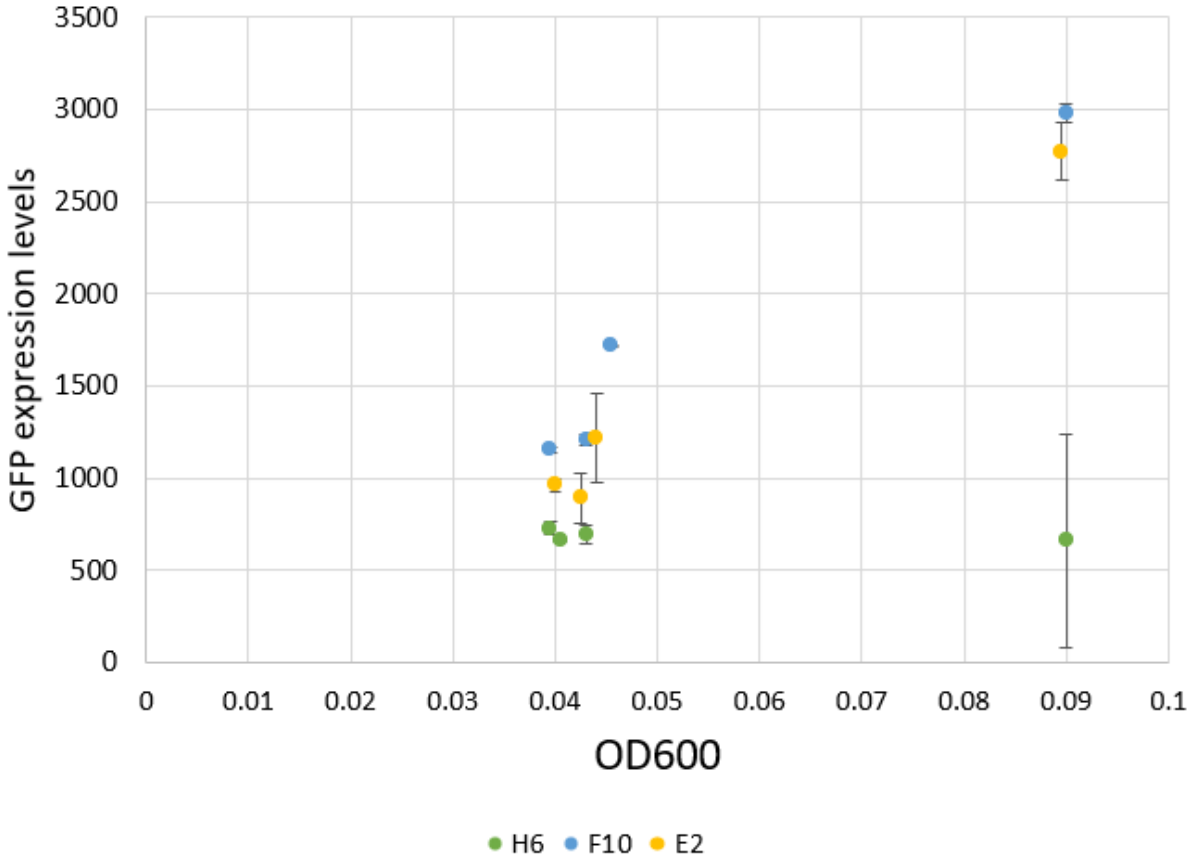
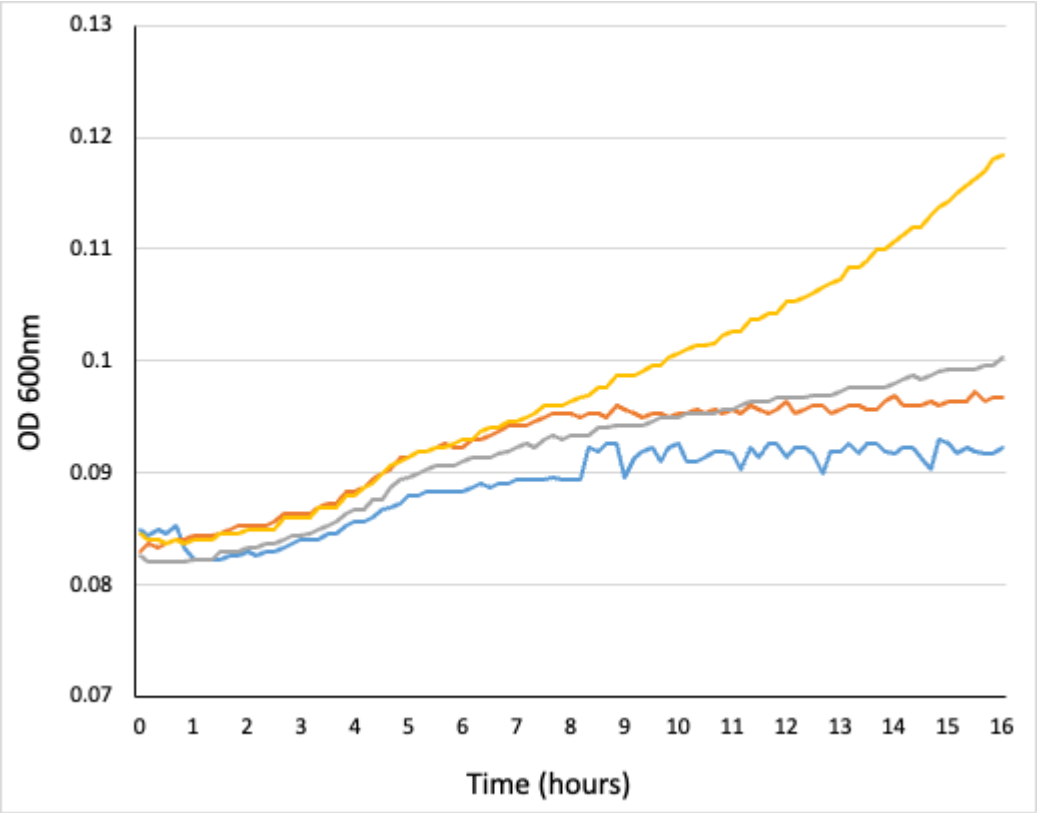
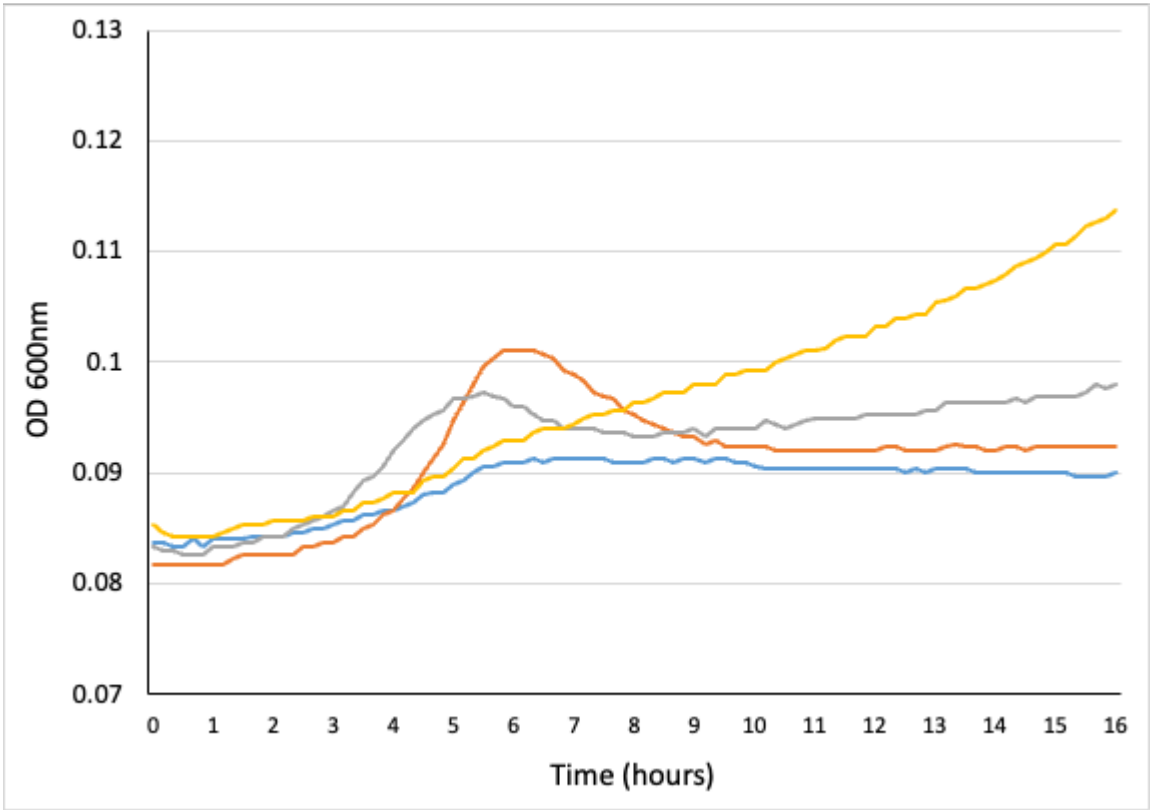
Supplementary Material:



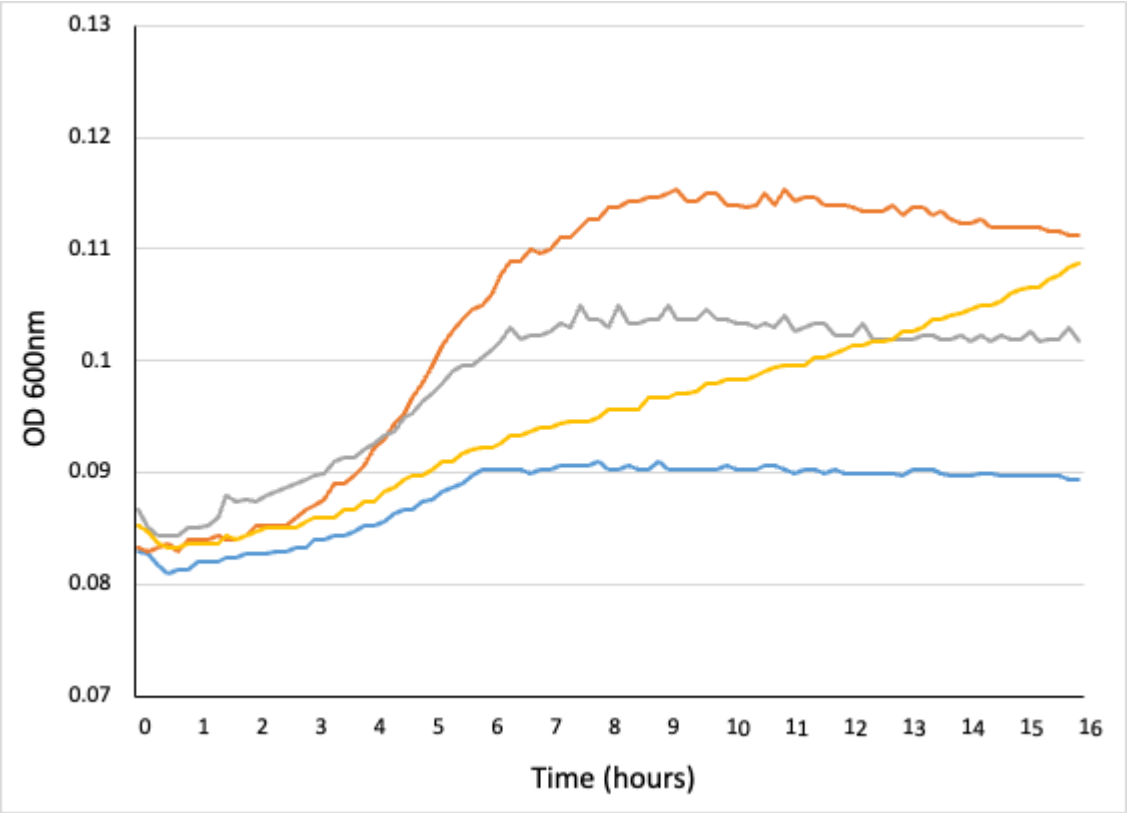
Supplemental Figure 1. Serial dilution curve for clones H6, F10 and E2. Initial culture was incubated at 37°C for 16 hours and was used to make serial 1:2, 1:4 and 1:8 dilutions. Right-most values for each clone represent 1:2 dilutions, followed by 1:4 dilutions, and 1:8 dilutions on the left. Volume of inoculation was kept constant for each dilution to ensure sample path length did not change OD_{600} measurements. Error bars represent standard deviation.



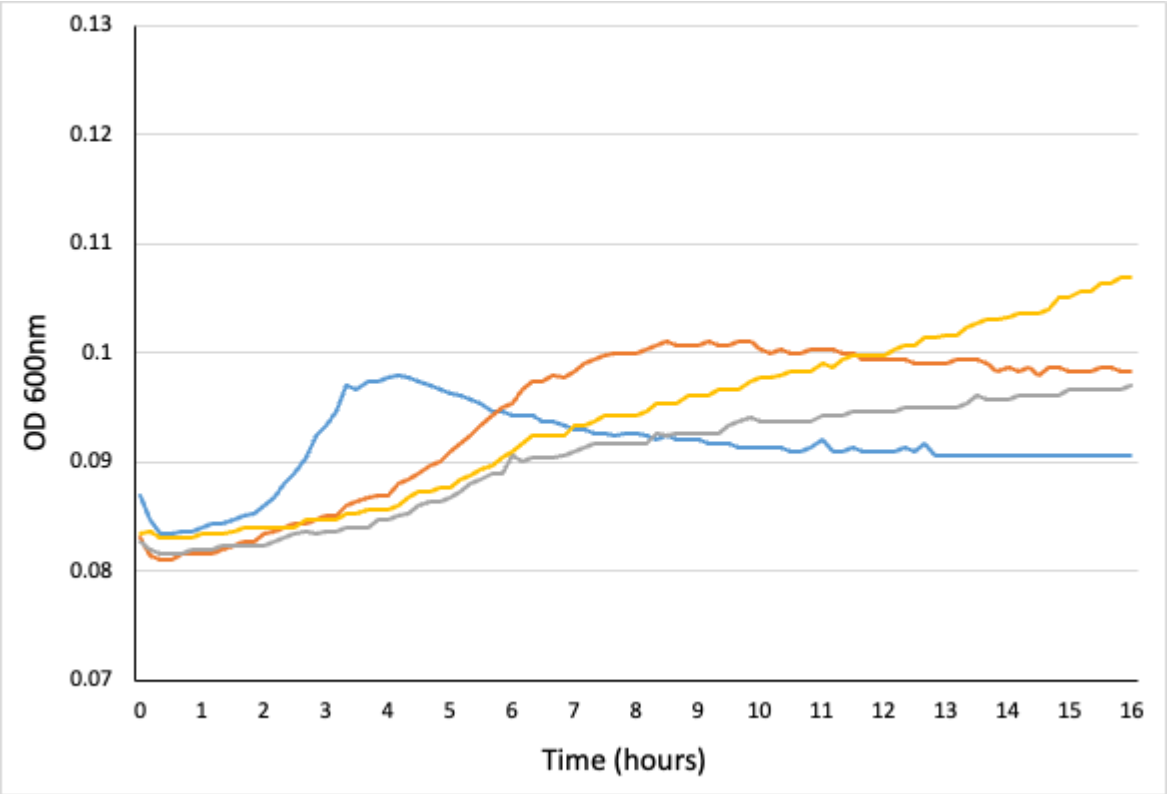
Supplemental Figure 2: Growth curve for clone H6 in plate 1 from the Alon promoter library. Strain was cultured for 16 h in M9 minimal media and with 0mM, 1mM, 3mM, or 5mM phenylalanine. The blue growth curve represents 0mM phenylalanine, orange growth curve represents 1mM phenylalanine, gray growth curve represents 3mM phenylalanine, and yellow growth curve represents 5mM phenylalanine. Experiments were performed in triplicate.



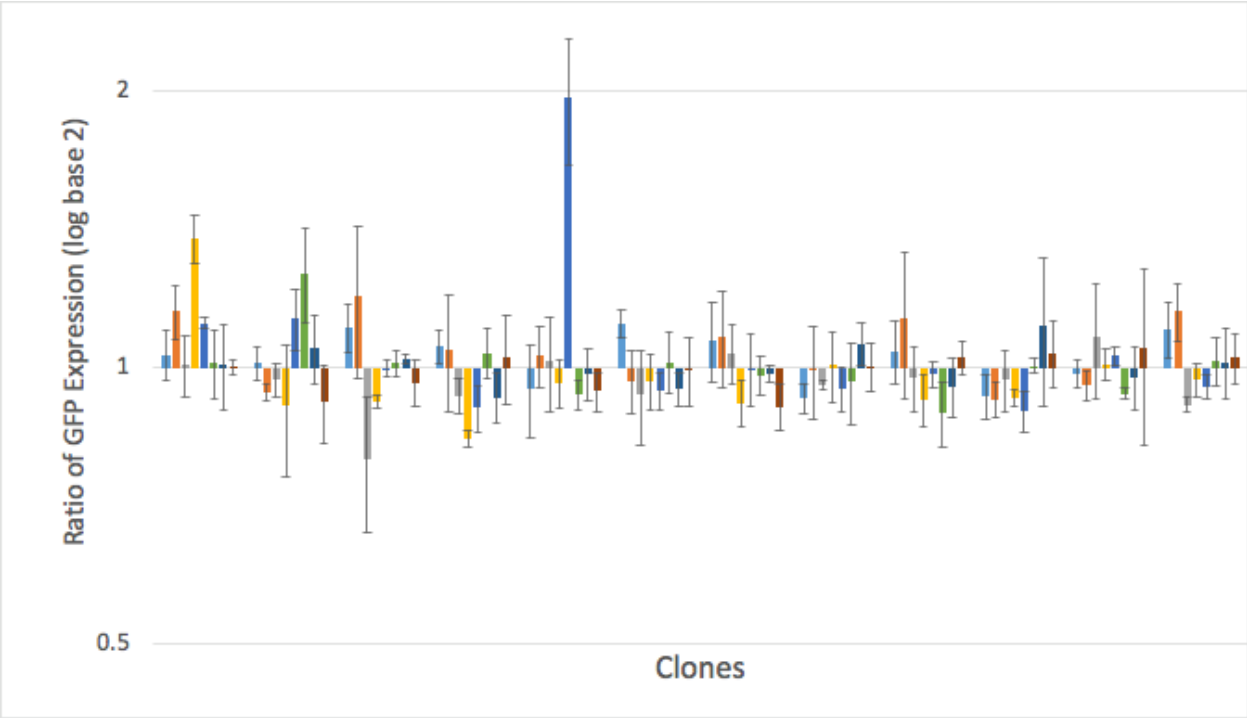
Supplemental Figure 3: Growth curve for clone F10 in plate 1 from the Alon promoter library. Strain was cultured for 16 h in M9 minimal media with 0mM, 1mM, 3mM, or 5mM phenylalanine. The blue growth curve represents 0mM phenylalanine, orange growth curve represents 1mM phenylalanine, gray growth curve represents 3mM phenylalanine, and yellow growth curve represents 5mM phenylalanine. Experiments were performed in triplicate.



Supplemental Figure 4: Growth curve for clone E2 in plate 1 from the Alon promoter library. Strain was cultured for 16 h in M9 minimal media with 0mM, 1mM, 3mM, or 5mM phenylalanine. The blue growth curve represents 0mM phenylalanine, orange growth curve represents 1mM phenylalanine, gray growth curve represents 3mM phenylalanine, and yellow growth curve represents 5mM phenylalanine. Experiments were performed in triplicate.



Supplemental Figure 5: Growth curve for clone D5 in plate 1 from the Alon promoter library. Strain was cultured for 16 h in M9 minimal media with 0mM, 1mM, 3mM, or 5mM phenylalanine. The blue growth curve represents 0mM phenylalanine, orange growth curve represents 1mM phenylalanine, gray growth curve represents 3mM phenylalanine, and yellow growth curve represents 5mM phenylalanine. Experiments were performed in triplicate.



Supplemental Figure 6. Fold Induction of GFP in 96 *E. coli* K12 strains in plate 1 of the Alon promoter library. Strains were cultured for 16 h in M9 minimal media with 3mM phenylalanine. Control conditions were cultured with 0mM phenylalanine. Experiments were performed in triplicate. Fold induction is given as a ratio of fluorescence expressed under treatment conditions to control conditions. Error bars represent standard deviation.

	1	2	3	4	5	6	7	8	9	10	11	12
A	1.032	1.012	1.106	1.053	0.949	1.116	1.07	0.925	1.042	0.93	0.984	1.099
B	1.151	0.941	1.199	1.046	1.03	0.966	1.082	0.993	1.13	0.923	0.956	1.152
C	1.007	0.969	0.794	0.931	1.016	0.933	1.035	0.956	0.975	0.97	1.079	0.91
D	1.382	0.908	0.918	0.837	0.962	0.966	0.915	1.005	0.921	0.926	1.007	0.969
E	1.117	1.13	0.999	0.904	1.969	0.943	0.997	0.949	0.983	0.895	1.029	0.952
F	1.012	1.267	1.01	1.038	0.933	1.013	0.98	0.964	0.891	1.004	0.937	1.016
G	1.007	1.051	1.021	0.927	0.985	0.946	0.984	1.062	0.952	1.112	0.976	1.012
H	1.001	0.916	0.962	1.026	0.942	0.993	0.906	1.001	1.025	1.038	1.051	1.025

Supplemental Figure 7. Fold Induction values of GFP in 96 *E. coli* K12 strains in plate 1 of the Alon promoter library. Strains were cultured for 16 h in M9 minimal media with 3mM

phenylalanine. Experiments were performed in triplicate. Fold induction is given as a ratio of fluorescence expressed under treatment conditions to control conditions.

Supplemental Table 1. Effect of phenylalanine concentration on the growth of *E. coli*

Phenylalanine concentration of growth medium	H6 growth rate μ (h^{-1})	F10 growth rate μ (h^{-1})	E2 growth rate μ (h^{-1})	D5 growth rate μ (h^{-1})
0mM	0.0064	0.0140	0.0109	0.0234
1mM	0.0178	0.0354	0.0358	0.0079
3mM	0.0160	0.0236	0.0225	0.0040
5mM	0.0156	0.0143	0.0114	0.0053