CLAIMS

What is claimed is:

1. A pharmaceutical composition for preventing or treating respiratory infection comprising:

(i) soluble ICAM-1 or an ICAM-1 inhibitor;

(ii) sialic acid (*e.g.*, sialyllactose);

(iii) lysozyme; and

(iv) lactoferrin; and

a pharmaceutically acceptable carrier.

2. The pharmaceutical composition according to claim 1, wherein said composition is in the form of a nasal spray, nasal drops, oral spray, oral rinse, or lozenge.

3. The pharmaceutical composition according to any one of claims 1-2, further comprising one or more of zinc peroxide, copper, and silver.

4. The pharmaceutical composition according to any one of claims 1-3, further comprising and neuraminidase inhibitor and/or carrageenan.

5. The pharmaceutical composition according to any one of claims 1-4, further comprising one or more of IgA, IgG, and IgM.

6. The composition according to any one of claims 1-5, further comprising one or more ingredients selected from the group consisting of marshmallow extract, calendula extract, citrus peel extract, honey extract, rosemary extract, myrrh extract, Helichrysum extract, arrowroot extract, neem oil, vitamin C, vitamin E, and grapefruit seed extract.

7. The pharmaceutical composition according to any one of claims 1-6, wherein the neuraminidase inhibitor is selected from the group consisting of quercetin, oseltamivir, zanamivir, laninamivir, and peramivir.

8. The compositions according to any one of claims 1-7, wherein said composition comprises and ICAM-1 inhibitor, and wherein said ICAM-1 inhibitor is selected from the group consisting of an anti-ICAM-1 antibody, cytokine, CD11a, ezrin (EZR), CD18, glycyrrhetinic acid, pyrrolidiniedithiocarbamate, NFkB activation inhibitor, heteryclic thiazole, lipoic acid, efalizumab, 4-[4-methylphenyl)thio]thieno92,3-c]pyridine-2-carboxamide, silibinin, stilbenes, and (+)-epigalloyl-catechin-gallate [(+)-EGCG].

9. The composition according to any one of claims 1-8, wherein the composition is formulated as a microsphere.

10. The composition according to any one of claims 1-9, wherein the composition contains soluble ICAM-1.

11. The composition according to any one of claims 1-10, comprising:

(i) 0.00000001% to 10% by weight soluble ICAM-1;

(ii) from 0% (or from 0.00000001%) to 10% by weight of a neuraminidase inhibitor;

(iii) 0.00000001% to 10% by weight of said sialic acid or sialyllactose;

(iv) 0.0000001% to 10% by weight of said lysozyme; and

(v) 0.00000001% to 10% by weight of said lactoferrin.

12. A composition for use in preventing or treating respiratory infection comprising:

(i) soluble ICAM-1 or an ICAM-1 inhibitor;
(ii) sialic acid (*e.g.*, siallyllactose);
(iii) lysozyme;
(iv) lactoferrin; and

a pharmaceutically acceptable carrier.

13. The composition for use according to claim 12, wherein said respiratory infection is due to human rhinovirus and/or human influenza virus.

14. The composition for use according to any one of claims 12-13, wherein said composition is in the form of a nasal spray, nasal drops, oral spray, oral rinse, or lozenge.

15. The composition for use according to any one of claims 12-14, wherein said composition further comprises one or more of zinc peroxide, copper, and silver.

16. The composition for use according to any one of claims 12-15, wherein said composition further comprises one or more of IgA, IgG, and IgM.

17. The composition for use according to any one of claims 12-16, further comprising a neuraminidase inhibitor, wherein the neuraminidase inhibitor is selected from the group consisting of quercetin, oseltamivir, zanamivir, laninamivir, and peramivir.

18. The composition for use according to any one of claims 12-17, wherein said composition comprises and ICAM-1 inhibitor, and wherein said ICAM-1 inhibitor is selected from the group consisting of an anti-ICAM-1 antibody, cytokine, CD11a, ezrin (EZR), CD18, glycyrrhetinic acid, pyrrolidiniedithiocarbamate, NFkB activation inhibitor, heteryclic thiazole, lipoic acid, efalizumab, 4-[4-methylphenyl)thio]thieno92,3-c]pyridine-2-carboxamide, silibinin, stilbenes, and (+)-epigalloyl-catechin-gallate [(+)-EGCG].

19. The composition for use according to any one of claims 12-18, further comprising one or more ingredients selected from the group consisting of marshmallow extract, calendula extract, citrus peel extract, honey extract, rosemary extract, myrrh extract, Helichrysum extract, arrowroot extract, neem oil, vitamin C, vitamin E, and grapefruit seed extract.

20. The composition for use according to any one of claims 12-19, wherein said composition comprises:

(i) 0.00000001% to 10% by weight of said ICAM-1;

(ii) 0% (or from 0.01%) to 10% by weight of a neuraminidase inhibitor;

(iii) 0.00000001% to 10% by weight of said sialic acid (*e.g.*, sialyllactose);

(iv) 0.00000001% to 10% by weight of said lysozyme; and

(v) 0.00000001% to 10% by weight of said lactoferrin.

21. A pharmaceutical composition for preventing or treating respiratory infection from human rhinovirus (HRV) comprising:

(i) soluble ICAM-1;

(ii) lysozyme; and

(iii) lactoferrin; and

a pharmaceutically acceptable carrier.

22. The pharmaceutical composition according to claim 21, wherein said carrier is adapted to provide residence time of said composition on the nasal and/or oral mucosa of at least 1 minute.

23. The pharmaceutical composition according to any one of claims 21-22, wherein said pharmaceutically acceptable carrier is an aqueous solution comprising from 5-50% (v/v) 1,3-propanediol.

24. Use of the composition according to any of claims 21-23 in the preparation of a medicament for prophylaxis and/or treatment of human rhinovirus infection in an individual in need thereof, wherein said composition is to be administered to the nasal and/or oral mucosa of the individual.

25. The use according to claim 24, wherein the nasal and/or oral mucosa of said individual in need thereof has human rhinovirus in contact therewith.

26. A pharmaceutical composition for preventing or treating respiratory infection from human influenza virus comprising:

(i) sialic acid (*e.g.*, sialyllactose);

(ii) lysozyme;

(iii) lactoferrin; and

(iv) 0% (or from 0.01%) to 10% by weight of a neuraminidase inhibitor; and

a pharmaceutically acceptable carrier.

27. The pharmaceutical composition according to claim 26, wherein said carrier is adapted to provide residence time of said composition on the nasal and/or oral mucosa of at least 1 minute.

28. The pharmaceutical composition according to one of claims 26-27, wherein said pharmaceutically acceptable carrier is an aqueous solution comprising from 5-50% (v/v) 1,3-propanediol.

29. Use of the composition according to any of claims 26-28 in the preparation of a medicament for prophylaxis and/or treatment of human influenza virus infection in an individual in need thereof.

30. The use according to claim 29, wherein a nasal and/or oral mucosa of said individual in need thereof has human influenza virus in contact therewith.

31. A composition for application to the nasal or oral mucosa, comprising one or more antiviral and/or antimicrobial agents dispersed in a liquid carrier comprising from 60-90% (v/v) water and from 10-40% (v/v) of a polyol, wherein said composition is capable of being sprayed onto the mucosa, and is adapted to remain on the mucosa for at least 5 minutes

following application without substantially irritating or drying the mucosa.

32. The composition according to claim 31, wherein said polyol comprises 1-3 propanediol.