

CLAIMS:

1. An RNA molecule encoding a varicella-zoster virus (VZV) glycoprotein E (gE) polypeptide, wherein the RNA molecule comprises at least one open reading frame comprising a nucleic acid sequence having at least 98% identity to any one of the sequences selected from any one of SEQ ID NO: 147, 148, 149, 151, 153 and 157.
2. The RNA molecule of claim 1, wherein the VZV gE polypeptide comprises any one of the amino acid sequences selected from SEQ ID NO: 1 to 5.
3. The RNA molecule of claim 1 or claim 2, wherein the open reading frame is transcribed from a nucleic acid sequence comprising any one of the sequences selected from SEQ ID NO:13, 14, 15, 17, 19 and 23.
4. The RNA molecule of any one of claims 1 to 3, wherein the open reading frame comprises a nucleic acid sequence having at least 99% identity to any one of the sequences selected from SEQ ID NO:147, 148, 149, 151, 153 and 157.
5. The RNA molecule of any one of claims 1 to 4, wherein the open reading frame comprises a nucleic acid sequence selected from any one of SEQ ID NO:147, 148, 149, 151, 153 and 157.
6. The RNA molecule of any one of claims 1 to 5, further comprising a 5' untranslated region (5' UTR), optionally wherein the 5' UTR comprises a sequence selected from any one of SEQ ID NO: 281, 312 or 313; and/or further comprising a 3' untranslated region (3' UTR), optionally wherein the 3' UTR comprises the sequence selected from any one of SEQ ID NO: 284, 314 or 317.
7. The RNA molecule of any one of claims 1 to 6, wherein the RNA molecule further comprises a 5' cap moiety and/or a 3' poly-A tail, optionally wherein the poly-A tail comprises a sequence selected from any one of SEQ ID NO: 287 or 315.

8. The RNA molecule of any one of claims 1 to 7, wherein the open reading frame comprises a G/C content of at least 55%, at least 60%, at least 65%, at least 70%, at least 75%, 50% to 75%, or 55% to 70%.

9. The RNA molecule of any one of claims 1 to 8, wherein the encoded VZV gE polypeptide localizes in the cellular membrane, localizes in the Golgi and/or is secreted.

10. The RNA molecule of any one of claims 1 to 9, wherein each uridine is replaced by N1-methylpseudouridine (Ψ); and/or wherein the RNA is a mRNA.

11. A composition comprising the RNA molecule of any one of claims 1 to 10, wherein the RNA molecule is formulated in a lipid nanoparticle (LNP);

optionally wherein the lipid nanoparticle comprises at least one of a cationic lipid, a PEGylated lipid, a neutral lipid, and a steroid or steroid analog;

optionally wherein the cationic lipid is (4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate) (ALC-0315);

optionally wherein the PEGylated lipid is PEG-modified phosphatidylethanolamine, PEG-modified phosphatidic acid, PEG-modified ceramides (e.g. PEG-CerC14 or PEG-CerC20), PEG-modified dialkylamines, PEG-modified diacylglycerols, PEG-modified dialkylglycerols, 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide (ALC-0159), glycol-lipids including PEG-c-DOMG, PEG-c-DMA, PEG-s-DMG, N-[(methoxy polyethylene glycol)2000]carbonyl-1,2-dimyristoylpropyl-3-amine (PEG-c-DMA), and PEG-2000-DMG, PEGylated diacylglycerol (PEG-DAG) such as 1-(monomethoxy-polyethyleneglycol)-2,3-dimyristoylglycerol (PEG-DMG), a PEGylated phosphatidylethanolamine (PEG-PE), a PEG succinate diacylglycerol (PEG-S-DAG) such as 4-O-(2',3'-di(tetradecanoyloxy)propyl-1-O-((o-methoxy(polyethoxy)ethyl)butanedioate (PEG-S-DMG), a PEGylated ceramide (PEG-cer), or a PEG dialkoxypolypropylcarbamate such as co-methoxy(polyethoxy)ethyl-N-

(2,3-di(tetradecanoxy)propyl)carbamate or 2,3-di(tetradecanoxy)propyl-N-(ω -methoxy(polyethoxy)ethyl)carbamate;

optionally wherein the neutral lipid is 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC), distearoylphosphatidylcholine (DSPC), dioleoylphosphatidylcholine (DOPC), dipalmitoylphosphatidylcholine (DPPC), dioleoylphosphatidylglycerol (DOPG), dipalmitoylphosphatidylglycerol (DPPG), dioleoyl-phosphatidylethanolamine (DOPE), palmitoyl-oleoylphosphatidylcholine (POPC), palmitoyl-oleoyl-phosphatidylethanolamine (POPE) and dioleoyl-phosphatidylethanolamine 4-(N-maleimidomethyl)-cyclohexane-1-carboxylate (DOPE-mal), dipalmitoyl phosphatidyl ethanolamine (DPPE), dimyristoylphosphoethanolamine (DMPE), distearoyl- phosphatidylethanolamine (DSPE), 16-O-monomethyl PE, 16-O-dimethyl PE, 18-1-trans PE, 1-stearioyl-2-oleoylphosphatidylethanol amine (SOPE), or 1,2-dielaidoyl-sn-glycero-3-phosphoethanolamine (transDOPE); and

optionally wherein the steroid or steroid analog is cholesterol.

12. An effective amount of the RNA molecule or composition of any one of claims 1 to 11 for use in inducing an immune response against VZV in a subject.

13. An effective amount of the RNA molecule or composition of any one of claims 1 to 11 for use in preventing, treating or ameliorating herpes zoster (shingles) or postherpetic neuralgia in a subject.

14. Use of the RNA molecule or composition of any one of claims 1 to 11 in the manufacture of a medicament for preventing, treating or ameliorating herpes zoster (shingles) or postherpetic neuralgia in a subject.

15. Use of the RNA molecule or composition of any one of claims 1 to 11 in the manufacture of a medicament for inducing an immune response against VZV in a subject.

16. The use of claim 14 or claim 15, wherein the subject is less than 1 year of age, 1 year of age or older, 5 years of age or older, 10 years of age or older, 20 years of age or older, 30 years of age or older, 40 years of age or older, 50 years of age or older, 60 years of age or older, 70 years of age or older.

17. The use of any one of claims 14 to 16, wherein the RNA molecule or composition is to be administered as a vaccine.

18. The use of any one of claims 14 to 17, wherein the subject is to be administered a single dose, two doses, three doses or more, and optionally, a booster dose of the RNA molecule or composition.