

CLAIMS

What is claimed is:

- 5 1. A method of treating a subject for infection with a Severe Acute Respiratory
Syndrome Coronavirus (SARSr-CoV), comprising:
 administering a therapeutically effective amount of a nitric oxide releasing
 solution (NORS) to the subject.
- 10 2. The method of claim 1, further comprising:
 administering the NORS to the subject when the subject is asymptomatic.
3. The method of claim 1, further comprising:
 administering the NORS to the subject within a selected number of days of
15 an identified first-person exposure.
4. The method of claim 1, further comprising:
 administering the NORS to the subject without an identified first-person
 exposure.
- 20 5. The method of claim 1, further comprising:
 administering the NORS to the subject when displaying mild symptoms of
 SARS-CoV-2 infection.
- 25 6. The method of claim 1, further comprising:
 administering the NORS to the subject when displaying moderate
 symptoms of SARS-CoV-2 infection.
7. The method of claim 1, further comprising:
30 administering the NORS to the subject when displaying severe symptoms
 of SARS-CoV-2 infection.

8. The method of claim 1, further comprising:
administering the NORS to the subject when displaying critical symptoms of SARS-CoV-2 infection.
- 5 9. The method of claim 1, further comprising:
administering the NORS to the subject according to a dosage regimen of 1 to 6 times per day for a duration of from about a single day to about 2 weeks.
- 10 10. The method of claim 1, further comprising:
administering the NORS to the subject at a single dose of from about 300 ul of NORS to about 700 ul of NORS.
- 15 11. The method of claim 1, further comprising:
administering the NORS to the subject at a single dose of from about 400 ul of NORS to about 600 ul of NORS.
- 20 12. The method of claim 1, further comprising:
administering the NORS to the subject at a daily dose of from about 1500 ul of NORS to about 4200 ul of NORS.
- 25 13. The method of claim 1, further comprising:
administering the NORS to the subject at a daily dose of from about 2000 ul of NORS to about 3600 ul of NORS.
- 30 14. The method of claim 1, wherein the therapeutically effective amount of the NORS reduces a viral RNA load compared to a baseline level by greater than one or more of: 80%, 90%, 95%, or 99% after a treatment duration of one or more of: 1 day, 2 days, 3 days, 4 days, 5 days, or 6 days.
15. The method of claim 1, wherein the therapeutically effective amount of the NORS:
provides a low pH that reduces SARS-CoV-2 viral load, or
provides a physical barrier over epithelial cells of the subject that prevents SARS-CoV-2 access to host cells of the subject, or

provides an angiotensin-converting enzyme 2 (ACE-2) receptor blocking agent.

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16. The method of claim 1, wherein the NORS is administered to an afflicted situs.

17. The method of claim 16, wherein the afflicted situs is an upper respiratory tract of the subject.

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18. The method of claim 1, wherein the afflicted situs is a mucosal membrane.

19. The method of claim 18, wherein the mucosal membrane is a subject's nasal passage or sinus and the NORS is administered as a sprayed solution or as a lavage.

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20. The method of claim 18, wherein the mucosal membrane is a subject's mouth or throat and the NORS is administered as a gargle solution.

21. The method of claim 1, wherein the virus is a SARS-CoV-2 virus or a variant thereof.

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22. The method of claim 21, wherein the SARS-Co-V-2 virus or the variant thereof is one or more of: Lineage A, Cluster 5, Lineage B.1.1.7, B.1.1.7 with E484K, Lineage B.1.1.207, Lineage B.1.1.317, Lineage B.1.1.318, Lineage B.1.351, Lineage B.1.429/CAL.20C, Lineage B.1.525, Lineage P.1, Lineage B.1.427, Lineage B.1.526, Lineage P.2, or a combination thereof.

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23. The method of claim 1, wherein the therapeutically effective amount of the NORS is substantially equally effective for treating one or more of: Lineage A, Cluster 5, Lineage B.1.1.7, B.1.1.7 with E484K, Lineage B.1.1.207, Lineage B.1.1.317, Lineage B.1.1.318, Lineage B.1.351, Lineage B.1.429/CAL.20C, Lineage B.1.525, Lineage P.1, Lineage B.1.427, Lineage B.1.526, Lineage P.2, or a combination thereof.

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24. A method of minimizing subject-to-subject transmissibility for a pathogen comprising:

administering a therapeutically effective amount of a nitric oxide releasing solution (NORS) to the subject.

25. The method of claim 24, further comprising:

5 administering the NORS to the subject before or after exposure of the subject to the pathogen.

26. The method of claim 24, further comprising:

10 administering the NORS to the subject before or after exposure of the subject to a person displaying symptoms of the pathogen.

27. The method of claim 24, wherein the pathogen is a Severe Acute Respiratory Syndrome Coronavirus (SARSr-CoV) or a variant thereof.

15 28. The method of claim 27, wherein the Severe Acute Respiratory Syndrome Coronavirus (SARSr-CoV) is a SARS-CoV-2 virus including one or more of: Lineage A, Cluster 5, Lineage B.1.1.7, B.1.1.7 with E484K, Lineage B.1.1.207, Lineage B.1.1.317, Lineage B.1.1.318, Lineage B.1.351, Lineage B.1.429/CAL.20C, Lineage B.1.525, Lineage P.1, Lineage B.1.427, Lineage
20 B.1.526, Lineage P.2, or a combination thereof.

29. The method of claim 24, wherein the therapeutically effective amount of the NORS is substantially equally effective for minimizing subject-to-subject transmissibility for a a Severe Acute Respiratory Syndrome Coronavirus (SARSr-CoV) or a variant thereof including one or more of: Lineage A, Cluster 5, Lineage
25 B.1.1.7, B.1.1.7 with E484K, Lineage B.1.1.207, Lineage B.1.1.317, Lineage B.1.1.318, Lineage B.1.351, Lineage B.1.429/CAL.20C, Lineage B.1.525, Lineage P.1, Lineage B.1.427, Lineage B.1.526, Lineage P.2, or a combination thereof.

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30. The method of claim 24, wherein the therapeutically effective amount of the NORS reduces a viral RNA load compared to a baseline level by greater than one or more of: 80%, 90%, 95%, or 99% after a treatment duration of one or more of: 1 day, 2 days, 3 days, 4 days, 5 days, or 6 days.

31. The method of claim 24, wherein the therapeutically effective amount of the NORS:
- 5 provides a low pH that reduces SARS-CoV-2 viral load, or
provides a physical barrier over epithelial cells of the subject that prevents SARS-CoV-2 access to host cells of the subject, or
provides an angiotensin-converting enzyme 2 (ACE-2) receptor blocking agent.
- 10 32. The method of claim 24, wherein the NORS is administered to a mucosal membrane.
33. The method of claim 32, wherein the mucosal membrane is a subject's nasal passage or sinus and the NORS is administered as a sprayed solution or as a
15 lavage.
34. The method of claim 32, wherein the mucosal membrane is a subject's mouth or throat and the NORS is administered as a gargle solution.
- 20 35. A method of treating a subject for infection of a pathogen in an upper respiratory tract comprising:
administering a therapeutically effective amount of a nitric oxide releasing solution (NORS) to the subject as a spray having an average droplet volume which contains treatment within the upper respiratory tract.
- 25 36. The method of claim 35, further comprising:
providing a median droplet size (Dv50) of greater than one or more of 100 μm , 150 μm , 200 μm , 250 μm , 300 μm , 350 μm , 400 μm , 450 μm , 500 μm , 550 μm , or 600 μm when measured a 30 mm or 60 mm distance from actuation.

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37. The method of claim 35, further comprising:

providing a percentage of spray by volume at droplet sizes of less than 10 μm ($\% < 10 \mu\text{m}$) of less than one or more of: 0.5%, 0.4%, 0.3%, 0.2%, or 0.1% when measured a 30 mm or 60 mm distance from actuation.

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38. The method of claim 35, further comprising:

providing a percentage of spray by volume at droplet sizes of less than 5 μm ($\% < 5 \mu\text{m}$) of less than one or more of: 0.5%, 0.4%, 0.3%, 0.2%, or 0.1% when measured a 30 mm or 60 mm distance from actuation.

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39. The method of claim 35, further comprising:

providing a 10th percentile by volume of spray ($D_v(10)$) of greater than one or more of 100 μm , 150 μm , 200 μm , 250 μm , 300 μm , 350 μm , or 400 μm when measured a 30 mm or 60 mm distance from actuation.

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40. The method of claim 35, further comprising:

providing a 90th percentile by volume of spray ($D_v(90)$) of greater than one or more of 500 μm , 550 μm , 600 μm , 650 μm , 700 μm , 750 μm , 800 μm , 850 μm , 900 μm , 950 μm , or 1000 μm when measured a 30 mm or 60 mm distance from actuation.

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41. The method of claim 35, further comprising:

providing a droplet size distribution of about 0.5 to about 2.0, wherein the droplet size distribution is: $(D_v(90) - D_v(10))/D_v(50)$.

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42. A nitric oxide releasing solution (NORS) comprising:

at least one nitric oxide releasing compound and at least one acidifying agent, wherein the NORS releases a therapeutically effective amount as a spray having an average droplet volume which contains treatment within an upper respiratory tract.

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43. The solution of claim 42, wherein the NORS provides a median droplet size

($D_v(50)$) of greater than one or more of 100 μm , 150 μm , 200 μm , 250 μm , 300

μm , 350 μm , 400 μm , 450 μm , 500 μm , 550 μm , or 600 μm when measured a 30 mm or 60 mm distance from actuation.

- 5 44. The solution of claim 42, wherein the NORS provides a percentage of spray by volume at droplet sizes of less than 10 μm ($\% < 10 \mu\text{m}$) of less than one or more of: 0.5%, 0.4%, 0.3%, 0.2%, or 0.1% when measured a 30 mm or 60 mm distance from actuation.
- 10 45. The solution of claim 42, wherein the NORS provides a percentage of spray by volume at droplet sizes of less than 5 μm ($\% < 5 \mu\text{m}$) of less than one or more of: 0.5%, 0.4%, 0.3%, 0.2%, or 0.1% when measured a 30 mm or 60 mm distance from actuation.
- 15 46. The solution of claim 42, wherein the NORS provides a 10th percentile by volume of spray ($D_v(10)$) of greater than one or more of 100 μm , 150 μm , 200 μm , 250 μm , 300 μm , 350 μm , or 400 μm when measured a 30 mm or 60 mm distance from actuation.
- 20 47. The solution of claim 42, wherein the NORS provides a 90th percentile by volume of spray ($D_v(90)$) of greater than one or more of 500 μm , 550 μm , 600 μm , 650 μm , 700 μm , 750 μm , 800 μm , 850 μm , 900 μm , 950 μm , or 1000 μm when measured a 30 mm or 60 mm distance from actuation.
- 25 48. The solution of claim 42, wherein the NORS provides a droplet size distribution of about 0.5 to about 2.0, wherein the droplet size distribution is: ($D_v(90) - D_v(10)$)/ $D_v(50)$.
- 30 49. The solution of claim 42, wherein the at least one nitric oxide releasing compound is selected from the group consisting of a nitrite, a salt thereof, and any combinations thereof.
50. The solution of claim 42, wherein the at least one acidifying agent is an acid.

51. A composition for use in treating a subject for infection with a Severe Acute Respiratory Syndrome Coronavirus (SARSr-CoV), wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject.

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52. A composition for use in minimizing subject-to-subject transmissibility for a pathogen, wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject.

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53. A composition for use in treating a subject for infection of a pathogen in an upper respiratory tract, wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject as a spray having an average droplet volume which contains treatment within the upper respiratory tract.

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54. Use of a pharmaceutical composition for the manufacture of a medicament for treating a subject for infection with a Severe Acute Respiratory Syndrome Coronavirus (SARSr-CoV), wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject.

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55. Use of a pharmaceutical composition for the manufacture of a medicament for minimizing subject-to-subject transmissibility for a pathogen, wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject.

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56. Use of a pharmaceutical composition for the manufacture of a medicament for treating a subject for infection of a pathogen in an upper respiratory tract, wherein said use comprises:
administering a therapeutically effective amount of nitric oxide releasing solution (NORS) to the subject as a spray having an average droplet volume which contains treatment within the upper respiratory tract.

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