~~WHAT IS CLAIMED IS~~CLAIMS:

1. A pharmaceutical composition comprising an aqueous formulation comprising an insoluble vitamin at least partially solubilized with a surfactant wherein the pharmaceutical composition is in liquid aerosol form.

2. The pharmaceutical composition according to claim 1, wherein the insoluble vitamin comprises at least one of vitamin A, all-trans retinol, 13-cis-retinol, the palmitate ester of all-trans retinol, the acetate ester of all-trans retinol, the maleate ester of all-trans retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, CD437, CD1530, and an intrinsically fluorescent retinoid analog~~a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, vitamin D, a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, vitamin E, a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, or vitamin K, a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof~~.

3. The pharmaceutical composition according to claim 1, wherein the insoluble vitamin comprises at least one of all-trans retinol, the palmitate ester of all-trans retinol, the acetate ester of all-trans retinol, the maleate ester of all-trans retinol, wherein the surfactant comprises polysorbate 80, and wherein the pH of the pharmaceutical composition is 7.0 to 7.5~~vitamin A, a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof~~.

4. The pharmaceutical composition according to claim 3, comprising up to 6.0% (w/w) of the ~~vitamin A, a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or~~all-trans retinol, the palmitate ester of all-trans retinol, the acetate ester of all-trans retinol, the maleate ester of all-trans retinol, and/or a mixture thereof.

5. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-~~4, wherein a weight of the surfactant is at least 3.0 times the weight of the insoluble vitamin.

~~6. The pharmaceutical composition according to any of claims 1-5, wherein the remainder of the pharmaceutical composition comprises water.~~

~~7. The pharmaceutical composition according to any of claims 1-6, wherein the pharmaceutical composition comprises a conjugate acid or a conjugate base.~~

~~8~~6. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-7~~, wherein the insoluble vitamin comprises at least one selected from the group consisting of all~~-~~trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, ~~or~~ the palmitate ester of all-trans-retinol, the acetate ester of all-trans-retinol, ~~or~~the maleate ester of all~~-~~trans~~-~~retinol, ~~13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol,~~ CD437, ~~or~~ CD1530, ~~or~~ an intrinsically fluorescent retinoid analog~~,~~ and/or a mixture thereof, wherein a weight of the surfactant ~~which~~ is ~~between~~ 3.0 times and 8.5 times the weight of the all~~-~~trans~~-~~retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, ~~or the palmitate, acetate, or~~the maleate ester of all~~-~~trans~~-~~retinol, ~~13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol,~~ 3,4-didehydroretinol, CD437, ~~or~~ CD-1530, ~~or~~ an intrinsically fluorescent retinoid analog, ~~or a~~and mixtures thereof, ~~contained in the composition, wherein the remainder of~~and, optionally, wherein the pharmaceutical composition further comprises a conjugate base~~water and, optionally, wherein the pH has been adjusted by addition~~ of a pharmaceutically acceptable acid and/or a conjugate acid of a pharmaceutically acceptable base.

~~9. The pharmaceutical composition according to any of claims 1-8, wherein the insoluble active ingredient comprises between 0.015% (w/w) and 4.0% (w/w) of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, or the palmitate, acetate, or maleate ester of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, CD437, or CD1530, a weight of surfactant which is between 4.0 times and 5.0 times the weight of the all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, or the palmitate, acetate, or maleate ester of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol contained in the composition, wherein the remainder of the composition comprises water and, optionally, wherein the pH has been adjusted to~~

~~between 7.0 and 7.5 by addition of a pharmaceutically acceptable acid and/or pharmaceutically acceptable base.~~

~~10. The pharmaceutical composition according to any of claims 1-9, wherein the insoluble active ingredient comprises between 0.015% (w/w) and 4.0% (w/w) of all trans retinol, or the palmitate, acetate, or maleate ester of all trans retinol, a weight of surfactant which is between 3.0 times and 8.5 times the weight of the all trans retinol, or the palmitate, acetate, or maleate ester of all trans retinol contained in the composition, wherein the remainder of the composition comprises water and, optionally, wherein the pH has been adjusted by addition of a pharmaceutically acceptable acid and/or pharmaceutically acceptable base.~~

~~11. The pharmaceutical composition according to any of claims 1-10, wherein the insoluble active ingredient comprises between 0.015% (w/w) and 4.0% (w/w) vitamin A or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, a weight of a surfactant which is between 3.0 times and 8.5 times the weight of the vitamin A palmitate contained in the composition, wherein the remainder of the composition comprises water, and, optionally, wherein the pH has been adjusted by addition of a pharmaceutically acceptable acid and/or a pharmaceutically acceptable base.~~

~~12. The pharmaceutical composition according to any of claims 1-11, wherein the pH of the pharmaceutical composition has been optionally adjusted to between pH 7.0 and pH 7.5.~~

~~13~~7. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-12~~, wherein the surfactant comprises polysorbate 20, polysorbate 60, polysorbate 80, stearyl alcohol, ~~a polyethylene glycol derivative of hydrogenated castor oil, a polyethylene glycol derivative of hydrogenated castor oil,~~ sorbitan monolaurate, sorbitan monopalmitate, sorbitan monostearate, polyoxyethylene (20) oleyl ether, polyoxyethylene (20) cetyl ether, polyoxyethylene (10) cetyl ether, polyoxyethylene (10) oleyl ether, polyoxyethylene (100) stearyl ether, polyoxyethylene (10) stearyl ether, polyoxyethylene (20) stearyl ether, polyoxyethylene (4) lauryl ether, polyoxyethylene (20) cetyl ether, polyoxyethylene (2) cetyl ether, caprylocaproyl polyoxyl-8 glyceride,

polyethylene glycol (20) stearate, polyethylene glycol (40) stearate, polyethylene glycol, polyethylene glycol (8) stearate, polyoxyl 40 stearate, poloxamer 188, polaxamer 312, or mixtures thereof.

~~14~~8. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-13~~, wherein the surfactant comprises polysorbate 80.

~~15. The pharmaceutical composition according to any of claims 1-14, wherein the particles formed by the insoluble active ingredient and the surfactant form particles in the configuration of micelles having a diameter of less than or equal to 500 nm.~~

~~16. The pharmaceutical composition according to claim 15, wherein the micelles have a diameter of less than or equal to 250 nm.~~

~~17. The pharmaceutical composition according to claim 15. wherein the micelles have a diameter of less than or equal to 100 nm.~~

~~18. The pharmaceutical composition according to any of claims 1-17, wherein the insoluble active ingredient comprises between 0.125 % and 3.0% vitamin A, or an isomer, analog, and/or derivative thereof, or a mixture thereof.~~

~~19. The pharmaceutical composition according to any of claims 1-18, wherein the insoluble active ingredient comprises between 1.25% and 3.0% vitamin A, or an isomer, analog, and/or derivative thereof, or a mixture thereof.~~

~~20. The pharmaceutical composition according to any of claims 1-19, wherein the surfactant comprises polysorbate 80 and the fatty acid content of the polysorbate 80 is between 58% and 100% oleic acid.~~

~~21~~9. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-20~~, wherein the surfactant comprises polysorbate 80 and the fatty acid content of the polysorbate 80 is between 85% and 100% oleic acid.

~~22. The pharmaceutical composition according to any of claims 1-21, wherein the surfactant comprises polysorbate 80 and the fatty acid content of the polysorbate 80 is greater than or equal to 98% oleic acid.~~

~~23. The pharmaceutical composition according to any of claims 1-22, wherein the pharmaceutically acceptable acid comprises hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, phosphoric acid, acetic acid, oleic acid, palmitic acid, stearic acid, glycolic acid, pyruvic acid, oxalic acid, maleic acid, malonic acid, succinic acid, fumaric acid, tartaric acid, citric acid, ascorbic acid, lactic acid, or tartaric acid.~~

~~24. The pharmaceutical composition according to any of claims 1-23, wherein the pharmaceutically acceptable base comprises sodium hydroxide, ammonium hydroxide, potassium hydroxide, histidine, arginine, or lysine.~~

~~25. The pharmaceutical composition according to any of claims 1-24, wherein the pharmaceutically acceptable acid comprises citric acid and the pharmaceutically acceptable base comprises sodium hydroxide.~~

~~26. The pharmaceutical composition according to any of claims 1-25, further comprising one or more antibiotic compounds or mixtures thereof.~~

~~27,~~10. The pharmaceutical composition according to claim ~~26~~1, wherein the pharmaceutical composition further comprises:

at least one antibiotic compound ~~or compounds comprises~~comprising at least one penicillin~~s~~, at least one tetracycline~~s~~, at least one cephalosporin~~s~~, at least one quinolone~~s~~, at least one lincomycin~~s~~, at least one macrolide~~s~~, at least one sulfonamide~~s~~, at least one glycopeptide~~s~~, at least one amino glycoside~~s~~, a carbapenem~~s~~, and/or a mixture~~s~~ thereof;

at least one insoluble vitamin comprising Vitamin D, an analog of Vitamin D, a derivative of Vitamin D, Vitamin E, an analog of Vitamin D, a derivative of Vitamin D, Vitamin K, an analog of Vitamin K, a derivative of Vitamin K, Vitamin B6, niacinamide, Vitamin B2, Vitamin B1. dexpanthenol, biotin, folic acid, vitamin B12, and/or a mixture thereof;

an anti-viral compound comprising oseltamivir, zanamivir, peramivir, ribavirin, remdesivir, at least one nucleoside analog, at least one interferon, at least one protease inhibitor, at least one reverse transcriptase inhibitor, at least one neuramidinidase inhibitor, and/or a mixture thereof; and/or

a sugar comprising glucose, arabinose, maltose, sucrose, dextrose, lactose, and/or a mixture thereof; and/or

caffeine, epinephrine, and/or a mixture thereof.

~~28. The pharmaceutical composition according to any of claims 1-27, further comprising one or more antibiotic or anti-viral compounds.~~

~~29. The pharmaceutical composition according to any of claims 1-28, wherein the insoluble active ingredient comprises all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, or the palmitate, acetate, or maleate ester of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, CD437 or CD1530, or a mixture thereof, or the palmitate, acetate, or maleate ester of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, CD437, CD-1530, an intrinsically fluorescent retinoid analog or the mixture thereof.~~

~~30. The pharmaceutical composition according to claim 29, comprising a therapeutically effective amount of all trans retinol, or the palmitate, acetate, or maleate ester of all trans retinol.~~

~~31. The pharmaceutical composition according to claim 30, comprising a therapeutically effective amount of vitamin A palmitate.~~

~~32. The pharmaceutical composition according to any of claims 1-31, further comprising Vitamin B, Vitamin C, Vitamin D, Vitamin D, Vitamin E, Vitamin K, or an analog and/or derivative of Vitamin B, Vitamin C, Vitamin D, Vitamin E, Vitamin K, or a mixture thereof.~~

~~33. The pharmaceutical composition according to any of claims 1-32, further comprising an anti-viral compound.~~

~~34. The pharmaceutical composition according to claim 33, wherein the anti-viral compound comprises oseltamivir, zanamivir, peramivir, ribavirin, remdesivir, a nucleoside analog or analogs, an interferon or interferons, a protease inhibitor or inhibitors, a reverse transcriptase inhibitor, a neuramidinidase inhibitor or inhibitors, or a mixture thereof.~~

~~35. The pharmaceutical composition according to any of claims 1-34, wherein the pharmaceutically acceptable carrier comprises a sugar or mixture of sugars.~~

~~36. The pharmaceutical composition according to claim 35, wherein the sugar or mixture of sugars comprises glucose, arabinose, maltose, sucrose, dextrose and lactose, or a mixture thereof.~~

~~37. A pharmaceutical composition according to any of claims 1-36, wherein the pharmaceutical composition is suitable for intravenous or intraarterial parenteral administration, oral administration, or administration by inhalation through the mouth or nose.~~

~~38. The pharmaceutical composition according to any of claims 37, wherein the pharmaceutical composition is suitable for intravenous or intraarterial parenteral administration.~~

~~39. The pharmaceutical composition according to any of claims 1-38, wherein the pharmaceutical composition is adapted for inhalation.~~

~~40~~11. The pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-39~~, wherein the pharmaceutical composition does not comprise a preservative.

~~41. The pharmaceutical composition according to any of claims 1-40, wherein the liquid aerosol form is disposed in a gas and the gas comprises oxygen.~~

~~42. The pharmaceutical composition according to any of claims 1-41, wherein the liquid aerosol form is disposed in ambient air.~~

~~43. The pharmaceutical composition according to claims 1-42, wherein the liquid aerosol form is disposed in a mixture of ambient air and oxygen such that the concentration of the oxygen in the mixture is above that of ambient air.~~

~~44. The pharmaceutical composition according to any of claims 1-43, wherein the pharmaceutical composition is disposed within a sealed container.~~

~~45. The pharmaceutical composition according to claim 44, wherein the sealed container comprises a gas.~~

~~46. The pharmaceutical composition according to claim 45, wherein the gas comprises oxygen.~~

~~47. The pharmaceutical composition according to claim 45. wherein the gas comprises an insoluble gas.~~

~~48. The pharmaceutical composition according to claim 47, wherein the insoluble gas comprises nitrogen or argon.~~

~~49. The pharmaceutical composition according to claim 45, wherein the gas comprises nitrous oxide.~~

~~50. The pharmaceutical composition according to any of claims 1-49, further comprising vitamin D, vitamin E, vitamin K, vitamin B6, vitamin C, niacinamide, vitamin B2, vitamin B1. dexpanthenol, biotin, folic acid, vitamin B12, or a mixture thereof.~~

~~51~~12. A pharmaceutical composition comprising an aqueously insoluble vitamin that has been at least partially solubilized with a surfactant wherein the pharmaceutical composition is in liquid aerosol form.

~~52. The pharmaceutical composition according to claim 51, wherein the insoluble vitamin comprises a therapeutically effective amount of vitamin A, or an isomer, analog, and/or derivative thereof, or a mixture thereof.~~

~~53. The pharmaceutical composition according to claims 51 or 52, wherein the therapeutically effective amount of vitamin A, or an isomer, analog, and/or derivative thereof, or a mixture thereof, comprises all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, or the palmitate, acetate, or maleate ester of all trans retinol, 13-cis-retinol, 9-cis-retinol, 9,13-dicis-retinol, 3,4-didehydroretinol, an intrinsically fluorescent retinoid analog or a mixture thereof.~~

~~54. The pharmaceutical composition according to claims 51 or 52, wherein the therapeutically effective amount of vitamin A, or an isomer, analog, and/or derivative thereof, or a mixture thereof, comprises a therapeutically effective amount of all trans retinol, or the palmitate, acetate, or maleate ester of all trans retinol.~~

~~55. The pharmaceutical composition according to claim 53, wherein the therapeutically effective amount of all trans retinol, or the palmitate, acetate, or maleate ester of all trans retinol comprises a therapeutically effective amount of vitamin A palmitate and a pharmaceutically acceptable carrier.~~

~~56. The pharmaceutical composition according to any claims 52-55, wherein the pharmaceutically acceptable carrier comprises a sugar or mixture of sugars.~~

~~57. The pharmaceutical composition according to claim 56, wherein the sugar or a mixture of sugars comprises glucose, arabinose, maltose, sucrose, dextrose and lactose, or a mixture thereof.~~

~~58~~13. A pharmaceutical composition comprising:

i) vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof;

ii) a surfactant, and

wherein the pharmaceutical composition is in aerosol form.

5914. The pharmaceutical composition according to claim 5813. wherein the surfactant comprises a non-natural surfactant.

~~60. The pharmaceutical composition according to claims 58 and 59. wherein the vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, and the surfactant form a solid particle.~~

~~61. The pharmaceutical composition according to claim 60, wherein the solid particle has a diameter of about 3 to about 5 μm.~~

~~62. The pharmaceutical composition according to claim 60, wherein the solid particle is sized to reach one or more portions of the respiratory zone of the lung, the conducting zone of the lung, or both portions.~~

~~63. The pharmaceutical composition according to claim 60, wherein the solid particle has a diameter of about 0.5 to about 3 μm.~~

~~64. The pharmaceutical composition according to claim 60, wherein the solid particle is sized to reach an alveolus.~~

6515. The pharmaceutical composition according to claim 5813, wherein the pharmaceutical composition is a liquid and wherein the vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, is disposed within a micelle.

~~66. The pharmaceutical composition according to claim 65, wherein the micelle has a diameter of between 1 nanometer and 1 micron.~~

~~67. The pharmaceutical composition according to claim 58, further comprising water.~~

~~68. The pharmaceutical composition according to claim 67, wherein the water further comprises a soluble active ingredient.~~

~~69. The pharmaceutical composition according to claim 68, wherein the hydrophilic constituent comprises vitamin C or certain antibiotics/antivirals.~~

~~70. The pharmaceutical composition according to claim 67, wherein the vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof is disposed within the water.~~

~~71. The pharmaceutical composition according to claim 67, wherein the surfactant is disposed within the water.~~

~~72. The pharmaceutical composition according to claim 67, wherein the vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, is disposed within a micelle.~~

~~73, The pharmaceutical composition according to claim 72, further comprising an insoluble constituent disposed within the micelle.~~

~~74. The pharmaceutical composition according to claim 73, wherein the insoluble constituent comprises vitamin D, vitamin E, vitamin K, an insoluble antibiotic, an insoluble antiviral, caffeine, epinephrine, or nitrous oxide.~~

~~75. The pharmaceutical composition according to claim 73, further comprising an additional micelle wherein the micelle and the additional micelle have an average diameter of between one micron and one nanometer.~~

~~76. The pharmaceutical composition according to claim 58, wherein the remainder of the pharmaceutical composition comprises water.~~

~~77. The pharmaceutical composition according to claim 58, wherein the pharmaceutical composition comprises a conjugate base of a pharmaceutically acceptable acid.~~

~~78. The pharmaceutical composition according to claim 58, wherein the pharmaceutical composition comprises a conjugate acid of a pharmaceutically acceptable base.~~

~~79~~16. A pharmaceutical composition according to claim 13, wherein the pharmaceutical composition ~~suitable for inhalation~~ consisting essentially of ~~an insoluble~~ vitamin A, or a pharmaceutically acceptable isomer, analog, and/or derivative thereof, or a mixture thereof, and a surfactant therein ~~at least partially solubilized with a surfactant wherein the pharmaceutical composition is in liquid aerosol form~~.

~~80~~17. A system for use in the prophylaxis or treatment of a vitamin deficiency disorder, hyperoxia damage, oxidative lung injury (lung damage), lung damage caused by chemical or environmental exposure, lung damage caused by a biological/infectious agent, lung damage caused by a chemical, biological, or radio-nuclear (CBRN) agent, and lung damage caused by radio-nuclear exposure, wherein the system comprises a therapeutically effective dose of a pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-50 and 58-79~~, and a device suitable for generating the liquid aerosol form thereby forming a plurality of liquid droplets wherein the liquid droplets produced by the system have a mass median aerodynamic diameter of less than 15 microns.

~~81. The system according to claim 80, wherein the liquid droplets have a mass median aerodynamic diameter of less than 10 microns.~~

~~82~~18. The system according to claim~~s~~ ~~80 or 81~~17, wherein the liquid droplets have a mass median aerodynamic diameter of less than 5 microns.

~~83. A system according to any of claims 80-82, wherein the liquid droplets have a mass median aerodynamic diameter of less than 3 microns.~~

~~84. A system for use in the prophylaxis or treatment of a vitamin deficiency disorder, hyperoxia damage, oxidative lung injury (lung damage), lung damage caused by chemical or environmental exposure, lung damage caused by a~~

~~biological/infectious agent, lung damage caused by a chemical, biological, or radio-nuclear (CBRN) agent, and lung damage caused by radio-nuclear exposure, wherein the system comprises a therapeutically effective dose of a pharmaceutical composition according to any of claims 51-57 and a device suitable for generating the solid aerosol form thereby forming a plurality of solid particles wherein the solid particles produced by the system have a mass median aerodynamic diameter of less than 15 microns.~~

~~85. The system according to claim 84, wherein the solid particles have a mass median aerodynamic diameter of less than 10 microns.~~

~~86. The system according to claims 84 or 85, wherein the solid particles have a mass median aerodynamic diameter of less than 5 microns.~~

~~87. A system according to any of claims 84-86, wherein the solid particles have a mass median aerodynamic diameter of less than 3 microns.~~

~~88~~19. Use of ~~T~~the pharmaceutical composition according to ~~any of~~ claim~~s~~ 1~~-79 for use~~ in the preparation of a medicament for treatment or prophylaxis ~~in a patient in need thereof~~ of a vitamin deficiency disorder, hyperoxia damage, lung damage caused by oxidative lung injury ~~(lung damage)~~, lung damage caused by chemical or environmental exposure, lung damage caused by a biological/infectious agent, lung damage caused by a chemical, biological, or radio-nuclear (CBRN) agent, ~~and~~ lung damage caused by radio-nuclear ~~exposure~~bronchopulmonary dysplasia, retinopathy of prematurity, neonatal sepsis, hypovitaminosis A, hospital-acquired sepsis, sepsis from premature rupture of membranes, meningitis, pneumonia, necrotizing enterocolitis, radiation-induced pneumonitis, a viral infection, and/or a bacterial infection.

~~89. The pharmaceutical composition according to claim 88, wherein the vitamin deficiency disorder comprises vitamin A deficiency disorder.~~

~~90. The pharmaceutical composition according to claim 89, wherein the vitamin A deficiency disorder comprises bronchopulmonary dysplasia, retinopathy of~~

prematurity, neonatal sepsis, hypovitaminosis A, hospital-acquired sepsis, sepsis from premature rupture of membranes, meningitis, pneumonia, necrotizing enterocolitis, radiation-induced pneumonitis, a viral infection. a bacterial infection, or a combination of such disorders.

91. The pharmaceutical composition according to claim 90, wherein the viral infection comprises a Sendai virus infection, a SARS-CoV-2 infection, a coronavirus infection, a bovine coronavirus infection, an infectious bronchitis virus infection, an influenza virus infection, or a measles virus infection.

92. The pharmaceutical composition according to claim 90, wherein the bacterial infection comprises a *Mycoplasma tuberculosis* infection, a *Mycoplasma pneumoniae* infection, a *Citrobacter rodentium* infection, a *Streptococcus pneumoniae* infection, or a methicillin-resistant *Staphylococcus aureus* infection.

93. The pharmaceutical composition according to any of claims 88-92, wherein the patient is a human born prematurely or a neonate.

94. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy peroxisome proliferator-activated receptor gamma signaling in lung tissue.

95. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal levels of activin receptor-like kinase 5 in lung tissue.

96. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal levels of surfactant protein C.

97. A pharmaceutical composition according to any of claims 1-79 for use in preventing β-catenin from reaching concentration levels consistent with the initiation or continuation of biological processes leading to lung physiology malformation.

98. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal levels of lung tissue physiology.

99. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal alveolar morphology.

100. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal alveolar count .

101. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal alveolar size.

102. A pharmaceutical composition according to any of claims 1-79 for use of achieving healthy normal alveolar septal thickness.

103. A pharmaceutical composition according to any of claims 1-79 for use in achieving or maintaining healthy normal lung maturation.

104. A pharmaceutical composition according to any of claims 1-79 for use in administration by inhalation for avoiding damage to normal healthy lung physiology or initiation of biological shock pathways leading to malformation of lung in any manner differing from healthy normal lung physiology that may be initiated by biological or chemical damage to lung tissue.

105. A pharmaceutical composition according to claim 103, wherein the healthy normal lung maturation status comprises one or more favorable characteristics of lung tissue histology, one or more favorable levels of one or more indicators of metabolic status, or a combination thereof.

106. A pharmaceutical composition according to claim 105, wherein the lung histology characteristic comprises maintenance of healthy levels of alveolar count, alveolar size, alveolar septal thickness, alveolar neutrophil infiltration, interstitial neutrophil infiltration, or a combination thereof.

~~107. A pharmaceutical composition according to claim 105, wherein the metabolic status comprises maintenance of healthy levels of Surfactant Protein A, Surfactant Protein B, Surfactant Protein C, Surfactant Protein D, Peroxisome Proliferator-activated Receptor Gamma, BCL-2 Protein, BCL-2 Associated X Protein, Retinoic Acid X Receptor Alpha, Retinoic Acid X Receptor Beta, Retinoic Acid X Receptor Gamma, Vascular Endothelial Growth Factor, T-complex Protein 1 Subunit Alpha (also known as CTP:Phosphocholine Cytidylyltransferase Subunit Alpha), Fetal Liver Kinase 1, Beta-catenin, Activin Receptor-Like Kinase 5, or lung surfactant phospholipid synthesis rate, either singly or in a combination thereof.~~

~~108. A pharmaceutical composition according to claim 104, wherein the biological or chemical damage is caused by exposure to excess oxygen, any chemical that damages lung tissue, viral lung infection, bacterial lung infection, a genetic defect or a disease, either singly or a combination thereof.~~

~~109. A pharmaceutical composition according to claims 104 or 108, wherein the chemical damage is a hyperoxic condition.~~

~~110. A pharmaceutical composition according to claims 104, 108 and 109, wherein the biological shock pathways include the wnt pathway, apoptotic responses, necrosis, initiation of fibrosis, or initiation of scarring, either singly or a combination thereof.~~

~~111. A pharmaceutical composition according to any of claims 104 and 108-110 for use in preventing a protein achieving concentration levels consistent with the initiation or continuation of biological processes leading to lung physiology malformation wherein the protein comprises Beta-catenin, Activin Receptor-like Kinase 5, Lymphoid Enhancing Binding Factor 1, Transforming Growth Factor Beta, calponin, fibronectin, or one or more proteins of the wnt pathway, either alone or in combination.~~

~~112. A pharmaceutical composition according to any of claims 103-111 for treating a human or an animal.~~

~~113. A pharmaceutical composition for use according to claim 112 for treating a prematurely born neonate.~~

~~114. The pharmaceutical composition according to any of claims 1-79 for use in the treatment or prophylaxis of an infection caused by one or more infectious agents.~~

~~115. The pharmaceutical composition according to claim 114 for use in the treatment or prophylaxis of an infection caused by one or more bacterial agents, one or more viral agents, one or more mycobacterial agents, or a combination thereof.~~

~~116. The pharmaceutical composition according to any of claims 114 and 115 for use in the treatment or prophylaxis of an infection caused by one or more antibiotic resistant bacteria.~~

~~117. The pharmaceutical composition according to claim 116 for use in the treatment or prophylaxis of an infection caused by a methicillin resistant *Staphyloccus aureus*.~~

~~118. The pharmaceutical composition according to claim 115 for use in the treatment or prophylaxis of an infection caused by a coronavirus.~~

~~119. The pharmaceutical composition according to claim 118 for use in the treatment or prophylaxis of an infection caused by SARS-CoV-2.~~

~~120. The pharmaceutical composition according to any of claims 114-119 for use in the treatment or prophylaxis of an infection or infections that target the respiratory system as the primary location of entry.~~

~~121. The pharmaceutical composition according to claim 120 for use in the treatment or prophylaxis of an infection or infections that target the lung, the nasal pathway, the oral cavity, or a combination thereof.~~

~~122. The pharmaceutical composition according to any of claims 114-121 for use in minimizing lung damage caused by an infectious agent or agents.~~

~~123. The pharmaceutical composition according to claim 122 for use in minimizing the onset of acute respiratory distress syndrome.~~

~~124. The pharmaceutical composition according to any of claims 114-123 for use in the treatment of prophylaxis of a condition or conditions facilitated by the presence of an infectious agent or agents.~~

~~125. The pharmaceutical composition according to claim 124 for use in the treatment or prophylaxis of iatrogenic damage to lung tissue caused by the introduction of increased oxygen levels used to counter reduced pulmonary function caused by an infectious agent or agents.~~

~~126. The pharmaceutical composition according to claim 124 for use of achieving healthy normal alveolar morphology in a patient that has been treated for an infectious agent or agents.~~

~~127. The pharmaceutical composition according to claim 126 for use in achieving normal alveolar septal thickness, radial alveolar count, or alveolar mean linear intercept, alone or in combination.~~

~~128. The pharmaceutical composition according to claim 124 for use in the treatment of prophylaxis of pneumonia, pneumonitis, other infections, asthma, angina, exacerbated arthritis, allergies, and intercalated infections, or a combination thereof.~~

~~129. The pharmaceutical composition according to any of claims 1-79 for use in the suppression of over-stimulation of the immune response in a patient in need thereof.~~

~~130. The pharmaceutical composition according to any of claims 1-79 for use in the treatment of infection-induced vitamin A deficiency.~~

~~1312~~0. Use of ~~T~~the pharmaceutical composition according to ~~any of~~ claim~~s~~ 1-~~79~~ in the preparation of a medicament for ~~use in~~ supporting a patient's immune

response in improving the efficacy of a vaccine against an infectious agent in a patient.

~~132. The pharmaceutical composition according to any of claims 1-79 for use in the stimulation of phagosome maturation or recruiting of white blood cells to the site of an infection.~~

~~133. The pharmaceutical composition according to any of claims 1-79 for use in improving the efficacy of a vaccine against an infectious agent in a patient.~~

~~134. The pharmaceutical composition according to any of claims 1-79 for use in countering suppressed levels of bloodborne vitamin A, suppressed levels of lung tissue vitamin A, or a combination thereof induced by systemic response to an infectious agent.~~

~~135. The pharmaceutical composition according to claim 90, wherein the vitamin A deficiency disorder is bronchopulmonary dysplasia or retinopathy of prematurity.~~

~~136. The pharmaceutical composition according to claim 135 , wherein the vitamin A deficiency disorder is bronchopulmonary dysplasia.~~

~~137. The pharmaceutical composition according to claim 91, wherein the pharmaceutical composition further comprises an anti-viral compound comprising oseltamivir, zanamivir, peramivir, ribavirin, remdesivir, a nucleoside analog or analogs, an interferon or interferons, a protease inhibitor or inhibitors, a reverse transcriptase inhibitor or inhibitors, and neuramidinidase inhibitor or inhibitors, or a mixture thereof.~~

~~138. A method of achieving or maintaining healthy normal lung maturation status comprising administering by inhalation a pharmaceutical composition according to any of claims 1-79.~~

~~139. The method according to claim 138, wherein the healthy normal lung maturation status comprises one or more favorable characteristics of lung tissue~~

histology, one or more favorable levels of one or more indicators of metabolic status, or a combination thereof.

140. The method according to claims 138 and 139, wherein the lung histology characteristic comprises maintenance of healthy levels of alveolar count, healthy levels of alveolar size, healthy levels of alveolar septal thickness, or a combination thereof.

141. The method according to claims 138-140, wherein the metabolic status comprises maintenance of healthy levels of Surfactant Protein A, Surfactant Protein B, Surfactant Protein C, Surfactant Protein D, Peroxisome Proliferator-activated Receptor Gamma signaling, BCL-2 Protein, BCL-2 Associated X Protein, Retinoic Acid X Receptor Alpha, Retinoic Acid X Receptor Beta, Retinoic Acid X Receptor Gamma, Vascular Endothelial Growth Factor, T-complex Protein 1 Subunit Alpha (also known as CTP:Phosphocholine Cytidylyltransferase Subunit Alpha), Fetal Liver Kinase 1, or lung surfactant phospholipid synthesis rate, either singly or in a combination thereof.

142. The method of avoiding damage to normal healthy lung physiology or initiation of biological repair or shock pathways leading to malformation of lung in any manner differing from healthy normal lung physiology that may be initiated by biological or chemical damage to lung tissue, a vitamin A deficiency, hyperoxia damage, oxidative lung injury (lung damage), lung damage caused by chemical or environmental exposure, lung damage caused by bacterial infections and/or viral infections, lung damage caused by a chemical, biological, or radio-nuclear (CBRN) agent, and lung damage caused by radio-nuclear exposure, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

143. The method according to claim 142, wherein the biological or chemical damage is caused by exposure to excess oxygen, any chemical that damages lung tissue, viral lung infection, bacterial lung infection, a genetic defect, or a disease, either singly or a combination thereof.

144. The method according to claims 142 and 143, wherein the chemical damage is a hyperoxic condition.

145. A method according to any of claims 142-144, wherein the biological repair or shock pathways comprise the wnt pathway, apoptotic responses, necrosis, initiation of fibrosis, or initiation of scarring, either singly or a combination thereof.

146. The method according to any of claims 142-145, wherein proteins comprising Beta-catenin, Activin Receptor-like Kinase 5, Lymphoid Enhancing Binding Factor 1, Transforming Growth Factor Beta, calponin, fibronectin, or one or more proteins of the wnt pathway, either alone or in combination, are prevented from achieving concentration levels consistent with the initiation or continuation of biological processes leading to lung physiology malformation.

147. The method according to any of claims 138-146, wherein which the treatment is applied to a human or an animal.

148. The method according to claim 147, wherein the treatment is applied to a prematurely born neonate.

149. A method of achieving healthy peroxisome proliferator-activated receptor gamma signaling in lung tissue, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

150. A method of achieving healthy normal levels of activin receptor-like kinase 5 in lung tissue, comprising administering by inhalation the composition according to any of claims 1-79.

151. A method of achieving healthy normal levels of surfactant protein C, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

152. A method of preventing β-catenin from reaching concentration levels consistent with the initiation or continuation of biological processes leading to lung physiology malformation, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

153. A method of achieving healthy normal development of lung tissue physiology, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

154. A method of achieving healthy normal alveolar morphology, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

155. A method of achieving healthy normal alveolar count, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

156. A method of achieving healthy normal alveolar size, comprising administering by inhalation the pharmaceutical composition according to claims 1-79.

157. A method of achieving healthy normal alveolar septal thickness, comprising administering by inhalation the pharmaceutical composition according to any of claims 1-79.

158. The method for the treatment or prophylaxis of an infection caused by one or more infectious agents comprising administration to a patient in need thereof of a therapeutically effective amount of a pharmaceutical composition according to any one of claims 1-79.

159. The method according to claim 158, wherein the administration is by inhalation.

~~160. The method according to claim 158, wherein the administration is by intravenous or intraarterial parenteral administration,~~

~~161. The method of claim 158, wherein the administration is by oral administration.~~

~~162. The method according to any of claims 158-161, wherein the one or more infectious agents is one or more bacterial agents, one or more viral agents, one or more mycobacterial agents, or a combination thereof.~~

~~163. The method according to any of claims 158-162, wherein the one or more infectious agents is one or more antibiotic resistant bacteria.~~

~~164. The method according to claim 163, wherein the is the one or more antibiotic resistant bacteria comprises methicillin resistant *Staphylococcus aureus*.~~

~~165. The method according to claim 162, wherein the one or more viral agents comprises a coronavirus.~~

~~166. The method according to claim 165, wherein the coronavirus is SARS-CoV-2.~~

~~167. The method according to any of claims 158-166, wherein the infectious agent or agents target the respiratory pathway as the primary location of entry.~~

~~168. The method according to claim 167, wherein the target of the respiratory pathway is the lung, the nasal passages, the oral cavity, or a combination thereof.~~

~~169. The method according to any of claims 158-168 for minimizing lung damage caused by the infectious agent or agents.~~

~~170. The method according to claim 169, wherein the minimizing lung damage minimizes the onset of acute respiratory distress syndrome.~~

~~171. The method according to any of claims 158-170 for the treatment or prophylaxis of a condition or conditions facilitated by the presence of the infectious agent or agents.~~

~~172. The method according to claim 171, wherein the condition being treated or prevented is iatrogenic damage to lung tissue caused by the introduction of increased oxygen levels used to counter reduced pulmonary function caused by an infectious agent or agents.~~

~~173. A method according to claim 171, wherein the treatment or prophylaxis achieves healthy normal alveolar morphology in a patient that has been treated for an infectious agent or agents.~~

~~174. A method according to claim 173, wherein the treatment or prophylaxis achieves healthy normal alveolar septal thickness, radial alveolar count, or alveolar septal thickness, alone or in combination.~~

~~175. The method according to claim 171, wherein the condition is selected from pneumonia, pneumonitis, an infection, asthma, angina, exacerbated arthritis, allergies, radiation-induced pneumonitis, sepsis, intercalated infections, or a combination thereof.~~

~~176. A method of suppressing the over-stimulation of the immune response in a patient in need thereof, comprising administering a therapeutically effective amount of a pharmaceutical composition according to any of claims 1-79.~~

~~177. A method of treating infection-induced vitamin A deficiency in a patient in need thereof, comprising administering a therapeutic effective amount of a pharmaceutical composition according to any of claims 1-79.~~

~~178. A method of supporting a patient's immune response, comprising administering a pharmaceutical composition according to any of claims 1-79.~~

~~179. The method according to claim 175, wherein the supporting comprises stimulation of phagosome maturation or recruiting of white blood cells to the site of an infection.~~

~~180. A method of improving the efficacy in a patient of a vaccine against an infectious agent, comprising administering a pharmaceutical composition according to any of claims 1-79.~~

~~181. A method of countering suppressed levels of bloodborne vitamin A, suppressed levels of lung tissue vitamin A, or a combination thereof induced by systemic response to an infectious agent in a patient, comprising administering by inhalation a pharmaceutical composition according to any of claims 1-79.~~

~~182. A method of prophylactically protecting against hyperoxia damage to a lung, comprising administering to a subject the pharmaceutical composition according to any of claims 1-79.~~

~~183. A method of preventing iatrogenic damage to a lung, comprising administering to a subject the pharmaceutical composition according to any of claims 1-79.~~

~~184. A method of treating radiation exposure of a lung, comprising administering to a subject the pharmaceutical composition according to any of claims 1-79.~~

~~185. A method of treating oxidative damage in a lung, comprising administering to a subject the pharmaceutical composition according to any of claims 1-79.~~

~~186. A method of treating inhalation of radioactive particles into a lung, comprising administering to a subject a pharmaceutical composition according to any of claims 1-79.~~

~~187. A method of treating a lung that has been exposed to a noxious chemical, comprising administering to a subject a pharmaceutical composition according to any of claims 1-79.~~

188. The method according to claim 187, wherein the noxious chemical comprises chlorine, phosphine, or smoke from a fire.

189. A method of treating vitamin deficiency disorders, oxidative lung injury (lung damage), lung damage caused by chemical or environmental exposure, lung damage caused by a biological/infectious agent, lung damage caused by a chemical, biological, or radio-nuclear (CBRN) agent, or lung damage caused by radio-nuclear exposure, comprising administering to a subject in need thereof a therapeutically effective amount of the composition according to any of claims 1-79.

190. The method according to claim 189, wherein the biological/infectious agent causes a bacterial infection.

191. The method according to claim 189, wherein the biological/infectious agent causes a viral infection.

192. The method according to claim 189, wherein the lung damage caused by radio-nuclear exposure comprises acute radiation-induced lung injury/damage

193. The method according to claim 189, wherein the lung damage caused by radio-nuclear exposure comprises chronic lung injury/damage.

194. The method according to claim 189, wherein the lung damage caused by radio-nuclear exposure comprises delayed effects of acute radiations exposure (DEARS).

195. The method according to claim 189, wherein the vitamin deficiency disorder comprises nutritional insufficiency, premature birth, genetic defect, or a disorder induced pursuant to infection or disease states.