

Vector pCAGGS Containing the SARS-Related Coronavirus 2, Alpha Variant Spike Glycoprotein Receptor Binding Domain (RBD) Gene

Catalog No. NR-54006

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Contributor:

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Manufacturer:

BEI Resources

Product Description:

The vector for the receptor binding domain (RBD) of the spike (S) glycoprotein gene from severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2), Wuhan-Hu-1 (GenBank: [MN908947](#)) was designed by fusing the N-terminal S protein signal sequence to the spike RBD (amino acids 319 to 541) with a C-terminal hexa-histidine tag.^{1,2} The sequence was codon optimized for mammalian expression, mutated to include the Alpha variant [also referred to as the United Kingdom (UK) variant; B.1.1.7 lineage] N501Y mutation and subcloned into the [pCAGGS](#) mammalian expression vector under the AG promoter.^{2,3} NR-54006 contains the beta-lactamase gene, *bla*, to provide transformant selection through ampicillin resistance in *Escherichia coli* (*E. coli*). The resulting size of the plasmid is approximately 5500 base pairs. The complete plasmid sequence and map are provided on the BEI Resources webpage. The plasmid was produced in *E. coli* and extracted.

Note: For a detailed protocol and list of related items, see <https://labs.icaahn.mssm.edu/krammerlab/covid-19/>

The S glycoprotein mediates viral binding to the host angiotensin converting enzyme 2 (ACE2). This protein forms a trimer, and when bound to a host receptor allows fusion of the viral and cellular membranes.⁴ The Alpha variant of SARS-CoV-2 includes multiple S glycoprotein mutations that were first identified in the United Kingdom, and the most studied is N501Y.⁵ Structural modeling and mouse studies indicate N501Y increases S glycoprotein binding to ACE2, resulting in increased SARS-CoV-2 virulence.^{6,7}

Material Provided:

Each vial contains plasmid DNA in TE buffer (10 mM Tris-HCl, 1 mM EDTA, pH 8.0). The DNA concentration and volume provided are shown on the Certificate of Analysis. The vial should be centrifuged prior to opening. Note: The contents of the vial should be used to replicate the plasmid in *E. coli* prior to mammalian expression.

Packaging/Storage:

NR-54006 was packaged aseptically in screw-capped plastic cryovials. The product is provided frozen on dry ice and should be stored at -20°C or colder immediately upon arrival. Freeze-thaw cycles should be minimized.

Citation:

Acknowledgment for publications should read “The following reagent was obtained through BEI Resources, NIAID, NIH: Vector pCAGGS Containing the SARS-Related Coronavirus 2, Alpha Variant Spike Glycoprotein Receptor Binding Domain (RBD) Gene, NR-54006.”

Biosafety Level: 1

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. [Biosafety in Microbiological and Biomedical Laboratories](#). 6th ed. Washington, DC: U.S. Government Printing Office, 2020; see www.cdc.gov/biosafety/publications/bmbl5/index.htm.

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References:

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