SUPLEMENTAL DATA

Sequence of pKO3-NotI. The NotI site is red, the temperature sensitive replication origin is purple, and the antibiotic resistance cassette (*cat*^{R}) is cyan.

GCGGCCGCGATATCTAACGGTGAACAGTTGTTCTACTTTTGTTTGTTAGTCTTGATGCTTCACTGATAGA
TACAAGAGCCATAAGAACCTCAGATCCTTCCGTATTTAGCCAGTATGTTCTCTAGTGTGGTTCGTTGTTT
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AAACTGGTGAGCTGAATTTTTGCAGTTAAAGCATCGTGTAGTGTTTTTCTTAGTCCGTTACGTAGGTAGG
AATCTGATGTAATGGTTGTTGGTATTTTGTCACCATTCATTTTTATCTGGTTGTTCTCAAGTTCGGTTAC
GAGATCCATTTGTCTATCTAGTTCAACTTGGAAAATCAACGTATCAGTCGGGCGGCCTCGCTTATCAACC
ACCAATTTCATATTGCTGTAAGTGTTTAAATCTTTACTTATTGGTTTCAAAACCCATTGGTTAAGCCTTT
TAAACTCATGGTAGTTATTTTCAAGCATTAACATGAACTTAAATTCATCAAGGCTAATCTCTATATTTGC
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AAAGACTTAACATGTTCCAGATTATATTTTATGAATTTTTTTAACTGGAAAAGATAAGGCAATATCTCTT
CACTAAAAACTAATTCTAATTTTTCGCTTGAGAACTTGGCATAGTTTGTCCACTGGAAAATCTCAAAGCC
TTTAACCAAAGGATTCCTGATTTCCACAGTTCTCGTCATCAGCTCTCTGGTTGCTTTAGCTAATACACCA
TAAGCATTTTCCCTACTGATGTTCATCATCTGAGCGTATTGGTTATAAGTGAACGATACCGTCCGTTCTT
TCCTTGTAGGGTTTTCAATCGTGGGGTTGAGTAGTGCCACACAGCATAAAATTAGCTTGGTTTCATGCTC
CGTTAAGTCATAGCGACTAATCGCTAGTTCATTTGCTTTGAAAACAACTAATTCAGACATACATCTCAAT
TGGTCTAGGTGATTTTAATCACTATACCAATTGAGATGGGCTAGTCAATGATAATTACTAGTCCTTTTCC
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AAAGAATAAAAAAAGATAAAAAGAATAGATCCCAGCCCTGTGTATAACTCACTACTTTAGTCAGTTCCGC
AGTATTACAAAAGGATGTCGCAAACGCTGTTTGCTCCTCTACAAAACAGACCTTAAAACCCTAAAGGCTT
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TACAGGCGCCTTTTATGGATTCATGCAAGGAAACTACCCATAATACAAGAAAAGCCCGTCACGGGCTTCT
CAGGGCGTTTTATGGCGGGTCTGCTATGTGGTGCTATCTGACTTTTTGCTGTTCAGCAGTTCCTGCCCTC
TGATTTTCCAGTCTGACCACTTCGGATTATCCCGTGACAGGTCATTCAGACTGGCTAATGCACCCAGTAA
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CCAACTTTCACCATAATGAAATAAGATCACTACCGGGCGTATTTTTTGAGTTATCGAGATTTTCAGGAGC
TAAGGAAGCTAAAATGGAGAAAAAAATCACTGGATATACCACCGTTGATATATCCCAATGGCATCGTAAA
GAACATTTTGAGGCATTTCAGTCAGTTGCTCAATGTACCTATAACCAGACCGTTCAGCTGGATATTACGG
CCTTTTTAAAGACCGTAAAGAAAAATAAGCACAAGTTTTATCCGGCCTTTATTCACATTCTTGCCCGCCT
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CCTTGTTACACCGTTTTCCATGAGCAAACTGAAACGTTTTCATCGCTCTGGAGTGAATACCACGACGATT
TCCGGCAGTTTCTACACATATATTCGCAAGATGTGGCGTGTTACGGTGAAAACCTGGCCTATTTCCCTAA
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GTGGCCAATATGGACAACTTCTTCGCCCCCGTTTTCACCATGGGCAAATATTATACGCAAGGCGACAAGG
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TGAATTACAACAGTACTGCGATGAGTGGCAGGGCGGGGCGTAATTTTTTTAAGGCAGTTATTGGTGCCCT
TAAACG

Sequence of pMM1. NotI sites are in blue, *adk* gene encoding TnAK is in red, and the extra base pair added so that the final linker is in frame is yellow.

GCGGCCGCaATGATGGCTTATCTGGTGTTTCTCGGACCTCCAGGGGCCGGAAAAGGTACGTACGCAAAGC
GAATCCAAGAAAAGACGGGTATTCCCCATATATCCACCGGCGACATCTTCAGAGATATTGTGAAGAAAGA
AAACGATGAACTTGGAAAGAAAATAAAGGAGATAATGGAAAAGGGAGAACTGGTTCCTGATGAACTGGTG
AACGAGGTTGTGAAAAGAAGACTTTCAGAGAAAGATTGTGAAAAGGGGTTCATTCTGGATGGGTATCCAA
GGACCGTAGCCCAGGCGGAGTTTCTCGACTCTTTCCTGGAATCCCAAAACAAGCAACTCACAGCTGCCGT
GCTTTTTGATGTTCCAGAGGACGTGGTTGTCCAGAGGCTCACCTCGAGAAGAATCTGCCCAAAGTGCGGT
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TTCAGCGAGACGACGACAAAGAGGAAACGGTCAGACACAGATACAAGGTTTACCTCGAAAAAACTCAACC
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GTTGCCGAGGTACTCAAAATAATAGGGTGGAGTGATAAA**GCGGCCGC**AGCGGCCGCGATATCTAACGGTG
AACAGTTGTTCTACTTTTGTTTGTTAGTCTTGATGCTTCACTGATAGATACAAGAGCCATAAGAACCTCA
GATCCTTCCGTATTTAGCCAGTATGTTCTCTAGTGTGGTTCGTTGTTTTTGCGTGAGCCATGAGAACGAA
CCATTGAGATCATGCTTACTTTGCATGTCACTCAAAAATTTTGCCTCAAAACTGGTGAGCTGAATTTTTG
CAGTTAAAGCATCGTGTAGTGTTTTTCTTAGTCCGTTACGTAGGTAGGAATCTGATGTAATGGTTGTTGG
TATTTTGTCACCATTCATTTTTATCTGGTTGTTCTCAAGTTCGGTTACGAGATCCATTTGTCTATCTAGT
TCAACTTGGAAAATCAACGTATCAGTCGGGCGGCCTCGCTTATCAACCACCAATTTCATATTGCTGTAAG
TGTTTAAATCTTTACTTATTGGTTTCAAAACCCATTGGTTAAGCCTTTTAAACTCATGGTAGTTATTTTC
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TCCACAGTTCTCGTCATCAGCTCTCTGGTTGCTTTAGCTAATACACCATAAGCATTTTCCCTACTGATGT
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GCTAGTTCATTTGCTTTGAAAACAACTAATTCAGACATACATCTCAATTGGTCTAGGTGATTTTAATCAC
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AACGCTGTTTGCTCCTCTACAAAACAGACCTTAAAACCCTAAAGGCTTAAGTAGCACCCTCGCAAGCTCG
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CAGTTCGCTGCGCTCACGGCTCTGGCAGTGAATGGGGGTAAATGGCACTACAGGCGCCTTTTATGGATTC
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CGGATTATCCCGTGACAGGTCATTCAGACTGGCTAATGCACCCAGTAAGGCAGCGGTATCATCAACAGGC
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AAAATCACTGGATATACCACCGTTGATATATCCCAATGGCATCGTAAAGAACATTTTGAGGCATTTCAGT
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CGTATGGCAATGAAAGACGGTGAGCTGGTGATATGGGATAGTGTTCACCCTTGTTACACCGTTTTCCATG
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TTCGCAAGATGTGGCGTGTTACGGTGAAAACCTGGCCTATTTCCCTAAAGGGTTTATTGAGAATATGTTT
TTCGTCTCAGCCAATCCCTGGGTGAGTTTCACCAGTTTTGATTTAAACGTGGCCAATATGGACAACTTCT
TCGCCCCCGTTTTCACCATGGGCAAATATTATACGCAAGGCGACAAGGTGCTGATGCCGCTGGCGATTCA
GGTTCATCATGCCGTTTGTGATGGCTTCCATGTCGGCAGAATGCTTAATGAATTACAACAGTACTGCGAT
GAGTGGCAGGGCGGGGCGTAATTTTTTTAAGGCAGTTATTGGTGCCCTTAAACG

Sequence of pMT2. BglII sites flanking the minitransposon (bold) are yellow, the stop codon designed to terminate translation of adjacent circularly permuted proteins is red, the MuA R1R2 binding sites are purple, the ribosomal binding site used to initiate translation of adjacent circularly permuted genes is in orange, and the start codon for translation of circularly permuted genes is green.

AGATCTTGAGCGGCGCACGAAAAACGCGAAAGCGTTTCACGATAAATGCGAAAAAAAGGATCTCAAGAAG
ATCCTTTGATTTTCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGCGGTAATACGGTTATCCACAGAA
TCAGGGGATAACGCAGGAAAGAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGGCCG
CGTTGCTGGCGTTTTTCCATAGGCTCCGCCCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAG
GTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCT
GTTCCGACCCTGCCGCTTACCGGATACCTGTCCGCCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATA
GCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTTCGCTCCAAGCTGGGCTGTGTGCACGAACCCCC
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CCAGGATCTTGCCATCCTATGGAACTGCCTCGGTGAGTTTTCTCCTTCATTACAGAAACGGCTTTTTCAA
AAATATGGTATTGATAATCCTGATATGAATAAATTGCAGTTTCATTTGATGCTCGATGAGTTTTTCTAAG
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AAAAGACGGGTATTCCCCATATATCCACCGGCGACATCTTCAGAGATATTGTGAAGAAAGAAAACGATGA
ACTTGGAAAGAAAATAAAGGAGATAATGGAAAAGGGAGAACTGGTTCCTGATGAACTGGTGAACGAGGTT
GTGAAAAGAAGACTTTCAGAGAAAGATTGTGAAAAGGGGTTCATTCTGGATGGGTATCCAAGGACCGTAG
CCCAGGCGGAGTTTCTCGACTCTTTCCTGGAATCCCAAAACAAGCAACTCACAGCTGCCGTGCTTTTTGA
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AACGTGATTTCACTTCAACCAAAAGAAGACGAACTGTGCGATGACTGTAAAGTAAAACTCGTTCAGCGAG
ACGACGACAAAGAGGAAACGGTCAGACACAGATACAAGGTTTACCTCGAAAAAACTCAACCCGTGATAGA
CTATTACGGGAAAAAGGGTATCCTCAAAAGAGTGGACGGCACGATAGGGATCGACAACGTGGTTGCCGAG
GTACTCAAAATAATAGGGTGGAGTGATAAATG

Figure S1. Growth of *E. coli* CV2 expressing full-length *T. neapolitana* AK using the minitransposon.

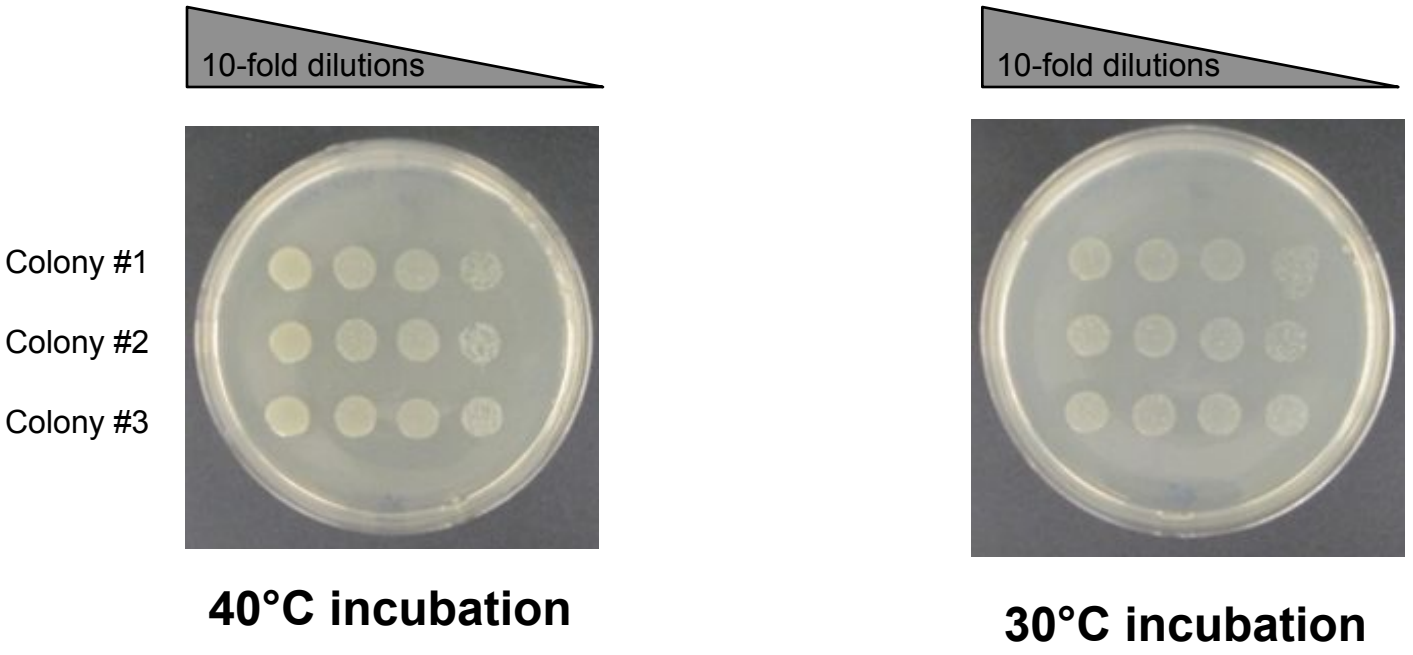

Figure S2. Growth of *E. coli* CV2 transformed with a circularized minitransposon that lacks the *adk* gene.

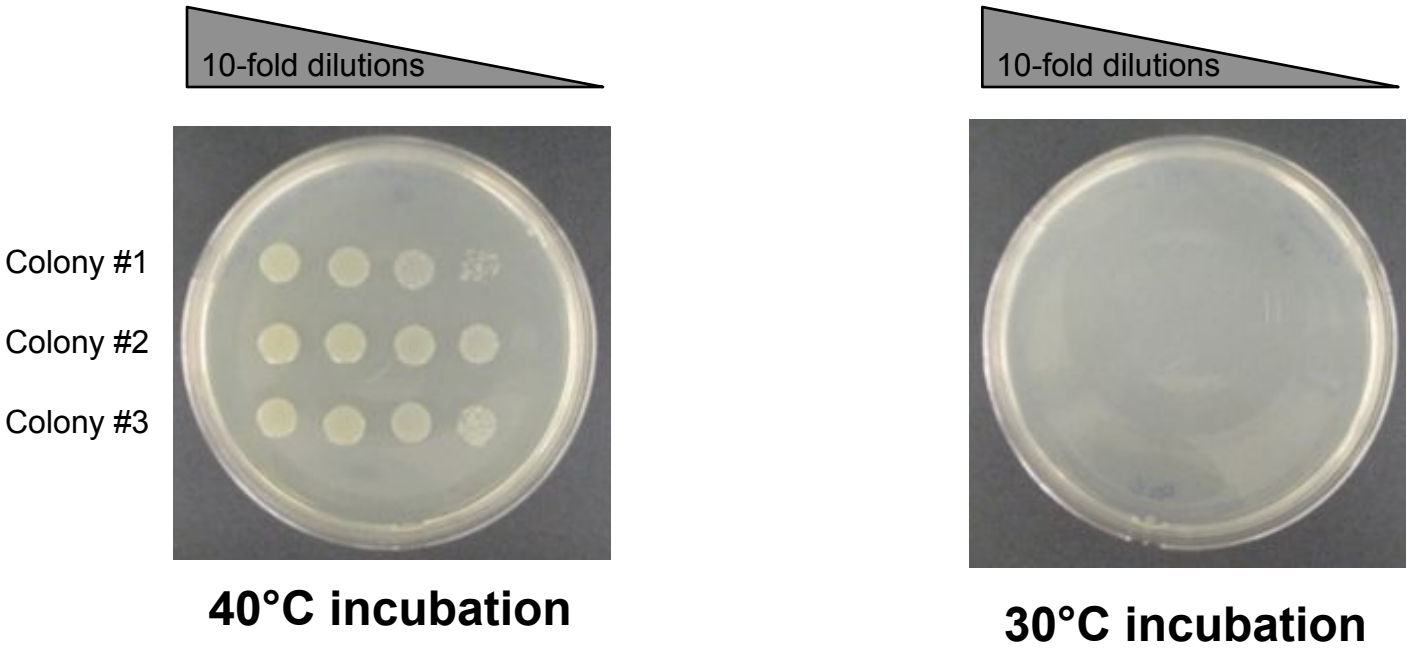

Figure S3. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 26-220 fused to 1-26.

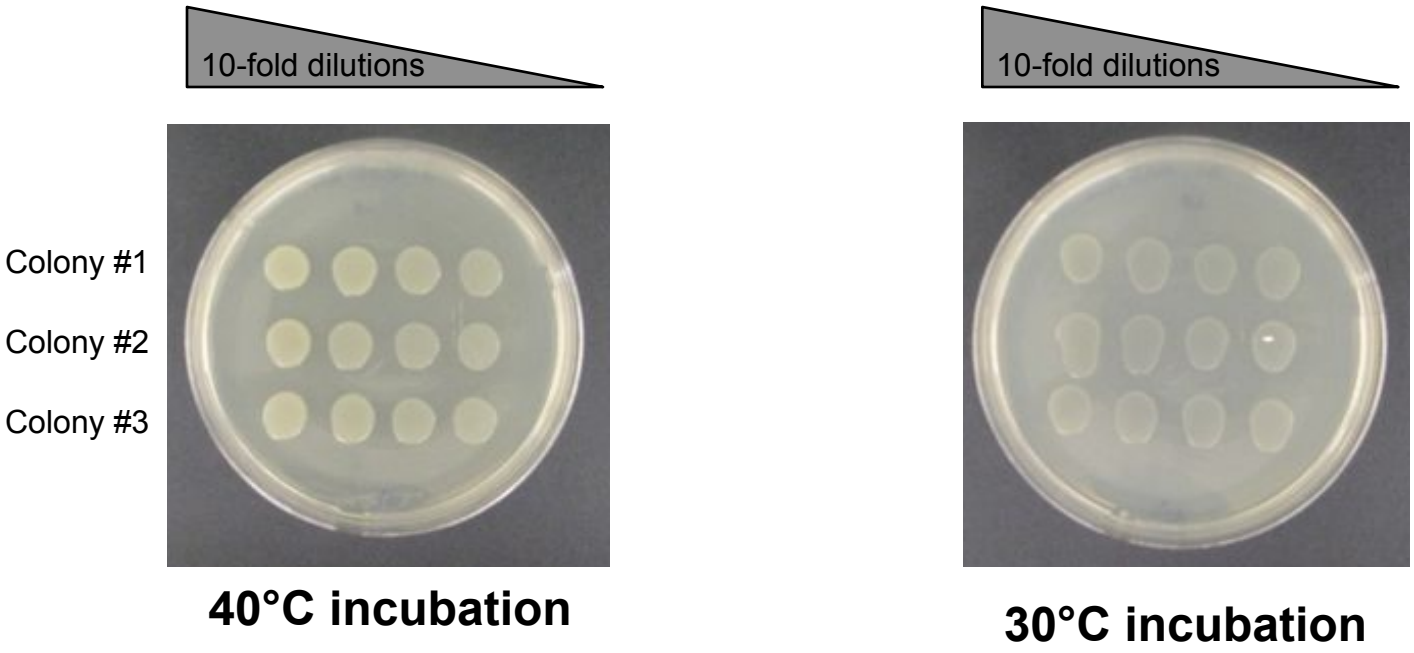

Figure S4. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 195-220 fused to 1-195.

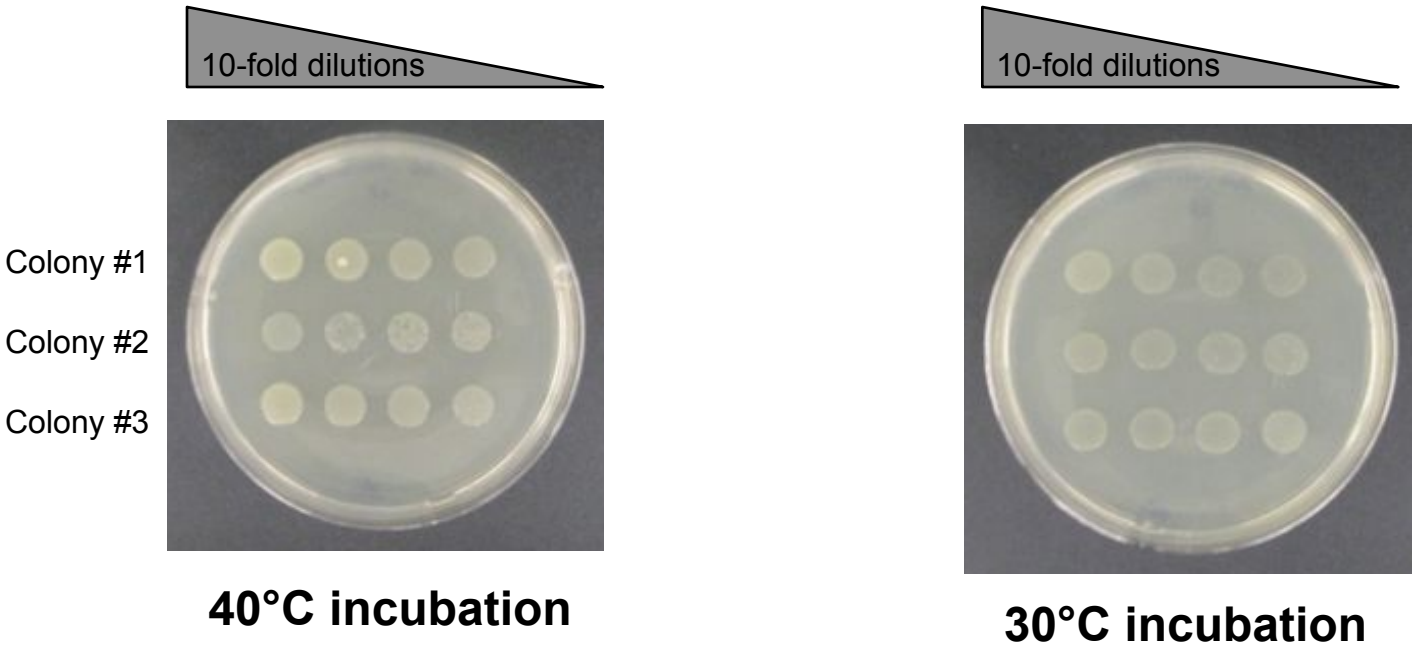

Figure S5. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 29-220 fused to 1-29.

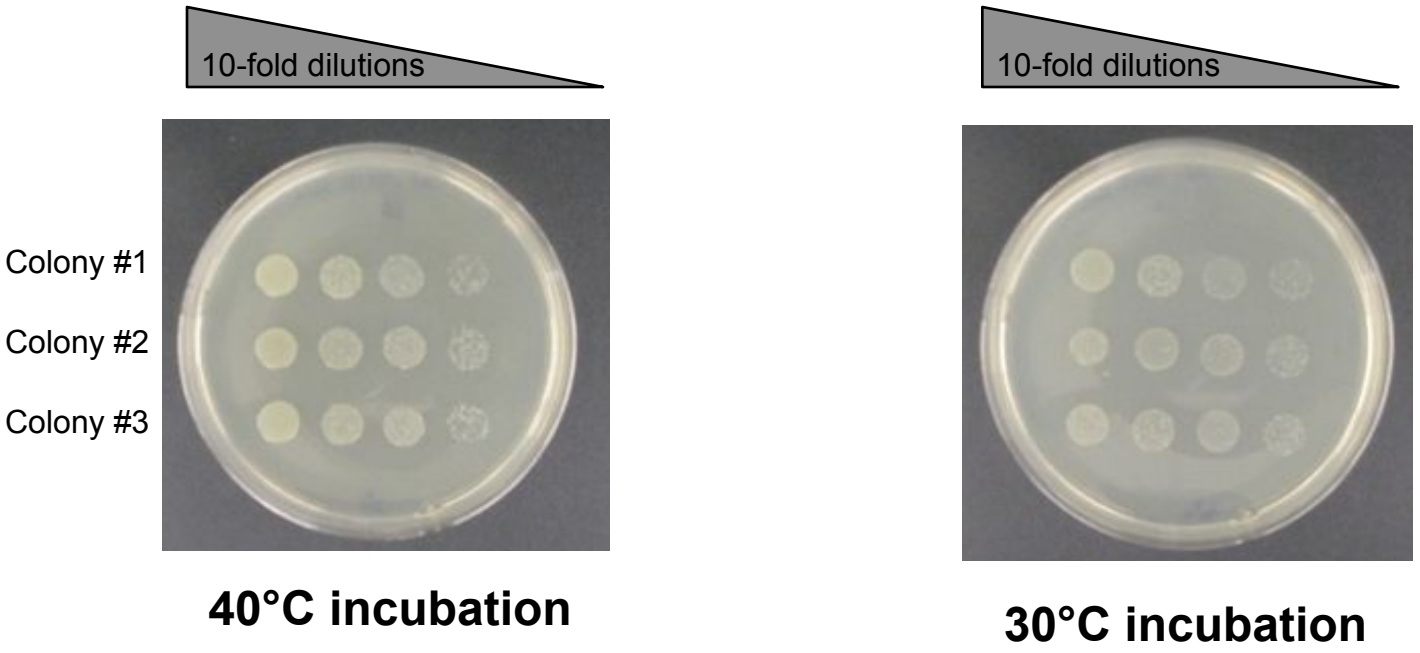

Figure S6. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 184-220 fused to 1-184.

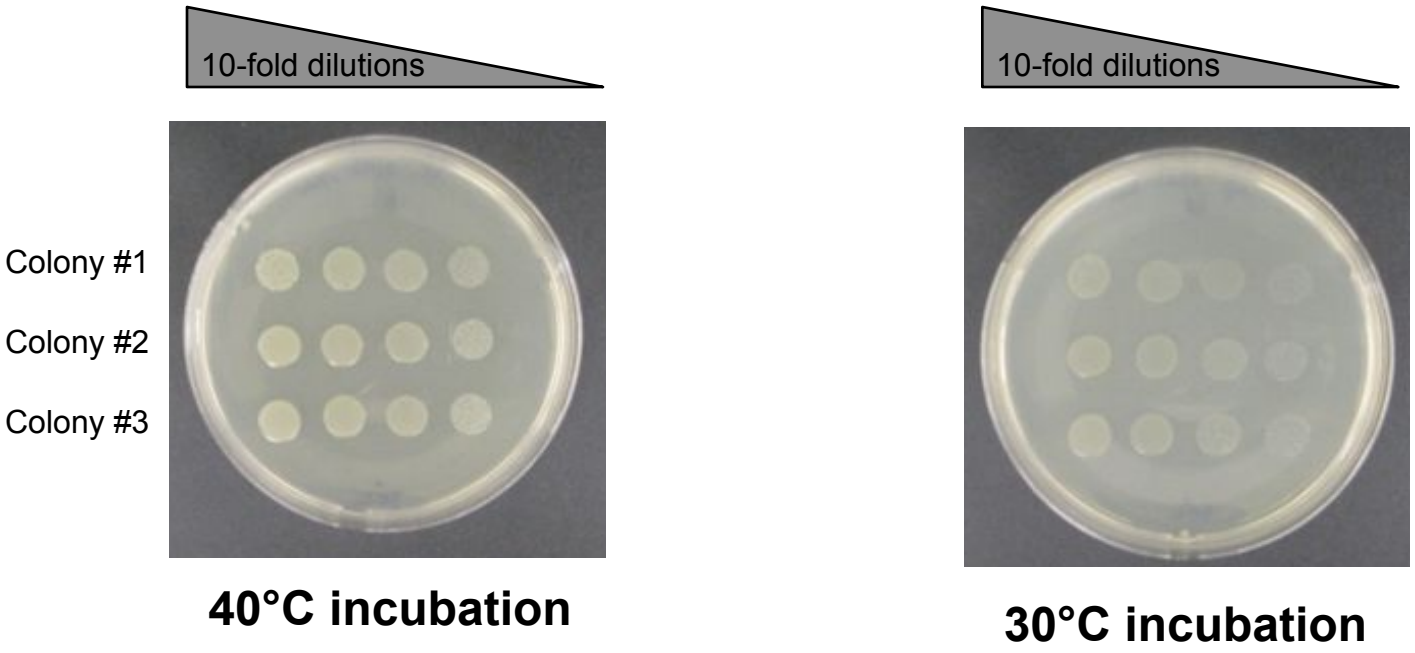

Figure S7. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 41-220 fused to 1-41.

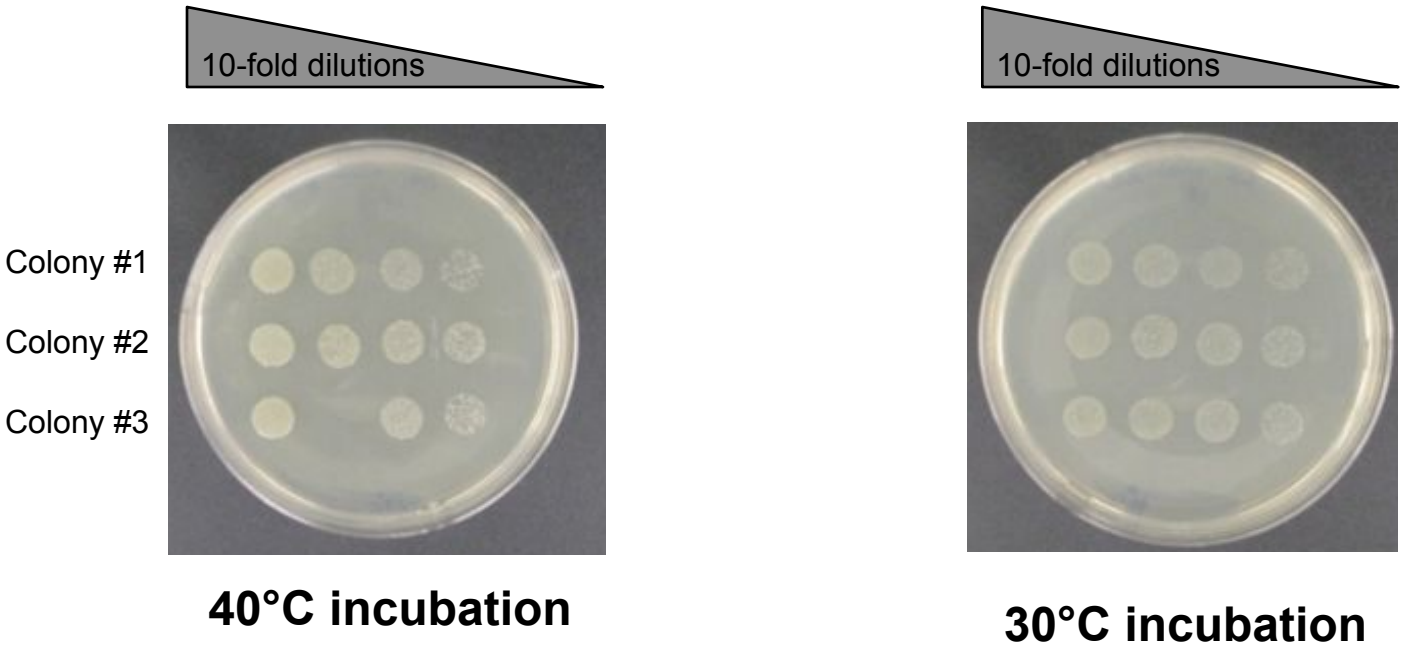

Figure S8. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 209-220 fused to 1-209.

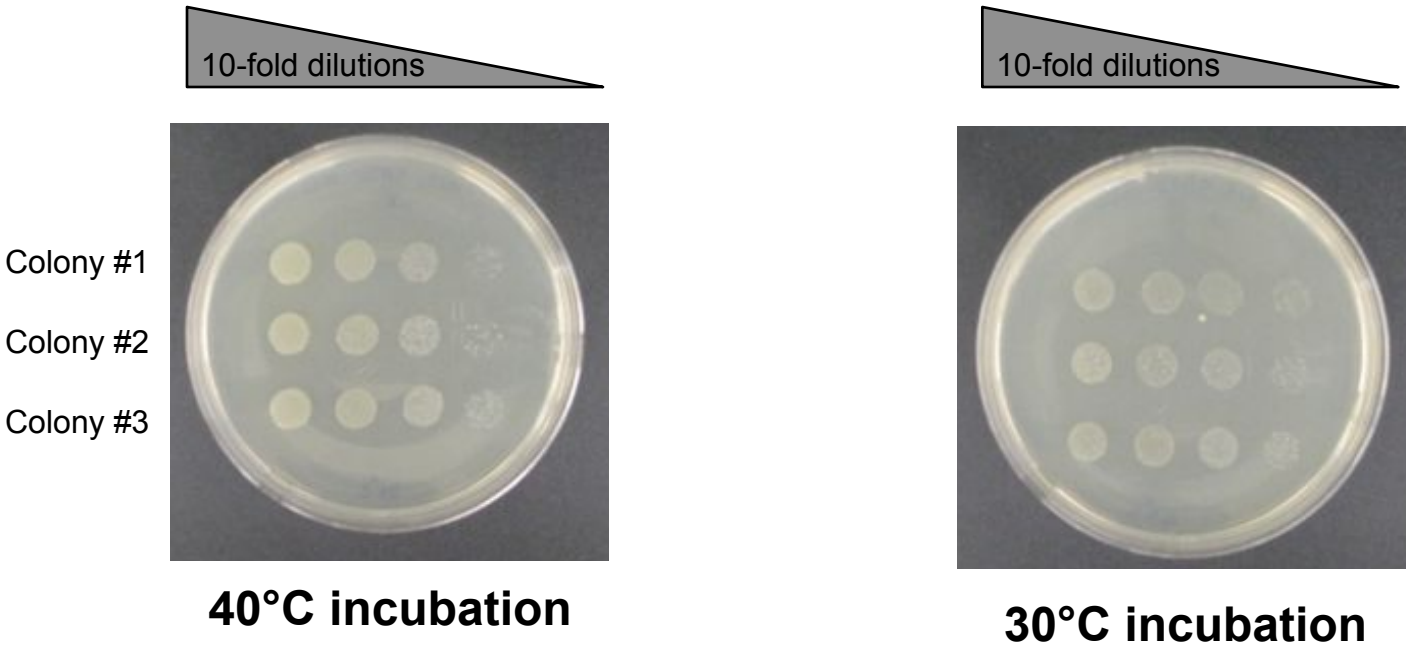

Figure S9. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 207-220 fused to 1-207.

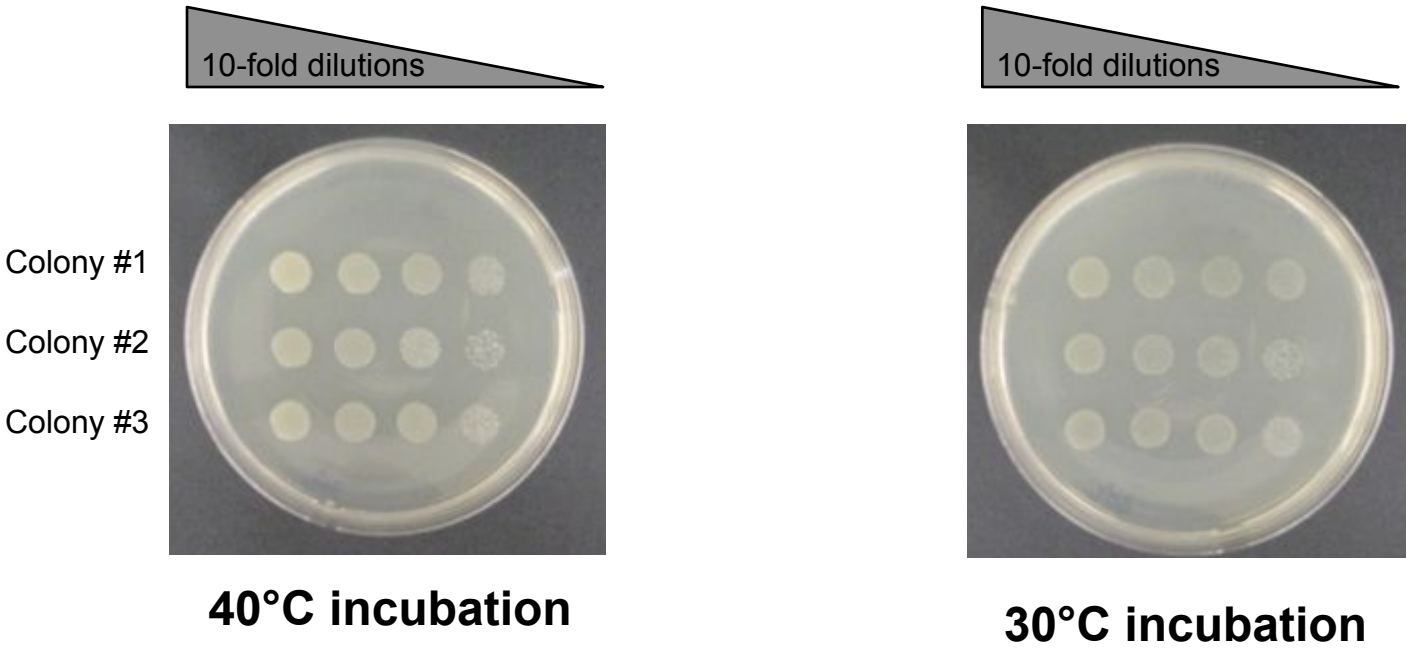

Figure S10. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 2-220 fused to 1-2.

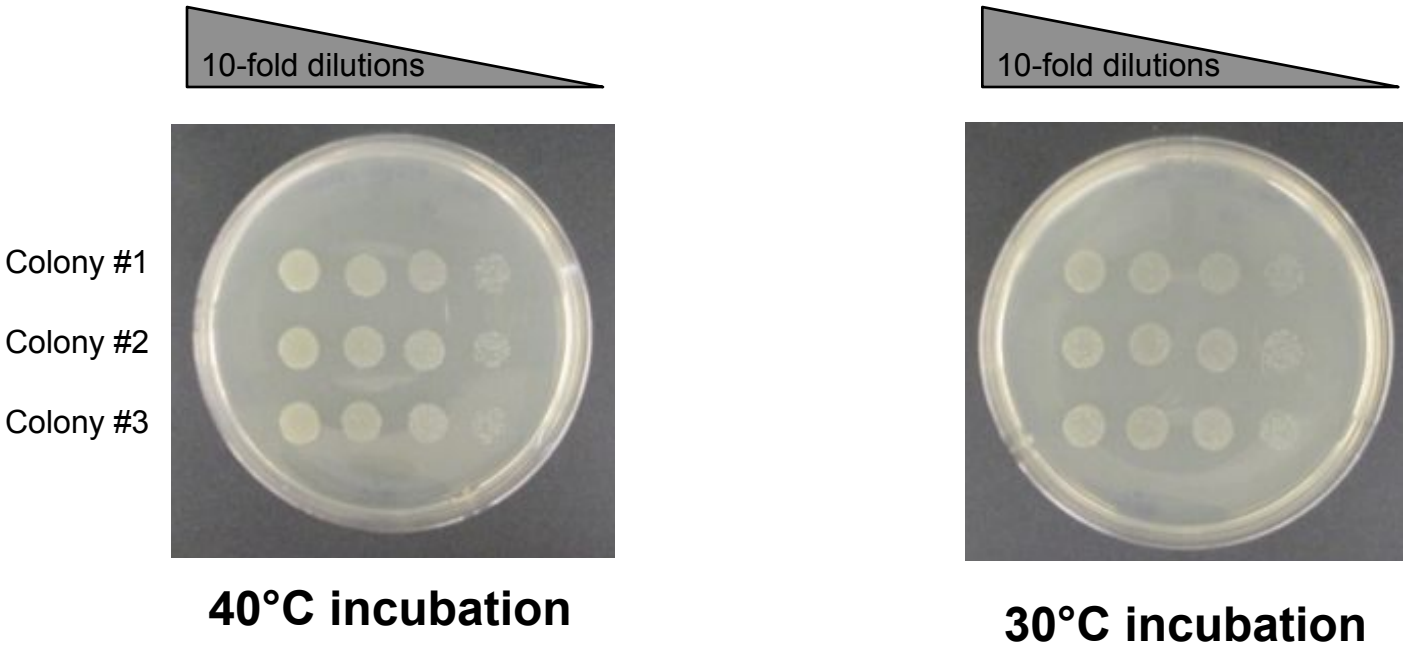

Figure S11. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 113-220 fused to 1-113.

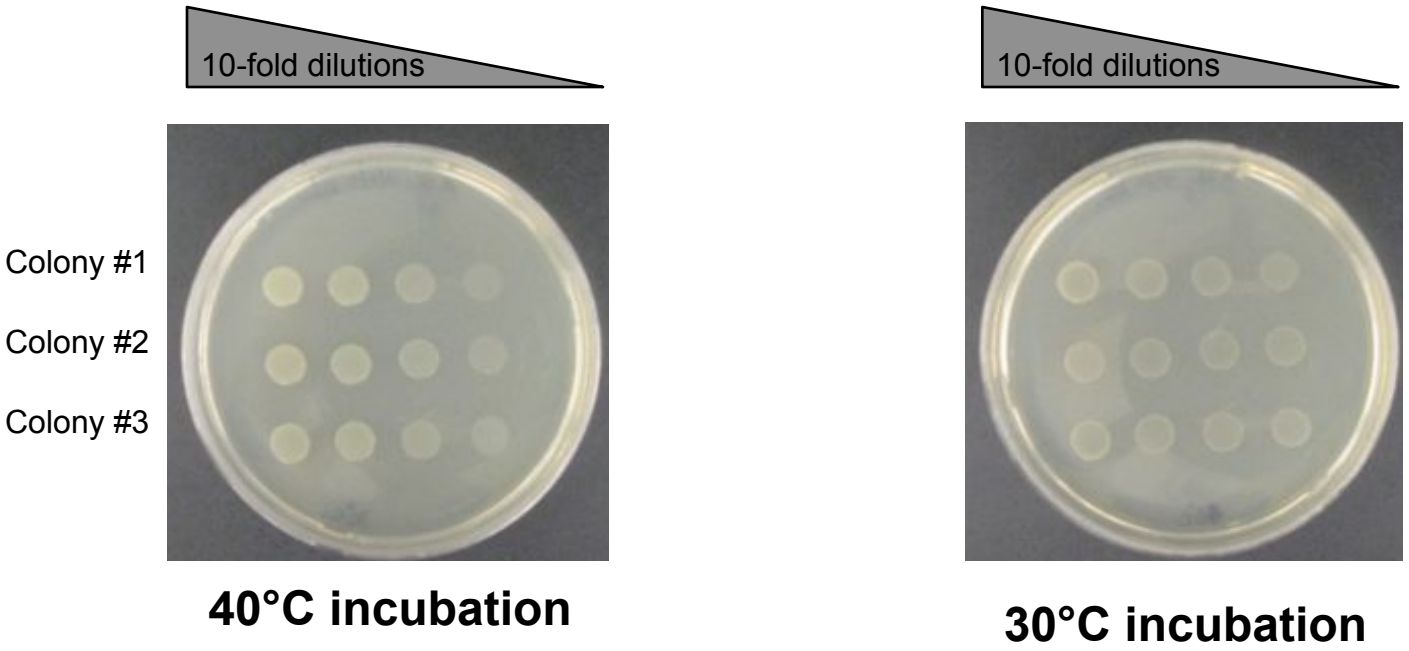

Figure S12. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 217-220 fused to 1-217.

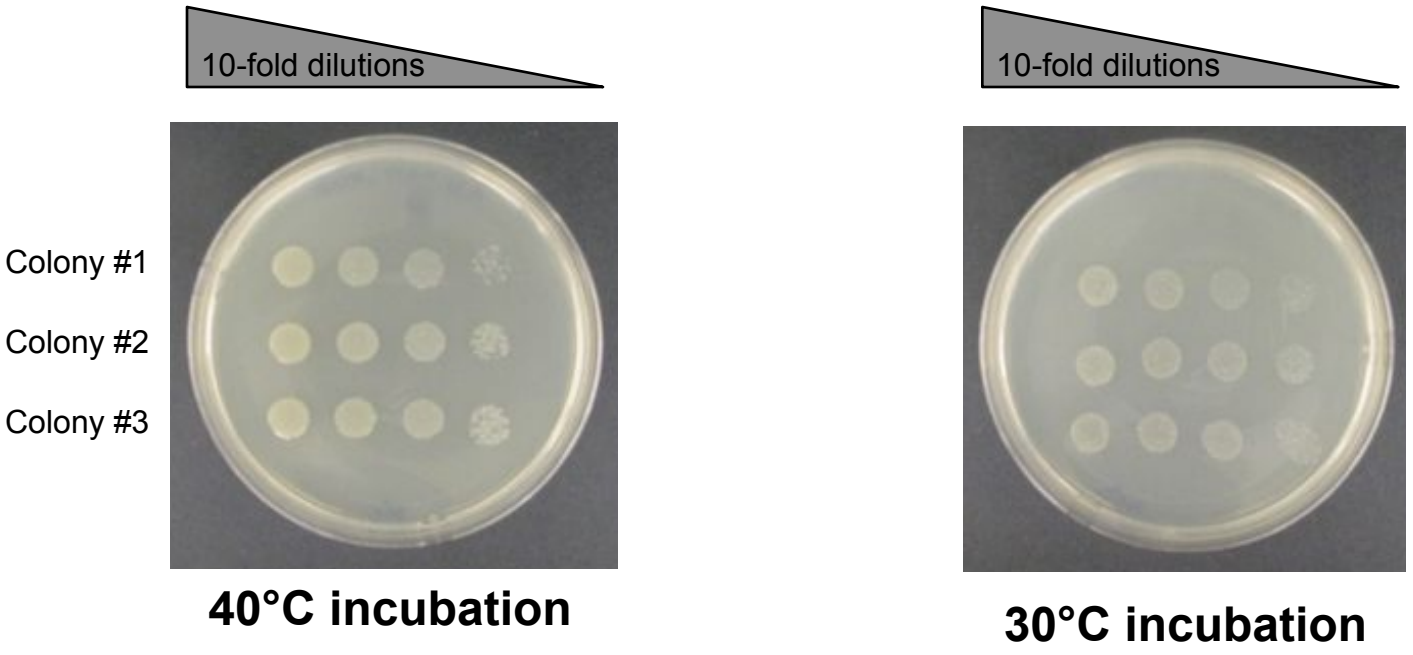

Figure S13. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 179-220 fused to 1-179.

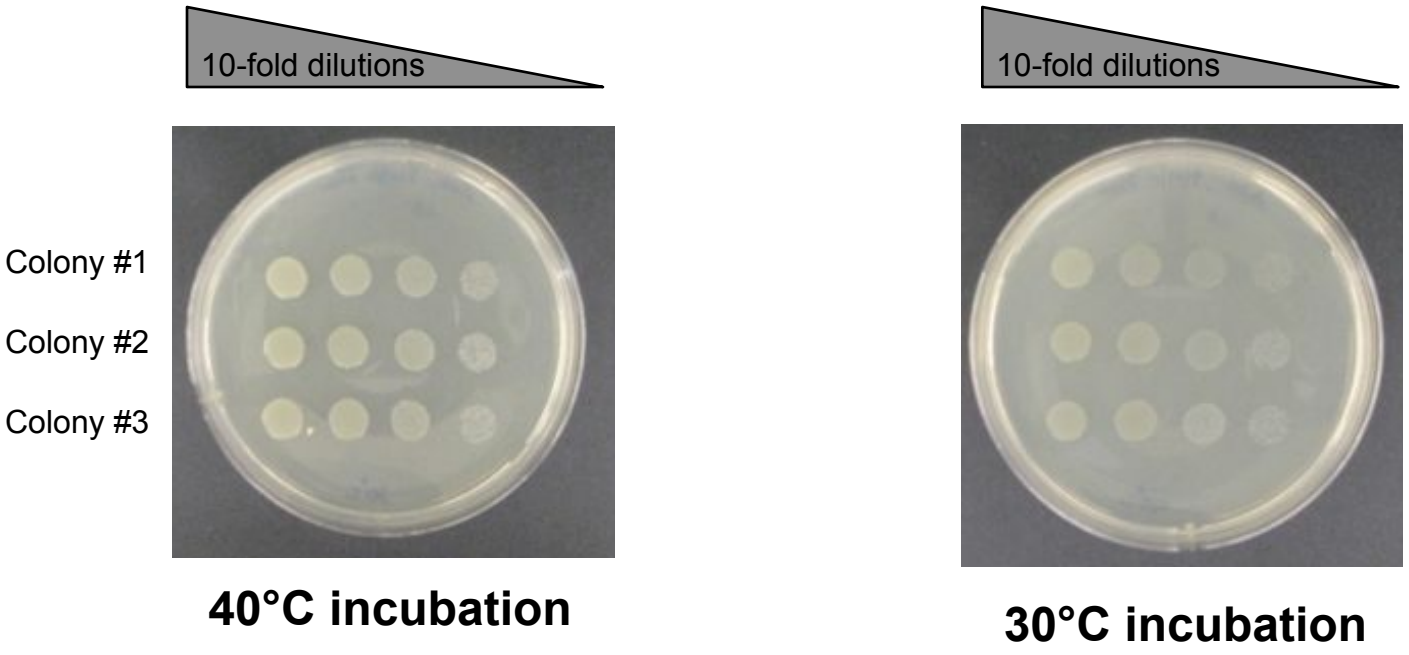

Figure S14. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 201-220 fused to 1-201.

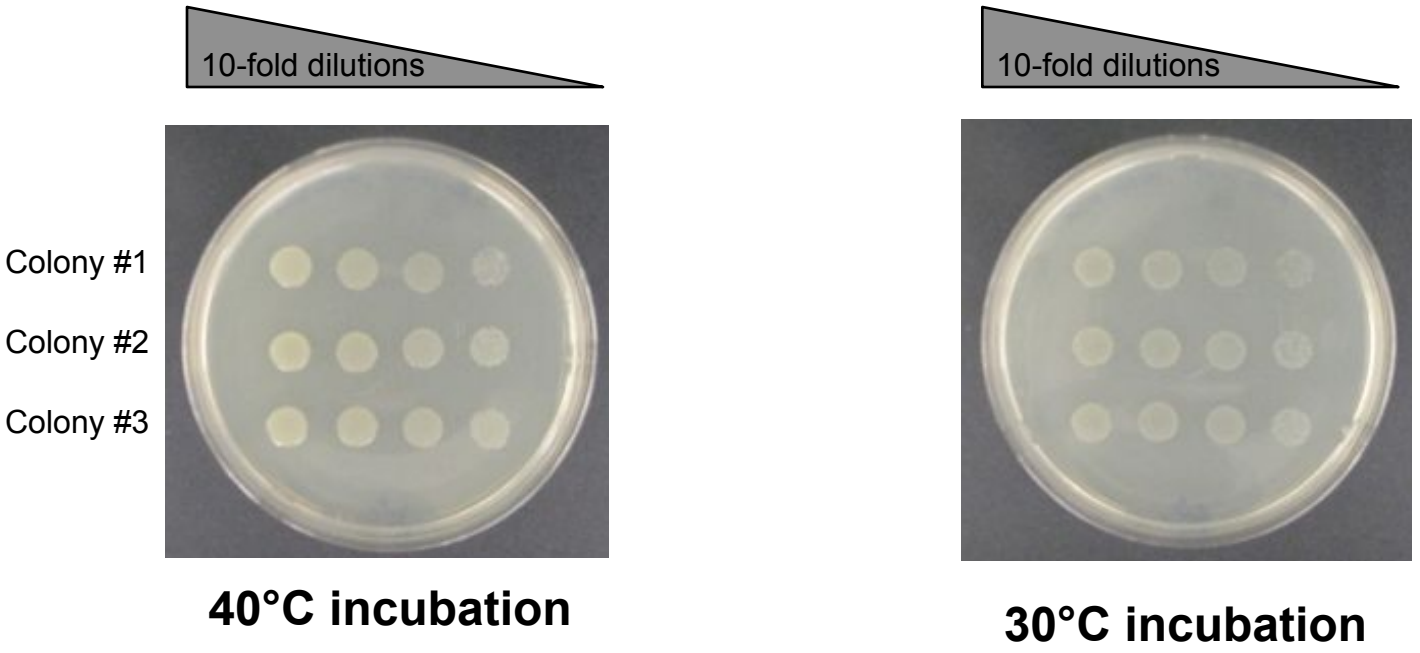

Figure S15. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 5-220 fused to 1-5.

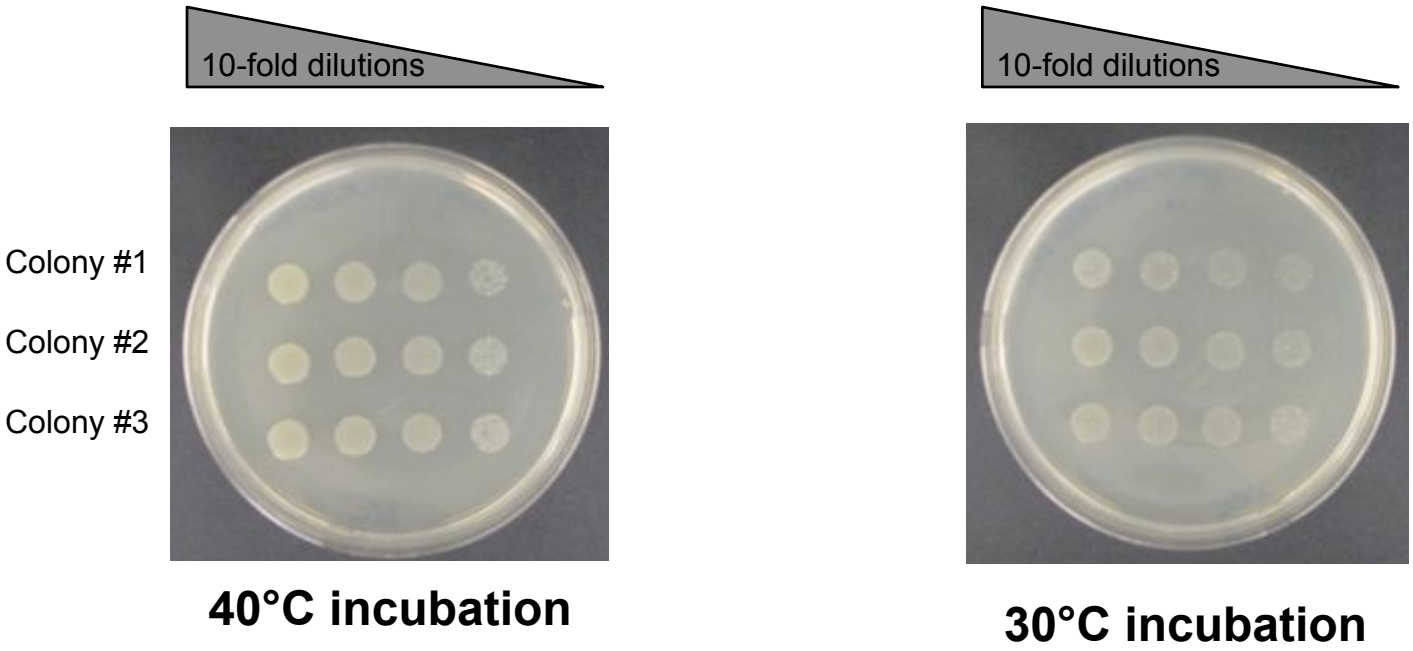

Figure S16. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 103-220 fused to 1-103.

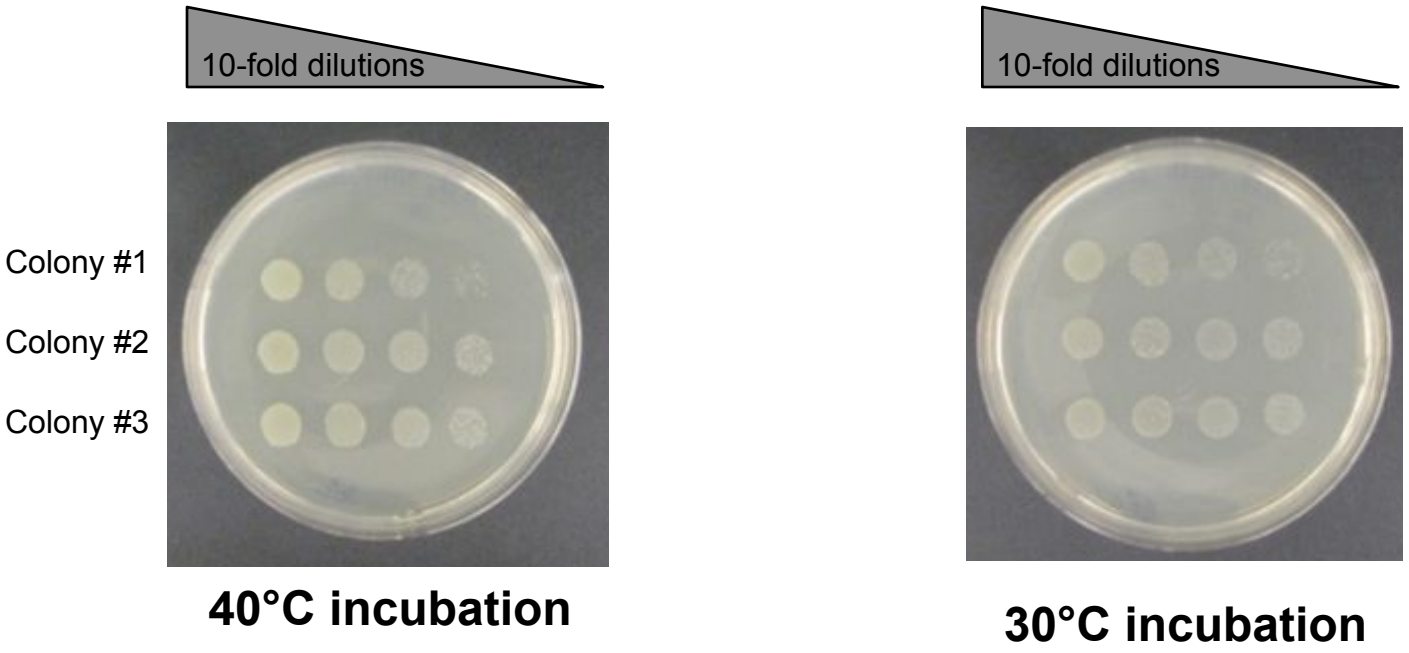

Figure S17. Growth of *E. coli* CV2 transformed with a vector that expresses AK residues 142-220 fused to 1-142.