

Vector pHAGE2 Containing the Angiotensin-Converting Enzyme 2 Gene

Catalog No. NR-52512

Product Description:

The vector for the human angiotensin-converting enzyme 2 (ACE2) gene (GenBank: [NM_021804](#)) was subcloned into the pHAGE2 lentiviral backbone vector under the human EF1 α promoter with an intron to increase expression. In addition, pHAGE2 includes the Woodchuck hepatitis virus post-transcriptional regulatory element to enhance levels of transcription and gene expression. NR-52512 contains the beta-lactamase gene, *bla*, to provide transformant selection through ampicillin resistance in *Escherichia coli* (*E. coli*). The deposited plasmid was transformed into One Shot™ TOP10 *E. coli* (Invitrogen™ C404003), grown in Luria-Bertani broth with ampicillin (50 μ g per mL) for 1 day at 37°C in an aerobic atmosphere, extracted using a Plasmid Plus Maxi Kit (QIAGEN® 12963) and vialled in TE buffer (10 mM Tris-HCl, 1 mM EDTA, pH 8.0).

Lot: 70035468

Manufacturing Date: 29APR2020

TEST	SPECIFICATIONS	RESULTS
Next-Generation DNA Sequencing	~ 9390 base pairs	9394 base pairs (Figure 1) ¹
Genotypic Analysis Sequencing of ACE2 insert (~ 2420 base pairs)	≥ 99% sequence identity to Human ACE2 (GenBank: NM_021804.3)	100% sequence identity to Human ACE2 (GenBank: NM_021804.3)
Antibiotic Resistance Ampicillin (encoded by beta-lactamase gene <i>bla</i>) ²	<i>bla</i> sequence present	<i>bla</i> sequence present
Concentration by PicoGreen® Measurement	≥ 2 μ g/mL	0.2 μ g in 20 μ L per vial (10 μ g/mL)
Amount per Vial	Report results	0.2 μ g per vial
OD ₂₆₀ /OD ₂₈₀ Ratio	1.7 to 2.1	1.9
Effective Bacterial Transformation Invitrogen™ One Shot™ TOP10 <i>E. coli</i>	≥ 50 colonies per ng	80 colonies per ng

¹The sequence was assembled pre-vial using the depositor's predicted sequence as the reference sequence.

²The antibiotic ampicillin degrades quickly during growth. Bacterial stationary phase should be minimized during plasmid replication to avoid plasmid loss and increased antibiotic concentrations may be necessary.

Figure 1: Complete Plasmid Sequence of NR-52512

>NR-52512 lot 70035468 complete plasmid sequence

TGGAAGGGCTAATTCACCTCCCAAAGAAGACAAGATATCCTTGATCTGTGGATCTACCACACACAAGGCTACTTCCCTGATTAGCAGAAGTACACAC
CAGGGCCAGGGGTCAGATATCCACTGACCTTTGGATGGTGTCTACAAGCTAGTACCAGTTGAGCCAGATAAGGTAGAAGAGGCCAATAAAGGAGAGA
ACACCAGCTTGTTACACCTGTGAGCCTGCATGGGATGGATGACCCGGAGAGAGAAGTGTAGAGTGGAGGTTTGACAGCCGCTAGCATTTTCATC
ACGTGGCCCGAGAGCTGCATCCGGAGTACTTCAAGAAGCTGCTGATATCGAGCTTGTCTACAAGGGACTTTCCGCTGGGGACTTTCCAGGGAGGCGTG
GCCTGGGCGGGACTGGGGAGTGGCGAGCCCTCAGATCCTGCATATAAGCAGCTGCTTTTTGCTGTACTGGGTCTCTCTGGTTAGACCAGATCTGA
GCCTGGGAGCTCTCTGGCTAACTAGGAACCCACTGCTTAAGCCTCAATAAAGCTTGCTTGTAGTGTCTCAAGTAGTGTGTGCCGCTCTGTTGTGT
GACTCTGGTAACTAGAGATCCCTCAGACCTTTTGTAGTGTGGAAAATCTCTAGCAGTGGCGCCGAAACAGGGACTTGAAAAGCGAAAGGGAAAC
CAGAGGAGCTCTCTCGACGCAGGACTCGGCTTGTGAAGCGCGCACGGCAAGAGGGCGAGGGGCGGGCGACTGGTGAGTACGCCAAAAATTTGACTA
GCGGAGGCTAGAAGGAGAGAGATGGGTGCGAGAGCGTCAGTATTAAGCGGGGAGAAATAGATCGCGATGGGAAAAAATTCGGTTAAGGCCAGGGG
GAAAGAAAAATATAAATTA AAAACTATAGTATGGGCAAGCAGGGGAGCTAGAACGATTCGACAGTTAATCCTGGCCTGTAGAAAACATCAGAAGGCT
GTAGACAAATACTGGGACAGCTACAACCATCCCTTCAGACAGGATCAGAAGAAGTGTAGATCATTATATAATACAGTAGCAACCCCTCTATTGTGTGC
ATCAAAGGATAGAGATAAAGACACCAAGGAAGCTTTAGACAAGATAGAGGAAGAGCAAAAAGTAAAGACCACCGCACAGCAAGCGGCCGGCC
GCTGATCTTCAGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTATATAAATATAAAGTAGTAAAAATTAAGCATTAGGAGTAGC
ACCCACCAAGGCAAAGAGAAGAGTGGTGCAGAGAGAAAAAGAGCAGTGGGAATAGGAGCTTTGTTCTTGGGTTCTTGGGAGCAGCAGGAAGCAC
TATGGGCGCAGCGTCAATGACGCTGACGGTACAGGCCAGACAATTATGTCTGGTATAGTGCAGCAGCAGAACAATTTGCTGAGGGCTATTGAGGC
GCAACAGCATCTGTTGCAACTCAGACTGCTGGGCAATCAAGCAGCTCCAGGCAAGAATCCTGGCTGTGGAAAGATACCTAAAGGATCAACAGCTCCT
GGGATTTGGGGTTGCTCTGGA AAAACTCATTTCAGCCTGCTGTGCTTGGAAATGCTAGTTGGAGTAATAAATCTCTGGAACAGATTTGGAATCA
CACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTACACAAGCTTAATACACTCCTTAATTGAAGAATCGCAAAAACAGCAAGAAAAGAAATGA

ACAAGAATTATTGGAATTAGATAAATGGGCAAGTTTGTGGAATTGGTTAACATAACAAATGGCTGTGGTATATAAAAATTATTCATAATGATAGT
AGGAGGCTTGGTAGGTTAAGAATAGTTTTTGGCTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATATTCACCATTATCGTTTTCAGACCCACCT
CCCAACCCCGAGGGGACCCGACAGGCCCGAAGGAATAGAAGAAGAAGTTGGAGAGAGAGACAGAGACAGATCCATTTCGATTAGTGAAACGGATCTCG
ACGGTATCGCCGAATTCACAAATGGCAGTATTTCATCCACAATTTTTAAAGAAAAGGGGGGATTGGGGGTACAGTGCAGGGGAAAGAAATAGTAGAC
ATAATAGCAACAGACATACAAACTAAAGAAATTACAAAAACAATTCAAAAATTCAAAAATTTTCGGGTTTATTACAGGGACAGCAGAGATCCAGTT
TGGACTAGTCGTGAGGCTCCGGTGCCTCAGTGGGCAGAGCGCACATCGCCACAGTCCCGGAGAAGTTGGGGGGAGGGTTCGGCAATTGAACCG
GTGCCTAGAGAAGGTGGCGGGGTAACTGGGAAAGTATGTCGTGTACTGGCTCCGCTTTTTCCCGAGGGTGGGGGAGAACCCTATATAAGTG
CAGTAGTCGCCGTGAACGTTCTTTTTCGCAACGGGTTGCGCCAGAACACAGGTAAGTGCCTGTGTGGTTCGCCGGGCCTGGCCTCTTTACGG
GTTATGGCCCTTGCCTGCTTGAATTACTTCCACCTGGCTGCAGTACGTGATTCTTGTATCCCGAGCTTCGGGTTGGAAGTGGGTGGGAGAGTTTGA
GGCCTTGGCCTTAAGGAGCCCTTCGCTCGTGTAGTTGAGGCTGGCCTGGGCGCTGGGGCCGCGCTGCAGTCTGGTGGCACCTTCGGC
CCTGTCTCGCTTTCGATAAGTCTTAGCCATTTAAAATTTTGTAGTGCCTGGCAGCTTTCCTTTTTCGGCAAGATAGTCTGTAAATGCGG
GCCAAGATCTGCACACTGGTATTTTCGGTTTTTGGGGCCGCGGGCGGACGGGGCCCGTGCCTCCAGCGCACATGTTTCGGCGAGGCGGGCCTGC
GAGCGCGCCACCGAGAATCGGACGGGGTAGTCTCAAGCTGGCCGGCCTGCTCTGGTGCCTGGCCTCGCGCCGCGTGTATCGCCCCGCCCTGGG
CGGCAAGCTGGCCCGTTCGGCACCAGTTGCGTGAAGGAAAGATGGCCGCTTCGCCGCCCTGCTGCAGGGAGCTCAAAATGGAGGACGCGGGCCT
CGGGAGAGCGGGCGGGTGAAGTACCCACACAAAGGAAAAGGGCCTTCCGTCCTCAGCCGTCGCTTATGTGACTCCACGGAGTACGGGGCGCCCT
CCAGGACCTCGATTAGTTCTCGAGCTTTTGGAGTACGTCGCTTTAGGTTGGGGGGAGGGGTTTTATGCGATGGAGTTTCCCCACACTGAGTGGG
TGAGACTGAAGTATGGCCAGCTTGGCACTTGTATCTTCCCTTGAATTTGCCCTTTTGGAGTTTGGATTTGGTTCATTCTCAAGCCTCAGCAGA
CAGTGGTTCAAAGTTTTTCTTCCATTTCCAGGTGTCTGAAGCGGCCGATGTCAAGCTCTTCCCTGGCTCCTTCTCAGCCTTGTGTGTAAGT
CTGCTCAGTCCACCATTGAGGAACAGGCCAAGACATTTTTGGACAAGTTAACCCAGAAAGCCGAAGACCTGTTCTATCAAAGTTCACTTGCTTCTT
GGAATTATAACACCAATATTACTGAAGAGAATGTCCAAAACATGAATAATGCTGGGGACAAATGGTCTGCCTTTTTAAAGGAACAGTCCACACTTG
CCAAATGTATCCACTACAAGAAATTCAGAATCTCAGTCAAGCTTCAGCTGCAGGCTCTTCAGCAAAAATGGGTCTTCAGTGTCTCAGAAGACA
AGAGCAACCGGTTGAACACAATTTAAATACAATGAGCACCATCTACAGTACTGGAAAAGTTTGTAAACCAGATAATCCACAAGAAATGCTTATTAC
TTGAACCAAGTTGAATGAAATAATGGCAACAGTTTAGACTACAATGAGAGGCTCTGGGCTTGGGAAAGCTGGAGATCTGAGGTCGGCAAGCAGC
TGAGGCCATATATGAGAGATGTGTCTTTGAAAATGAGATGGCAAGCAAAATCATTTATGAGGACTATGGGGATTTTGGAGAGGAGACTATG
AAGTAAATGGGGTAGATGGCTATGACTACAGCCGCGCCAGTTGATGAAAGATGTGGAACATACCTTTGAAGAGATTAAACATTATATGAACATC
TTCATGCCTATGTGAGGGCAAAGTTGATGAATGCCTATCCTTCTATATCAGTCCAAATGGATGCCTCCCTGCTCATTTGCTTGGTATATGTTGGG
GTAGATTTTGGACAAATCTGTACTCTTTGACAGTTCCCTTTGGACAGAAACCAACATAGATGTTACTGATGCAATGGTGGACCAGGCTGGGATG
CACAGAGAATATTCAAGGAGGCCGAGAAGTTCTTTGTATCTGTTGGTCTTCTTAATATGACTCAAGGATTCTGGGAAAATTCATGCTAACGGACC
CAGGAAATGTTTCAAGAACAGTCTGCCATCCACAGCTTGGGACCTGGGGAAGGGCGACTTCAGGATCCTTATGTGCACAAAGGTGACAATGGACG
ACTTCTTGACAGCTCATGATGAGATGGGGCATATCCAGTATGATATGGCATATGCTGCACAACCTTTCTGCTAGAAGAAATGGAGCTAATGAAGGAT
TCCATGAAGCTTATGGGAAATCATGTCTTCTGAGCCACACCTAAGCATTAAATCCATTTGGTCTTCTGTCACCCCGATTTCGAAGAGACA
ATGAAACAGAAAATAAATCTCTGCTCAAACAAGCACTCACGATTGTTGGGACTCTGCCATTTACTTACATGTTAGAGAAGTGGAGGTGGATGGTCT
TTAAAGGGGAAATTTCCAAAGACCAGTGGATGAAAAGTGGTGGGAGATGAAGCGAGAGATAGTTGGGGTGGTGGAACTGTGCCCATGATGAAA
CATACTGTGACCCCGCATCTCTGTTCCATGTTTCTAATGATTACTCATTCATTTCGATATTACACAAGGACCCTTTACCAATTCAGTTTCAAGAAG
CACTTTGTCAAGCAGCTAAACATGAAGGCCCTCTGCACAAATGTGACATCTCAAACCTTACAGAAGCTGGACAGAACTGTTCAATATGCTGAGGC
TTGGAAAATCAGAACCCTGGACCCTAGCATTGGAAAATGTTGTAGGAGCAAAGAACAATGAATGTAAGGCCACTGCTCAACTACTTTGAGCCCTTAT
TTACCTGGCTGAAAGACCAGAAACAAGAAATTTCTTTTGGGATGGATACCGACTGGATCCATATGACAGCAAAAGCATCAAAGTGGAGATAAGCC
TAAATCAGCTCTTGGAGATAAAGCATATGAATGGAGCACAATGAATGTAACCTGTTCCGATCATCTGTTGCATATGCTATGAGGAGTACTTTTT
TAAAGTAAAAAATCAGATGATTCTTTTTGGGGAGGAGGATGTGCGAGTGGCTAATTTGAAACCAAGAATCTCCTTTAATTTCTTTGCTACTGCAC
CTAAAAATGTGTCTGATATCATTCTTAGAAGTGAAGTGAAGAGGCCATCAGGATGTCCCGAGCCGTATCAATGATGCTTTCCGCTGAATGACA
ACAGCCTAGAGTTTTCTGGGATACAGCCAACACTTGACCTCCTAACCAGCCCTGTTTCCATATGGCTGATTGTTTTTGGAGTTGTGATGGGAG
TGATAGTGGTTGGCATTGTCATCCTGATCTTCACTGGGATCAGAGATCGGAAGAAGAAAAATAAAGCAAGAAGTGGAGAAAATCCTTATGCCTCAA
TCGATATTAGCAAAAGGAGAAAATAATCCAGGATTCAAAAACACTGATGATGTTTCAGACCTCCTTTTAGGGATCTTAATCAACCTCTGGATTACAAA
ATTTGTGAAAAGATTGACTGGTATTTTAACTATGTTGCTCCTTTTACGCTCTATGTTGATACGCTTTAATGCCTTTGTATATCATGCTATTGCTTCC
CGTATGGCTTTCATTTTCTCCTCCTTGTATAAATCCTGGTTGCTGTCTCTTTATGAGGAGTTGTGGCCGTTGTGAGCAACGTTGGCTGGTGTGC
ACTGTGTTTGGCTGACGCAACCCCACTGGTTGGGGCATTGCCACCACCTGTGAGCTCCTTTCCGGGACTTTTCGCTTTCCCCCTCCCTATTGCCACG
GCGGAACCTCATCGCCGCTGCCTTGGCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTGACAATCCGTTGGTGTGTGCGGGGAAATCATCGTCC
TTTTCTTGGCTGCTCGCTGTGTTGCCACCTGGATTTGCGCGGGAGTCTTCTGCTACGTCCTTCGGCCCTCAATCCAGCGGACCTTCTTCC
CGCGGCTGCTGCCGGCTCTGCGGCCCTTCCGCGCTTCCGCTTCCGCTCAGACGAGTCCGATCCTCCTTTGGGGCCGCTCCTCCCTGGTACC
TTAAGACCAATGACTTACAAGCCAGCTGTAGATCTTAGCCACTTTTTAAAGAAAAGGGGGGACTGGAAGGGCTAATTCACCTCCCAACGAAGACA
AGATCCTGACAGGACAGGCGGCCCTGCTTTTTGCTTGTACTGGTCTCTGTTTGTAGACCAGATCTGAGCCTGGGAGCTCTCTGGCTAACTAGG
GAACCCACTGCTTAAGCCTCAATAAAGCTTGCCTTGAAGTGTCTCAAGTAGTGTGTGCCCGTCTGTTGTGTGACTCTGGTAACTAGAGATCCCTCAG
ACCCTTTTAGTCAAGTGTGAAAATCTCTAGCACCCGGGCGATTAAGGAAAAGGGCTAGATCATTCTTGAAGACGAAAGGGCCTCGTGATACGCCTAT
TTTTATAGGTTAATGTATGATAAATAGGTTTCTTAGACGTCAGGTGGCAGCTTTTCGGGAAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCT
AAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCGTATAAATGCTTCAATAATATTGAAAAAGGAAGATATGAGTATTCACATTTCC
GTGTCGCCCTTATTTCCCTTTTTTGGCGCATTTTGCCTTCTGTTTTTGTCAACCCAGAAACGCTGGTGAAGTAAAGATGCTGAAGATCAGTTGG
GTGACAGTGGGTTACATCGAAGTGCATCAACAGCGGTAAAGTCTTGAAGTTTTTCGGGAAAAGACCTTTTCAATGATGAGCAGCTTTTTTA
AAGTTCTGCTATGTGCGCGGTAATTAATCCCGTGTGAGCAGGCGGGAAGGAGCAACTCGGTCGCCGATACACTATTTTCAGAATGACTTGGTTGAGT
ACTCACAGTACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATATGCAAGTGTGCCATAACCATGAGTGATAACACTGCGGCCAACT
TACTTCTGACAACGATCGGAGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAACCTCGCCTTGTATGTTGGAAACCGGAGC

TGAATGAAGCCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACCTATTAACCTGGCGAACTACTTACTC
TAGCTTCCCAGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCCTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTGCTG
ATAAATCTGGAGCCGGTGAAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGG
GGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCAGTATTAAGCATGGTAACCTGACAGCAAGTTACTCAT
ATATACTTTAGATTGATTTAAACTTCATTTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTTGATAATCTCATGACCAAAATCCCTTAACGTG
AGTTTTCGTTCCTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAA
AAAAACCACCGCTACCAGCGGTGGTTTTGTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACCTGGCTTCAGCAGAGCGCAGATACCAA
ATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACCCTTCAAGAATCTGTAGCACCGCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGG
CTGCTGCCAGTGGCGATAAGTCGTGTCTTACCAGGTTGGACTCAAGACGATAGTTACCAGGATAAGGCGCAGCGGTGCGGGCTGAACGGGGGGTTCGT
GCACACAGCCAGCTTGAGCGAAGCAGCTACACCGAAGTGAAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCAGAGGAGAAAG
CGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGAAACGCCTGGTATCTTTATAGTCTGTCCGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGCGGAGCCTATGAAAAACGCCAGCAACCGGCCCTTTTTACGGTTCC
TGGCCTTTTGTGCTGGCCTTTGCTCACATGTTCTTTCTGCGTTATCCCCTGATTCGTGGATAACCGTATTACCAGCCTTTGAGTGAGCTGATACCG
CTCGCCGAGCCGAACGACCGAGCGCAGCGAGTCAGTGAAGCGGAAAGCGGAAAGCGCCCAATACGCAAACCGCCTTCCCAGCGGGTGGCCGA
TTCATTAATGCAGCAAGCTCATGGCTGACTAATTTTTTTATTTATGCAGAGGCCGAGGCCGCTCGGCTCTGAGCTATTCCAGAAGTAGTGAGG
AGGCTTTTTGGAGGCCTAGGCTTTGCAAAAAGCTCCCGTGGCACGACAGGTTTCCCGACTGAAAAGCGGGCAGTGAGCGCAACGCAATTAATG
TGAGTTAGTCACTCATTAGGCACCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGGAATTGTGAGCGGATAACAATTCACACAG
GAAACAGCTATGACATGATTACGAATTTACAAAATAAGCATTTTTTTCACTGCATTCATGTTGTGGTTTGTCCAAACTCATCAATGTATCTATC
ATGTCTGGATCAACTGGATAACTCAAGTAACCAAAATCATCCAAACTTCCCACCCATACCCTATTACCAGTCCCAATTACCTGTGGTTTCATT
TACTCTAAACCTGTGATTCCTCTGAATTTTTTCAATTTAAAGAAATGTATTTGTTAAATATGTACTACAAACTTAGTAGT

/Heather Couch/

Heather Couch

29 MAY 2020

Program Manager or designee, ATCC Federal Solutions

ATCC®, on behalf of BEI Resources, hereby represents and warrants that the material provided under this certificate has been
subjected by ATCC® and the contributor to the tests and procedures specified and that the results described, along with any other
data provided in this certificate, are true and accurate to the best of ATCC®'s knowledge.

ATCC® is a trademark of the American Type Culture Collection.

You are authorized to use this product for research use only. It is not intended for human use.

