

## Vector pCMV/R Containing the SARS-Related Coronavirus 2, Spike Glycoprotein Gene, Lineage B.1.1.529, Omicron Variant

### Catalog No. NR-56470

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**For research use only. Not for use in humans.**

#### Contributor:

John R. Mascola, M.D., Director, Humoral Immunology Section, Vaccine Research Center, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA

#### Manufacturer:

BEI Resources

#### Product Description:

[NR-56470 expresses the full-length, Omicron variant spike \(S\) glycoprotein, and is intended for producing pseudotyped particles/pseudovirions.<sup>1,2</sup> NR-56470 is not intended for recombinant protein expression.](#)

The vector for the S glycoprotein gene from severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2), Wuhan-Hu-1 (GenBank: [MN908947](#)) was designed by codon optimizing the full-length S sequence (residues 1 to 1273) for mammalian expression and introducing point mutations found in the B.1.1.529 lineage, resulting in a spike glycoprotein gene representative of the Omicron variant. The spike gene was subcloned into the pCMV/R mammalian expression vector (also referred to as VRC8400).<sup>1,3,4</sup> The protein encoded by NR-56470 contains the following lineage-defining point mutations: A67V, T95I, G339D, S371L, S373P, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, T547K, D614G, H655Y, N679K, P681H, N764K, D796Y, N856K, Q954H and N969K.<sup>1</sup> The kanamycin resistance gene, *aph*, provides transformant selection through kanamycin resistance in *Escherichia coli* (*E. coli*).<sup>1</sup> The resulting size of the plasmid is approximately 8240 base pairs. The complete plasmid sequence and map are provided on the BEI Resources webpage. The plasmid was produced in *E. coli* and extracted.

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. The S protein is a target for neutralizing antibodies.<sup>5</sup> The Omicron variant of SARS-CoV-2 includes multiple S glycoprotein mutations that were first identified in Botswana, Hong Kong, and South Africa in November 2021.<sup>6</sup>

#### 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-56470 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 pCMV/R Containing the SARS-Related Coronavirus 2, Spike Glycoprotein Gene, Lineage B.1.1.529, Omicron Variant, NR-56470.”

#### 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/bmb15/index.htm](http://www.cdc.gov/biosafety/publications/bmb15/index.htm).

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**References:**

1. Mascola, J. R., Personal Communication.
2. Millet, J. K., et al. "Production of Pseudotyped Particles to Study Highly Pathogenic Coronaviruses in a Biosafety Level 2 Setting." *J. Vis. Exp.* 145 (2019): doi: 10.3791/59010. PubMed: 30882796.
3. Wu, F., et al. "A New Coronavirus Associated with Human Respiratory Disease in China." *Nature* 579 (2020): 265-269. PubMed: 32015508.
4. Barouch, D. H., et al. "A Human T-Cell Leukemia Virus Type 1 Regulatory Element Enhances the Immunogenicity of Human Immunodeficiency Virus Type 1 DNA Vaccines in Mice and Nonhuman Primates." *J. Virol.* 79 (2005): 8828-8834. PubMed: 15994776.
5. Hulswit, R. J. G., C. A. M. de Haan and B.-J. Bosch. "Coronavirus Spike Protein and Tropism Changes." *Adv. Virus Res.* 96 (2016): 29-57. PubMed: 27712627.
6. [WHO](#)

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