R^2
byMM617	pGPD-B42	lexOpR(40-TATA)_pCYC1min	y = -1.537x + 3.6101	0.9920
byMM635	pGPD-VP64	lexOpR(40-TATA)_pCYC1min	y = -1.3263x + 1.1399	0.9944
byMM644	pCMV-VP64	lexOpR(40-TATA)_pCYC1min	y = -1.0048x + 1.869	0.9625
byMM667	DEG1t_pCYC1noTATA-VP64	lexOpR(40-TATA)_pCYC1min	y = -1.3165x + 1.8058	0.9742
byMM888	DEG1t_pCYC1noTATA-VP64	2lexOpR(1,40-TATA)_pCYC1min	y = -1.6431x + 2.4737	0.9893
byMM889	pGPD-B42	2lexOpR(1,40-TATA)_pCYC1min	y = -1.2966x + 3.3124	0.9816
byMM890	DEG1t_pCYC1noTATA-VP64	2lexOpR(20,40-TATA)_pCYC1min	y = -1.3719x + 1.582	0.9972
byMM892	pGPD-B42	2lexOpR(20,40-TATA)_pCYC1min	y = -1.2222x + 2.8285	0.9884
byMM1449	DEG1t_pCYC1noTATA-VP64	lexOpL(40-TATA)_pCYC1min	y = -1.3392x + 1.8719	0.9926
byMM1450	DEG1t_pCYC1noTATA-VP64	lexOpR(1)lexOpL(40-TATA) _pCYC1min	y = -1.0171x + 1.4094	0.9958
byMM1451	DEG1t_pCYC1noTATA-VP64	2lexOpL(1,40-TATA)_pCYC1min	y = -1.4454x + 1.8074	0.9668
byMM1452	DEG1t_pCYC1noTATA-VP64	2lexOpL(20,40-TATA)_pCYC1min	y = -1.3261x + 1.6189	0.9893
byMM1453	DEG1t_pCYC1noTATA-VP64	lexOpL(1)lexOpR(40-TATA) _pCYC1min	y = -1.0023x + 0.9659	0.9912
byMM1454	DEG1t_pCYC1noTATA-VP64	lexOpR(20)lexOpL(40-TATA) _pCYC1min	y = -1.0536x + 1.3154	0.9926
byMM1480	pGPD-B42	lexOpL(40-TATA)_pCYC1min	y = -1.1667x + 3.0281	0.9909
byMM1481	pGPD-B42	lexOpR(1)lexOpL(40-TATA) _pCYC1min	y = -1.3342x + 3.1574	0.9869
byMM1482	pGPD-B42	2lexOpL(1,40-TATA) _pCYC1min	y = -1.4711x + 3.625	0.9972
byMM1483	pGPD-B42	2lexOpL(20,40-TATA) _pCYC1min	y = -1.3164x + 3.2836	0.9932
byMM1484	pGPD-B42	lexOpL(1)lexOpR(40-TATA) _pCYC1min	y = -1.3926x + 3.1036	0.9946
byMM1485	pGPD-B42	lexOpR(20)lexOpL(40-TATA) _pCYC1min	y = -1.3557x + 3.3416	0.9993
byMM1847	DEG1t_pCYC1noTATA-VP64	lexOpL(20-TATA) _pCYC1min	y = -1.187x + 1.6861	0.9823
byMM1848	pGPD-B42	lexOpL(20-TATA) _pCYC1min	y = -0.8714x + 1.9851	0.9669
byMM1904	DEG1t_pCYC1noTATA-VP64	lexOpL(60-TATA) _pCYC1min	y = -1.3694x + 1.4672	0.9953
byMM1905	pGPD-B42	lexOpL(60-TATA) _pCYC1min	y = -1.2617x + 2.2224	0.9766
byMM1973	DEG1t_pCYC1noTATA-VP64	2lexOpL(40,40-TATA) _pCYC1min	y = -1.0484x + 2.0819	0.9976
byMM1974	pGPD-B42	2lexOpL(40,40-TATA) _pCYC1min	y = -1.3759x + 3.4808	0.9907
byMM1982	DEG1t_pCYC1noTATA-VP64	4lexOpL(1,60-TATA)_pCYC1min	y = -1.3193x + 2.0861	0.9804
byMM1983	pGPD-B42	4lexOpL(1,60-TATA)_pCYC1min	y = -2.0118x + 4.3216	0.9988
byMM1984	DEG1t_pCYC1noTATA-VP64	8lexOpL(1,60-TATA)_pCYC1min	y = -1.3703x + 1.7779	0.9822
byMM1985	pGPD-B42	8lexOpL(1,60-TATA)_pCYC1min	y = -2.5698x + 5.6324	0.9955

Table S10. Statistical analysis of the results in Figure S3A.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
lexOpR(40-TATA)_pCYC1min (0 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (0 nM, 2)	1013.45	964.74	31.18	87.85	3	3	0.4441	ns
lexOpR(40-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	1012.79	978.96	35.15	32.33	3	3	0.2876	ns
lexOpR(40-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	1049.57	924.28	21.82	96.56	3	3	0.1478	ns
lexOpR(40-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	1053.07	949.38	1.95	56.25	3	3	0.0855	ns
lexOpR(40-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	1044.30	1020.22	14.38	87.06	3	3	0.6809	ns
lexOpR(40-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	1063.28	943.56	19.68	46.66	3	3	0.0324	*
lexOpR(40-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	1107.17	1105.12	37.15	16.31	3	3	0.9363	ns
lexOpR(40-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	1255.97	1094.09	25.79	99.86	3	3	0.0987	ns
lexOpR(40-TATA)_pCYC1min (125 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (125 nM, 2)	1513.08	1389.59	34.28	191.96	3	3	0.3812	ns
lexOpR(40-TATA)_pCYC1min (250 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (250 nM, 2)	1834.51	1890.47	44.82	25.28	3	3	0.1516	ns
lexOpR(40-TATA)_pCYC1min (500 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (500 nM, 2)	2155.35	2533.58	108.56	230.66	3	3	0.0870	ns
lexOpR(40-TATA)_pCYC1min (1000 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	3189.26	2111.53	411.29	233.81	3	3	0.0262	*
lexOpR(40-TATA)_pCYC1min (2000 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	3128.59	1765.47	508.62	385.65	3	3	0.0236	*

Table S11. Statistical analysis of the results in Figure S3B.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
2lexOpR(1, 40-TATA)_pCYC1min (0 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (0 nM, 2)	769.07	662.26	34.47	34.53	3	3	0.0192	*
2lexOpR(1, 40-TATA)_pCYC1min (0.98 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (0.98 nM, 2)	745.91	647.04	31.52	25.78	3	3	0.0148	*
2lexOpR(1, 40-TATA)_pCYC1min (1.95 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (1.95 nM, 2)	772.10	651.76	26.08	28.56	3	3	0.0059	**
2lexOpR(1, 40-TATA)_pCYC1min (3.91 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (3.91 nM, 2)	752.06	634.92	42.29	22.03	3	3	0.0236	*
2lexOpR(1, 40-TATA)_pCYC1min (7.81 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (7.81 nM, 2)	791.58	649.97	59.83	17.52	3	3	0.0454	*
2lexOpR(1, 40-TATA)_pCYC1min (15.63 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (15.63 nM, 2)	815.66	684.53	65.71	32.49	3	3	0.0552	ns
2lexOpR(1, 40-TATA)_pCYC1min (31.25 nM, 1) vs. 2lexOpL(1, 40-TATA)_pCYC1min (31.25 nM, 2)	822.97	789.55	37.61	11.48	3	3	0.2600	ns

2lexOpR(1，40-TATA)_pCYC1min (62.5 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (62.5 nM, 2)	933.14	1051.29	70.02	93.26	3	3	0.1597	ns
2lexOpR(1，40-TATA)_pCYC1min (125 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (125 nM, 2)	1195.22	1592.72	54.46	179.65	3	3	0.0517	ns
2lexOpR(1，40-TATA)_pCYC1min (250 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (250 nM, 2)	1768.29	2316.81	94.55	184.58	3	3	0.0198	*
2lexOpR(1，40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (500 nM, 2)	2383.22	3296.13	133.74	191.35	3	3	0.0037	**
2lexOpR(1，40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (1000 nM, 2)	3131.58	4514.64	723.75	617.48	3	3	0.0670	ns
2lexOpR(1，40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (2000 nM, 2)	2315.46	3123.89	809.49	673.21	3	3	0.2565	ns
2lexOpR(20，40-TATA)_pCYC1min (0 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (0 nM, 2)	806.14	505.04	62.08	143.98	3	3	0.0518	ns
2lexOpR(20，40-TATA)_pCYC1min (0.98 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (0.98 nM, 2)	717.31	502.36	34.15	132.99	3	3	0.0993	ns
2lexOpR(20，40-TATA)_pCYC1min (1.95 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (1.95 nM, 2)	726.27	504.09	26.06	112.50	3	3	0.0691	ns
2lexOpR(20，40-TATA)_pCYC1min (3.91 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (3.91 nM, 2)	716.67	523.26	32.85	131.10	3	3	0.1175	ns
2lexOpR(20，40-TATA)_pCYC1min (7.81 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (7.81 nM, 2)	793.26	530.02	0.95	147.18	3	3	0.0903	ns
2lexOpR(20，40-TATA)_pCYC1min (15.63 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (15.63 nM, 2)	836.05	572.46	37.58	120.64	3	3	0.0526	ns
2lexOpR(20，40-TATA)_pCYC1min (31.25 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (31.25 nM, 2)	964.85	717.78	43.82	122.12	3	3	0.0592	ns
2lexOpR(20，40-TATA)_pCYC1min (62.5 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (62.5 nM, 2)	1381.46	977.96	53.83	138.35	3	3	0.0250	*
2lexOpR(20，40-TATA)_pCYC1min (125 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (125 nM, 2)	1917.54	1597.03	68.83	208.12	3	3	0.1048	ns
2lexOpR(20，40-TATA)_pCYC1min (250 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (250 nM, 2)	2826.79	2304.19	124.40	221.51	3	3	0.0349	*
2lexOpR(20，40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (500 nM, 2)	2915.99	3299.94	92.98	177.83	3	3	0.0449	*
2lexOpR(20，40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (1000 nM, 2)	3982.74	4809.83	242.04	524.00	3	3	0.0946	ns
2lexOpR(20，40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (2000 nM, 2)	2937.46	3421.48	943.50	744.52	3	3	0.5258	ns

Table S12. Statistical analysis of the results in Figure S3D.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
2lexOpL(1,40-TATA)_pCYC1min (0 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (0 nM, 2)	662.26	505.04	34.53	143.98	3	3	0.1941	ns
2lexOpL(1,40-TATA)_pCYC1min (0.98 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (0.98 nM, 2)	647.04	502.36	25.78	132.99	3	3	0.1966	ns
2lexOpL(1,40-TATA)_pCYC1min (1.95 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (1.95 nM, 2)	651.76	504.09	28.56	112.50	3	3	0.1438	ns
2lexOpL(1,40-TATA)_pCYC1min (3.91 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (3.91 nM, 2)	634.92	523.26	22.03	131.10	3	3	0.2766	ns
2lexOpL(1,40-TATA)_pCYC1min (7.81 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (7.81 nM, 2)	649.97	530.02	17.52	147.18	3	3	0.2929	ns
2lexOpL(1,40-TATA)_pCYC1min (15.63 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (15.63 nM, 2)	684.53	572.46	32.49	120.64	3	3	0.2450	ns
2lexOpL(1,40-TATA)_pCYC1min (31.25 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (31.25 nM, 2)	789.55	717.78	11.48	122.12	3	3	0.4159	ns
2lexOpL(1,40-TATA)_pCYC1min (62.5 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (62.5 nM, 2)	1051.29	977.96	93.26	138.35	3	3	0.4945	ns
2lexOpL(1,40-TATA)_pCYC1min (125 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (125 nM, 2)	1592.72	1597.03	179.65	208.12	3	3	0.9797	ns
2lexOpL(1,40-TATA)_pCYC1min (250 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (250 nM, 2)	2316.81	2304.19	184.58	221.51	3	3	0.9433	ns
2lexOpL(1,40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (500 nM, 2)	3296.13	3299.94	191.35	177.83	3	3	0.9811	ns
2lexOpL(1,40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (1000 nM, 2)	4514.64	4809.83	617.48	524.00	3	3	0.5630	ns
2lexOpL(1,40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(20,40-TATA)_pCYC1min (2000 nM, 2)	3123.89	3421.48	673.21	744.52	3	3	0.6349	ns
2lexOpL(20,40-TATA)_pCYC1min (0 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (0 nM, 2)	505.04	312.91	143.98	29.68	3	3	0.1419	ns
2lexOpL(20,40-TATA)_pCYC1min (0.98 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (0.98 nM, 2)	502.36	268.10	132.99	32.37	3	3	0.0852	ns
2lexOpL(20,40-TATA)_pCYC1min (1.95 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (1.95 nM, 2)	504.09	306.97	112.50	26.08	3	3	0.0867	ns
2lexOpL(20,40-TATA)_pCYC1min (3.91 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (3.91 nM, 2)	523.26	321.56	131.10	17.09	3	3	0.1143	ns
2lexOpL(20,40-TATA)_pCYC1min (7.81 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (7.81 nM, 2)	530.02	322.85	147.18	63.12	3	3	0.1203	ns
2lexOpL(20,40-TATA)_pCYC1min (15.63 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (15.63 nM, 2)	572.46	353.92	120.64	58.40	3	3	0.0695	ns
2lexOpL(20,40-TATA)_pCYC1min (31.25 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (31.25 nM, 2)	717.78	371.21	122.12	73.60	3	3	0.0204	*
2lexOpL(20,40-TATA)_pCYC1min (62.5 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (62.5 nM, 2)	977.96	523.41	138.35	309.33	3	3	0.1100	ns

2lexOpL(20,40-TATA)_pCYC1min (125 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (125 nM, 2)	1597.03	692.43	208.12	372.16	3	3	0.0323	*
2lexOpL(20,40-TATA)_pCYC1min (250 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (250 nM, 2)	2304.19	1187.04	221.51	690.26	3	3	0.0957	ns
2lexOpL(20,40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (500 nM, 2)	3299.94	1760.89	177.83	988.50	3	3	0.1101	ns
2lexOpL(20,40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (1000 nM, 2)	4809.83	2095.57	524.00	343.66	3	3	0.0030	**
2lexOpL(20,40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(40,40-TATA)_pCYC1min (2000 nM, 2)	3421.48	2498.98	744.52	1017.21	3	3	0.2795	ns

Table S13. Statistical analysis of the results in Figure S3E.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
4lexOpL(1,60-TATA)_pCYC1min (0 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (0 nM, 2)	59.30	54.58	9.00	6.12	3	3	0.4999	ns
4lexOpL(1,60-TATA)_pCYC1min (0.98 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (0.98 nM, 2)	57.02	59.27	9.94	7.03	3	3	0.7666	ns
4lexOpL(1,60-TATA)_pCYC1min (1.95 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (1.95 nM, 2)	57.91	58.96	6.27	7.45	3	3	0.8615	ns
4lexOpL(1,60-TATA)_pCYC1min (3.91 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (3.91 nM, 2)	72.76	55.85	7.80	10.99	3	3	0.1028	ns
4lexOpL(1,60-TATA)_pCYC1min (7.81 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (7.81 nM, 2)	80.79	60.65	12.84	7.84	3	3	0.0949	ns
4lexOpL(1,60-TATA)_pCYC1min (15.63 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (15.63 nM, 2)	131.53	95.65	32.00	20.49	3	3	0.1897	ns
4lexOpL(1,60-TATA)_pCYC1min (31.25 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (31.25 nM, 2)	357.17	279.68	116.97	82.78	3	3	0.4074	ns
4lexOpL(1,60-TATA)_pCYC1min (62.5 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (62.5 nM, 2)	1028.22	2031.96	319.26	661.44	3	3	0.1023	ns
4lexOpL(1,60-TATA)_pCYC1min (125 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (125 nM, 2)	3116.69	6604.14	507.51	1489.47	3	3	0.0440	*
4lexOpL(1,60-TATA)_pCYC1min (250 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (250 nM, 2)	5057.47	11029.82	533.47	1471.19	3	3	0.0119	*
4lexOpL(1,60-TATA)_pCYC1min (500 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (500 nM, 2)	6610.82	12936.82	422.81	765.18	3	3	0.0009	***
4lexOpL(1,60-TATA)_pCYC1min (1000 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (1000 nM, 2)	6002.86	15723.06	576.78	2643.56	3	3	0.0198	*
4lexOpL(1,60-TATA)_pCYC1min (2000 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (2000 nM, 2)	777.75	5162.28	47.26	3144.15	3	3	0.1370	ns

Table S14. Statistical analysis of the results in Figure S4A.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
lex2Op(40-TATA) _pCYC1min (0 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (0 nM, 2)	1380.96	1162.50	144.43	96.54	3	3	0.1049	ns
lex2Op(40-TATA) _pCYC1min (0.98 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	1805.33	1305.21	69.66	24.25	3	3	0.0031	**
lex2Op(40-TATA) _pCYC1min (1.95 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	1993.94	1401.57	187.89	83.02	3	3	0.0189	*
lex2Op(40-TATA) _pCYC1min (3.91 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	2317.61	1648.11	158.39	77.67	3	3	0.0079	**
lex2Op(40-TATA) _pCYC1min (7.81 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	3078.09	2190.95	50.99	164.35	3	3	0.0069	*
lex2Op(40-TATA) _pCYC1min (15.63 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	3551.08	2969.64	411.58	165.68	3	3	0.1203	ns
lex2Op(40-TATA) _pCYC1min (31.25 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	3734.83	3929.85	432.83	63.04	3	3	0.5179	ns
lex2Op(40-TATA) _pCYC1min (62.5 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	4656.14	4342.09	599.48	310.28	3	3	0.4793	ns
lex2Op(40-TATA) _pCYC1min (125 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (125 nM, 2)	4780.94	4776.37	636.08	59.37	3	3	0.9912	ns
lex2Op(40-TATA) _pCYC1min (250 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (250 nM, 2)	5040.43	4718.27	468.53	177.17	3	3	0.3588	ns
lex2Op(40-TATA) _pCYC1min (500 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (500 nM, 2)	3830.05	4901.38	321.82	217.35	3	3	0.0121	*
lex2Op(40-TATA) _pCYC1min (1000 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	3118.35	5082.48	132.88	188.30	3	3	0.0002	***
lex2Op(40-TATA) _pCYC1min (2000 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	2695.02	4903.32	292.29	300.64	3	3	0.0008	***
lexOpR(1)lexOpL(40-TATA)_pCYC1min (0 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (0 nM, 2)	1162.50	1135.17	96.54	137.92	3	3	0.7941	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	1305.21	1178.80	24.25	51.95	3	3	0.0349	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	1401.57	1188.28	83.02	88.47	3	3	0.0384	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	1648.11	1477.21	77.67	64.23	3	3	0.0444	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	2190.95	1680.52	164.35	128.59	3	3	0.0150	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	2969.64	2113.31	165.68	222.29	3	3	0.0073	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	3929.85	2321.34	63.04	60.38	3	3	<0.0001	****

lexOpR(1)lexOpL(40-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	4342.09	2587.71	310.28	331.45	3	3	0.0026	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (125 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (125 nM, 2)	4776.37	2837.41	59.37	335.05	3	3	0.0082	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (250 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (250 nM, 2)	4718.27	2959.05	177.17	290.76	3	3	0.0020	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (500 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (500 nM, 2)	4901.38	3055.83	217.35	192.63	3	3	0.0004	***
lexOpR(1)lexOpL(40-TATA)_pCYC1min (1000 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	5082.48	2804.87	188.30	225.71	3	3	0.0002	***
lexOpR(1)lexOpL(40-TATA)_pCYC1min (2000 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	4903.32	2616.75	300.64	99.92	3	3	0.0029	**

Table S15. Statistical analysis of the results in Figure S4B.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
lex2Op(40-TATA) _pCYC1min (0 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (0 nM, 2)	506.67	633.41	52.07	144.71	3	3	0.2653	ns
lex2Op(40-TATA) _pCYC1min (0.98 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	489.88	732.86	99.88	43.55	3	3	0.0361	*
lex2Op(40-TATA) _pCYC1min (1.95 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	514.05	703.36	57.36	33.80	3	3	0.0134	*
lex2Op(40-TATA) _pCYC1min (3.91 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	560.30	750.94	66.83	34.91	3	3	0.0218	*
lex2Op(40-TATA) _pCYC1min (7.81 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	580.16	747.72	43.20	43.46	3	3	0.0091	**
lex2Op(40-TATA) _pCYC1min (15.63 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	638.61	743.01	57.63	22.30	3	3	0.0733	ns
lex2Op(40-TATA) _pCYC1min (31.25 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	817.10	879.13	94.21	23.32	3	3	0.3727	ns
lex2Op(40-TATA) _pCYC1min (62.5 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	1253.75	1038.34	148.26	25.64	3	3	0.1243	ns
lex2Op(40-TATA) _pCYC1min (125 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (125 nM, 2)	2019.70	1752.09	156.78	255.49	3	3	0.2111	ns
lex2Op(40-TATA) _pCYC1min (250 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (250 nM, 2)	2816.94	2360.55	203.63	180.63	3	3	0.0447	*
lex2Op(40-TATA) _pCYC1min (500 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (500 nM, 2)	3910.82	3412.51	364.54	470.10	3	3	0.2247	ns
lex2Op(40-TATA) _pCYC1min (1000 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	4479.33	4215.73	135.08	391.76	3	3	0.3663	ns
lex2Op(40-TATA) _pCYC1min (2000 nM, 1) vs. lexOpR(1)lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	3012.43	2228.86	268.00	91.85	3	3	0.0267	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (0 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (0 nM, 2)	633.41	457.75	144.71	37.88	3	3	0.1634	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	732.86	435.43	43.55	18.38	3	3	0.0027	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	703.36	455.94	33.80	33.84	3	3	0.0009	***
lexOpR(1)lexOpL(40-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	750.94	469.31	34.91	43.93	3	3	0.0012	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	747.72	486.38	43.46	46.33	3	3	0.0021	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	743.01	498.20	22.30	52.65	3	3	0.0072	**
lexOpR(1)lexOpL(40-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	879.13	627.86	23.32	64.92	3	3	0.0134	*
lexOpR(1)lexOpL(40-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	1038.34	874.21	25.64	96.43	3	3	0.0897	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (125 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (125 nM, 2)	1752.09	1471.87	255.49	216.53	3	3	0.2227	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (250 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (250 nM, 2)	2360.55	2180.92	180.63	196.07	3	3	0.3084	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (500 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (500 nM, 2)	3412.51	3471.51	470.10	201.55	3	3	0.8557	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (1000 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	4215.73	4364.54	391.76	505.83	3	3	0.7089	ns
lexOpR(1)lexOpL(40-TATA)_pCYC1min (2000 nM, 1) vs. lexOpR(20)lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	2228.86	2672.85	91.85	163.28	3	3	0.0238	*

Table S16. Statistical analysis of the results in Figure 1A.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
pGPD-VP64 (15.63 nM, 1) vs. pGPD-VP64 (31.25 nM, 2)	5526	5123	321.40	518.49	3	3	0.3276	ns
pGPD-VP64 (31.25 nM, 1) vs. pGPD-VP64 (62.5 nM, 2)	5123	3575	518.49	121.57	3	3	0.03	*

Table S17. Statistical analysis of the results in Figure 1B.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
lexOpL(40-TATA)_pCYC1min (0 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (0 nM, 2)	1195.68	1151.80	60.26	54.28	3	3	0.4090	ns

lexOpL(40-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (0.98 nM, 2)	1328.44	1153.16	32.64	36.54	3	3	0.0036	**
lexOpL(40-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (1.95 nM, 2)	1246.74	1239.77	72.19	56.12	3	3	0.9121	ns
lexOpL(40-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (3.91 nM, 2)	1300.84	1282.50	50.06	47.40	3	3	0.6830	ns
lexOpL(40-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (7.81 nM, 2)	1523.74	1345.78	122.55	52.22	3	3	0.1142	ns
lexOpL(40-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (15.63 nM, 2)	1825.41	1659.50	142.09	25.34	3	3	0.1777	ns
lexOpL(40-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (31.25 nM, 2)	2134.61	1995.42	155.99	29.56	3	3	0.2616	ns
lexOpL(40-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (62.5 nM, 2)	2418.89	2285.21	128.51	12.03	3	3	0.2145	ns
lexOpL(40-TATA)_pCYC1min (125 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (125 nM, 2)	2584.39	2607.81	132.72	147.92	3	3	0.8459	ns
lexOpL(40-TATA)_pCYC1min (250 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (250 nM, 2)	2681.84	2686.88	196.22	43.75	3	3	0.9638	ns
lexOpL(40-TATA)_pCYC1min (500 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (500 nM, 2)	2828.21	2656.86	273.33	105.34	3	3	0.3968	ns
lexOpL(40-TATA)_pCYC1min (1000 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (1000 nM, 2)	2693.62	2549.73	106.07	104.43	3	3	0.1708	ns
lexOpL(40-TATA)_pCYC1min (2000 nM, 1) vs. lexOpR(40-TATA)_pCYC1min (2000 nM, 2)	2685.73	2394.92	159.22	64.72	3	3	0.0716	ns

Table S18. Statistical analysis of the results in Figure 1C—ANOVA. 1 corresponds to 2lexOpL(1，40-TATA)_pCYC1min, 2 tp 2lexOpR(20，40-TATA)_pCYC1min, and 3 to 2lexOpL(20，40-TATA)_pCYC1min.

Ordinary one-way ANOVA	Mean 1	Mean 2	Mean 3	SD1	SD2	SD3	n1	n2	n3	P value	P value summary
0 nM group	1169.79	1286.57	1044.01	82.22	112.92	211.16	3	3	3	0.2076	ns
0.98 nM group	1301.89	1358.01	1087.50	71.07	63.04	169.80	3	3	3	0.0559	ns
1.95 nM group	1383.30	1536.94	1232.29	72.74	139.64	239.89	3	3	3	0.1591	ns
3.91 nM group	1641.33	1787.68	1649.41	49.21	347.01	166.40	3	3	3	0.6841	ns
7.81 nM group	2033.93	2357.79	2076.62	207.42	419.51	163.68	3	3	3	0.3823	ns
15.63 nM group	2489.27	3060.85	3171.12	303.70	494.94	258.63	3	3	3	0.126	ns
31.25 nM group	3342.98	3791.28	3961.30	359.35	436.48	113.00	3	3	3	0.1411	ns
62.5 nM group	4699.90	4302.14	4290.64	221.08	437.34	219.59	3	3	3	0.2609	ns
125 nM group	4753.96	4691.35	4855.24	369.00	373.73	482.11	3	3	3	0.888	ns
250 nM group	5031.74	4644.15	5088.86	261.15	175.45	441.84	3	3	3	0.2455	ns
500 nM group	4927.32	4161.00	4770.68	289.76	76.45	132.02	3	3	3	0.0057	**
1000 nM group	4873.29	3814.81	4542.48	344.84	160.51	99.64	3	3	3	0.0033	**
2000 nM group	5078.57	3621.49	4601.9	277.70	130.57	419.41	3	3	3	0.0028	**

Table S19. Statistical analysis of the results in Figure 1C—Welch's t test.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
2lexOpR(1，40-TATA)_pCYC1min (0 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (0 nM, 2)	786.69	1169.79	12.35	82.22	3	3	0.0135	*
2lexOpR(1，40-TATA)_pCYC1min (0.98 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (0.98 nM, 2)	819.36	1301.89	27.82	71.07	3	3	0.0030	**
2lexOpR(1，40-TATA)_pCYC1min (1.95 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (1.95 nM, 2)	800.09	1383.30	20.35	72.74	3	3	0.0031	**
2lexOpR(1，40-TATA)_pCYC1min (3.91 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (3.91 nM, 2)	830.99	1641.33	33.67	49.21	3	3	<0.0001	****
2lexOpR(1，40-TATA)_pCYC1min (7.81 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (7.81 nM, 2)	966.60	2033.93	66.84	207.42	3	3	0.0075	**
2lexOpR(1，40-TATA)_pCYC1min (15.63 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (15.63 nM, 2)	1210.39	2489.27	143.18	303.70	3	3	0.0083	**
2lexOpR(1，40-TATA)_pCYC1min (31.25 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (31.25 nM, 2)	1555.58	3342.98	148.62	359.35	3	3	0.0063	**
2lexOpR(1，40-TATA)_pCYC1min (62.5 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (62.5 nM, 2)	1960.84	4699.90	171.59	221.08	3	3	0.0001	***
2lexOpR(1，40-TATA)_pCYC1min (125 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (125 nM, 2)	2103.12	4753.96	95.96	369.00	3	3	0.0042	**
2lexOpR(1，40-TATA)_pCYC1min (250 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (250 nM, 2)	2315.31	5031.74	39.98	261.15	3	3	0.0025	**
2lexOpR(1，40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (500 nM, 2)	2352.42	4927.32	141.50	289.76	3	3	0.0010	***
2lexOpR(1，40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (1000 nM, 2)	2277.97	4873.29	192.58	344.84	3	3	0.0012	**
2lexOpR(1，40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (2000 nM, 2)	2284.02	5078.57	272.49	277.70	3	3	0.0002	***
2lexOpR(20，40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (500 nM, 2)	4161.00	4927.32	76.45	289.76	3	3	0.0372	*
2lexOpR(20，40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (1000 nM, 2)	3814.81	4873.29	160.51	344.84	3	3	0.0195	*

2lexOpR(20，40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(1，40-TATA)_pCYC1min (2000 nM, 2)	3621.49	5078.57	130.57	277.70	3	3	0.0046	**
2lexOpR(20，40-TATA)_pCYC1min (500 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (500 nM, 2)	4161.00	4770.68	76.45	132.02	3	3	0.0050	**
2lexOpR(20，40-TATA)_pCYC1min (1000 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (1000 nM, 2)	3814.81	4542.48	160.51	99.64	3	3	0.0049	**
2lexOpR(20，40-TATA)_pCYC1min (2000 nM, 1) vs. 2lexOpL(20，40-TATA)_pCYC1min (2000 nM, 2)	3621.49	4601.90	130.57	419.41	3	3	0.0456	*

Table S20. Statistical analysis of the results in Figure 1D.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
lexOpL(20-TATA)_pCYC1min (0 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (0 nM, 2)	503.46	1195.68	20.68	60.26	3	3	0.0010	**
lexOpL(20-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (0.98 nM, 2)	513.64	1328.44	25.81	32.64	3	3	<0.0001	****
lexOpL(20-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (1.95 nM, 2)	542.20	1246.74	35.05	72.19	3	3	0.0008	***
lexOpL(20-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (3.91 nM, 2)	643.73	1300.84	175.29	50.06	3	3	0.0169	*
lexOpL(20-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (7.81 nM, 2)	691.28	1523.74	194.76	122.55	3	3	0.0058	**
lexOpL(20-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (15.63 nM, 2)	794.03	1825.41	191.17	142.09	3	3	0.0023	**
lexOpL(20-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (31.25 nM, 2)	843.45	2134.61	173.82	155.99	3	3	0.0007	***
lexOpL(20-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (62.5 nM, 2)	1078.73	2418.89	119.58	128.51	3	3	0.0002	***
lexOpL(20-TATA)_pCYC1min (125 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (125 nM, 2)	1190.67	2584.39	42.61	132.72	3	3	0.0014	**
lexOpL(20-TATA)_pCYC1min (250 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (250 nM, 2)	1256.70	2681.84	129.06	196.22	3	3	0.0010	***
lexOpL(20-TATA)_pCYC1min (500 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (500 nM, 2)	1231.34	2828.21	49.75	273.33	3	3	0.0080	**
lexOpL(20-TATA)_pCYC1min (1000 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (1000 nM, 2)	1262.79	2693.62	206.27	106.07	3	3	0.0018	**
lexOpL(20-TATA)_pCYC1min (2000 nM, 1) vs. lexOpL(40-TATA)_pCYC1min (2000 nM, 2)	1174.57	2685.73	339.47	159.22	3	3	0.0072	**
lexOpL(40-TATA)_pCYC1min (0 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (0 nM, 2)	1195.68	1447.73	60.26	72.45	3	3	0.0106	*
lexOpL(40-TATA)_pCYC1min (0.98 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (0.98 nM, 2)	1328.44	1432.79	32.64	57.46	3	3	0.0674	ns
lexOpL(40-TATA)_pCYC1min (1.95 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (1.95 nM, 2)	1246.74	1724.91	72.19	129.43	3	3	0.0101	*
lexOpL(40-TATA)_pCYC1min (3.91 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (3.91 nM, 2)	1300.84	1966.89	50.06	158.95	3	3	0.0123	*
lexOpL(40-TATA)_pCYC1min (7.81 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (7.81 nM, 2)	1523.74	2568.23	122.55	462.37	3	3	0.0514	ns
lexOpL(40-TATA)_pCYC1min (15.63 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (15.63 nM, 2)	1825.41	3278.03	142.09	308.03	3	3	0.0063	**
lexOpL(40-TATA)_pCYC1min (31.25 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (31.25 nM, 2)	2134.61	3997.80	155.99	479.30	3	3	0.0143	*
lexOpL(40-TATA)_pCYC1min (62.5 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (62.5 nM, 2)	2418.89	3956.27	128.51	218.68	3	3	0.0013	**
lexOpL(40-TATA)_pCYC1min (125 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (125 nM, 2)	2584.39	4112.55	132.72	330.29	3	3	0.0078	**
lexOpL(40-TATA)_pCYC1min (250 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (250 nM, 2)	2681.84	4607.45	196.22	111.28	3	3	0.0005	***
lexOpL(40-TATA)_pCYC1min (500 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (500 nM, 2)	2828.21	4320.88	273.33	217.66	3	3	0.0022	**
lexOpL(40-TATA)_pCYC1min (1000 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (1000 nM, 2)	2693.62	4107.81	106.07	117.86	3	3	0.0001	***
lexOpL(40-TATA)_pCYC1min (2000 nM, 1) vs. lexOpL(60-TATA)_pCYC1min (2000 nM, 2)	2685.73	3853.35	159.22	431.26	3	3	0.0306	*

Table S21. Statistical analysis of the results in Figure 1E.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
2lexOpL(1,40-TATA) _pCYC1min (0 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (0 nM, 2)	1169.79	1044.01	82.22	211.16	3	3	0.4172	ns
2lexOpL(1,40-TATA) _pCYC1min (0.98 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (0.98 nM, 2)	1301.89	1087.50	71.07	169.80	3	3	0.1478	ns
2lexOpL(1,40-TATA) _pCYC1min (1.95 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (1.95 nM, 2)	1383.30	1232.29	72.74	239.89	3	3	0.3915	ns
2lexOpL(1,40-TATA) _pCYC1min (3.91 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (3.91 nM, 2)	1641.33	1649.41	49.21	166.40	3	3	0.9421	ns
2lexOpL(1,40-TATA) _pCYC1min (7.81 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (7.81 nM, 2)	2033.93	2076.62	207.42	163.68	3	3	0.7942	ns
2lexOpL(1,40-TATA) _pCYC1min (15.63 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (15.63 nM, 2)	2489.27	3171.12	303.70	258.63	3	3	0.0428	*
2lexOpL(1,40-TATA) _pCYC1min (31.25 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (31.25 nM, 2)	3342.98	3961.30	359.35	113.00	3	3	0.0853	ns
2lexOpL(1,40-TATA) _pCYC1min (62.5 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (62.5 nM, 2)	4699.90	4290.64	221.08	219.59	3	3	0.0853	ns

2lexOpL(1,40-TATA) _pCYC1min (125 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (125 nM, 2)	4753.96	4855.24	369.00	482.11	3	3	0.7879	ns
2lexOpL(1,40-TATA) _pCYC1min (250 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (250 nM, 2)	5031.74	5088.86	261.15	441.84	3	3	0.8596	ns
2lexOpL(1,40-TATA) _pCYC1min (500 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (500 nM, 2)	4927.32	4770.68	289.76	132.02	3	3	0.4609	ns
2lexOpL(1,40-TATA) _pCYC1min (1000 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (1000 nM, 2)	4873.29	4542.48	344.84	99.64	3	3	0.2338	ns
2lexOpL(1,40-TATA) _pCYC1min (2000 nM, 1) vs. 2lexOpL(20,40-TATA) _pCYC1min (2000 nM, 2)	5078.57	4601.90	277.70	419.41	3	3	0.1868	ns
2lexOpL(20,40-TATA) _pCYC1min (0 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (0 nM, 2)	1044.01	917.75	211.16	84.45	3	3	0.4163	ns
2lexOpL(20,40-TATA) _pCYC1min (0.98 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (0.98 nM, 2)	1087.50	733.96	169.80	52.05	3	3	0.0584	ns
2lexOpL(20,40-TATA) _pCYC1min (1.95 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (1.95 nM, 2)	1232.29	895.98	239.89	142.24	3	3	0.1209	ns
2lexOpL(20,40-TATA) _pCYC1min (3.91 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (3.91 nM, 2)	1649.41	944.82	166.40	221.48	3	3	0.0137	*
2lexOpL(20,40-TATA) _pCYC1min (7.81 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (7.81 nM, 2)	2076.62	1131.98	163.68	354.56	3	3	0.0281	*
2lexOpL(20,40-TATA) _pCYC1min (15.63 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (15.63 nM, 2)	3171.12	1290.01	258.63	366.22	3	3	0.0028	**
2lexOpL(20,40-TATA) _pCYC1min (31.25 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (31.25 nM, 2)	3961.30	1663.23	113.00	741.61	3	3	0.0306	*
2lexOpL(20,40-TATA) _pCYC1min (62.5 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (62.5 nM, 2)	4290.64	2080.26	219.59	867.34	3	3	0.0407	*
2lexOpL(20,40-TATA) _pCYC1min (125 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (125 nM, 2)	4855.24	2726.42	482.11	995.51	3	3	0.0471	*
2lexOpL(20,40-TATA) _pCYC1min (250 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (250 nM, 2)	5088.86	3272.24	441.84	555.23	3	3	0.0127	*
2lexOpL(20,40-TATA) _pCYC1min (500 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (500 nM, 2)	4770.68	3591.87	132.02	290.83	3	3	0.0096	**
2lexOpL(20,40-TATA) _pCYC1min (1000 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (1000 nM, 2)	4542.48	3760.77	99.64	317.59	3	3	0.0407	*
2lexOpL(20,40-TATA) _pCYC1min (2000 nM, 1) vs. 2lexOpL(40,40-TATA) _pCYC1min (2000 nM, 2)	4601.90	4042.06	419.41	292.75	3	3	0.1393	ns

Table S22. Statistical analysis of the results in Figure 1F.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
4lexOpL(1,60-TATA)_pCYC1min (0 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (0 nM, 2)	655.82	553.91	108.41	168.20	3	3	0.4354	ns
4lexOpL(1,60-TATA)_pCYC1min (0.98 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (0.98 nM, 2)	587.61	1063.60	139.09	396.94	3	3	0.1636	ns
4lexOpL(1,60-TATA)_pCYC1min (1.95 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (1.95 nM, 2)	639.12	1642.85	131.78	474.87	3	3	0.0582	ns
4lexOpL(1,60-TATA)_pCYC1min (3.91 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (3.91 nM, 2)	885.22	3235.19	231.94	614.96	3	3	0.0133	*
4lexOpL(1,60-TATA)_pCYC1min (7.81 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (7.81 nM, 2)	1516.21	6045.60	506.54	237.33	3	3	0.0010	**
4lexOpL(1,60-TATA)_pCYC1min (15.63 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (15.63 nM, 2)	2922.75	10968.00	768.91	1212.85	3	3	0.0014	**
4lexOpL(1,60-TATA)_pCYC1min (31.25 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (31.25 nM, 2)	3930.01	16222.13	1035.85	1444.40	3	3	0.0005	***
4lexOpL(1,60-TATA)_pCYC1min (62.5 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (62.5 nM, 2)	5943.48	19991.04	677.67	1526.48	3	3	0.0011	**
4lexOpL(1,60-TATA)_pCYC1min (125 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (125 nM, 2)	6807.02	22776.37	575.03	1882.93	3	3	0.0025	**
4lexOpL(1,60-TATA)_pCYC1min (250 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (250 nM, 2)	7409.74	25079.19	790.71	772.10	3	3	<0.0001	****
4lexOpL(1,60-TATA)_pCYC1min (500 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (500 nM, 2)	8227.38	25488.84	634.55	1593.81	3	3	0.0009	***
4lexOpL(1,60-TATA)_pCYC1min (1000 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (1000 nM, 2)	8379.75	23372.16	254.79	286.28	3	3	<0.0001	****
4lexOpL(1,60-TATA)_pCYC1min (2000 nM, 1) vs. 8lexOpL(1,60-TATA)_pCYC1min (2000 nM, 2)	8449.45	24266.66	334.19	892.07	3	3	0.0003	***

Table S23. Transfer functions for the *S. cerevisiae* biosensors in our library (part A). The transfer function for byMM644 corresponds to y = y_0 + k*$\log_{10}(x)$, where y_0 is the value y takes when $\log_{10}(x) = 0$, and k—the slope—is given by $\Delta y/\Delta\left(log_{10}(x)\right)$ when $\Delta\left(log_{10}(x)\right) \rightarrow 0$.The transfer function for the other strains in this table is y=y_M*y(0)/((y_M-y(0))*exp(-A*x) + y(0)), where y(0) is the basal fluorescence value, y_M is the maximum fluorescence, and A is a constant such that the transfer function has an inflection point at $x = \frac{ln\left(\frac{y_M - y(0)}{y(0)}\right)}{A}$.

Strain	Receptor	Reporter	Fitting function	R^2
byMM617	pGPD-B42	lexOpR(40-TATA)_pCYC1min	y=3414*1052/((3414-1052)*exp(-0.003480*x) +1052)	0.9848
byMM644	pCMV-VP64	lexOpR(40-TATA)_pCYC1min	y=1107+236.9*log10x	0.9749
byMM667	DEG1t_pCYC1noTATA-VP64	lexOpR(40-TATA)_pCYC1min	y=2572*1166/((2572-1166)*exp(-0.04329*x) +1166)	0.9849

byMM888	DEG1t_pCYC1noTATA-VP64	2lexOpR(1,40-TATA)_pCYC1min	y=2269*789.4/((2269-789.4)*exp(-0.04243*x) +789.4)	0.9926
byMM890	DEG1t_pCYC1noTATA-VP64	2lexOpR(20,40-TATA)_pCYC1min	y=4189*1335/((4189-1335)*exp(-0.1129*x) +1335)	0.9501
byMM1449	DEG1t_pCYC1noTATA-VP64	lexOpL(40-TATA)_pCYC1min	y=2683*1241/((2683-1241)*exp(-0.04741*x) +1241)	0.9870
byMM1450	DEG1t_pCYC1noTATA-VP64	lexOpR(1)lexOpL(40-TATA) _pCYC1min	y=4792*1298/((4792-1298)*exp(-0.08667*x) +1298)	0.9880
byMM1451	DEG1t_pCYC1noTATA-VP64	2lexOpL(1,40-TATA)_pCYC1min	y=4937*1328/((4937-1328)*exp(-0.06010*x) +1328)	0.9944
byMM1452	DEG1t_pCYC1noTATA-VP64	2lexOpL(20,40-TATA)_pCYC1min	y=4668*1125/((4668-1125)*exp(-0.1107*x) +1125)	0.9826
byMM1454	DEG1t_pCYC1noTATA-VP64	lexOpR(20)lexOpL(40-TATA) _pCYC1min	y=2810*1190/((2810-1190)*exp(-0.07414*x) +1190)	0.9636
byMM1847	DEG1t_pCYC1noTATA-VP64	lexOpL(20-TATA) _pCYC1min	y=1224*550.8/((1224-550.8)*exp(-0.03717*x) +550.8)	0.9799
byMM1904	DEG1t_pCYC1noTATA-VP64	lexOpL(60-TATA) _pCYC1min	y=4153*1435/((4153-1435)*exp(-0.1313*x) +1435)	0.9764
byMM1973	DEG1t_pCYC1noTATA-VP64	2lexOpL(40,40-TATA) _pCYC1min	y=3705*982.8/((3705-982.8)*exp(-0.01738*x) +982.8)	0.9771
byMM1974	pGPD-B42	2lexOpL(40,40-TATA) _pCYC1min	y=2290*340.4/((2290-340.4)*exp(-0.006420*x) +340.4)	0.9844
byMM1982	DEG1t_pCYC1noTATA-VP64	4lexOpL(1,60-TATA)_pCYC1min	y=7822*1010/((7822-1010)*exp(-0.05520*x) +1010)	0.9705

Table S24. Transfer functions for the *S. cerevisiae* biosensors in our library (part B). All transfer functions in this table have a quadratic form such as $y = B_0 + B_1*x + B_2*x^2$.

Strain	Receptor	Reporter	Fitting function	R^2
byMM889	pGPD-B42	2lexOpR(1,40-TATA)_pCYC1min	y=745.3 + 4.071*x - 0.001645*x^2	0.9972
byMM892	pGPD-B42	2lexOpR(20,40-TATA)_pCYC1min	y=799.6 + 7.303*x - 0.004207*x^2	0.9566
byMM1480	pGPD-B42	lexOpL(40-TATA)_pCYC1min	y=917.5 + 4.928*x - 0.003717*x^2	0.9872
byMM1481	pGPD-B42	lexOpR(1)lexOpL(40-TATA) _pCYC1min	y=722.8 + 6.639*x - 0.002952*x^2	0.9901
byMM1482	pGPD-B42	2lexOpL(1,40-TATA) _pCYC1min	y=648.8 + 6.686*x - 0.002729*x^2	0.9964
byMM1483	pGPD-B42	2lexOpL(20,40-TATA) _pCYC1min	y=524.9 + 7.202*x - 0.002880*x^2	0.9962
byMM1484	pGPD-B42	lexOpL(1)lexOpR(40-TATA) _pCYC1min	y=653.9 + 7.577*x - 0.003225*x^2	0.9612
byMM1485	pGPD-B42	lexOpR(20)lexOpL(40-TATA) _pCYC1min	y=464.9 + 7.155*x - 0.003036*x^2	0.9935
byMM1848	pGPD-B42	lexOpL(20-TATA) _pCYC1min	y=850.0+ 21.390*x - 0.03484*x^2	0.9792
byMM1905	pGPD-B42	lexOpL(60-TATA) _pCYC1min	y=1172 + 26.27*x - 0.04822*x^2	0.9587
byMM1983	pGPD-B42	4lexOpL(1,60-TATA)_pCYC1min	y=-27.43 + 22.59*x - 0.01664*x^2	0.9857
byMM1985	pGPD-B42	8lexOpL(1,60-TATA)_pCYC1min	y=-77.13 + 43.98*x - 0.02850*x^2	0.9704

Table S25. Real sample recovery method: results. Cell solutions in SDC supplied with different amount of β-estradiol were used as real samples. For each biosensor, six β-estradiol concentrations were measured. Biosensor byMM381 is characterized by a larger detection range, whereas biosensor byMM1984 appears more precise. Both biosensors shown acceptable reproducibility and reliability for practical applications.

Sample	Added (nM)	Estimated (nM)	Recovery (%)	RSD (%)
byMM381-1	5	4.64	92.80	11.91
byMM381-2	25	22.93	91.72	6.64
byMM381-3	50	52.17	104.34	3.86
byMM381-4	100	110.98	110.98	7.49
byMM381-5	300	292.37	97.46	7.37
byMM381-6	500	532.38	106.48	4.03
byMM1984-1	5	4.86	97.20	3.40
byMM1984-2	10	10.47	104.70	4.98
byMM1984-3	15	15.31	102.07	2.79
byMM1984-4	20	20.37	101.85	2.04
byMM1984-5	25	24.82	99.28	2.33
byMM1984-6	30	30.49	101.63	0.92

Table S26. Statistical analysis of the results in Figure 3.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
7 hours (1) vs. 14 hours (2)	25343.52	30841.1	1966.007	1037.302	3	3	0.0229	*
14 hours (1) vs. 21 hours (2)	30841.1	30777.16	1037.302	874.2746	3	3	0.9390	ns
14 hours (1) vs. 28 hours (2)	30841.1	30116.53	1037.302	1192.621	3	3	0.4724	ns
21 hours (1) vs. 28 hours (2)	30777.16	30116.53	874.2746	1192.621	3	3	0.4859	ns
CYP1B1 (1) vs. Control (2)	970.71	524.43	187.67	75.86	7	7	0.0004	***
CYP19A1 (1) vs. Control (2)	3183.43	330.71	308.2	56.26	7	7	<0.0001	****

Table S27. Statistical analysis of the results in Figure 4B. 1 means CPR, 2 is CPR & CYP19A1, 3 stands for control.

Ordinary one-way ANOVA	Mean 1	Mean 2	Mean 3	SD1	SD2	SD3	n1	n2	n3	P value	P value summary
No inducer group	1130.51	1123.58	1163.11	49.29	54.66	4.77	3	3	3	0.5106	ns
2000 nM β-estradiol group	30922.05	31328.73	30872.80	742.85	490.90	909.82	3	3	3	0.7202	ns
2000 nM Testosterone group	1155.68	31372.72	1154.35	73.08	526.06	67.01	3	3	3	<0.0001	****

Table S28. Statistical analysis of the results in Figure 4D.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
VP64-β-estradiol (0 nM, 1) vs. VP64-testosterone (0 nM, 2)	1237.13	1531.69	15.86	106.46	3	3	0.0383	*
VP64-β-estradiol (0.98 nM, 1) vs. VP64-testosterone (0.98 nM, 2)	1538.34	3087.41	56.02	372.52	3	3	0.0170	*
VP64-β-estradiol (1.95 nM, 1) vs. VP64-testosterone (1.95 nM, 2)	1854.27	3595.62	25.14	383.16	3	3	0.0154	*
VP64-β-estradiol (3.91 nM, 1) vs. VP64-testosterone (3.91 nM, 2)	2523.54	3317.79	16.21	566.55	3	3	0.1358	ns
VP64-β-estradiol (7.81 nM, 1) vs. VP64-testosterone (7.81 nM, 2)	3142.85	2722.60	187.11	628.31	3	3	0.3674	ns
VP64-β-estradiol (15.63 nM, 1) vs. VP64-testosterone (15.63 nM, 2)	506.92	2212.83	48.75	650.71	3	3	0.0445	*
VP64-β-estradiol (31.25 nM, 1) vs. VP64-testosterone (31.25 nM, 2)	464.80	2590.64	35.05	421.81	3	3	0.0124	*
VP64-β-estradiol (62.5 nM, 1) vs. VP64-testosterone (62.5 nM, 2)	176.87	3351.21	4.77	935.32	3	3	0.0277	*
VP64-β-estradiol (125 nM, 1) vs. VP64-testosterone (125 nM, 2)	214.92	4251.44	10.79	827.81	3	3	0.0137	*
VP64-β-estradiol (250 nM, 1) vs. VP64-testosterone (250 nM, 2)	153.17	4956.78	4.14	1230.10	3	3	0.0212	*
VP64-β-estradiol (500 nM, 1) vs. VP64-testosterone (500 nM, 2)	134.52	5405.82	3.70	1737.41	3	3	0.0344	*
VP64-β-estradiol (1000 nM, 1) vs. VP64-testosterone (1000 nM, 2)	139.33	4238.16	2.60	1585.87	3	3	0.0464	*
VP64-β-estradiol (2000 nM, 1) vs. VP64-testosterone (2000 nM, 2)	140.84	3765.08	5.69	1106.08	3	3	0.0297	*

Table S29. Statistical analysis of the results in Figure 4E.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
mDR521_805-β-estradiol (0 nM, 1) vs. mDR521_805-testosterone (0 nM, 2)	228.32	28.41	51.16	12.67	3	3	0.0166	*
mDR521_805-β-estradiol (0.98 nM, 1) vs. mDR521_805-testosterone (0.98 nM, 2)	308.58	164.10	34.23	17.98	3	3	0.0073	**
mDR521_805-β-estradiol (1.95 nM, 1) vs. mDR521_805-testosterone (1.95 nM, 2)	468.58	535.03	33.75	180.71	3	3	0.5915	ns
mDR521_805-β-estradiol (3.91 nM, 1) vs. mDR521_805-testosterone (3.91 nM, 2)	661.69	1162.30	85.39	80.24	3	3	0.0018	**
mDR521_805-β-estradiol (7.81 nM, 1) vs. mDR521_805-testosterone (7.81 nM, 2)	1213.98	1688.66	120.66	173.34	3	3	0.0219	*
mDR521_805-β-estradiol (15.63 nM, 1) vs. mDR521_805-testosterone (15.63 nM, 2)	2093.28	1704.39	145.96	217.79	3	3	0.0709	ns
mDR521_805-β-estradiol (31.25 nM, 1) vs. mDR521_805-testosterone (31.25 nM, 2)	2501.57	1448.83	79.26	176.67	3	3	0.0035	**
mDR521_805-β-estradiol (62.5 nM, 1) vs. mDR521_805-testosterone (62.5 nM, 2)	2717.01	1588.16	208.69	108.11	3	3	0.0036	**
mDR521_805-β-estradiol (125 nM, 1) vs. mDR521_805-testosterone (125 nM, 2)	3088.08	1298.34	273.90	511.10	3	3	0.0122	*
mDR521_805-β-estradiol (250 nM, 1) vs. mDR521_805-testosterone (250 nM, 2)	1127.40	1747.82	320.43	229.39	3	3	0.0586	ns
mDR521_805-β-estradiol (500 nM, 1) vs. mDR521_805-testosterone (500 nM, 2)	134.91	1415.42	21.52	639.73	3	3	0.0739	ns
mDR521_805-β-estradiol (1000 nM, 1) vs. mDR521_805-testosterone (1000 nM, 2)	82.86	2181.44	32.67	320.71	3	3	0.0072	**
mDR521_805-β-estradiol (2000 nM, 1) vs. mDR521_805-testosterone (2000 nM, 2)	75.29	2017.85	28.60	149.89	3	3	0.0014	**

Table S30. Statistical analysis of the results in Figure 6B.

Unpaired t test with Welch's correction	Mean 1	Mean 2	SD1	SD2	n1	n2	P value	P value summary
Control (1) vs.CYP1B1 (2)	30164.79	20814.40	516.99	812.19	3	3	0.0002	***
Control (1) vs.CYP2C9 (2)	30164.79	26449.65	516.99	259.48	3	3	0.0017	**
Control (1) vs.CYP5A1 (2)	30164.79	29829.99	516.99	381.43	3	3	0.4219	ns
Control (1) vs.CYP19A1 (2)	30164.79	29872.51	516.99	421.46	3	3	0.4910	ns
CYP1B1 (1) vs.CYP2C9 (2)	20814.40	26449.65	812.19	259.48	3	3	0.0037	**