What is claimed:

1. A nucleic acid molecule encoding a Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) spike antigen, the nucleic acid molecule comprising:
a nucleic acid sequence having at least 99% ~~about 90%~~ identity over an entire length of the nucleic acid sequence set forth in nucleotides 55 to 3837 of SEQ ID NO: 2;
a nucleic acid sequence having at least 99% ~~about 90%~~ identity over an entire length of SEQ ID NO: 2;
the nucleic acid sequence of nucleotides 55 to 3837 of SEQ ID NO: 2; or
the nucleic acid sequence of SEQ ID NO: 2.~~;~~
~~a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 3;~~
~~the nucleic acid sequence of SEQ ID NO: 3;~~
~~a nucleic acid sequence having at least about 90% identity over an entire length of nucleotides 55 to 3837 of SEQ ID NO: 5;~~
~~a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 5;~~
~~the nucleic acid sequence of nucleotides 55 to 3837 of SEQ ID NO: 5; the nucleic acid sequence of SEQ ID NO: 5;~~
~~a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 6; or~~
~~the nucleic acid sequence of SEQ ID NO: 6.~~

2. An expression vector comprising the nucleic acid molecule according to claim 1, said vector optionally comprising the nucleic acid sequence of SEQ ID NO: 3.

3. An immunogenic composition comprising an effective amount of the expression vector according claim 2 and a pharmaceutically acceptable excipient.

4. The immunogenic composition according to claim 3 wherein the pharmaceutically acceptable excipient comprises a buffer, optionally saline-sodium citrate buffer.

5. The immunogenic composition of claim 4, wherein the composition comprises 10 mg of the vector per milliliter of saline-sodium citrate buffer.

6. The immunogenic composition according to any one of claims 3-5, further comprising an

adjuvant.

~~7. A method of inducing an immune response against Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) in a subject in need thereof, the method comprising administering an effective amount of the immunogenic composition of any one of claims 3-6 to the subject.~~

~~8. A method of protecting a subject in need thereof from infection with Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2), the method comprising administering an effective amount of the immunogenic composition of any one of claims 3-6 to the subject.~~

~~9. A method of treating a subject in need thereof against Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) infection, the method comprising administering an effective amount of the immunogenic composition of any one of claims 3-6 to the subject, wherein the subject is thereby resistant to one or more SARS-CoV-2 strains.~~

~~10. The method of any one of claims 7 to 9, wherein administering comprises at least one of electroporation and injection.~~

~~11. The method of any one of claims 7 to 9, wherein administering comprises parenteral administration followed by electroporation.~~

~~12. The method of any one of claims 7 to 11, wherein an initial dose of about 0.5 mg to about 2.0 mg of the vector is administered to the subject, optionally wherein the initial dose is 0.5 mg, 1.0 mg or 2.0 mg of the vector.~~

~~13. The method of claim 12, wherein a subsequent dose of about 0.5 mg to about 2.0 mg of the vector is administered to the subject about four weeks after the initial dose, optionally wherein the subsequent dose is 0.5 mg,1.0 mg or 2.0 mg of the vector.~~

~~14. The method of claim 13, wherein one or more further subsequent doses of about 0.5 mg to about 2.0 mg of the vector is administered to the subject at least twelve weeks after the initial dose, optionally wherein the further subsequent dose is 0.5 mg, 1.0 mg, or 2.0 mg of the vector.~~

~~15. The method of any one of claims 7 to 14, wherein the immunogenic composition is INO-4800 or a biosimilar thereof.~~

~~16. The method of any one of claims 7 to 15, further comprising administering to the subject at least one additional agent for the treatment of SARS-CoV-2 infection or the treatment or prevention of a disease or disorder associated with SARS-CoV-2 infection.~~

~~17. The method of claim 16 wherein the immunogenic composition is administered to the subject before, concurrently with, or after the additional agent.~~

~~18.~~7. Use of the immunogenic composition of any one of claims 3-6 in the manufacture of a medicament for ~~a method of~~ inducing an immune response against Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) in a subject in need thereof.

~~19.~~8. Use of the immunogenic composition of any one of claims 3-6 in the manufacture of a medicament for ~~a method of~~ protecting a subject from infection with Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV- 2).

~~20.~~9. Use of the immunogenic composition of any one of claims 3-6 in the manufacture of a medicament for ~~in a method of~~ treating a subject in need thereof against Severe Acute Respiratory Syndrome coronavirus 2 (SARS- CoV-2) infection.

~~21.~~10. The use of any one of claims ~~18 to 20~~ 7-9 in combination with at least one additional agent for the treatment of SARS-CoV-2 infection or the treatment or prevention of a disease or disorder associated with SARS-CoV-2 infection.

~~22.~~11. The use of any one of claims 7-10 ~~18 to 21~~, wherein the immunogenic composition is ~~administered to the subject~~formulated for administration by at least one of electroporation and injection.

~~23.~~12. The use of claim ~~22~~11, wherein the immunogenic composition is formulated for parenteral administration ~~parenterally administered to the subject~~ followed by electroporation.

~~24.~~ The use of any one of claims 7 to 12 ~~18 to 23~~, wherein the immunogenic composition is formulated at a an initial dose of about 0.5 mg to about 2.0 mg of the vector ~~is administered to the subject~~, optionally ~~wherein the initial dose~~at a dose of ~~is~~ 0.5 mg, 1.0 mg, or 2.0 mg of the vector.

13.

~~25. The use of claim 24, wherein a subsequent dose of about 0.5 mg to about 2.0 mg of the vector is administered to the subject about four weeks after the initial dose, optionally wherein the subsequent dose is 0.5 mg, 1.0 mg, or 2.0 mg of the vector.~~

~~26. The use of claim 25, wherein a further subsequent dose of about 0.5 mg to about 2.0 mg of the vector is administered to the subject at least twelve weeks after the initial dose, optionally wherein the further subsequent dose is 0.5 mg, 1.0 mg, or 2.0 mg of the vector.~~

14. The use of any one of claims 7 to 13~~24 18 to 26~~, wherein the immunogenic composition is INO- 4800 or a biosimilar thereof.

~~27.~~ The immunogenic composition of any one of claims 3-6 for use in therapy.

15.

~~28.~~16. ~~Use of t~~The vector of claim 2 ~~in the preparation of~~for use as a medicament.

~~29.~~17. Use of the vector of claim 2 in the preparation of a medicament for treating or protecting against infection with Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2).

~~30. A method of detecting a persistent cellular immune response in a subject, the method comprising the steps of:~~

~~administering an immunogenic composition for inducing an immune response against a SARS-CoV-2 antigen to a subject in need thereof;~~

~~isolating peripheral mononuclear cells (PBMCs) from the subject;~~

~~stimulating the isolated PBMCs with a SARS-CoV-2 spike antigen comprising an amino acid sequence selected from the group consisting of an amino acid sequence having at least about 90% identity over an entire length of residues 19 to 1279 of SEQ ID NO: 1, the amino acid sequence set forth in residues 19 to 1279 of SEQ ID NO: 1, an amino acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 1, the amino acid sequence of SEQ ID NO: 1, an amino acid sequence having at least about 90% identity over an entire length of residues 19 to 1279 of SEQ ID NO: 4, an amino acid sequence having at least about 90% identity over an entire~~

length of SEQ ID NO: 4, the amino acid sequence set forth in residues 19 to 1279 of SEQ ID NO: 4, the amino acid sequence of SEQ ID NO: 4., and a fragment thereof comprising at least 20 amino acids; and

detecting at least one of the number of cytokine expressing cells and the level of cytokine expression.

31. The method of claim 30, wherein the step of detecting at least one of the number of cytokine expressing cells and the level of cytokine expression is performed using an assay selected from the group consisting of Enzyme-linked immunospot (ELISpot) and Intracellular Cytokine Staining (ICS) analysis using flow cytometry.

32. The method of claim 30, wherein the subject is administered an immunogenic composition comprising a nucleic acid molecule, wherein the nucleic acid molecule comprises a nucleotide sequence selected from the group consisting of:

a nucleic acid sequence having at least about 90% identity over an entire length of the nucleic acid sequence set forth in nucleotides 55 to 3837 of SEQ ID NO: 2;

a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 2; the nucleic acid sequence of nucleotides 55 to 3837 of SEQ ID NO: 2; the nucleic acid sequence of SEQ ID NO: 2;

a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 3; the nucleic acid sequence of SEQ ID NO: 3;

a nucleic acid sequence having at least about 90% identity over an entire length of nucleotides 55 to 3837 of SEQ ID NO: 5;

a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 5; the nucleic acid sequence of nucleotides 55 to 3837 of SEQ ID NO: 5; the nucleic acid sequence of SEQ ID NO: 5;

a nucleic acid sequence having at least about 90% identity over an entire length of SEQ ID NO: 6; and

the nucleic acid sequence of SEQ ID NO: 6.