Product Information Sheet for NR-58667

Vector pCC1-BAC-HIS-GLuc containing the SARS-Related Coronavirus 2 Δ Spike and NSP1 Mutations (K164A/H165A) Replicon

Catalog No. NR-58667
Lot No. 70055806

For research use only. Not for use in humans.

Contributor and Manufacturer:
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Product Description:
The vector for the non-infectious replicon from severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2) was designed by assembling a replicon consisting of all non-structural genes (nsp1 to nsp16) and the structural genes membrane (M), envelope (E) and nucleocapsid (N) using an RNA virus reverse genetics system in Saccharomyces cerevisiae. The replicon is flanked by a T7 promoter upstream and a self-cleaving hepatitis delta virus poly A/HDV ribozyme downstream. The non-structural protein 1 (nsp1) gene was mutated to introduce two point mutations resulting in K164A and H165A substitutions, which causes increased sensitivity to interferons and reduces NSP1-induced cellular toxicity. The spike (S) gene was replaced by a gene cassette consisting of a neomycin-resistance (neoR) gene and a secreted Gaussia luciferase (Gluc) reporter gene, separated by a T2A ribosome sequence shift. Expression of the cassette is under the control of the S transcription-regulating sequence (TRS).

The SARS-CoV-2 replicon system enables the production of non-infectious self-replicating RNAs or replicons enabling the study of the virus outside the BSL3 setting. The replicon plasmids allow testing of various spike variants and the use of cell types not ordinarily susceptible to live SARS-CoV-2, in addition to their use in antiviral testing. Trans-complementation of these replicons with viral glycoprotein can be used to generate Replicon Delivery Particles (RDPs) for single-cycle delivery into a range of cell types. Protocols for this system can be requested through Bio-protocol.

Please refer to Appendix I for isolation of plasmid DNA from glycerol stock and Appendix II for reagents and growth media formulations.

Material Provided:
Each vial contains approximately 0.5 mL of NR-58667 transformed S. cerevisiae in Yeast Extract-Peptone-Dextrose broth without histidine (YPD-HIS) supplemented with 15% glycerol.

Packaging/Storage:
NR-58667 was packaged aseptically in screw-capped plastic cryovials. The product is provided frozen on dry ice and should be stored at -60°C or colder immediately upon arrival. Freeze-thaw cycles should be minimized.

Citation:
Acknowledge the following reagent was obtained through BEI Resources, NIAID, NIH: Vector pCC1-BAC-HIS-GLuc containing the SARS-Related Coronavirus 2 Δ Spike and NSP1 Mutations (K164A/H165A) Replicon, NR-58667.

Biosafety Level: 1

Note: Transfection of cells with the product of in vitro transcription may require institutional biosafety committee approval.

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

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NR-58667 is claimed in U.S. Provisional Patent Application numbers 63/083,852 and 63/187,233.

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References:
1. Rice, C. M., Personal Communication.

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APPENDIX I: PLASMID DNA ISOLATION FROM GLYCEROL STOCK

1. Thaw the glycerol stock by placing it in a 37°C water bath. Immediately after thawing, inoculate an SD-HIS agar plate using a sterile pick/tip.
2. Incubate the plates at 30°C for 2 to 4 days until colonies form.
3. For plasmid DNA maxi-prep, select a colony from the SD-HIS agar plate and transfer it to a tube containing 40mL SD-HIS media.
4. Incubate overnight at 30°C with agitation.
5. Transfer the culture to 500 mL fresh SD-HIS media. Incubate overnight at 30°C with agitation until optical density reaches approximately 2.0.
6. Extract the plasmid DNA using a column-based commercial plasmid DNA extraction kit with the following modifications:
   a) Harvest the culture at 24,000 × g (or maximum speed for the rotor) for 30 minutes at 4°C.
   b) Discard the supernatant and resuspend the pellet in 14 mL fresh Lysis solution.
   c) Incubate at 37°C for 1 hour without agitation.

   Note: It is recommended to centrifuge the tube after the neutralization step to remove most of the debris to avoid clogging the column during elution.

7. Elute in the minimal possible volume, as plasmid yield is typically low.


APPENDIX II: REAGENTS AND GROWTH MEDIA

Zymolase® Solution:
- Zymolyase® 100-T 10 mg/mL
- Tris-HCl, pH 7.5 50 mM
- Glycerol 50% (v/v)

Lysis Solution:
To prepare the Lysis Solution add the following to the resuspension buffer (from a commercial kit - typically called P1 or similar)
- Zymolyase® Solution 10%
- β-mercaptoethanol 1%

SD-HIS Medium:
- Succinic acid 10 g
- NaOH 6 g
- SC-HIS dropout powder 1.37 g
Dissolve the components completely in ddH₂O and bring up to the volume to 800 mL (for 1 liter).
For solid growth medium, add 20 g/L agar. Autoclave for 35 minutes.
When the media cools down (42°C for plates), add 100 mL of 20% D-glucose and 100 mL of filter-sterilized 10x YNB+AS Solution.

10X YNB+AS Solution:
- Yeast Nitrogen Base (YNB) without amino 17 g
- acids and without ammonium sulfate
- Ammonium sulfate 50 g
Dissolve the components completely in ddH₂O to a final volume of 1 liter and filter sterilize using a 0.22 µm filter. Store at 4°C.
Alternatively, dissolve 67 g of the YNB containing ammonium sulfate to a final volume of 1 liter and filter sterilize using a 0.22 µm filter. Store at 4°C.

D-Glucose solution:
Dissolve 20% (w/v) D-glucose solution in ddH₂O. Autoclave and store at room temperature.