Claims

1. Use of a composition, comprising six mRNAs, wherein each mRNA encodes a different antigen selected from the group consisting of:
• 5T4 (Trophoblast glycoprotein; TPBG);
• Survivin (Baculoviral IAP repeat-containing protein 5; BIRC5),
• NY-ESO-1 (New York esophageal squamous cell carcinoma 1; CTAG1B),
• MAGE-C1 (Melanoma antigen family C1);
• MAGE-C2 (Melanoma antigen family C2), and
• MUC1]. (Mucin 1),
in the manufacture of a medicament for the treatment of a non-small cell lung cancer,
wherein each mRNA is identical to a different RNA sequence selected from the RNA sequences according to SEQ ID NO: 19, 20, 21, 22, 23 or 24, wherein each mRNA is complexed with a cationic compound selected from the group consisting of a cationic peptide, a cationic protein, a cationic polysaccharide, a cationic polymer and a cationic lipid, and
wherein a chemotherapeutic agent is to be administered as well as the medicament as part of any treatment.

2. The use according to claim 1, wherein the cationic compound is a polycation.

3 The use according to claim 2 wherein the polycation is at least one of protamine or oligo-fectamine..

4. The use according to any one of claims 1 to 3, wherein the N/P ratio of at least one mRNA to the one or more polycations is in the range of about 0.1 to 10, or about 0.3 to 4, or about 0.5 to 2, or about 0.7 to 2 or about 0.7 to 1.5.

5. The use according to any one of claims 1 to 4 comprising at least one RNA, which is complexed with one or more polycations, and at least one free RNA, wherein the complexed RNA is preferably identical to the free RNA.

6. The use according to any one of claims 1 to 5, wherein the composition additionally comprises at least one adjuvant.

7. The use according to claim 6, wherein the at least one adjuvant is selected from the group consisting of:
cationic or polycationic compounds, comprising cationic or polycationic peptides or proteins, nucleoline, sperrnin or spermidine, poly-L-lysine (PLL), poly-arginine, basic polypeptides, cell penetrating peptides (CPPs), HIV-binding peptides, Tat, HIV-1 Tat (HIV), Tat-derived peptides, Penetratin, VP22 derived or analog peptides, HSV VP22 (Herpes simplex), MAP, KALA or protein transduction domains (PTDs), PpT620, prolin-rich peptides, arginine-rich peptides, lysine-rich peptides, MPG-peptide(s), Pep-I, L-oligomers, Calcitonin peptide(s), Antennapedia-derived peptides (particularly from Drosophila antennapedia), pAntp, pIsl, FGF, Lactoferrin, Transportan, Buforin-2, Bac715-24, SynB, SynB(1), pVEC, hCT-derived peptides, SAP, protamine, spermine, spermidine, or histones, cationic polysaccharides, chitosan, polybrene, cationic polymers, polyethyleneimine (PEI), cationic lipids, DOTMA: [1-(2,3-sioleyloxy)propyl] -N,N,N-trimethylammonium chloride, DMRIE, di-C14-amidine, DOTIM, SAINT, DC-Chol, BGTC, CTAP, DOPC, DODAP, DOPE: Dioleyl phosphatidylethanol-amine, DOSPA, DODAB, DOIC, DMEPC, DOGS: Dioctadecylamidoglycylspermin, DIMRI: Dimyristo-oxypropyl dimethyl hydroxyethyl ammonium bromide, DOTAP: dioleoyloxy-3-(trirnethylarnmonio) propane, DC-6-I4: O,O-ditetradecanoyl-N-(α-trimethylammonioacetyl)diethanolamine chloride, CLIP 1: rac[(2,3-dioctadecyloxypropyl)(2-hydroxyethyl)]-dimethylammonium chloride, CLIP6: rac-[2(2,3-dihexadecyl-oxypropyloxymethyloxy)ethyl]trimethylammonium, CLIP9: rac-[2(2,3-dihexadecyloxypropyl-oxysuccinyloxy)ethyl]-trimethylammonium, oligofectamine, or cationic or polycationic polymers, including modified polyaminoacids, including β-aminoacid-polymers or reversed polyamides, modified polyethylenes, including PVP (poly(N-ethyl-4-vinyl-pyridinium bromide)), modified acrylates, including pDMAEMA (poly(dimethylaminoethyl methylacrylate)), modified Amidoamines including pAMAM (poly(amidoamine)), modified polybetaaminoester (PBAE), diamine end modified 1,4 butanediol diacrylate-co-5-amino-1-pentanol polymers, dendrimers, including polypropylamine dendrimers or pAMAM based dendrimers, polyimine(s), including PEI: poly(ethyleneimine), poly(propyleneimine), polyallyl amine, sugar backbone based polymers, including cyclodextrin based polymers, dextran based

polymers, Chitosan, etc., silan backbone based polymers , such as PMOXA-PDMS copolymers, etc., Blockpolymers consisting of a combination of one or more cationic blocks selected from a cationic polymer and of one or more hydrophilic- or hydrophobic blocks (e.g polyethylene-glycole);

or

cationic or polycationic proteins or peptides, selected from following proteins or peptides having the following total formula (I): (Arg)l;(Lys)m;(His)n;(Orn)o;(Xaa)x, wherein 1 + m + n + o + x = 8-15, and 1, rn, n or o independently of each other are any number selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15, provided that the overall content of Arg, Lys, His and Orn represents at least 50% of all amino acids of the oligopeptide; and Xaa is any amino acid selected from native (naturally occurring) or non-native amino acids except of Arg, Lys, His or Orn; and x is any number selected from 0, 1, 2, 3 or 4, provided, that the overall content of Xaa does not exceed 50 % of all amino acids of the oligopeptide;

or

nucleic acids having the formula (II): GlXmGn, wherein: G is guanosine, uridine or an analogue of guanosine or uridine; X is guanosine, uridine, adenosine, thymidine, cytidine or an analogue of the above-mentioned nucleotides; l is an integer from 1 to 40, wherein when 1 = 1 G is guanosine or an analogue thereof, when l > 1 at least 50% of the nucleotides are guanosine or an analogue thereof; m is an integer and is at least 3; wherein when m = 3 X is uridine or an analogue thereof, when m > 3 at least 3 successive uridines or analogues of uridine occur; n is an integer from 1 to 40, wherein when n = 1 G is guanosine or an analogue thereof, when n > 1 at least 50% of the nucleotides are guanosine or an analogue thereof;

or

nucleic acids having the formula (III): ClXmCn, wherein: C is cytidine, uridine or an analogue of cytidine or uridine; X is guanosine, uridine, adenosine, thymidine, cytidine or an analogue of the afore-mentioned nucleotides; l is an integer from 1 to 40, wherein when l = 1 C is cytidine or an analogue thereof; when 1 > 1 at least 50% of the nucleotides are cytidine or an analogue thereof; in is an integer and is at least 3; wherein when m = 3 X is uridine or an analogue thereof; when m > 3 at least 3 successive uridines or analogues of uridine occur; n is an integer from 1 to 40, wherein when n = 1 C is cytidine or an analogue thereof, when n > 1 at least 50% of the nucleo-tides are cytidine or an analogue thereof.

8. The use according to any one of claims 1 to 7, wherein the chemotherapeutic agent is selected from the group consisting of a platinum-based compound, pemetrexed, gemcitabine, taxanes, vinorelbine, etoposide, docetaxel and paclitaxel.

9. The use according to any one of claims 1 to 8, wherein the medicament is to be used for treatment of a patient with stage III or stage IV non-small cell lung cancer.

10. The use according to claim 9, wherein the non-small cell lung cancer is characterized by a non-squamous histology.

11. The use according to any one of claims 1 to 10, wherein the subject is a patient receiving chemotherapy, or a patient having achieved partial response or stable disease after chemotherapy.

12. The use according to claim 11, wherein the chemotherapy is a platinum-based chemotherapy or a platinum-based combination chemotherapy,

13. Use of a vaccine comprising six mRNAs, wherein each mRNA encodes a different antigen selected from the group consisting of:
• 5T4 (Trophoblast glycoprotein; TPBG);
• Survivin (Baculoviral IAP repeat-containing protein 5; BIRC5),
• NY-ESO-1 (New York esophageal squamous cell carcinoma 1; CTAG1B),
• MAGE-C1 (Melanoma antigen family C1);
• MAGE-C2 (Melanoma antigen family C2), and
• MUC1]. (Mucin 1),
in the manufacture of a medicament for the treatment of a non-small cell lung cancer,
wherein each mRNA is identical to a different RNA sequence selected from the RNA sequences according to SEQ ID NO: 19, 20, 21, 22, 23 or 24, wherein each mRNA is complexed with a cationic compound selected from the group consisting of a cationic peptide, a cationic protein, a cationic polysaccharide, a cationic polymer and a cationic lipid, and
wherein a chemotherapeutic agent is to be administered as well as the medicament as part of any

treatment.

14. The use according to claim 13, wherein the vaccine further comprises a pharmaceutically acceptable carrier.

15. The use according to claim 13 or 14, wherein the chemotherapeutic agent is selected from the group consisting of a platinum-based compound, pemetrexed, gemcitabine, taxanes, vinorelbine, etoposide, docetaxel and paclitaxel.

16. The use according to any one of claims 13 to 15, wherein the medicament is to be used for treatment of a patient with stage III or stage IV non-small cell lung cancer.

17. The use according to claim 16, wherein the non-small cell lung cancer is characterized by a non-squamous histology.

18. The use according to any one of claims 13 to 17, wherein the subject is a patient receiving chemotherapy, or a patient having achieved partial response or stable disease after chemotherapy.

19. The use when used according to claim 18, wherein the chemotherapy is a platinum-based chemotherapy or a platinum-based combination chemotherapy,

20. Use of a combination of six mRNAs in the manufacture of a medicament for the treatment of a non-small cell lung cancer, wherein each mRNA encodes one antigen selected from the group consisting of 5T4 (Tropho-blast glycoprotein, TPBG), Survivin (Baculoviral IAP repeat-containing protein 5; BIRCS), NY-ESO-1 (New York esophageal squamous cell carcinoma 1, CTAG1B), MAGE-Ci (Melanoma antigen family Cl), MAGE-C2 (Melanoma antigen family C2), and MUCI (Mucin 1) and wherein each mRNA is identical to a different RNA sequence selected from the RNA sequences according to SEQ ID NO: 19, 20, 21, 22, 23 or 24, and wherein each mRNA is complexed with a cationic compound selected from the group consisting of a cationic peptide, a cationic protein, a cationic polysaccharide, a cationic polymer and a

cationic lipid, and wherein a chemotherapeutic agent is to be administered as well as the medicament as part of any treatment.