What is claimed is:

1. An immunogenic composition, comprising a ribonucleic acid (RNA) of a varicella-zoster virus (VZV) encoding a variant of a wild-type VZV gE glycoprotein;

wherein the sequence of the wild-type VZV gE glycoprotein is SEQ ID NO: 3;

wherein the variant of the VZV gE glycoprotein is the variant selected from: YK-VZV-020, YK-VZV-030, YK-VZV-031, YK-VZV-009, YK-VZV-010, YK-VZV-011, YK-VZV-012, YK-VZV-013 and YK-VZV-014,

Name	Sequence truncation	Site mutation	Sequence deletion
YK-VZV-020	gE (1 to 573)	Y569K	No sequence deletion
YK-VZV-030	gE (1 to 587)	A568D; Y569K; R570E; V571K; Y582A	No sequence deletion
YK-VZV-031	gE (1 to 587)	A568D; Y569K; R570E; V571K; Y582G	No sequence deletion
YK-VZV-009	No sequence truncation	Y569K; Y582A	No sequence deletion
YK-VZV-010	No sequence truncation	Y569K; Y582A; S593A; S595A; T596A; T598A	No sequence deletion
YK-VZV-011	No sequence truncation	A568D; Y569K; R570E; V571K	No sequence deletion
YK-VZV-012	No sequence truncation	A568D; Y569K; R570E; V571K; S593A; S595A; T596A; T598A	No sequence deletion
YK-VZV-013	No sequence truncation	A568D; Y569K; R570E; V571K; Y582A	No sequence deletion
YK-VZV-014	No sequence truncation	A568D; Y569K; R570E; V571K; Y582A; S593A; S595A; T596A; T598A	No sequence deletion

.

2. The composition according to claim 1, wherein the variant of the VZV gE glycoprotein is the variant selected from: YK-VZV-020, YK-VZV-010, YK-VZV-011 and YK-VZV-013,

Name	Sequence truncation	Site mutation	Sequence deletion
YK-VZV-020	gE (1 to 573)	Y569K	No sequence deletion
YK-VZV-010	No sequence truncation	Y569K; Y582A; S593A; S595A; T596A; T598A	No sequence deletion
YK-VZV-011	No sequence	A568D; Y569K; R570E;	No sequence deletion

	truncation	V571K	
YK-VZV-013	No sequence truncation	A568D; Y569K; R570E; V571K; Y582A	No sequence deletion

.

3. The composition according to claim 1, wherein the amino acid sequence of the variant of the VZV gE glycoprotein is as shown in SEQ ID NO: 27, 31, 35, 39, 43, 47, 71, 111, or 115.

4. The composition according to claim 1, wherein the RNA of the VZV has an open reading frame (ORF) encoding a VZV gE glycoprotein, the sequence of the open reading frame is as shown in SEQ ID NO: 26,30, 34, 38, 42, 46, 70, 110 or 114.

5. The composition according to claim 1, wherein the RNA of the VZV further comprises a 5′ untranslated region (UTR).

6. The composition according to claim 5, wherein the sequence of the 5′ UTR is as shown in SEQ ID NO: 173, 174, 175, 176, or 177.

7. The composition according to claim 1, wherein the RNA of the VZV further comprises a 3′ untranslated region (UTR).

8. The composition according to claim 7, wherein the sequence of the 3′ UTR is as shown in SEQ ID NO: 178, 179, 180, or 181.

9. The composition according to claim 1, wherein the RNA of the VZV further comprises a poly(A) tail.

10. The composition according to claim 9, wherein the poly(A) tail has a length of 50 to 150 nucleotides.

11. The composition according to claim 1, wherein the RNA of the VZV further comprises

a 5′ terminal cap.

12. The composition according to claim 11, wherein the 5′ terminal cap is 7mG(5′)ppp(5′)NlmpNp.

13. The composition according to claim 4, wherein the sequence of the open reading frame is codon-optimized.

14. The composition according to claim 13, wherein the sequence of the open reading frame comprises at least one base modification.

15. The composition according to claim 14, wherein the base modification is selected from one or more of the following: pseudouridine, N1-methylpseudouridine, N1-ethylpseudouridine, 2-thiouridine, 4′-thiouridine, 5-methylcytosine, 2-thio-1-methyl-1-deaza-pseudouridine, 2-thio-1-methyl-pseudouridine, 2-thio-5-aza-uridine, 2-thio-dihydropseudouridine, 2-thio-dihydrouridine, 2-thio-pseudouridine, 4-methoxy-2-thio-pseudouridine, 4-methoxy-pseudouridine, 4-thio-1-methyl-pseudouridine, 4-thio-pseudouridine, 5-aza-uridine, dihydropseudouridine, 5-methoxyuridine, and 2′-O-methyluridine.

16. The composition according to claim 15, wherein the base modification is replacement of uracil by pseudouridine and/or N1-methylpseudouridine.

17. The composition according to claim 14, 15 or 16, wherein the base modification is 1 to 100% base modification.

18. The composition according to claim 17, wherein the base modification is 100% base modification.

19. The composition according to claim 1, wherein the sequence of the RNA of the VZV is as shown in SEQ ID NO: 28, 32, 36, 40, 44, 48, 72, 112, or 116.

20. The composition according to claim 1, wherein the RNA of the VZV is mRNA.

21. The composition according to claim 1, wherein the sequence of the RNA encoding the VZV gE glycoprotein corresponding to a DNA sequence shown in SEQ ID NO: 25, 29, 33, 37, 41, 45,69, 109, or 113.

22. A method for preparing the composition according to any one of claims 1 to 21, comprising:

providing a template that can transcribe the RNA of the VZV;

transcribing the RNA using the template under conditions suitable for transcription.

23. The method according to claim 22, further comprising a purification step selected from: lithium chloride precipitation, affinity chromatography, ultrafiltration exchange, and cellulose chromatography.

24. The composition according to claim 1, wherein the composition is a vaccine, and further comprises a pharmaceutically acceptable carrier.

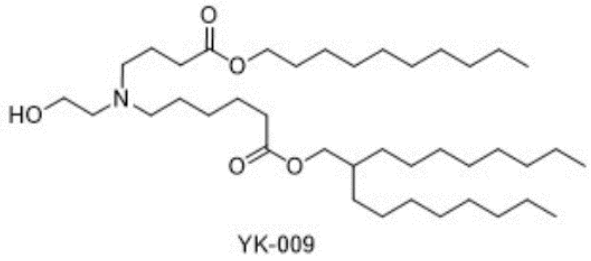
25. The composition according to claim 24, wherein the carrier comprises a lipid mixture.

26. The composition according to claim 25, wherein the lipid mixture is a lipid nanoparticle (LNP).

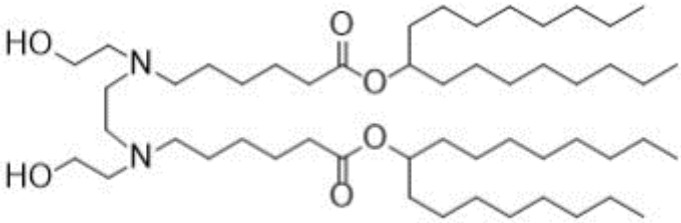
27. The composition according to claim 24, 25, or 26, wherein the vaccine is an mRNA vaccine.

28. The composition according to claim 27, wherein the lipid nanoparticle (LNP) comprises a cationic lipid, a neutral lipid, a structural lipid, and a polymer-conjugated lipid.

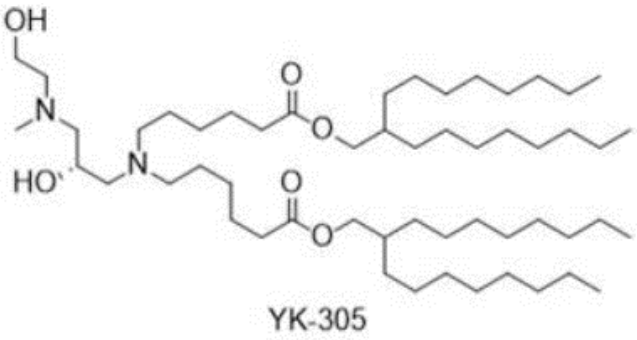
29. The composition according to claim 28, wherein the cationic lipid is selected from: YK-009, YK-401, YK-305, ALC0315, SM102 and DLIN-MC3-DMA:



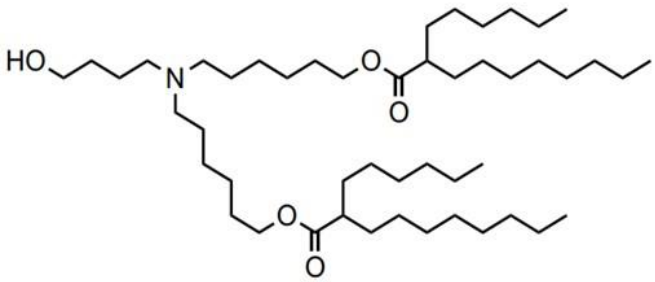
YK-009



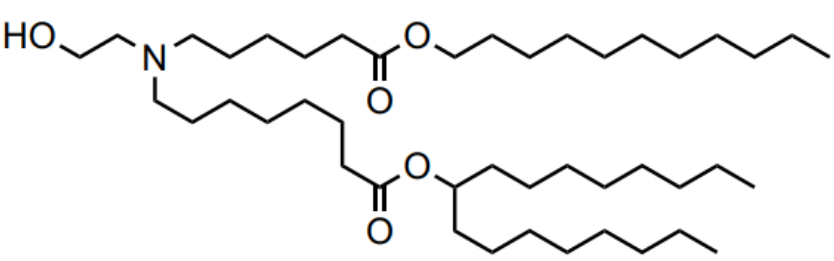
YK-401



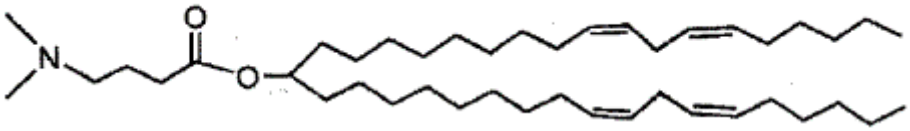
YK-305



ALC0315



SM102



DLIN-MC3

.

30. The composition according to claim 28, wherein the molar ratio of the cationic lipid to the neutral lipid is (1 to 10):1.

31. The composition according to claim 28, wherein the molar ratio of the cationic lipid to the structural lipid is (1 to 5):1.

32. The composition according to claim 28, wherein the molar ratio of the cationic lipid, the neutral lipid, the structural lipid, and the polymer-conjugated lipid is (25 to 75):(5 to 25):(15 to 65):(0.5 to 10).

33. The composition according to claim 32, wherein the molar ratio of the cationic lipid, the neutral lipid, the structural lipid, and the polymer-conjugated lipid is (35 to 49):(7.5 to 15):(35 to 55):(1 to 5).

34. The composition according to claim 33, wherein the molar ratio of the cationic lipid, the neutral lipid, the structural lipid, and the polymer-conjugated lipid is 49:10:43.5:1.5.

35. The composition according to claim 28, wherein the neutral lipid is selected from phosphatidylcholine, phosphatidylethanolamine, sphingomyelin, ceramide, derivatives thereof, and any combination thereof.

36. The composition according to claim 28, wherein the neutral lipid is selected from: 1,2-dilinoleoyl-sn-glycero-3-phosphocholine (DLPC), 1,2-dimyristoyl-sn-glycero-phosphocholine (DMPC), 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC), 1,2-dipalmitoyl-sn-glycero-3-phosphocholine (DPPC), 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC), 1,2-diundecanoyl-sn-glycero-phosphocholine (DUPC), 1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine (POPC), 1,2-di-O-octadecenyl-sn-glycero-3-

phosphocholine (18:0 Diether PC), 1-oleoyl-2-cholesterylhemisuccinoyl-sn-glycero-3-phosphocholine (OChemsPC), 1-hexadecyl-sn-glycero-3-phosphocholine (C16 Lyso PC), 1,2-dilinolenoyl-sn-glycero-3-phosphocholine, 1,2-diarachidonoyl-sn-glycero-3-phosphocholine, 1,2-didocosahexaenoyl-sn-glycero-3-phosphocholine, 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (DOPE), 1,2-diphytanoyl-sn-glycero-3-phosphoethanolamine (ME 16.0 PE), 1,2-distearoyl-sn-glycero-3-phosphoethanolamine, 1,2-dilinoleoyl-sn-glycero-3-phosphoethanolamine, 1,2-dilinolenoyl-sn-glycero-3-phosphoethanolamine, 1,2-diarachidonoyl-sn-glycero-3-phosphoethanolamine, 1,2-didocosahexaenoyl-sn-glycero-3-phosphoethanolamine, 1,2-dioleoyl-sn-glycero-3-phospho-rac-(1-glycerol) sodium salt (DOPG), dipalmitoyl phosphatidylglycerol (DPPG), palmitoyl oleoyl phosphatidylethanolamine (POPE), distearoyl-phosphatidyl-ethanolamine (DSPE), dipalmitoyl phosphatidylethanolamine (DPPE), dimyristoyl phosphoethanolamine (DMPE), 1-stearoyl-2-oleoyl-stearoylethanolamine (SOPE), 1-stearoyl-2-oleoyl-phosphatidylcholine (SOPC), sphingomyelin, phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, phosphatidylinositol, phosphatidic acid, palmitoyl oleoyl phosphatidylcholine, lysophosphatidylcholine, lysophosphatidylethanolamine (LPE), and mixtures thereof.

37. The composition according to claim 28, wherein the neutral lipid is DOPE and/or DSPC.

38. The composition according to claim 28, wherein the structural lipid is selected from: sterol, cholesterol, nonsterol, sitosterol, ergosterol, campesterol, stigmasterol, brassinosterol, tomatine, ursolic acid, α-tocopherol, corticosteroid, and any combination thereof.

39. The composition according to claim 38, wherein the structural lipid comprises cholesterol.

40. The composition of claim 39, wherein the structural lipid is cholesterol.

41. The composition according to claim 28, wherein the polymer-conjugated lipid is selected from: PEG-modified phosphatidylethanolamine, PEG-modified phosphatidic acid, PEG-modified ceramide, PEG-modified dialkylamine, PEG-modified diacylglycerol, PEG-modified dialkylglycerol, and any combination thereof.

42. The composition according to claim 41, wherein the polymer-conjugated lipid is selected from: distearoyl phosphatidylethanolamine polyethylene glycol 2000 (DSPE-PEG2000), dimyristoylglycero-3-methoxypolyethylene glycol 2000 (DMG-PEG2000), methoxypolyethylene glycol ditetradecylacetamide (ALC-0159), and any combination thereof.

43. The composition according to claim 24, wherein the RNA of the VZV has an effective dose of 25 μg to 200 μg.

44. The composition according to claim 43, wherein the VZV has an effective dose of 50 μg to 100 μg.

45. The composition according to claim 24, wherein the vaccine is an injection.

46. The composition according to claim 45, wherein the vaccine is a liquid preparation or a lyophilized preparation.

47. A method for preparing the composition according to any one of claims 24 to 46, comprising: mixing the RNA of the VZV with the pharmaceutically acceptable carrier.

48. The method according to claim 47, wherein the method comprises encapsulating at least a portion of the RNA in lipid nanoparticles.

49. A use of the composition according to any one of claims 1 to 21, 24 to 46 in the preparation of a medicament for inducing a protective immune response against VZV in a subject.

50. The use according to claim 49, wherein the protective immune response comprises the production of a neutralizing antibody.

51. The composition according to claim 1, for use in inducing a protective immune

response against VZV in a subject in need thereof.

52. The composition according to claim 51, wherein the protective immune response comprises the production of a neutralizing antibody.