comprising *n* different RNA molecule species would be a major cost and time advantage.

Therefore, a robust process that allows the simultaneous, i.e. in parallel, production of *n* different RNA species in one production batch would be a major advantage in the art.

SUMMARY

In one aspect, the present disclosure refers to a method for producing a ribonucleic acid (RNA) molecule composition comprising *n* different RNA molecule species, wherein said composition comprises the *n* different RNA molecule species in identical amounts or amounts that do not differ by more than 20%, the method comprising the following steps: a) simultaneous RNA *in vitro* transcription of a mixture of *m* different deoxyribonucleic acid (DNA) molecule species in a single reaction vessel, wherein each of the *m* different DNA molecule species encodes one of the *n* different RNA molecule species thereby generating the *n* different RNA molecule species, wherein the amount of each of the *m* different DNA molecule species is identical or does not differ by more than 20%; and b) obtaining the RNA molecule composition comprising *n* different RNA molecule species generated in step a), wherein *n* is an integer of at least 2, wherein *m* is an integer of at least 2, and wherein *m* is identical to *n*.

The above mentioned problems in the art are solved by the inventive method for producing a ribonucleic acid (RNA) molecule composition comprising *n* different RNA molecule species, the method comprising the following steps:

a) RNA *in vitro* transcription of a mixture of *m* different deoxyribonucleic acid (DNA) molecule species in a single reaction vessel in parallel, i.e. simultaneously, wherein each of the *m* different DNA molecule species encodes one or more of the *n* different RNA molecule species thereby generating the *n* different RNA molecule species, and

b) obtaining the RNA molecule composition comprising *n* different RNA molecule species generated in step a),
wherein *n* is an integer of at least 2, and wherein *m* is an integer of at least 1 or preferably of at least 2.

Preferably, the method further comprises prior to step a) a step of

c1) generating the mixture of *m* different DNA molecule species using bacterial amplification,

c2) generating the mixture of *m* different DNA molecule species using polymerase chain reaction (PCR),

c3) generating the mixture of *m* different DNA molecule species using chemical DNA synthesis, and/or

c4) generating the mixture of *m* different DNA molecule species using enzymatic amplification, for example by rolling circle amplification.

In another preferred example, step c1) comprises a step of

d) transforming a bacterial cell culture with at least one single DNA plasmid species of the mixture of *m* different DNA plasmid species, wherein each DNA plasmid species encodes one or more of the *n* different RNA molecule species.

In a further preferred example, step c1) comprises a step of

d1) transforming *m* single bacterial cell cultures each with a single DNA plasmid species of the *m* different DNA plasmid species, wherein the single DNA plasmid species encodes one or more of the *n* different RNA molecule species, or

d2) transforming a single bacterial cell culture with a mixture of *m* different DNA plasmid species, wherein each DNA plasmid species encodes one or more of the *n* different RNA molecule species.

Optionally, the method comprises a step of

e) isolating at least one single bacterial cell clone for each DNA plasmid species of the mixture of *m* different DNA plasmid species and

f) growing each of the at least one single bacterial cell clone isolated in step e) in a separate bacterial cell clone culture.

In another preferred example, the method as disclosed herein further comprises after step d1) the following steps:

e1) isolating at least one single bacterial cell clone of each of the *m* single bacterial cell cultures transformed in step d1),

f1) growing each of the single bacterial cell clones isolated in step e1) in a separate bacterial cell culture,

g1) optionally determining the identity of the DNA plasmid species of each of the bacterial cell clone cultures grown in step f1),

h1) selecting at least one bacterial cell clone culture for each of the *m* different DNA plasmid species.

In another preferred example, the method as disclosed hereinfurther comprises after step d2) the following steps:

e2) isolating at least *m* single bacterial cell clones, and

f2) growing each of the at least *m* single bacterial cell clones isolated in step e2) in a separate bacterial cell clone culture,

g2) determining the identity of the DNA plasmid species of each of the at least *m* single bacterial cell clone cultures grown in step f2),

h2) selecting at least one single bacterial cell clone culture for each of the *m* different DNA plasmid species.

Optionally, the method comprises a step of)

i) determining at least one parameter of growth kinetics and/or amount of plasmid DNA of the at least one single bacterial cell clone culture, and

j) selecting one or more bacterial cell clone cultures for each of the *m* different DNA plasmid species depending on the parameter determined in step i), preferably selecting one bacterial cell clone culture for each of the *m* different DNA plasmid species.

In another preferred exampleof the methodas disclosed herein, step i) comprises a step of

i1) determining a parameter of growth kinetics by measuring the optical density of the bacterial cell clone culture after a time interval, preferably using a microplate reader, or by scattered light online measurement, and/or

i2) determining the amount of plasmid produced per volume and time of bacterial cell culture.

Optionally, the selected one or more bacterial cell clone cultures for each of the *m* different DNA plasmid species exhibit similar or identical growth kinetics and/or similar or identical DNA production levels, preferably the similar or equal growth kinetics and/or similar identical DNA production levels are as high as possible.

In the method as disclosed herein, step c1) further comprises a step of

k1) inoculating and growing an amount of at least one of the one or more bacterial cell clone cultures selected for each of the *m* different DNA plasmid species in step j) in a single reaction vessel, or

k2) inoculating and growing an amount of at least one of the one or more bacterial cell clone cultures selected for each of the *m* different DNA plasmid species in step j) in one or more separate reaction vessels for each of the *m* different DNA plasmid species, optionally wherein one or more bacterial cell clone cultures of the *m* different DNA plasmid species are grown together in a single reaction vessel. Optionally, wherein equal amounts of each bacterial cell clone culture are inoculated.

Preferably, the amount of each bacterial cell clone culture used for inoculating in step k1 or k2) is selected so that equal or similar amounts of each of the *m* different DNA plasmid species are obtained.

Preferably, step c1) further comprises a step of

l) obtaining the *m* different DNA plasmid species of the bacterial cell clone cultures grown in step k1) and/or k2),

m) optionally linearizing the *m* different DNA plasmid species obtained in step l), and

n) obtaining the mixture of *m* different deoxyribonucleic acid (DNA) molecule species.

The method optionally further comprises prior to step a) a step of

o) determining a parameter of transcription efficiency for each of the *m* different deoxyribonucleic acid (DNA) molecule species.

Preferably, in the method as disclosed herein the amount of each of the *n* different RNA molecule species in the RNA molecule composition is proportional or at least 90% proportional to the amount of the corresponding deoxyribonucleic acid (DNA)

molecule species in the mixture of *m* different deoxyribonucleic acid (DNA) molecule species. "Corresponding DNA molecule species" in the sense of the present invention denotes the DNA molecule which encodes for the respective RNA molecule species. In the same way, the DNA template species corresponds to the respective (linearized) DNA molecule species which is used for RNA *in vitro* transcription if they encode the same RNA molecule species. Vice versa, the corresponding RNA molecule species to a DNA molecule/template species is a RNA molecule which is encoded by the corresponding DNA molecule/template species.

In another example, step b) comprises a step of

p) purifying the *n* different RNA molecule species, optionally via HPLC.

In a preferred example, the method further comprises a step of

q) qualitatively and/or quantitatively analyzing the RNA molecule composition obtained in step b).

In an optional example, the DNA sequences of the *m* different deoxyribonucleic acid (DNA) molecule species are at least 80%, more preferably at least 90% and most preferably at least 95%, identical to each other.

Preferably, the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species have the same plasmid backbone and/or the open reading frames of the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species are at least 80%, more preferably at least 90% and most preferably at least 95% identical to each other and/or the open reading frames of the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species vary in their length by a maximum of 100 or 50 nucleotides.

In a preferred example, the RNA sequences of the *n* different RNA molecule species are at least 80%, more preferably at least 90% and most preferably at least 95% identical to each other.

In a preferred example, each of the *m* different DNA molecule species encodes for one or more of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes for a antigen of different serotypes or strains of a pathogen, for a different allergen, for a different autoimmune antigen, for a different antigen of a pathogen, different adjuvant proteins, for a different isoform or variant of a cancer or tumor antigen, for a different tumor antigen of one patient, for one antibody among a group of antibodies which target different epitopes of a protein or of a group of proteins, for different proteins of a metabolic pathway, for a single protein among a group of proteins which are defect in a subject, or for a different isoform of a protein for molecular therapy.

More preferably, the pathogen is selected from the group consisting of a virus, bacterium, prion, fungus, protozoon, viroid, and parasite.

Even more preferably, pathogen is selected from the group consisting of Acinetobacter baumannii, Anaplasma genus, Anaplasma phagocytophilum, Ancylostoma braziliense, Ancylostoma duodenale, Arcanobacterium haemolyticum, Ascaris lumbricoides, Aspergillus genus, Astroviridae, Babesia genus, Bacillus anthracis, Bacillus cereus, Bartonella henselae, BK virus, Blastocystis hominis, Blastomyces dermatitidis, Bordetella pertussis, Borrelia burgdorferi, Borrelia genus, Borrelia spp, Brucella genus, Brugia malayi, Bunyaviridae family, Burkholderia cepacia and other Burkholderia species, Burkholderia mallei, Burkholderia pseudomallei, Caliciviridae family, Campylobacter genus, Candida albicans, Candida spp, Chlamydia trachomatis, Chlamydophila pneumoniae, Chlamydophila psittaci, CJD prion, Clonorchis sinensis, Clostridium botulinum, Clostridium difficile, Clostridium perfringens, Clostridium perfringens, Clostridium spp, Clostridium tetani, Coccidioides spp, coronaviruses, Corynebacterium diphtheriae, Coxiella burnetii, Crimean-Congo hemorrhagic fever virus, Cryptococcus neoformans, Cryptosporidium genus, Cytomegalovirus (CMV), Dengue viruses (DEN-1, DEN-2, DEN-3 and DEN-4), Dientamoeba fragilis, Ebolavirus (EBOV), Echinococcus genus, Ehrlichia chaffeensis, Ehrlichia ewingii, Ehrlichia genus, Entamoeba

histolytica, Enterococcus genus, Enterovirus genus, Enteroviruses, mainly Coxsackie A virus and Enterovirus 71 (EV71), Epidermophyton spp, Epstein-Barr Virus (EBV), Escherichia coli O157:H7, O111 and O104:H4, Fasciola hepatica and Fasciola gigantica, FFI prion, Filarioidea superfamily, Flaviviruses, Francisella tularensis, Fusobacterium genus, Geotrichum candidum, Giardia intestinalis, Gnathostoma spp, GSS prion, Guanarito virus, Haemophilus ducreyi, Haemophilus influenzae, Helicobacter pylori, Henipavirus (Hendra virus Nipah virus), Hepatitis A Virus, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Hepatitis D Virus, Hepatitis E Virus, Herpes simplex virus 1 and 2 (HSV-1 and HSV-2), Histoplasma capsulatum, HIV (Human immunodeficiency virus), Hortaea werneckii, Human bocavirus (HBoV), Human herpesvirus 6 (HHV-6) and Human herpesvirus 7 (HHV-7), Human metapneumovirus (hMPV), Human papillomavirus (HPV), Human parainfluenza viruses (HPIV), Japanese encephalitis virus, JC virus, Junin virus, Kingella kingae, Klebsiella granulomatis, Kuru prion, Lassa virus, Legionella pneumophila, Leishmania genus, Leptospira genus, Listeria monocytogenes, Lymphocytic choriomeningitis virus (LCMV), Machupo virus, Malassezia spp, Marburg virus, Measles virus, Metagonimus yokagawai, Microsporidia phylum, Molluscum contagiosum virus (MCV), Mumps virus, Mycobacterium leprae and Mycobacterium lepromatosis, Mycobacterium tuberculosis, Mycobacterium ulcerans, Mycoplasma pneumoniae, Naegleria fowleri, Necator americanus, Neisseria gonorrhoeae, Neisseria meningitidis, Nocardia asteroides, Nocardia spp, Onchocerca volvulus, Orientia tsutsugamushi, Orthomyxoviridae family (Influenza), Paracoccidioides brasiliensis, Paragonimus spp, Paragonimus westermani, Parvovirus B19, Pasteurella genus, Plasmodium genus, Pneumocystis jirovecii, Poliovirus, Rabies virus, Respiratory syncytial virus (RSV), Rhinovirus, rhinoviruses, Rickettsia akari, Rickettsia genus, Rickettsia prowazekii, Rickettsia rickettsii, Rickettsia typhi, Rift Valley fever virus, Rotavirus, Rubella virus, Sabia virus, Salmonella genus, Sarcoptes scabiei, SARS coronavirus, Schistosoma genus, Shigella genus, Sin Nombre virus, Hantavirus, Sporothrix schenckii, Staphylococcus genus, Staphylococcus genus, Streptococcus agalactiae, Streptococcus pneumoniae, Streptococcus pyogenes, Strongyloides stercoralis, Taenia genus, Taenia solium,

Tick-borne encephalitis virus (TBEV), Toxocara canis or Toxocara cati, Toxoplasma gondii, Treponema pallidum, Trichinella spiralis, Trichomonas vaginalis, Trichophyton spp, Trichuris trichiura, Trypanosoma brucei, Trypanosoma cruzi, Ureaplasma urealyticum, Varicella zoster virus (VZV), Varicella zoster virus (VZV), Variola major or Variola minor, vCJD prion, Venezuelan equine encephalitis virus, Vibrio cholerae, West Nile virus, Western equine encephalitis virus, Wuchereria bancrofti, Yellow fever virus, Yersinia enterocolitica, Yersinia pestis, and Yersinia pseudotuberculosis, preferably the pathogen is selected from the group consisting of influenza virus, respiratory syncytial virus (RSV), Herpes simplex virus (HSV), human Papilloma virus (HPV), Human immunodeficiency virus (HIV), Plasmodium, Staphylococcus aureus, Dengue virus, Chlamydia trachomatis, Cytomegalovirus (CMV), Hepatitis B virus (HBV), Mycobacterium tuberculosis, Rabies virus, Rotavirus and Yellow Fever Virus.

In a preferred example, each of the *m* different DNA molecule species encodes for one or more of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes a different pathogenic antigen or a fragment or variant thereof, selected from the group consisting of influenza haemagglutinin, influenza neuraminidase, influenza nucleoprotein, coronavirus glycoprotein S, prostate specific antigen, outer membrane protein A OmpA, biofilm associated protein Bap, transport protein MucK of Acinetobacter baumannii and Acinetobacter infections; variable surface glycoprotein (VSG), microtubule-associated protein MAPP15, trans-sialidase (TSA) of Trypanosoma brucei; HIV p24 antigen, Human immunodeficiency virus (HIV) envelope proteins Gp120, Gp41, and Gp160, poly-protein GAG, negative factor protein Nef, trans-activator of transcription (Tat) of HIV; galactose-inhibitable adherence protein (GIAP), 29 kDa antigen Eh29, Gal/GalNAc lectin, protein CRT, 125 kDa immunodominant antigen, protein M17, adhesin ADH112 and protein STIRP of Entamoeba histolytica; major surface proteins 1 to 5 (MSP1a, MSP1b, MSP2, MSP3, MSP4, MSP5), type IV secreotion system proteins (VirB2, VirB7, VirB11, VirD4) of Anaplasma genus; protective Antigen PA, edema factor EF, lethal factor LF, the S-layer homology proteins (SLH)

of Bacillus anthracis; acranolysin, phospholipase D, collagen-binding protein CbpA of Arcanobacterium haemolyticum; nucleocapsid protein (NP), glycoprotein precursor GPC, glycoprotein GP1, glycoprotein GP2 of Junin virus; chitin-protein layer proteins, 14 kDa suarface antigen A14, major sperm protein (MSP), MSP polymerization-organizing protein (MPOP), MSP fiber protein 2 (MFP2), MSP polymerization-activating kinase (MPAK), ABA-1-like protein (ALB), protein ABA-1, cuticulin (CUT-1) of Ascaris lumbricoides; 41 kDa allergen Asp v13, allergen Asp f3, major conidial surface protein rodlet A, protease Pep1p, GPI-anchored protein Gel1p, GPI-anchored protein Crf1p of Aspergillus genus; family VP26 protein, VP29 protein of Astroviridae; Rhoptry-associated protein 1 (RAP-1), merozoite surface antigens MSA-1, MSA-2 (a1, a2, b, c), 12D3, 11C5, 21B4, P29, variant erythrocyte surface antigen VESA1, Apical Membrane Antigen 1 (AMA-1) of Babesia genus; hemolysin, enterotoxin C, PXO1-51, glycolate oxidase, ABC-transporter, penicillin-bingdn protein, zinc transporter family protein, pseudouridine synthase Rsu, plasmid replication protein RepX, oligoendopeptidase F, prophage membrane protein, protein HemK, flagellar antigen H, 28.5-kDa cell surface antigen of Bacillus cereus; large T antigen LT, small T antigen, capsid protein VP1, capsid protein VP2 of BK virus; 29 kDa-protein, caspase-3-like antigens, glycoproteins of Blastocystis hominis; yeast surface adhesin WI-1 of Blastomyces dermatitidis; nucleoprotein N, polymerase L, matrix protein Z, glycoprotein (GP) of Machupo virus; outer surface protein A (OspA), outer surface protein B (OspB), outer surface protein C (OspC), decorin binding protein A (DbpA), decorin binding protein B (DbpB), flagellar filament 41 kDa core protein Fla, basic membrane protein A precursor (BmpA) (Immunodominant antigen P39), outer surface 22 kDa lipoprotein precursor (antigen IPLA7), variable surface lipoprotein vlsE of Borrelia genus; Botulinum neurotoxins BoNT/A1, BoNT/A2, BoNT/A3, BoNT/B, BoNT/C, BoNT/D, BoNT/E, BoNT/F, BoNT/G, recombinant botulinum toxin F Hc domain (FHc) of Clostridium botulinum; nucleocapsid, glycoprotein precursor of Sabia virus; copper/Zinc superoxide dismutase (SodC), bacterioferritin (Bfr), 50S ribosomal protein RplL, OmpA-like transmembrane domain-containing protein Omp31, immunogenic 39-kDa protein M5 P39, zinc ABC transporter periplasmic zinc-

bnding protein znuA, periplasmic immunogenic protein Bp26, 30S ribosomal protein S12 RpsL, glyceraldehyde-3-phosphate dehydrogenase Gap, 25 kDa outer-membrane immunogenic protein precursor Omp25, invasion protein B lalB, trigger factor Tig, molecular chaperone DnaK, putative peptidyl-prolyl cis-trans isomerase SurA, lipoprotein Omp19, outer membrane protein MotY Omp16, conserved outer membrane protein D15, malate dehydrogenase (Mdh), component of the Type-IV secretion system (T4SS) VirJ, lipoprotein of unknown function BAB1_0187 of Brucella genus; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A (BimA), bacterial Elongation factor-Tu (EF-Tu), 17 kDa OmpA-like protein, boaA coding protein, boaB coding protein of Burkholderia cepacia and other Burkholderia species; mycolyl-transferase Ag85A, heat-shock protein 65 (Hsp65), protein TB10.4, 19 kDa antigen, protein PstS3, heat-shock protein 70 (Hsp70) of Mycobacterium ulcerans; norovirus major and minor viral capsid proteins VP1 and VP2, genome polyprotein, Sapovirus capsid protein VP1, protein Vp3, geome polyprotein of Caliciviridae family, Norovirus and Sapovirus; major outer membrane protein PorA, flagellin FlaA, surface antigen CjaA, fibronectin binding protein CadF, aspartate/glutamate-binding ABC transporter protein Peb1A, protein FspA1, protein FspA2 of Campylobacter genus; glycolytic enzyme enolase, secreted aspartyl proteinases SAP1-10, glycophosphatidylinositol (GPI)-linked cell wall protein, protein Hyr1, complement receptor 3-related protein (CR3-RP), adhesin Als3p, heat shock protein 90 kDa (Hsp90), cell surface hydrophobicity protein (CSH) of Candida albicans and other Candida species; 17-kDa antigen, protein P26, trimeric autotransporter adhesins TAAs, Bartonella adhesin A BadA, variably expressed outer-membrane proteins Vomps, protein Pap3, protein HbpA, envelope-associated protease HtrA, protein OMP89, protein GroEL, protein LalB, protein OMP43, dihydrolipoamide succinyltransferase SucB of Bartonella henselae; amastigote surface protein-2, amastigote-specific surface protein SSP4, cruzipain, trans-sialidase TS, trypomastigote surface glycoprotein TSA-1, complement regulatory protein CRP-10, protein G4, protein G2, paraxonemal rod protein PAR2, paraflagellar rod component Par1, mucin-associated

Surface Proteins MPSP of Trypanosoma cruzi; envelope glycoproteins (gB, gC, gE, gH, gI, gK, gL) of Varicella zoster virus (VZV); major outer membrane protein MOMP, probable outer membrane protein PMPC, outer membrane complex protein B OmcB, heat shock proteins Hsp60 and HSP10, protein IncA, proteins from the type III secretion system, ribonucleotide reductase small chain protein NrdB, plasmid protein Pgp3, chlamydial outer protein N (CopN), antigen CT521, antigen CT425, antigen CT043, antigen TC0052, antigen TC0189, antigen TC0582, antigen TC0660, antigen TC0726, antigen TC0816, antigen TC0828 of Chlamydia trachomatis; low calcium response protein E (LCrE), serine/threonine-protein kinase PknD, acyl-carrier-protein S-malonyltransferase FabD, single-stranded DNA-binding protein Ssb, major outer membrane protein (MOMP), outer membrane protein 2 (Omp2), polymorphic membrane protein family, such as(Pmp1, Pmp2, Pmp3, Pmp4, Pmp5, Pmp6, Pmp7, Pmp8, Pmp9, Pmp10, Pmp11, Pmp12, Pmp13, Pmp14, Pmp15, Pmp16, Pmp17, Pmp18, Pmp19, Pmp20 and Pmp21 of Chlamydophila pneumoniae, Chlamydophila pneumoniae infection; cholera toxin B (CTB), toxin coregulated pilin A (TcpA), toxin coregulated pilin (TcpF), toxin co-regulated pilus biosynthesis ptrotein F (TcpF), cholera enterotoxin subunit A, cholera enterotoxin subunit B, Heat-stable enterotoxin ST, mannose-sensitive hemagglutinin (MSHA), outer membrane protein U Porin (ompU), Poring B protein, polymorphic membrane protein-D of Vibrio cholerae; propionyl-CoA carboxylase PCC, 14-3-3 protein, prohibitin, cysteine proteases, glutathione transferases, gelsolin, cathepsin L proteinase CatL, Tegumental Protein 20.8 kDa TP20.8, tegumental protein 31.8 kDa TP31.8, lysophosphatidic acid phosphatase LPAP of Clonorchis sinensis; surface layer proteins SLPs, glutamate dehydrogenase antigen GDH, toxin A, toxin B, cysteine protease Cwp84, cysteine protease Cwp13, cysteine protease Cwp19, Cell Wall Protein CwpV, flagellar protein FliC, flagellar protein FliD of Clostridium difficile; rhinovirus capsid proteins VP1, VP2, VP3, VP4; coronavirus sprike proteins S, envelope protein E, membrane protein M, nucleocapsid protein N of rhinoviruses and coronaviruses; prion protein Prp (CJD prion); envelope protein Gc, envelope protein Gn, nucleocapsid proteins of Crimean-Congo hemorrhagic fever virus; virulence-associated DEAD-box RNA helicase VAD1, galactoxylomannan-protein GalXM,

glucuronoxylomannan GXM, mannoprotein MP of Cryptococcus neoformans; acidic ribosomal protein P2 CpP2, mucin antigens Muc1, Muc2, Muc3 Muc4, Muc5, Muc6, Muc7, surface adherence protein CP20, surface adherence protein CP23, surface protein CP12, surface protein CP21, surface protein CP40, surface protein CP60, surface protein CP15, surface-associated glycopeptides gp40, surface-associated glycopeptides gp15, oocyst wall protein AB, profilin PRF, apyrase of the Cryptosporidium genus; fatty acid and retinol binding protein-1(FAR-1), tissue inhibitor of metalloproteinase (TIMP), cysteine proteinase ACEY-1, cysteine proteinase ACCP-1, surface antigen Ac-16, secreted protein 2 ASP-2, metalloprotease 1 MTP-1, aspartyl protease inhibitor API-1, surface-associated antigen SAA-1, adult-specific secreted factor Xa serine protease inhibitor anticoagulant AP, cathepsin D-like aspartic protease ARR-1, for example of Ancylostoma braziliense and other pathogens like Cutaneous larva migrans (CLM); cathepsin L-like proteases, 53/25-kDa antigen, 8kDa family members, cysticercus protein with a marginal trypsin-like activity TsAg5, oncosphere protein TSOL18, oncosphere protein TSOL45-1A, lactate dehydrogenase A LDHA, lactate dehydrogenase B LDHB of Taenia solium; pp65 antigen, membrane protein pp15, capsid-proximal tegument protein pp150, protein M45, DNA polymerase UL54, helicase UL105, glycoprotein gM, glycoprotein gN, glycoprotein H, glycoprotein B gB, protein UL83, protein UL94, protein UL99 of Cytomegalovirus (CMV); capsid protein C, premembrane protein prM, membrane protein M, envelope protein E (domain I, domain II, domain II), protein NS1, protein NS2A, protein NS2B, protein NS3, protein NS4A, protein 2K, protein NS4B, protein NS5 of Dengue viruses (DEN-1, DEN-2, DEN-3 and DEN-4)–Flaviviruses; 39 kDa protein of Dientamoeba fragilis; diphtheria toxin precursor Tox, diphteria toxin DT, pilin-specific sortase SrtA, shaft pilin protein SpaA, tip pilin protein SpaC, minor pilin protein SpaB, surface-associated protein DIP1281 of Corynebacterium diphtheriae; glycoprotein GP, nucleoprotein NP, minor matrix protein VP24, major matrix protein VP40, transcription activator VP30, polymerase cofactor VP35, RNA polymerase L of Ebolavirus (EBOV); prion protein (vCJD prion, vCJD, nvCJD); UvrABC system protein B, protein Flp1, protein Flp2, protein Flp3, protein TadA, hemoglobin receptor HgbA, outer membrane protein TdhA,

protein CpsRA, regulator CpxR, protein SapA, 18 kDa antigen, outer membrane protein NcaA, protein LspA, protein LspA1, protein LspA2, protein LspB, outer membrane component DsrA, lectin DltA, lipoprotein Hlp, major outer membrane protein OMP, outer membrane protein OmpA2 of Haemophilus ducreyi; aspartyl protease 1 Pep1, phospholipase B PLB, alpha-mannosidase 1 AMN1, glucanosyl-transferase GEL1, urease URE, peroxisomal matrix protein Pmp1, proline-rich antigen Pra, humal T-cell reative protein TcrP of Coccidioides immitis and Coccidioides posadasii; allergen Tri r 2, heat shock protein 60 Hsp60, fungal actin Act, antigen Tri r2, antigen Tri r4, antigen Tri t1, protein IV, glycerol-3-phosphate dehydrogenase Gpd1, osmosensor HwSho1A, osmosensor HwSho1B, histidine kinase HwHhk7B, allergen Mala s 1, allergen Mala s 11, thioredoxin Trx Mala s 13, allergen Mala f, allergen Mala s, for examples of Trichophyton spp, Epidermophyton spp., Malassezia spp., Hortaea werneckii; protein EG95, protein EG10, protein EG18, protein EgA31, protein EM18, antigen EPC1, antigen B, antigen 5, protein P29, protein 14-3-3, 8-kDa protein, myophilin, heat shock protein 20 (HSP20), glycoprotein GP-89, fatty acid binding protein FAPB of Echinococcus genus; major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of the Ehrlichia genus; secreted antigen SagA, sagA-like proteins SalA and SalB, collagen adhesin Scm, surface proteins Fms1 EbpA(fm), Fms5 EbpB(fm), Fms9 EpbC(fm) and Fms10, protein EbpC(fm), 96 kDa immunoprotective glycoprotein G1 of the Enterococcus genus; genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of the Enterovirus genus; outer membrane proteins OM, 60 kDa outer membrane protein, cell surface antigen OmpA, cell surface antigen OmpB (sca5), 134 kDa outer membrane protein, 31 kDa outer membrane protein, 29.5 kDa outer membrane protein, cell surface protein SCA4, cell surface protein Adr1 (RP827), cell surface

protein Adr2 (RP828), cell surface protein SCA1, Invasion protein invA, cell division protein fts, secretion proteins of the sec family, virulence proteins virB, tlyA, tlyC, parvulin-like protein Plp, preprotein translocase SecA, 120-kDa surface protein antigen SPA, 138 kD complex antigen, major 100-kD protein (protein I), intracytoplasmic protein D, protective surface protein antigen SPA (Rickettsia prowazekii, Epidemic typhus); Epstein–Barr nuclear antigens (EBNA-1, EBNA-2, EBNA-3A, EBNA-3B, EBNA-3C, EBNA-leader protein (EBNA-LP)), latent membrane proteins (LMP-1, LMP-2A, LMP-2B), early antigen EBV-EA, membrane antigen EBV-MA, viral capsid antigen EBV-VCA, alkaline nuclease EBV-AN, glycoprotein H, glycoprotein gp350, glycoprotein gp110, glycoprotein gp42, glycoprotein gHgL, glycoprotein gB of Epstein-Barr Virus (EBV); cpasid protein VP2, capsid protein VP1, major protein NS1 of Parvovirus B19; pp65 antigen, glycoprotein 105, major capsid protein, envelope glycoprotein H, protein U51 of Human herpesvirus 6 (HHV-6) and Human herpesvirus 7 (HHV-7); thioredoxin-glutathione reductase TGR, cathepsins L1 and L2, Kunitz-type protein KTM, leucine aminopeptidase LAP, cysteine proteinase Fas2, saposin-like protein-2 SAP-2, thioredoxin peroxidases TPx, Prx-1, Prx-2, cathepsin l cysteine proteinase CL3, protease cathepsin L CL1, phosphoglycerate kinase PGK, 27-kDa secretory protein, 60 kDa protein HSP35alpha, glutathione transferase GST, 28.5 kDa tegumental antigen 28.5 kDa TA, cathepsin B3 protease CatB3, Type I cystatin stefin-1, cathepsin L5, cathepsin L1g and cathepsin B, fatty acid binding protein FABP, leucine aminopeptidases LAP of Fasciola hepatica and Fasciola gigantica; prion protein FFI prion; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP (peptides N, N1, N2, and N3), activation associated protein-1 ASP-1, Thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceraldehyde-3-phosphate dehydrogenase GAPDH, cuticular collagen Col-4, secreted larval acidic proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific

gene product OvB20, onchocystatin CPI-2, Cox-2 of the Filarioidea superfamily; phospholipase C PLC, heat-labile enterotoxin B, Iota toxin component Ib, protein CPE1281 , pyruvate ferredoxin oxidoreductase, elongation factor G EF-G, perfringolysin O Pfo, glyceraldehyde-3-phosphate dehydrogenase GapC, Fructose-bisphosphate aldolase Alf2, clostridium perfringens enterotoxin CPE, alpha toxin AT, alpha toxoid ATd, epsilon-toxoid ETd, protein HP, large cytotoxin TpeL, endo-beta-N-acetylglucosaminidase Naglu, phosphoglyceromutase Pgm of Clostridium perfringens; leukotoxin lktA, adhesion FadA, outer membrane protein RadD, high-molecular weight arginine-binding protein of Fusobacterium genus; phospholipase C PLC, heat-labile enterotoxin B, Iota toxin component Ib, protein CPE1281, pyruvate ferredoxin oxidoreductase, elongation factor G EF-G, perfringolysin O Pfo, glyceraldehyde-3-phosphate dehydrogenase GapC, fructose-bisphosphate aldolase Alf2, clostridium perfringens enterotoxin CPE, alpha toxin AT, alpha toxoid ATd, epsilon-toxoid ETd, protein HP, large cytotoxin TpeL, endo-beta-N-acetylglucosaminidase Naglu, phosphoglyceromutase Pgm, for example of Clostridium perfringens and other Clostridium species; lipase A, lipase B, peroxidase Dec1 of Geotrichum candidum; prion protein GSS prion; cyst wall proteins CWP1, CWP2, CWP3, variant surface protein VSP, VSP1, VSP2, VSP3, VSP4, VSP5, VSP6, 56 kDa antigen, pyruvate ferredoxin oxidoreductase PFOR, alcohol dehydrogenase E ADHE, alpha-giardin, alpha8-giardin, alpha1-guiardin, beta-giardin, cystein proteases, glutathione-S-transferase GST, arginine deiminase ADI, fructose-1,6-bisphosphat aldolase FBA, Giardia trophozoite antigens GTA (GTA1, GTA2), ornithine carboxyl transferase OCT, striated fiber-asseblin-like protein SALP, uridine phosphoryl-like protein UPL, alpha-tubulin, beta-tubulin of Giardia intestinalis; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A BimA, bacterial Elongation factor-Tu EF-Tu, 17 kDa OmpA-like protein, boaA coding protein of Burkholderia mallei; cyclophilin CyP, 24 kDa third-stage larvae protien GS24, excretion-secretion products ESPs (40, 80, 120 and 208 kDa) of Gnathostoma spinigerum and Gnathostoma hispidum; pilin proteins, minor pilin-associated subunit pilC, major pilin subunit and variants pilE,

pilS, phase variation protein porA, Porin B PorB, protein TraD, Neisserial outer membrane antigen H.8, 70kDa antigen, major outer membrane protein PI, outer membrane proteins PlA and PlB, W antigen, surface protein A NspA, transferrin binding protein TbpA, transferrin binding protein TbpB , PBP2, mtrR coding protein, ponA coding protein, membrane permease FbpBC, FbpABC protein system, LbpAB proteins, outer membrane protein Opa, outer membrane transporter FetA, iron-repressed regulator MpeR of Neisseria gonorrhoeae; outer membrane protein A OmpA, outer membrane protein C OmpC, outer membrane protein K17 OmpK17 of Klebsiella granulomatis; fibronectin-binding protein Sfb, fibronectin/fibrinogen-binding protein FBP54, fibronectin-binding protein FbaA, M protein type 1 Emm1, M protein type 6 Emm6, immunoglobulin-binding protein 35 Sib35, Surface protein R28 Spr28, superoxide dismutase SOD, C5a peptidase ScpA, antigen I/II AgI/II, adhesin AspA, G-related alpha2-macroglobulin-binding protein GRAB, surface fibrillar protein M5 of Streptococcus pyogenes; C protein β antigen, arginine deiminase proteins, adhesin BibA, 105 kDA protein BPS, surface antigens c, surface antigens R, surface antigens X, trypsin-resistant protein R1, trypsin-resistant protein R3, trypsin-resistant protein R4, surface immunogenic protein Sip, surface protein Rib, Leucine-rich repeats protein LrrG, serine-rich repeat protein Srr-2, C protein alpha-antigen Bca, Beta antigen Bag, surface antigen Epsilon, alpha-like protein ALP1, alpha-like protein ALP5 surface antigen delta, alpha-like protein ALP2, alpha-like protein ALP3, alpha-like protein ALP4, Cbeta protein Bac of Streptococcus agalactiae; transferrin-binding protein 2 Tbp2, phosphatase P4, outer membrane protein P6, peptidoglycan-associated lipoprotein Pal, protein D, protein E, adherence and penetration protein Hap, outer membrane protein 26 Omp26, outer membrane protein P5 (Fimbrin), outer membrane protein D15, outer membrane protein OmpP2, 5'-nucleotidase NucA, outer membrane protein P1, outer membrane protein P2, outer membrane lipoprotein Pcp, Lipoprotein E, outer membrane protein P4, fuculokinase FucK, [Cu,Zn]-superoxide dismutase SodC, protease HtrA, protein O145, alpha-galactosylceramide of Haemophilus influenzae; polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C (Enteroviruses, mainly Coxsackie A virus and

Enterovirus 71 (EV71), Hand, foot and mouth disease (HFMD)); RNA polymerase L, protein L, glycoprotein Gn, glycoprotein Gc, nucleocapsid protein S, envelope glycoprotein G1, nucleoprotein NP, protein N, polyprotein M of Sin Nombre virus, Hantavirus; heat shock protein HspA, heat shock protein HspB, citrate synthase GltA, protein UreB, heat shock protein Hsp60, neutrophil-activating protein NAP, catalase KatA, vacuolating cytotoxin VacA, urease alpha UreA, urease beta Ureb, protein Cpn10, protein groES, heat shock protein Hsp10, protein MopB, cyto-toxicity-associated 10 kDa protein CAG, 36 kDa antigen, beta-lactamase HcpA, Beta-lactamase HcpB of Helicobacter pylori; integral membrane proteins, aggregation-prone proteins, O-antigen, toxin-antigens Stx2B, toxin-antigen Stx1B, adhesion-antigen fragment Int28, protein EspA, protein EspB, Intimin, protein Tir, protein IntC300, protein Eae of Escherichia coli O157:H7, O111 and O104:H4; RNA polymerase L, protein L, glycoprotein Gn, glycoprotein Gc, nucleocapsid protein S, envelope glycoprotein G1, nucleoprotein NP, protein N, polyprotein M of Bunya-viridae family; glycoprotein G, matrix protein M, nucleoprotein N, fusion protein F, polymerase L, protein W, proteinC, phosphoprotein p, non-structural protein V of Henipavirus, Hendra virus or Nipah virus; polyprotein, glycoproten Gp2, hepatitis A surface antigen HBAg, protein 2A, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, protein P1B, protein P2A, protein P3AB, protein P3D of Hepatitis A Virus; hepatitis B surface antigen HBsAg, Hepatitis B core antigen HbcAg, polymerase, protein Hbx, preS2 middle surface protein, surface protein L, large S protein, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4 of Hepatitis B Virus (HBV); envelope glycoprotein E1 gp32 gp35, envelope glycoprotein E2 NS1 gp68 gp70, capsid protein C , core protein Core, polyprotein, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, antigen G, protein NS3, protein NS5A of Hepatitis C Virus; virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, large hepaptitis delta antigen, small hepaptitis delta antigen of Hepatitis D Virus; virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, capsid protein E2 of Hepatitis E Virus; glycoprotein L UL1, uracil-DNA glycosylase UL2, protein UL3, protein UL4, DNA replication protein UL5, portal protein UL6, virion maturation protein UL7,

DNA helicase UL8, replication origin-binding protein UL9, glycoprotein M UL10, protein UL11, alkaline exonuclease UL12, serine-threonine protein kinase UL13, tegument protein UL14, terminase UL15, tegument protein UL16, protein UL17, capsid protein VP23 UL18, major capsid protein VP5 UL19, membrane protein UL20, tegument protein UL21, Glycoprotein H (UL22), Thymidine Kinase UL23, protein UL24, protein UL25, capsid protein P40 (UL26, VP24, VP22A), glycol-protein B (UL27), ICP18.5 protein (UL28), major DNA-binding protein ICP8 (UL29), DNA polymerase UL30, nuclear matrix protein UL31, envelope glycol-protein UL32, protein UL33, inner nuclear membrane protein UL34, capsid protein VP26 (UL35), large tegument protein UL36, capsid assembly protein UL37, VP19C protein (UL38), ribonucleotide reductase (Large subunit) UL39, ribonucleotide reductase (Small subunit) UL40, tegument protein/virion host shutoff VHS protein (UL41), DNA polymerase processivity factor UL42, membrane protein UL43, glycoprotein C (UL44), membrane protein UL45, tegument proteins VP11/12 (UL46), tegument protein VP13/14 (UL47), virion maturation protein VP16 (UL48, Alpha-TIF), envelope protein UL49, dUTP diphosphatase UL50, tegument protein UL51, DNA helicase/primase complex protein UL52, glycoprotein K (UL53), transcriptional regulation protein IE63 (ICP27, UL54), protein UL55, protein UL56, viral replication protein ICP22 (IE68, US1), protein US2, serine/threonine-protein kinase US3, glycoprotein G (US4), glycoprotein J (US5), glycoprotein D (US6), glycoprotein I (US7), glycoprotein E (US8), tegument protein US9, capsid/tegument protein US10, Vmw21 protein (US11), ICP47 protein (IE12, US12), major transcriptional activator ICP4 (IE175, RS1), E3 ubiquitin ligase ICP0 (IE110), latency-related protein 1 LRP1, latency-related protein 2 LRP2, neurovirulence factor RL1 (ICP34.5), latency-associated transcript LAT of Herpes simplex virus 1 and 2 (HSV-1 and HSV-2); heat shock protein Hsp60, cell surface protein H1C, dipeptidyl peptidase type IV DppIV, M antigen, 70 kDa protein, 17 kDa histone-like protein of Histoplasma capsulatum; fatty acid and retinol binding protein-1 FAR-1, tissue inhibitor of metalloproteinase TIMP (TMP), cysteine proteinase ACEY-1, cysteine proteinase ACCP-1, surface antigen Ac-16, secreted protein 2 ASP-2, metalloprotease 1 MTP-1, aspartyl protease inhibitor API-1, surface-associated

antigen SAA-1, surface-associated antigen SAA-2, adult-specific secreted factor Xa, serine protease inhibitor anticoagulant AP, cathepsin D-like aspartic protease ARR-1, glutathione S-transferase GST, aspartic protease APR-1, acetylcholinesterase AChE of Ancylostoma duodenale and Necator americanus; protein NS1, protein NP1, protein VP1, protein VP2, protein VP3 of Human bocavirus (HBoV); major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of Ehrlichia ewingii; major surface proteins 1-5 (MSP1a, MSP1b, MSP2, MSP3, MSP4, MSP5), type IV secreotion system proteins VirB2, VirB7, VirB11, VirD4 of Anaplasma phagocytophilum; protein NS1, small hydrophobic protein NS2, SH protein, fusion protein F, glycoprotein G, matrix protein M, matrix protein M2-1, matrix protein M2-2, phosphoprotein P, nucleoprotein N, polymerase L of Human metapneumovirus (hMPV); major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of Ehrlichia chaffeensis; replication protein E1, regulatory protein E2, protein E3, protein E4, protein E5, protein E6, protein E7, protein E8, major capsid protein L1, minor capsid protein L2 of Human papillomavirus (HPV); fusion protein F, hemagglutinin-neuramidase HN, glycoprotein G, matrix protein M, phosphoprotein P, nucleoprotein N, polymerase L of Human parainfluenza viruses (HPIV); Hemagglutinin (HA), Neuraminidase (NA), Nucleoprotein (NP), M1 protein, M2 protein, NS1 protein, NS2 protein (NEP protein: nuclear export protein), PA protein, PB1 protein (polymerase basic 1 protein), PB1-F2 protein and PB2 protein of the Orthomyxoviridae family, Influenza virus (flu); genome polyprotein, protein E, protein M, capsid protein C of Japanese

encephalitis virus; RTX toxin, type IV pili, major pilus subunit PilA, regulatory transcription factors PilS and PilR, protein sigma54, outer membrane proteins of Kingella kingae; prion protein Kuru prion; nucleoprotein N, polymerase L, matrix protein Z, glycoprotein GP of Lassa virus; peptidoglycan-associated lipoprotein PAL, 60 kDa chaperonin Cpn60 (groEL, HspB), type IV pilin PilE, outer membrane protein MIP, major outer membrane protein MompS, zinc metalloproteinase MSP of Legionella pneumophila; P4 nuclease, protein WD, ribonucleotide reductase M2, surface membrane glycoprotein Pg46, cysteine proteinase CP, glucose-regulated protein 78 GRP-78, stage-specific S antigen-like protein A2, ATPase F1, beta-tubulin, heat shock protein 70 Hsp70, KMP-11, glycoprotein GP63, protein BT1, nucleoside hydrolase NH, cell surface protein B1, ribosomal protein P1-like protein P1, sterol 24-c-methyltransferase SMT, LACK protein, histone H1, SPB1 protein, thiol specific antioxidant TSA, protein antigen STl1, signal peptidase SP, histone H2B, suface antigen PSA-2, cystein proteinase b Cpb of the Leishmania genus; major membrane protein I, serine-rich antigen- 45 kDa, 10 kDa caperonin GroES, HSP kDa antigen, amino-oxononanoate synthase AONS, protein recombinase A RecA, Acetyl-/propionyl-coenzyme A carboxylase alpha, alanine racemase, 60 kDa chaperonin 2, ESAT-6-like protein EcxB (L-ESAT-6), protein Lsr2, protein ML0276, Heparin-binding hemagglutinin HBHA, heat-shock protein 65 Hsp65, mycP1 or ML0041 coding protein , htrA2 or ML0176 coding protein , htrA4 or ML2659 coding protein, gcp or ML0379 coding protein, clpC or ML0235 coding protein of Mycobacterium leprae; outer membrane protein LipL32, membrane protein LIC10258, membrane protein LP30, membrane protein LIC12238, Ompa-like protein Lsa66, surface protein LigA, surface protein LigB, major outer membrane protein OmpL1, outer membrane protein LipL41, protein LigAni, surface protein LcpA, adhesion protein LipL53, outer membrane protein UpL32, surface protein Lsa63, flagellin FlaB1, membran lipoprotein LipL21, membrane protein pL40, leptospiral surface adhesin Lsa27, outer membrane protein OmpL36, outer membrane protein OmpL37, outer membrane protein OmpL47, outer membrane protein OmpL54, acyltransferase LpxA of the Leptospira genus; listeriolysin O precursor Hly (LLO), invasion-associated protein Iap (P60), Listeriolysin regulatory

protein PrfA, Zinc metalloproteinase Mpl, Phosphatidylinositol- specific phospholipase C PLC (PlcA, PlcB), O-acetyltransferase Oat, ABC-transporter permease Im.G_1771, adhesion protein LAP, LAP receptor Hsp60, adhesin LapB, haemolysin listeriolysin O LLO, protein ActA, Internalin A InlA, protein lnlB of Listeria monocytogenes; outer surface protein A OspA, outer surface protein OspB, outer surface protein OspC, decorin binding protein A DbpA, decorin binding protein B DbpB, flagellar filament 41 kDa core protein Fla, basic membrane protein A BmpA (Immunodominant antigen P39), outer surface 22 kDa lipoprotein precursor (antigen IPLA7), variable surface lipoprotein vlsE, for example of Borrelia burgdorferi and other Borrelia species; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP (peptides N, N1, N2, and N3), activation associated protein-1 ASP-1, thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceraldehyde-3-phosphate dehydrogenase GAPDH, cuticular collagen Col-4, Secreted Larval Acidic Proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific gene product OvB20, onchocystatin CPI-2, protein Cox-2 (Wuchereria bancrofti and Brugia malayi, Lymphatic filariasis (Elephantiasis)); glycoprotein GP, matrix protein Z, polymerase L, nucleoprotein N of Lymphocytic choriomeningitis virus (LCMV); thrombospondin-related anonymous protein TRAP, SSP2 Sporozoite surface protein 2, apical membrane antigen 1 AMA1, rhoptry membrane antigen RMA1, acidic basic repeat antigen ABRA, cell-traversal protein PF, protein Pvs25, merozoite surface protein 1 MSP-1, merozoite surface protein 2 MSP-2, ring-infected erythrocyte surface antigen RESALiver stage antigen 3 LSA-3, protein Eba-175, serine repeat antigen 5 SERA-5, circumsporozoite protein CS, merozoite surface protein 3 MSP3, merozoite surface protein 8 MSP8, enolase PF10, hepatocyte erythrocyte protein 17 kDa HEP17, erythrocyte membrane protein 1 EMP1, protein Kbetamerozoite surface protein 4/5 MSP 4/5, heat shock protein Hsp90, glutamate-rich protein GLURP, merozoite surface protein 4 MSP-4, protein

STARP, circumsporozoite protein-related antigen precursor CRA (Plasmodium genus, Malaria); nucleoprotein N, membrane-associated protein VP24, minor nucleoprotein VP30, polymerase cofactor VP35, polymerase L, matrix protein VP40, envelope glycoprotein GP of Marburg virus; protein C, matrix protein M, phosphoprotein P, non-structural protein V, hemagglutinin glycoprotein H, polymerase L, nucleoprotein N, fusion protein F of Measles virus; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A BimA, bacterial Elongation factor-Tu EF-Tu, 17 kDa OmpA-like protein, boaA coding protein, boaB coding protein of Burkholderia pseudomallei; pilin proteins, minor pilin-associated subunit pilC, major pilin subunit and variants pilE, pilS, phase variation protein porA, Porin B PorB, protein TraD, Neisserial outer membrane antigen H.8, 70kDa antigen, major outer membrane protein PI, outer membrane proteins PlA and PlB, W antigen, surface protein A NspA, transferrin binding protein TbpA, transferrin binding protein TbpB , PBP2, mtrR coding protein, ponA coding protein, membrane permease FbpBC, FbpABC protein system, LbpAB proteins, outer membrane protein Opa, outer membrane transporter FetA, iron-repressed regulator MpeR, factor H-binding protein fHbp, adhesin NadA, protein NhbA, repressor FarR of Neisseria meningitidis; 66 kDa protein, 22 kDa protein, for example of Metagonimus yokagawai; polar tube proteins (34, 75, and 170 kDa in Glugea, 35, 55 and 150kDa in Encephalitozoon), kinesin-related protein, RNA polymerase II largest subunit, similar of integral membrane protein YIPA, anti-silencing protein 1, heat shock transcription factor HSF, protein kinase, thymidine kinase, NOP-2 like nucleolar protein of Microsporidia phylum; CASP8 and FADD-like apoptosis regulator, Glutathione peroxidase GPX1, RNA helicase NPH-II NPH2, Poly(A) polymerase catalytic subunit PAPL, Major envelope protein P43K, early transcription factor 70 kDa subunit VETFS, early transcription factor 82 kDa subunit VETFL, metalloendopeptidase G1-type, nucleoside triphosphatase I NPH1, replication protein A28-like MC134L, RNA polymease 7 kDa subunit RPO7 of Molluscum contagiosum virus (MCV); matrix protein M, phosphoprotein P/V, small hydrophobic protein SH, nucleoprotein N, protein V, fusion glycoprotein F,

hemagglutinin-neuraminidase HN, RNA polymerase L of Mumps virus; Outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D, crystalline surface layer protein SLP, protective surface protein antigen SPA of Rickettsia typhi; adhesin P1, adhesion P30, protein p116, protein P40, cytoskeletal protein HMW1, cytoskeletal protein HMW2, cytoskeletal protein HMW3, MPN152 coding protein, MPN426 coding protein, MPN456 coding protein, MPN-500coding protein of Mycoplasma pneumoniae; NocA, Iron dependent regulatory protein, VapA, VapD, VapF, VapG, caseinolytic protease, filament tip-associated 43-kDa protein, protein P24, protein P61, 15-kDa protein, 56-kDa protein, for example of Nocardia asteroides and other Nocardia species; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP, such as peptides N, N1, N2, and N3, activation associated protein-1 ASP-1, Thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceraldehyde-3-phosphate dehydrogenase GAPDH, cuticular collagen Col-4, Secreted Larval Acidic Proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific gene product OvB20, onchocystatin CPI-2, Cox-2 of Onchocerca volvulus; 43 kDa secreted glycoprotein, glycoprotein gp0, glycoprotein gp75, antigen Pb27, antigen Pb40, heat shock protein Hsp65, heat shock protein Hsp70, heat shock protein Hsp90, protein P10, triosephosphate isomerase TPI, N-acetyl-glucosamine-binding lectin Paracoccin, 28 kDa protein Pb28 of Paracoccidioides brasiliensis; 28-kDa cruzipain-like cystein protease Pw28CCP, for example of Paragonimus westermani and other Paragonimus species; outer membrane protein OmpH, outer membrane protein Omp28, protein PM1539, protein PM0355, protein PM1417, repair protein MutL, protein BcbC, protein PM0305, formate dehydrogenase-N, protein PM0698, protein PM1422, DNA gyrase, lipoprotein PlpE, adhesive protein Cp39, heme aquisition system receptor HasR, 39 kDa capsular protein, iron-regulated OMP IROMP, outer membrane protein

OmpA87, fimbrial protein Ptf, fimbrial subunit protein PtfA, transferrin binding protein Tbpl, esterase enzyme MesA, Pasteurella multocida toxin PMT, adhesive protein Cp39 of the Pasteurella genus; filamentous hemagglutinin FhaB, adenylate cyclase CyaA, pertussis toxin subunit 4 precursor PtxD, pertactin precursor Prn, toxin subunit 1 PtxA, protein Cpn60, protein brkA, pertussis toxin subunit 2 precursor PtxB, pertussis toxin subunit 3 precursor PtxC, pertussis toxin subunit 5 precursor PtxE, pertactin Prn, protein Fim2, protein Fim3 of Bordetella pertussis; F1 capsule antigen, virulence-associated V antigen, secreted effector protein LcrV, V antigen, outer membrane protease Pla, secreted effector protein YopD, putative secreted protein-tyrosine phosphatase YopH, needle complex major subunit YscF, protein kinase YopO, putative autotransporter protein YapF, inner membrane ABC-transporter YbtQ (Irp7), putative sugar binding protein YPO0612, heat shock protein 90 HtpG, putative sulfatase protein YdeN, outer-membrane lipoprotein carrier protein LolA, secretion chaperone YerA, putative lipoprotein YPO0420, hemolysin activator protein HpmB, pesticin/yersiniabactin outer membrane receptor Psn, secreted effector protein YopE, secreted effector protein YopF, secreted effector protein YopK, outer membrane protein YopN , outer membrane protein YopM, Coagulase/fibrinolysin precursor Pla of Yersinia pestis; protein PhpA, surface adhesin PsaA, pneumolysin Ply, ATP-dependent protease Clp, lipoate-protein ligase LplA, cell wall surface anchored protein psrP, sortase SrtA, glutamyl-tRNA synthetase GltX, choline binding protein A CbpA, pneumococcal surface protein A PspA, pneumococcal surface protein C PspC, 6-phosphogluconate dehydrogenase Gnd, iron-binding protein PiaA, Murein hydrolase LytB, proteon LytC, protease A1 of Streptococcus pneumoniae; major surface protein B, kexin-like protease KEX1, protein A12, 55 kDa antigen P55, major surface glycoprotein Msg of Pneumocystis jirovecii; genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of Poliovirus; protein Nfa1, exendin-3, secretory lipase, cathepsin B-like protease, cysteine protease, cathepsin, peroxiredoxin, protein Cry1Ac, for example of Naegleria fowleri; agnoprotein, large T antigen, small T antigen, major capsid protein VP1, minor capsid protein Vp2 of JC virus; low calcium response protein E

LCrE, chlamydial outer protein N CopN, serine/threonine-protein kinase PknD, acyl-carrier-protein S-malonyltransferase FabD, single-stranded DNA-binding protein Ssb, major outer membrane protein MOMP, outer membrane protein 2 (Omp2), polymorphic membrane protein family, such as Pmp1, Pmp2, Pmp3, Pmp4, Pmp5, Pmp6, Pmp7, Pmp8, Pmp9, Pmp10, Pmp11, Pmp12, Pmp13, Pmp14, Pmp15, Pmp16, Pmp17, Pmp18, Pmp19, Pmp20, Pmp21 of Chlamydophila psittaci; outer membrane protein P1, heat shock protein B HspB, peptide ABC transporter, GTP-binding protein, protein IcmB, ribonuclease R, phosphatas SixA, protein DsbD, outer membrane protein TolC, DNA-binding protein PhoB, ATPase DotB, heat shock protein B (HspB), membrane protein Com1, 28 kDa protein, DNA-3-methyladenine glycosidase I, outer membrane protein OmpH, outer membrane protein AdaA, glycine cleavage system T-protein of Coxiella burnetii; nucleoprotein N, large structural protein L, phophoprotein P, matrix protein M, glycoprotein G of Rabies virus; fusionprotein F, nucleoprotein N, matrix protein M, matrix protein M2-1, matrix protein M2-2, phosphoprotein P, small hydrophobic protein SH, major surface glycoprotein G, polymerase L, non-structural protein 1 NS1, non-structural protein 2 NS2 of Respiratory syncytial virus (RSV); genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of Rhinovirus; outer membrane (OM) proteins, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, protein PS120, intracytoplasmic protein D, protective surface protein antigen SPA of the Rickettsia genus; outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D of Rickettsia akari; envelope glycoprotein GP, polymerase L, nucleoprotein N, non-structural protein NSS of Rift Valley fever virus; outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D of Rickettsia rickettsii; non-structural protein 6 NS6, non-structural protein 2 NS2, intermediate capsid protein VP6, inner capsid protein VP2, non-structural protein 3 NS3, RNA-directed RNA polymerase L, protein VP3, non-structural protein 1 NS1, non-structural protein 5

NS5, outer capsid glycoprotein VP7, non-structural glycoprotein 4 NS4, outer capsid protein VP4 of Rotavirus; polyprotein P200, glycoprotein E1, glycoprotein E2, protein NS2, capsid protein C of Rubella virus; chaperonin GroEL (MopA), inositol phosphate phosphatase SopB, heat shock protein HslU, chaperone protein DnaJ, protein TviB, protein IroN, flagellin FliC, invasion protein SipC, glycoprotein gp43, outer membrane protein LamB, outer membrane protein PagC, outer membrane protein TolC, outer membrane protein NmpC, outer membrane protein FadL, transport protein SadA, transferase WgaP, effector proteins SifA, SteC, SseL, SseJ and SseF of the Salmonella genus; protein 14, non-structural protein NS7b, non-structural protein NS8a, protein 9b, protein 3a, nucleoprotein N, non-structural protein NS3b, non-structural protein NS6, protein 7a, non-structural protein NS8b, membrane protein M, envelope small membrane protein EsM, replicase polyprotein 1a, spike glycoprotein S, replicase polyprotein 1ab of SARS coronavirus; serine protease, Atypical Sarcoptes Antigen 1 ASA1, glutathione S-transferases (GST), cystein protease, serine protease, apolipoprotein of Sarcoptes scabiei; glutathione S-transferases (GST), paramyosin, hemoglbinase SM32, major egg antigen, 14 kDa fatty acid-binding protein Sm14, major larval surface antigen P37, 22,6 kDa tegumental antigen, calpain CANP, triphospate isomerase Tim, surface protein 9B, outer capsid protein VP2, 23 kDa integral membrane protein Sm23, Cu/Zn-superoxide dismutase, glycoprotein Gp, myosin of the Schistosoma genus; 60 kDa chaperonin, 56 kDa type-specific antigen, pyruvate phosphate dikinase, 4-hydroxybenzoate octaprenyltransferase of Orientia tsutsugamushi; dehydrogenase GuaB, invasion protein Spa32, invasin IpaA, invasin IpaB, invasin IpaC, invasin IpaD, invasin IpaH, invasin IpaJ of the Shigella genus; protein P53, virion protein US10 homolog, transcriptional regulator IE63, transcriptional transactivator IE62, protease P33, alpha trans-inducing factor 74 kDa protein, deoxyuridine 5'-triphosphate nucleotidohydrolase, transcriptional transactivator IE4, membrane protein UL43 homolog, nuclear phosphoprotein UL3 homolog, nuclear protein UL4 homolog, replication origin-binding protein, membrane protein 2, phosphoprotein 32, protein 57,DNA polymerase processivity factor, portal protein 54, DNA primase, tegument protein UL14 homolog, tegument protein UL21 homolog, tegument protein

UL55 homolog, tripartite terminase subunit UL33 homolog, tripartite terminase subunit UL15 homolog, capsid-binding protein 44, virion-packaging protein 43 of Varicella zoster virus (VZV); truncated 3-beta hydroxy-5-ene steroid dehydrogenase homolog, virion membrane protein A13, protein A19, protein A31, truncated protein A35 homolog, protein A37.5 homolog, protein A47, protein A49, protein A51, semaphorin-like protein A43, serine proteinase inhibitor 1, serine proteinase inhibitor 2, serine proteinase inhibitor 3, protein A6, protein B15, protein C1, protein C5, protein C6, protein F7, protein F8, protein F9, protein F11, protein F14, protein F15, protein F16 of Variola major and Variola minor; adhesin/glycoprotein gp70, proteases of Sporothrix schenckii; heme-iron binding protein IsdB, collagen adhesin Cna, clumping factor A (ClfA), protein MecA, fibronectin-binding protein A (FnbA), enterotoxin type A (EntA), enterotoxin type B (EntB), enterotoxin type C EntC1, enterotoxin type C EntC2, enterotoxin type D (EntD), enterotoxin type E (EntE), Toxic shock syndrome toxin-1 (TSST-1), Staphylokinase, Penicillin binding protein 2a (PBP2a, MecA), secretory antigen SssA of the Staphylococcus genus, such as Staphylococcus aureus; antigen Ss-IR, antigen NIE, strongylastacin, Na+-K+ ATPase Sseat-6, tropomysin SsTmy-1, protein LEC-5, 41 kDa aantigen P5, 41-kDa larval protein, 31-kDa larval protein, 28-kDa larval protein of Strongyloides stercoralis; glycerophosphodiester phosphodiesterase GlpQ (Gpd), outer membrane protein TmpB, protein Tp92, antigen TpF1, repeat protein Tpr, repeat protein F TprF, repeat protein G TprG, repeat protein I TprI, repeat protein J TprJ, repeat protein K TprK, treponemal membrane protein A (TmpA), lipoprotein, 15 kDa Tpp15, 47 kDa membrane antigen, miniferritin TpF1, adhesin Tp0751, lipoprotein TP0136, protein TpN17, protein TpN47, outer membrane protein TP0136, outer membrane protein TP0155, outer membrane protein TP0326, outer membrane protein TP0483, outer membrane protein TP0956 of Treponema pallidum; Cathepsin L-like proteases, 53/25-kDa antigen, 8kDa family members, cysticercus protein with a marginal trypsin-like activity TsAg5, oncosphere protein TSOL18, oncosphere protein TSOL45-1A, lactate dehydrogenase A LDHA, lactate dehydrogenase B LDHB of the Taenia genus; tetanus toxin TetX, tetanus toxin C TTC, 140 kDa S layer protein, flavoprotein beta-subunit CT3, phospholipase (lecithinase), phosphocarrier protein

HPr of Clostridium tetani; genome polyprotein, protein E, protein M, capsid protein C of Tick-borne encephalitis virus (TBEV); 58-kDa antigen, 68-kDa antigens, Toxocara larvae excretory-secretory antigen TES, 32-kDa glycoprotein, glycoprotein TES-70, glycoprotein GP31, excretory-secretory antigen TcES-57, perienteric fluid antigen Pe, soluble extract antigens Ex, excretory/secretory larval antigens ES, antigen TES-120, polyprotein allergen TBA-1, cathepsin L-like cysteine protease c-cpl-1, 26-kDa protein of Toxocara canis or Toxocara cati; microneme proteins, such as MIC1, MIC2, MIC3, MIC4, MIC5, MIC6, MIC7, or MIC8, rhoptry protein Rop2, rhoptry proteins, such as Rop1, Rop2, Rop3, Rop4, Rop5, Rop6, Rop7, Rop16, or Rjop17, protein SR1,surface antigen P22, major antigen p24, major surface antigen p30, dense granule proteins, such as GRA1, GRA2, GRA3, GRA4, GRA5, GRA6, GRA7, GRA8, GRA9, or GRA10, 28 kDa antigen, surface antigen SAG1, SAG2 related antigen, nucleoside-triphosphatase 1, nucleoside-triphosphatase 2, protein Stt3, HesB-like domain-containing protein, rhomboid-like protease 5, toxomepsin 1 of Toxoplasma gondii; 43 kDa secreted glycoprotein, 53 kDa secreted glycoprotein, paramyosin, antigen Ts21, antigen Ts87, antigen p46000, TSL-1 antigens, caveolin-1 CAV-1, 49 kDa newborn larva antigen, prosaposin homologue, serine protease, serine proteinase inhibitor, 45 -kDa glycoprotein Gp45 of Trichinella spiralis; Myb-like transcriptional factors (Myb1, Myb2, Myb3), adhesion protein AP23, adhesion protein AP33, adhesin protein AP33-3, adhesins AP51, adhesin AP65, adhesion protein AP65-1, alpha-actinin, kinesin-associated protein, teneurin, 62 kDa proteinase, subtilisin-like serine protease SUB1, cysteine proteinase gene 3 CP3, alpha-enolase Eno1, cysteine proteinase CP30, heat shock proteins Hsp70 and Hsp60, immunogenic protein P270 of Trichomonas vaginalis; beta-tubulin, 47-kDa protein, secretory leucocyte-like proteinase-1 SLP-1, 50-kDa protein TT50, 17 kDa antigen, 43/47 kDa protein of Trichuris trichiura; protein ESAT-6 (EsxA), 10 kDa filtrate antigen EsxB, secreted antigen 85-B FBPB, fibronectin-binding protein A FbpA (Ag85A), serine protease PepA, PPE family protein PPE18, fibronectin-binding protein D FbpD, immunogenic protein MPT64, secreted protein MPT51, catalase-peroxidase-peroxynitritase T KATG, periplasmic phosphate-binding lipoprotein PSTS3 (PBP-3, Phos-1), iron-regulated heparin binding hemagglutinin

Hbha, PPE family protein PPE14, PPE family protein PPE68, protein Mtb72F, protein Apa, immunogenic protein MPT63, periplasmic phosphate-binding lipoprotein PSTS1 (PBP-1), molecular chaperone DnaK, cell surface lipoprotein Mpt83, lipoprotein P23, phosphate transport system permease protein pstA, 14 kDa antigen, fibronectin-binding protein C FbpC1, Alanine dehydrogenase TB43, Glutamine synthetase 1, ESX-1 protein, protein CFP10, TB10.4 protein, protein MPT83, protein MTB12, protein MTB8, Rpf-like proteins, protein MTB32, protein MTB39, crystallin, heat-shock protein HSP65, protein PST-S, for example of Mycobacterium tuberculosis; outer membrane protein FobA, outer membrane protein FobB, intracellular growth locus lglC1, intracellular growth locus IglC2, aminotransferase Wbtl, chaperonin GroEL, 17 kDa major membrane protein TUL4, lipoprotein LpnA, chitinase family 18 protein, isocitrate dehydrogenase, Nif3 family protein, type IV pili glycosylation protein, outer membrane protein tolC, FAD binding family protein, type IV pilin multimeric outer membrane protein, two component sensor protein KdpD, chaperone protein DnaK, protein TolQ of Francisella tularensis; MB antigen, urease, protein GyrA, protein GyrB, protein ParC, protein ParE, lipid associated membrane proteins LAMP, thymidine kinase TK, phospholipase PL-A1, phospholipase PL-A2, phospholipase PL-C, surface-expressed 96-kDa antigen of Ureaplasma urealyticum; non-structural polyprotein, structural polyprotein, capsid protein CP, protein E1, protein E2, protein E3, protease P1, protease P2, protease P3 of Venezuelan equine encephalitis virus; glycoprotein GP, matrix protein Z, polymerase L, nucleoprotein N of Guanarito virus; polyprotein, protein E, protein M, capsid protein C, protease NS3, protein NS1, protein NS2A, protein AS2B, brotein NS4A, protein NS4B, protein NS5 of West Nile virus; capsid protein CP, protein E1, protein E2, protein E3, protease P2 of Western equine encephalitis virus; genome polyprotein, protein E, protein M, capsid protein C, protease NS3, protein NS1, protein NS2A, protein AS2B, protein NS4A, protein NS4B, protein NS5 of Yellow fever virus; putative Yop targeting protein YobB, effector protein YopD, effector protein YopE, protein YopH, effector protein YopJ, protein translocation protein YopK, effector protein YopT, protein YpkA, flagellar biosyntheses protein FlhA, peptidase M48, potassium efflux system KefA, transcrip-

tional regulator RovA, adhesin Ifp, translocator portein LcrV, protein PcrV, invasin Inv, outer membrane protein OmpF-like porin, adhesin YadA, protein kinase C, phospholipase C1, protein PsaA, mannosyltransferase-like protein WbyK, protein YscU, antigen YPMa of Yersinia pseudotuberculosis; effector protein YopB, 60 kDa chaperonin, protein WbcP, tyrosin-protein phosphatase YopH, protein YopQ, enterotoxin, Galactoside permease, reductaase NrdE, protein YasN, Invasin Inv, adhesin YadA, outer membrane porin F OmpF, protein UspA1, protein EibA, protein Hia, cell surface protein Ail, chaperone SycD, protein LcrD, protein LcrG, protein LcrV, protein SycE, protein YopE, regulator protein TyeA, protein YopM, protein YopN, protein YopO, protein YopT, protein YopD, protease ClpP, protein MyfA, protein FilA, and protein PsaA of Yersinia enterocolitica.

Preferably, the cancer or tumor is selected from the group consisting of Acute lymphoblastic leukemia, Acute myeloid leukemia, Adrenocortical carcinoma, AIDS-related cancers, AIDS-related lymphoma, Anal cancer, Appendix cancer, Astrocytoma, Basal cell carcinoma, Bile duct cancer, Bladder cancer, Bone cancer, Osteosarcoma/Malignant fibrous histiocytoma, Brainstem glioma, Brain tumor, cerebellar astrocytoma, cerebral astrocytoma/malignant glioma, ependymoma, medulloblastoma, supratentorial primitive neuroectodermal tumors, visual pathway and hypothalamic glioma, Breast cancer, Bronchial adenomas/carcinoids, Burkitt lymphoma, childhood Carcinoid tumor, gastrointestinal Carcinoid tumor, Carcinoma of unknown primary, primary Central nervous system lymphoma, childhood Cerebellar astrocytoma, childhood Cerebral astrocytoma/Malignant glioma, Cervical cancer, Childhood cancers, Chronic lymphocytic leukemia, Chronic myelogenous leukemia, Chronic myeloproliferative disorders, Colon Cancer, Cutaneous T-cell lymphoma, Desmoplastic small round cell tumor, Endometrial cancer, Ependymoma, Esophageal cancer, Ewing's sarcoma in the Ewing family of tumors, Childhood Extracranial germ cell tumor, Extragonadal Germ cell tumor, Extrahepatic bile duct cancer, Intraocular melanoma, Retinoblastoma, Gallbladder cancer, Gastric (Stomach) cancer, Gastrointestinal Carcinoid Tumor, Gastrointestinal stromal tumor (GIST), extracranial, extragonadal, or ovarian Germ cell tumor, Gestational

trophoblastic tumor, Glioma of the brain stem, Childhood Cerebral Astrocytoma, Childhood Visual Pathway and Hypothalamic Glioma, Gastric carcinoid, Hairy cell leukemia, Head and neck cancer, Heart cancer, Hepatocellular (liver) cancer, Hodgkin lymphoma, Hypopharyngeal cancer, childhood Hypothalamic and visual pathway glioma, Intraocular Melanoma, Islet Cell Carcinoma (Endocrine Pancreas), Kaposi sarcoma, Kidney cancer (renal cell cancer), Laryngeal Cancer, Leukemias, acute lymphoblastic Leukemia, acute myeloid Leukemia, chronic lymphocytic Leukemia, chronic myelogenous Leukemia, hairy cell Leukemia, Lip and Oral Cavity Cancer, Liposarcoma, Liver Cancer, Non-Small Cell Lung Cancer, Small Cell Lung Cancer, Lymphomas, AIDS-related Lymphoma, Burkitt Lymphoma, cutaneous T-Cell Lymphoma, Hodgkin Lymphoma, Non-Hodgkin Lymphomas, Primary Central Nervous System Lymphoma, Waldenström Macroglobulinemia, Malignant Fibrous Histiocytoma of Bone/Osteosarcoma, Childhood Medulloblastoma, Melanoma, Intraocular (Eye) Melanoma, Merkel Cell Carcinoma, Adult Malignant Mesothelioma, Childhood Mesothelioma, Metastatic Squamous Neck Cancer with Occult Primary, Mouth Cancer, Childhood Multiple Endocrine Neoplasia Syndrome, Multiple Myeloma/Plasma Cell Neoplasm, Mycosis Fungoides, Myelodysplastic Syndromes, Myelodysplastic/Myeloproliferative Diseases, Chronic Myelogenous Leukemia, Adult Acute Myeloid Leukemia, Childhood Acute Myeloid Leukemia, Multiple Myeloma (Cancer of the Bone-Marrow), Chronic Myeloproliferative Disorders, Nasal cavity and paranasal sinus cancer, Nasopharyngeal carcinoma, Neuroblastoma, Oral Cancer, Oropharyngeal cancer, Osteosarcoma/malignant fibrous histiocytoma of bone, Ovarian cancer, Ovarian epithelial cancer (Surface epithelial-stromal tumor), Ovarian germ cell tumor, Ovarian low malignant potential tumor, Pancreatic cancer, islet cell Pancreatic cancer, Paranasal sinus and nasal cavity cancer, Parathyroid cancer, Penile cancer, Pharyngeal cancer, Pheochromocytoma, Pineal astrocytoma, Pineal germinoma, childhood Pineoblastoma and supratentorial primitive neuroectodermal tumors, Pituitary adenoma, Plasma cell neoplasia/Multiple myeloma, Pleuropulmonary blastoma, Primary central nervous system lymphoma, Prostate cancer, Rectal cancer, Renal cell carcinoma (kidney cancer), Cancer of the Renal pelvis and ureter, Retinoblastoma, childhood

Rhabdomyosarcoma, Salivary gland cancer, Sarcoma of the Ewing family of tumors, Kaposi Sarcoma, soft tissue Sarcoma, uterine Sarcoma, Sézary syndrome, Skin cancer (nonmelanoma), Skin cancer (melanoma), Merkel cell Skin carcinoma, Small intestine cancer, Squamous cell carcinoma, metastatic Squamous neck cancer with occult primary, childhood Supratentorial primitive neuroectodermal tumor, Testicular cancer, Throat cancer, childhood Thymoma, Thymoma and Thymic carcinoma, Thyroid cancer, childhood Thyroid cancer, Transitional cell cancer of the renal pelvis and ureter, gestational Trophoblastic tumor, Urethral cancer, endometrial Uterine cancer, Uterine sarcoma, Vaginal cancer, childhood Visual pathway and hypothalamic glioma, Vulvar cancer, Waldenström macroglobulinemia, and childhood Wilms tumor (kidney cancer).

Preferably, each of the *m* different DNA molecule species encodes for one or more of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes a different cancer or tumor antigen, or a fragment or variant thereof, selected from the group consisting of 5T4, 707-AP, 9D7, AFP, AlbZIP HPG1, alpha-5-beta-1-integrin, alpha-5-beta-6-integrin, alpha-actinin-4/m, alpha-methylacyl-coenzyme A racemase, ART-4, ARTC1/m, B7H4, BAGE-1, BCL-2, bcr/abl, beta-catenin/m, BING-4, BRCA1/m, BRCA2/m, CA 15-3/CA 27-29, CA 19-9, CA72-4, CA125, calreticulin, CAMEL, CASP-8/m, cathepsin B, cathepsin L, CD19, CD20, CD22, CD25, CDE30, CD33, CD4, CD52, CD55, CD56, CD80, CDC27/m, CDK4/m, CDKN2A/m, CEA, CLCA2, CML28, CML66, COA-1/m, coactosin-like protein, collage XXIII, COX-2, CT-9/BRD6, Cten, cyclin B1, cyclin D1, cyp-B, CYPB1, DAM-10, DAM-6, DEK-CAN, EFTUD2/m, EGFR, ELF2/m, EMMPRIN, EpCam, EphA2, EphA3, ErbB3, ETV6-AML1, EZH2, FGF-5, FN, Frau-1, G250, GAGE-1, GAGE-2, GAGE-3, GAGE-4, GAGE-5, GAGE-6, GAGE7b, GAGE-8, GDEP, GnT-V, gp100, GPC3, GPNMB/m, HAGE, HAST-2, hepsin, Her2/neu, HERV-K-MEL, HLA-A*0201-R17I, HLA-A11/m, HLA-A2/m, HNE, homeobox NKX3.1, HOM-TES-14/SCP-1, HOM-TES-85, HPV-E6, HPV-E7, HSP70-2M, HST-2, hTERT, iCE, IGF-1R, IL-13Ra2, IL-2R, IL-5, immature laminin receptor, kallikrein-2, kallikrein-4, Ki67, KIAA0205, KIAA0205/m, KK-LC-1, K-Ras/m,

LAGE-A1, LDLR-FUT, MAGE-A1, MAGE-A2, MAGE-A3, MAGE-A4, MAGE-A6, MAGE-A9, MAGE-A10, MAGE-A12, MAGE-B1, MAGE-B2, MAGE-B3, MAGE-B4, MAGE-B5, MAGE-B6, MAGE-B10, MAGE-B16, MAGE-B17, MAGE-C1, MAGE-C2, MAGE-C3, MAGE-D1, MAGE-D2, MAGE-D4, MAGE-E1, MAGE-E2, MAGE-F1, MAGE-H1, MAGEL2, mammaglobin A, MART-1/melan-A, MART-2, MART-2/m, matrix protein 22, MC1R, M-CSF, ME1/m, mesothelin, MG50/PXDN, MMP11, MN/CA IX-antigen, MRP-3, MUC-1, MUC-2, MUM-1/m, MUM-2/m, MUM-3/m, myosin class I/m, NA88-A, N-acetylglucosaminyltransferase-V, Neo-PAP, Neo-PAP/m, NFYC/m, NGEP, NMP22, NPM/ALK, N-Ras/m, NSE, NY-ESO-B, NY-ESO-1, OA1, OFA-iLRP, OGT, OGT/m, OS-9, OS-9/m, osteocalcin, osteopontin, p15, p190 minor bcr-abl, p53, p53/m, PAGE-4, PAI-1, PAI-2, PAP, PART-1, PATE, PDEF, Pim-1-Kinase, Pin-1, Pml/PARalpha, POTE, PRAME, PRDX5/m, prostein, proteinase-3, PSA, PSCA, PSGR, PSM, PSMA, PTPRK/m, RAGE-1, RBAF600/m, RHAMM/CD168, RU1, RU2, S-100, SAGE, SART-1, SART-2, SART-3, SCC, SIRT2/m, Sp17, SSX-1, SSX-2/HOM-MEL-40, SSX-4, STAMP-1, STEAP-1, survivin, survivin-2B, SYT-SSX-1, SYT-SSX-2, TA-90, TAG-72, TARP, TEL-AML1, TGFbeta, TGFbetaRII, TGM-4, TPI/m, TRAG-3, TRG, TRP-1, TRP-2/6b, TRP/INT2, TRP-p8, tyrosinase, UPA, VEGFR1, VEGFR-2/FLK-1, and WT1. Such tumour antigens preferably may be selected from the group consisting of p53, CA125, EGFR, Her2/neu, hTERT, PAP, MAGE-A1, MAGE-A3, Mesothelin, MUC-1, GP100, MART-1, Tyrosinase, PSA, PSCA, PSMA, STEAP-1, VEGF, VEGFR1, VEGFR2, Ras, CEA or WT1, and more preferably from PAP, MAGE-A3, WT1, and MUC-1, preferably selected from the group consisting of MAGE-A1, e.g. MAGE-A1 according to accession number M77481, MAGE-A2, MAGE-A3, MAGE-A6, e.g. MAGE-A6 according to accession number NM_005363, MAGE-C1, MAGE-C2, melan-A, e.g. melan-A according to accession number NM_005511, GP100, e.g. GP100 according to accession number M77348, tyrosinase, e.g. tyrosinase according to accession number NM_000372, surviving, e.g. survivin according to accession number AF077350, CEA, e.g. CEA according to accession number NM_004363, Her-2/neu, e.g. Her-2/neu according to accession number M11730, WT1, e.g. WT1 according to

accession number NM_000378, PRAME, e.g. PRAME according to accession number NM_006115, EGFRI (epidermal growth factor receptor 1), e.g. EGFRI (epidermal growth factor receptor 1) according to accession number AF288738, MUC1, mucin-1, e.g. mucin-1 according to accession number NM_002456, SEC61G, e.g. SEC61G according to accession number NM_014302, hTERT, e.g. hTERT accession number NM_198253, 5T4, e.g. 5T4 according to accession number NM_006670, TRP-2, e.g. TRP-2 according to accession number NM_001922, STEAP1, PCA, PSA, and PSMA.

In a preferred example, the method further comprises a step of complexing the RNA molecules (all or only a part of the molecules) as disclosed with one or more cationic or polycationic compounds, preferably with cationic or polycationic polymers, cationic or polycationic peptides or proteins, e.g. protamine, cationic or polycationic polysaccharides and/or cationic or polycationic lipids.

Also provided is a RNA molecule composition produced by the method disclosed herein and a pharmaceutical composition comprising the RNA molecule composition disclosed herein and a pharmaceutically acceptable excipient. In a preferred example, the RNA molecules produced as disclosed herein are mRNA molecules.

In a preferred example, the RNA molecule composition disclosed herein comprises at least one RNA molecule being complexed with one or more member selected from the group consisting of cationic and polycationic compounds, preferably selected from the group consisting of cationic and polycationic polymers, cationic and polycationic peptides and proteins, preferably protamine, cationic and polycationic polysaccharides, and cationic and polycationic lipids..

Optionally, the N/P ratio (the ratio of moles of the amine groups of cationic polymers to those of the phosphate ones of RNA) of the at least one RNA molecule to the one or more cationic or polycationic compounds is in the range of 0.1 to 20, preferably in the range of 0.3 to 4, of 0.5 to 2, of 0.7 to 2 and more preferably of 0.7 to 1.5.

In another preferred example, the at least one RNA molecule is complexed with one or more cationic or polycationic compounds in a weight ratio in the range from 6:1 (w/w) to 0.25:1 (w/w), more preferably from 5:1 (w/w) to 0.5:1 (w/w), even more preferably from 4:1 (w/w) to 1:1 (w:w) or from 3:1 (w/w) to 1:1 (w/w), and most preferably in a weight ratio in the range from 3:1 (w/w) to 2:1 (w/w) of RNA to cationic or polycationic compound and/or with a polymeric carrier; or optionally in a nitrogen/phosphate ratio (N/P ratio) of RNA to cationic or polycationic compound and/or polymeric carrier in the range of about 0.1-10, preferably in a range of 0.3-4 or 0.3-1, and most preferably in a range of 0.5-1 or 0.7-1, and even most preferably in a range of 0.3-0.9 or 0.5-0.9.

In another example, the RNA molecule composition may comprise at least one RNA molecule complexed with one or more cationic or polycationic compounds (also denoted as complexed RNA molecule), and at least one free RNA molecule. Optionally, the nucleic acid sequence of the at least one complexed RNA molecule is identical to the at least one free RNA molecule.

The molar ratio of complexed RNA molecules to the free RNA molecules is selected from a molar ratio of 0.001:1 to 1:0.001, preferably a ratio of about 1:1.

In a preferred example, the ratio of the complexed RNA molecules to the (free) RNA molecules is selected from a range of about 5:1 (w/w) to about 1:10 (w/w), more preferably from a range of about 4:1 (w/w) to about 1:8 (w/w), even more preferably from a range of about 3:1 (w/w) to about 1:5 (w/w) or 1:3 (w/w), and most preferably the ratio of the complexed RNA molecules to the free RNA molecules is in a ratio of 1:1 (w/w).

In another preferred example, the at least one complexed RNA molecule may be complexed with one or more lipids, thereby forming liposomes, lipid nanoparticles and/or lipoplexes.

Further disclosed is a pharmaceutical container comprising the RNA composition as disclosed herein or the pharmaceutical composition as disclosed herein. Optionally, the pharmaceutical container is a syringe, vial, infusion bottle, ampoule or carpoule.

Also described is the RNA molecule (composition) as disclosed herein or the pharmaceutical composition as disclosed herein for use as a medicament.

In a preferred example, the RNA molecule composition or the pharmaceutical composition is for use in the treatment or prophylaxis of a disease selected from the group consisting of genetic diseases, allergies, autoimmune diseases, infectious diseases, neoplasms, cancer and tumor-related diseases, inflammatory diseases, diseases of the blood and blood-forming organs, endocrine, nutritional and metabolic diseases, diseases of the nervous system, inherited diseases, diseases of the circulatory system, diseases of the respiratory system, diseases of the digestive system, diseases of the skin and subcutaneous tissue, diseases of the musculoskeletal system and connective tissue, and diseases of the genitourinary system, independently if they are inherited or acquired and combinations thereof.

Moreover provided is the use of the RNA molecule composition or of the pharmaceutical composition as immunotherapeutic agent, gene-therapeutic agent or as vaccine.

CLAIMS

1. Method for producing a ribonucleic acid (RNA) molecule composition comprising *n* different RNA molecule species, wherein said composition comprises the *n* different RNA molecule species in identical amounts or amounts that do not differ by more than 20%, the method comprising the following steps:

a) simultaneous RNA *in vitro* transcription of a mixture of *m* different deoxyribonucleic acid (DNA) molecule species in a single reaction vessel, wherein each of the *m* different DNA molecule species encodes one of the *n* different RNA molecule species thereby generating the *n* different RNA molecule species, wherein the amount of each of the *m* different DNA molecule species is identical or does not differ by more than 20%; and

b) obtaining the RNA molecule composition comprising *n* different RNA molecule species generated in step a),

wherein *n* is an integer of at least 2, wherein *m* is an integer of at least 2, and wherein *m* is identical to *n.*

2. The method according to claim 1, further comprising prior to step a) a step of

c1) generating the mixture of *m* different DNA molecule species using bacterial amplification,

c2) generating the mixture of *m* different DNA molecule species using polymerase chain reaction (PCR),

c3) generating the mixture of *m* different DNA molecule species using chemical DNA synthesis, and/or

c4) generating the mixture of *m* different DNA molecule species using enzymatic amplification, for example by rolling circle amplification.

3. The method according to claim 2, wherein step c1) comprises a step of

d) transforming a bacterial cell culture with at least one single DNA plasmid species of the mixture of *m* different DNA plasmid species, wherein each DNA plasmid species encodes one of the *n* different RNA molecule species.

4. The method according to claim 2, wherein step c1) comprises a step of

d1) transforming *m* single bacterial cell cultures each with a single DNA plasmid species of the *m* different DNA plasmid species, wherein the single DNA plasmid species encodes one of the *n* different RNA molecule species, or

d2) transforming a single bacterial cell culture with a mixture of *m* different DNA plasmid species, wherein each DNA plasmid species encodes one of the *n* different RNA molecule species.

5. The method according to claim 3 or 4 further comprising a step of

e) isolating at least one single bacterial cell clone for each DNA plasmid species of the mixture of *m* different DNA plasmid species and

f) growing each of the at least one single bacterial cell clone isolated in step e) in a separate bacterial cell clone culture.

6. The method according to claim 4 further comprising after step d1) the following steps:

e1) isolating at least one single bacterial cell clone of each of the *m* single bacterial cell cultures transformed in step d1),

f1) growing each of the single bacterial cell clones isolated in step e1) in a separate bacterial cell culture,

g1) optionally determining the identity of the DNA plasmid species of each of the bacterial cell clone cultures grown in step f1),

h1) selecting at least one bacterial cell clone culture for each of the *m* different DNA plasmid species.

7. The method according to claim 4 further comprising after step d2) the following steps:

e2) isolating at least *m* single bacterial cell clones, and

f2) growing each of the at least *m* single bacterial cell clones isolated in step e2) in a separate bacterial cell clone culture,

g2) determining the identity of the DNA plasmid species of each of the at least *m* single bacterial cell clone cultures grown in step f2),

h2) selecting at least one single bacterial cell clone culture for each of the *m* different DNA plasmid species.

8. The method according to any one of claims 5 to 7 further comprising a step of

i) determining at least one parameter of growth kinetics and/or amount of plasmid DNA of the at least one single bacterial cell clone culture, and

j) selecting one or more bacterial cell clone cultures for each of the *m* different DNA plasmid species depending on the parameter determined in step i), preferably selecting one bacterial cell clone culture for each of the *m* different DNA plasmid species.

9. The method according to claim 8, wherein step i) comprises a step of

i1) determining a parameter of growth kinetics by measuring the optical density of the bacterial cell clone culture after a time interval, preferably using a microplate reader, or by scattered light online measurement, and/or

i2) determining the amount of plasmid produced per volume and time of bacterial cell culture.

10. The method according to claim 8 or 9, wherein the selected one or more bacterial cell clone cultures for each of the *m* different DNA plasmid species exhibit similar or identical growth kinetics and/or similar or identical DNA production levels, preferably the similar or equal growth kinetics and/or similar identical DNA production levels are as high as possible.

11. The method according to any one of claims 8 to 10, wherein step c1) further comprises a step of

k1) inoculating and growing an amount of at least one of the one or more bacterial cell clone cultures selected for each of the *m* different DNA plasmid species in step j) in a single reaction vessel, or

k2) inoculating and growing an amount of at least one of the one or more bacterial cell clone cultures selected for each of the *m* different DNA plasmid species in step j) in one or more separate reaction vessels for each of the *m*

different DNA plasmid species, optionally wherein one or more bacterial cell clone cultures of the *m* different DNA plasmid species are grown together in a single reaction vessel.

12. The method according to claim 11, wherein equal amounts of each bacterial cell clone culture are inoculated.

13. The method according to claim 11 or 12, wherein the amount of each bacterial cell clone culture used for inoculating in step k1 or k2) is selected so that equal or similar amounts of each of the *m* different DNA plasmid species are obtained.

14. The method according to any one of claims 11 to 13, wherein step c1) further comprises a step of

l) obtaining the *m* different DNA plasmid species of the bacterial cell clone cultures grown in step k1) and/or k2),

m) optionally linearizing the *m* different DNA plasmid species obtained in step l), and

n) obtaining the mixture of *m* different deoxyribonucleic acid (DNA) molecule species.

15. The method according to any one of the preceding claims, further comprising prior to step a) a step of

o) determining a parameter of transcription efficiency for each of the *m* different deoxyribonucleic acid (DNA) molecule species.

16. The method according to any one of the preceding claims, wherein the amount of each of the *n* different RNA molecule species in the RNA molecule composition is proportional or at least 90% proportional to the amount of the corresponding DNA molecule species in the mixture of *m* different DNA molecule species.

17. The method according to any one of the preceding claims, wherein step b) comprises a step of

p) purifying the *n* different RNA molecule species, optionally via HPLC.

18. The method according to any one of the preceding claims, further comprising a step of

q) qualitatively and/or quantitatively analyzing the RNA molecule composition obtained in step b).

19. The method according to any one of the preceding claims, wherein the DNA sequences of the *m* different deoxyribonucleic acid (DNA) molecule species are at least 80% identical to each other.

20. The method according to any one of claims 3 to 14, wherein the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species have the same plasmid backbone.

21. The method according to any one of claims 3 to 14, and 20, wherein the open reading frames of the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species are at least 80% identical to each other.

22. The method according to any one of claims 3 to 14, and 21, wherein the open reading frames of the DNA plasmid species of the *m* different deoxyribonucleic acid (DNA) molecule species vary in their length by a maximum of 100 or 50 nucleotides.

23. The method according to any one of the preceding claims, wherein the RNA sequences of the *n* different RNA molecule species are at least 80% identical to each other.

24. The method according to any one of the preceding claims, wherein each of the *m* different DNA molecule species encodes for one of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes for

a antigen of different serotypes or strains of a pathogen, for a different allergen, for a different autoimmune antigen, for a different antigen of a pathogen, different adjuvant proteins, for a different isoform or variant of a cancer or tumor antigen, for a different tumor antigen of one patient, for one antibody among a group of antibodies which target different epitopes of a protein or of a group of proteins, for different proteins of a metabolic pathway, for a single protein among a group of proteins which are defect in a subject, or for a different isoform of a protein for molecular therapy.

25. The method according to claim 24, wherein the pathogen is selected from the group consisting of a virus, bacterium, prion, fungus, protozoon, viroid, and parasite.

26. The method according to claim 25, wherein the pathogen is selected from the group consisting of Acinetobacter baumannii, Anaplasma genus, Anaplasma phagocytophilum, Ancylostoma braziliense, Ancylostoma duodenale, Arcanobacterium haemolyticum, Ascaris lumbricoides, Aspergillus genus, Astroviridae, Babesia genus, Bacillus anthracis, Bacillus cereus, Bartonella henselae, BK virus, Blastocystis hominis, Blastomyces dermatitidis, Bordetella pertussis, Borrelia burgdorferi, Borrelia genus, Borrelia spp, Brucella genus, Brugia malayi, Bunyaviridae family, Burkholderia cepacia and other Burkholderia species, Burkholderia mallei, Burkholderia pseudomallei, Caliciviridae family, Campylobacter genus, Candida albicans, Candida spp, Chlamydia trachomatis, Chlamydophila pneumoniae, Chlamydophila psittaci, CJD prion, Clonorchis sinensis, Clostridium botulinum, Clostridium difficile, Clostridium perfringens, Clostridium perfringens, Clostridium spp, Clostridium tetani, Coccidioides spp, coronaviruses, Corynebacterium diphtheriae, Coxiella burnetii, Crimean-Congo hemorrhagic fever virus, Cryptococcus neoformans, Cryptosporidium genus, Cytomegalovirus (CMV), Dengue viruses (DEN-1, DEN-2, DEN-3 and DEN-4), Dientamoeba fragilis, Ebolavirus (EBOV), Echinococcus genus, Ehrlichia chaffeensis, Ehrlichia ewingii, Ehrlichia genus, Entamoeba histolytica, Enterococcus genus, Enterovirus genus, Enteroviruses, mainly Coxsackie A virus and Enterovirus 71 (EV71), Epidermophyton spp, Epstein-Barr Virus (EBV), Escherichia coli

O157:H7, O111 and O104:H4, Fasciola hepatica and Fasciola gigantica, FFI prion, Filarioidea superfamily, Flaviviruses, Francisella tularensis, Fusobacterium genus, Geotrichum candidum, Giardia intestinalis, Gnathostoma spp, GSS prion, Guanarito virus, Haemophilus ducreyi, Haemophilus influenzae, Helicobacter pylori, Henipavirus (Hendra virus Nipah virus), Hepatitis A Virus, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Hepatitis D Virus, Hepatitis E Virus, Herpes simplex virus 1 and 2 (HSV-1 and HSV-2), Histoplasma capsulatum, HIV (Human immunodeficiency virus), Hortaea werneckii, Human bocavirus (HBoV), Human herpesvirus 6 (HHV-6) and Human herpesvirus 7 (HHV-7), Human metapneumovirus (hMPV), Human papillomavirus (HPV), Human parainfluenza viruses (HPIV), Japanese encephalitis virus, JC virus, Junin virus, Kingella kingae, Klebsiella granulomatis, Kuru prion, Lassa virus, Legionella pneumophila, Leishmania genus, Leptospira genus, Listeria monocytogenes, Lymphocytic choriomeningitis virus (LCMV), Machupo virus, Malassezia spp, Marburg virus, Measles virus, Metagonimus yokagawai, Microsporidia phylum, Molluscum contagiosum virus (MCV), Mumps virus, Mycobacterium leprae and Mycobacterium lepromatosis, Mycobacterium tuberculosis, Mycobacterium ulcerans, Mycoplasma pneumoniae, Naegleria fowleri, Necator americanus, Neisseria gonorrhoeae, Neisseria meningitidis, Nocardia asteroides, Nocardia spp, Onchocerca volvulus, Orientia tsutsugamushi, Orthomyxoviridae family (Influenza), Paracoccidioides brasiliensis, Paragonimus spp, Paragonimus westermani, Parvovirus B19, Pasteurella genus, Plasmodium genus, Pneumocystis jirovecii, Poliovirus, Rabies virus, Respiratory syncytial virus (RSV), Rhinovirus, rhinoviruses, Rickettsia akari, Rickettsia genus, Rickettsia prowazekii, Rickettsia rickettsii, Rickettsia typhi, Rift Valley fever virus, Rotavirus, Rubella virus, Sabia virus, Salmonella genus, Sarcoptes scabiei, SARS coronavirus, Schistosoma genus, Shigella genus, Sin Nombre virus, Hantavirus, Sporothrix schenckii, Staphylococcus genus, Staphylococcus genus, Streptococcus agalactiae, Streptococcus pneumoniae, Streptococcus pyogenes, Strongyloides stercoralis, Taenia genus, Taenia solium, Tick-borne encephalitis virus (TBEV), Toxocara canis or Toxocara cati, Toxoplasma gondii, Treponema pallidum, Trichinella spiralis, Trichomonas vaginalis, Trichophyton spp, Trichuris trichiura, Trypanosoma brucei, Trypanosoma cruzi,

Ureaplasma urealyticum, Varicella zoster virus (VZV), Varicella zoster virus (VZV), Variola major or Variola minor, vCJD prion, Venezuelan equine encephalitis virus, Vibrio cholerae, West Nile virus, Western equine encephalitis virus, Wuchereria bancrofti, Yellow fever virus, Yersinia enterocolitica, Yersinia pestis, and Yersinia pseudotuberculosis, preferably the pathogen is selected from the group consisting of influenza virus, respiratory syncytial virus (RSV), Herpes simplex virus (HSV), human Papilloma virus (HPV), Human immunodeficiency virus (HIV), Plasmodium, Staphylococcus aureus, Dengue virus, Chlamydia trachomatis, Cytomegalovirus (CMV), Hepatitis B virus (HBV), Mycobacterium tuberculosis, Rabies virus, Rotavirus and Yellow Fever Virus.

27. The method according to any one of the preceding claims, wherein each of the *m* different DNA molecule species encodes for one of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes a different pathogenic antigen or a fragment or variant thereof selected from the group consisting of influenza haemagglutinin, influenza neuraminidase, influenza nucleoprotein, coronavirus glycoprotein S, prostate specific antigen, outer membrane protein A OmpA, biofilm associated protein Bap, transport protein MucK of Acinetobacter baumannii and Acinetobacter infections; variable surface glycoprotein (VSG), microtubule-associated protein MAPP15, trans-sialidase (TSA) of Trypanosoma brucei; HIV p24 antigen, Human immunodeficiency virus (HIV) envelope proteins Gp120, Gp41, and Gp160, polyprotein GAG, negative factor protein Nef, trans-activator of transcription (Tat) of HIV; galactose-inhibitable adherence protein (GIAP), 29 kDa antigen Eh29, Gal/GalNAc lectin, protein CRT, 125 kDa immunodominant antigen, protein M17, adhesin ADH112 and protein STIRP of Entamoeba histolytica; major surface proteins 1 to 5 (MSP1a, MSP1b, MSP2, MSP3, MSP4, MSP5), type IV secreotion system proteins (VirB2, VirB7, VirB11, VirD4) of Anaplasma genus; protective Antigen PA, edema factor EF, lethal factor LF, the S-layer homology proteins (SLH) of Bacillus anthracis; acranolysin, phospholipase D, collagen-binding protein CbpA of Arcanobacterium haemolyticum; nucleocapsid protein (NP), glycoprotein precursor GPC, glycoprotein GP1, glycoprotein GP2 of Junin virus; chitin-protein layer proteins, 14 kDa suarface

antigen A14, major sperm protein (MSP), MSP polymerization-organizing protein (MPOP), MSP fiber protein 2 (MFP2), MSP polymerization-activating kinase (MPAK), ABA-1-like protein (ALB), protein ABA-1, cuticulin (CUT-1) of Ascaris lumbricoides; 41 kDa allergen Asp v13, allergen Asp f3, major conidial surface protein rodlet A, protease Pep1p, GPI-anchored protein Gel1p, GPI-anchored protein Crf1p of Aspergillus genus; family VP26 protein, VP29 protein of Astroviridae; Rhoptry-associated protein 1 (RAP-1), merozoite surface antigens MSA-1, MSA-2 (a1, a2, b, c), 12D3, 11C5, 21B4, P29, variant erythrocyte surface antigen VESA1, Apical Membrane Antigen 1 (AMA-1) of Babesia genus; hemolysin, enterotoxin C, PXO1-51, glycolate oxidase, ABC-transporter, penicillin-bingdn protein, zinc transporter family protein, pseudouridine synthase Rsu, plasmid replication protein RepX, oligoendopeptidase F, prophage membrane protein, protein HemK, flagellar antigen H, 28.5-kDa cell surface antigen of Bacillus cereus; large T antigen LT, small T antigen, capsid protein VP1, capsid protein VP2 of BK virus; 29 kDa-protein, caspase-3-like antigens, glycoproteins of Blastocystis hominis; yeast surface adhesin WI-1 of Blastomyces dermatitidis; nucleoprotein N, polymerase L, matrix protein Z, glycoprotein (GP) of Machupo virus; outer surface protein A (OspA), outer surface protein B (OspB), outer surface protein C (OspC), decorin binding protein A (DbpA), decorin binding protein B (DbpB), flagellar filament 41 kDa core protein Fla, basic membrane protein A precursor (BmpA) (Immunodominant antigen P39), outer surface 22 kDa lipoprotein precursor (antigen IPLA7), variable surface lipoprotein vlsE of Borrelia genus; Botulinum neurotoxins BoNT/A1, BoNT/A2, BoNT/A3, BoNT/B, BoNT/C, BoNT/D, BoNT/E, BoNT/F, BoNT/G, recombinant botulinum toxin F Hc domain (FHc) of Clostridium botulinum; nucleocapsid, glycoprotein precursor of Sabia virus; copper/Zinc superoxide dismutase (SodC), bacterioferritin (Bfr), 50S ribosomal protein RplL, OmpA-like transmembrane domain-containing protein Omp31, immunogenic 39-kDa protein M5 P39, zinc ABC transporter periplasmic zinc-bnding protein znuA, periplasmic immunogenic protein Bp26, 30S ribosomal protein S12 RpsL, glyceraldehyde-3-phosphate dehydrogenase Gap, 25 kDa outer-membrane immunogenic protein precursor Omp25, invasion protein B lalB, trigger factor Tig, molecular chaperone DnaK, putative peptidyl-prolyl cis-trans isomerase SurA, lipoprotein Omp19, outer membrane protein MotY

Omp16, conserved outer membrane protein D15, malate dehydrogenase (Mdh), component of the Type-IV secretion system (T4SS) VirJ, lipoprotein of unknown function BAB1_0187 of Brucella genus; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A (BimA), bacterial Elongation factor-Tu (EF-Tu), 17 kDa OmpA-like protein, boaA coding protein, boaB coding protein of Burkholderia cepacia and other Burkholderia species; mycolyl-transferase Ag85A, heat-shock protein 65 (Hsp65), protein TB10.4, 19 kDa antigen, protein PstS3, heat-shock protein 70 (Hsp70) of Mycobacterium ulcerans; norovirus major and minor viral capsid proteins VP1 and VP2, genome polyprotein, Sapovirus capsid protein VP1, protein Vp3, geome polyprotein of Caliciviridae family, Norovirus and Sapovirus; major outer membrane protein PorA, flagellin FlaA, surface antigen CjaA, fibronectin binding protein CadF, aspartate/glutamate-binding ABC transporter protein Peb1A, protein FspA1, protein FspA2 of Campylobacter genus; glycolytic enzyme enolase, secreted aspartyl proteinases SAP1-10, glycophosphatidylinositol (GPI)-linked cell wall protein, protein Hyr1, complement receptor 3-related protein (CR3-RP), adhesin Als3p, heat shock protein 90 kDa (Hsp90), cell surface hydrophobicity protein (CSH) of Candida albicans and other Candida species; 17-kDa antigen, protein P26, trimeric autotransporter adhesins TAAs, Bartonella adhesin A BadA, variably expressed outer-membrane proteins Vomps, protein Pap3, protein HbpA, envelope-associated protease HtrA, protein OMP89, protein GroEL, protein LalB, protein OMP43, dihydrolipoamide succinyltransferase SucB of Bartonella henselae; amastigote surface protein-2, amastigote-specific surface protein SSP4, cruzipain, trans-sialidase TS, trypomastigote surface glycoprotein TSA-1, complement regulatory protein CRP-10, protein G4, protein G2, paraxonemal rod protein PAR2, paraflagellar rod component Par1, mucin-associated Surface Proteins MPSP of Trypanosoma cruzi; envelope glycoproteins (gB, gC, gE, gH, gI, gK, gL) of Varicella zoster virus (VZV); major outer membrane protein MOMP, probable outer membrane protein PMPC, outer membrane complex protein B OmcB, heat shock proteins Hsp60 and HSP10, protein IncA, proteins from the type III secretion system, ribonucleotide reductase small chain protein NrdB, plasmid protein Pgp3, chlamydial outer protein N (CopN),

antigen CT521, antigen CT425, antigen CT043, antigen TC0052, antigen TC0189, antigen TC0582, antigen TC0660, antigen TC0726, antigen TC0816, antigen TC0828 of Chlamydia trachomatis; low calcium response protein E (LCrE), serine/threonine-protein kinase PknD, acyl-carrier-protein S-malonyltransferase FabD, single-stranded DNA-binding protein Ssb, major outer membrane protein (MOMP), outer membrane protein 2 (Omp2), polymorphic membrane protein family, such as(Pmp1, Pmp2, Pmp3, Pmp4, Pmp5, Pmp6, Pmp7, Pmp8, Pmp9, Pmp10, Pmp11, Pmp12, Pmp13, Pmp14, Pmp15, Pmp16, Pmp17, Pmp18, Pmp19, Pmp20 and Pmp21 of Chlamydophila pneumoniae, Chlamydophila pneumoniae infection; cholera toxin B (CTB), toxin coregulated pilin A (TcpA), toxin coregulated pilin (TcpF), toxin co-regulated pilus biosynthesis ptrotein F (TcpF), cholera enterotoxin subunit A, cholera enterotoxin subunit B, Heat-stable enterotoxin ST, mannose-sensitive hemagglutinin (MSHA), outer membrane protein U Porin (ompU), Poring B protein, polymorphic membrane protein-D of Vibrio cholerae; propionyl-CoA carboxylase PCC, 14-3-3 protein, prohibitin, cysteine proteases, glutathione transferases, gelsolin, cathepsin L proteinase CatL, Tegumental Protein 20.8 kDa TP20.8, tegumental protein 31.8 kDa TP31.8, lysophosphatidic acid phosphatase LPAP of Clonorchis sinensis; surface layer proteins SLPs, glutamate dehydrogenase antigen GDH, toxin A, toxin B, cysteine protease Cwp84, cysteine protease Cwp13, cysteine protease Cwp19, Cell Wall Protein CwpV, flagellar protein FliC, flagellar protein FliD of Clostridium difficile; rhinovirus capsid proteins VP1, VP2, VP3, VP4; coronavirus sprike proteins S, envelope protein E, membrane protein M, nucleocapsid protein N of rhinoviruses and coronaviruses; prion protein Prp (CJD prion); envelope protein Gc, envelope protein Gn, nucleocapsid proteins of Crimean-Congo hemorrhagic fever virus; virulence-associated DEAD-box RNA helicase VAD1, galactoxylomannan-protein GalXM, glucuronoxylomannan GXM, mannoprotein MP of Cryptococcus neoformans; acidic ribosomal protein P2 CpP2, mucin antigens Muc1, Muc2, Muc3 Muc4, Muc5, Muc6, Muc7, surface adherence protein CP20, surface adherence protein CP23, surface protein CP12, surface protein CP21, surface protein CP40, surface protein CP60, surface protein CP15, surface-associated glycopeptides gp40, surface-associated glycopeptides gp15, oocyst wall protein AB, profilin PRF, apyrase of the Cryptosporidium genus; fatty acid and

retinol binding protein-1(FAR-1), tissue inhibitor of metalloproteinase (TIMP), cysteine proteinase ACEY-1, cysteine proteinase ACCP-1, surface antigen Ac-16, secreted protein 2 ASP-2, metalloprotease 1 MTP-1, aspartyl protease inhibitor API-1, surface-associated antigen SAA-1, adult-specific secreted factor Xa serine protease inhibitor anticoagulant AP, cathepsin D-like aspartic protease ARR-1, for example of Ancylostoma braziliense and other pathogens like Cutaneous larva migrans (CLM); cathepsin L-like proteases, 53/25-kDa antigen, 8kDa family members, cysticercus protein with a marginal trypsin-like activity TsAg5, oncosphere protein TSOL18, oncosphere protein TSOL45-1A, lactate dehydrogenase A LDHA, lactate dehydrogenase B LDHB of Taenia solium; pp65 antigen, membrane protein pp15, capsid-proximal tegument protein pp150, protein M45, DNA polymerase UL54, helicase UL105, glycoprotein gM, glycoprotein gN, glycoprotein H, glycoprotein B gB, protein UL83, protein UL94, protein UL99 of Cytomegalovirus (CMV); capsid protein C, premembrane protein prM, membrane protein M, envelope protein E (domain I, domain II, domain II), protein NS1, protein NS2A, protein NS2B, protein NS3, protein NS4A, protein 2K, protein NS4B, protein NS5 of Dengue viruses (DEN-1, DEN-2, DEN-3 and DEN-4)–Flaviviruses; 39 kDa protein of Dientamoeba fragilis; diphtheria toxin precursor Tox, diphteria toxin DT, pilin-specific sortase SrtA, shaft pilin protein SpaA, tip pilin protein SpaC, minor pilin protein SpaB, surface-associated protein DIP1281 of Corynebacterium diphtheriae; glycoprotein GP, nucleoprotein NP, minor matrix protein VP24, major matrix protein VP40, transcription activator VP30, polymerase cofactor VP35, RNA polymerase L of Ebolavirus (EBOV); prion protein (vCJD prion, vCJD, nvCJD); UvrABC system protein B, protein Flp1, protein Flp2, protein Flp3, protein TadA, hemoglobin receptor HgbA, outer membrane protein TdhA, protein CpsRA, regulator CpxR, protein SapA, 18 kDa antigen, outer membrane protein NcaA, protein LspA, protein LspA1, protein LspA2, protein LspB, outer membrane component DsrA, lectin DltA, lipoprotein Hlp, major outer membrane protein OMP, outer membrane protein OmpA2 of Haemophilus ducreyi; aspartyl protease 1 Pep1, phospholipase B PLB, alpha-mannosidase 1 AMN1, glucanosyltransferase GEL1, urease URE, peroxisomal matrix protein Pmp1, proline-rich antigen Pra, humal T-cell reative protein TcrP of Coccidioides immitis and Coccidioides posadasii;

allergen Tri r 2, heat shock protein 60 Hsp60, fungal actin Act, antigen Tri r2, antigen Tri r4, antigen Tri t1, protein IV, glycerol-3-phosphate dehydrogenase Gpd1, osmosensor HwSho1A, osmosensor HwSho1B, histidine kinase HwHhk7B, allergen Mala s 1, allergen Mala s 11, thioredoxin Trx Mala s 13, allergen Mala f, allergen Mala s, for examples of Trichophyton spp, Epidermophyton spp., Malassezia spp., Hortaea werneckii; protein EG95, protein EG10, protein EG18, protein EgA31, protein EM18, antigen EPC1, antigen B, antigen 5, protein P29, protein 14-3-3, 8-kDa protein, myophilin, heat shock protein 20 (HSP20), glycoprotein GP-89, fatty acid binding protein FAPB of Echinococcus genus; major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of the Ehrlichia genus; secreted antigen SagA, sagA-like proteins SalA and SalB, collagen adhesin Scm, surface proteins Fms1 EbpA(fm), Fms5 EbpB(fm), Fms9 EpbC(fm) and Fms10, protein EbpC(fm), 96 kDa immunoprotective glycoprotein G1 of the Enterococcus genus; genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of the Enterovirus genus; outer membrane proteins OM, 60 kDa outer membrane protein, cell surface antigen OmpA, cell surface antigen OmpB (sca5), 134 kDa outer membrane protein, 31 kDa outer membrane protein, 29.5 kDa outer membrane protein, cell surface protein SCA4, cell surface protein Adr1 (RP827), cell surface protein Adr2 (RP828), cell surface protein SCA1, Invasion protein invA, cell division protein fts, secretion proteins of the sec family, virulence proteins virB, tlyA, tlyC, parvulin-like protein Plp, preprotein translocase SecA, 120-kDa surface protein antigen SPA, 138 kD complex antigen, major 100-kD protein (protein I), intracytoplasmic protein D, protective surface protein antigen SPA (Rickettsia prowazekii, Epidemic typhus); Epstein–Barr nuclear antigens (EBNA-1, EBNA-2, EBNA-3A, EBNA-3B, EBNA-3C, EBNA-leader protein (EBNA-LP)), latent membrane proteins (LMP-1, LMP-2A, LMP-2B), early antigen EBV-EA, membrane antigen EBV-MA, viral capsid antigen

EBV-VCA, alkaline nuclease EBV-AN, glycoprotein H, glycoprotein gp350, glycoprotein gp110, glycoprotein gp42, glycoprotein gHgL, glycoprotein gB of Epstein-Barr Virus (EBV); cpasid protein VP2, capsid protein VP1, major protein NS1 of Parvovirus B19; pp65 antigen, glycoprotein 105, major capsid protein, envelope glycoprotein H, protein U51 of Human herpesvirus 6 (HHV-6) and Human herpesvirus 7 (HHV-7); thioredoxin-glutathione reductase TGR, cathepsins L1 and L2, Kunitz-type protein KTM, leucine aminopeptidase LAP, cysteine proteinase Fas2, saposin-like protein-2 SAP-2, thioredoxin peroxidases TPx, Prx-1, Prx-2, cathepsin l cysteine proteinase CL3, protease cathepsin L CL1, phosphoglycerate kinase PGK, 27-kDa secretory protein, 60 kDa protein HSP35alpha, glutathione transferase GST, 28.5 kDa tegumental antigen 28.5 kDa TA, cathepsin B3 protease CatB3, Type I cystatin stefin-1, cathepsin L5, cathepsin L1g and cathepsin B, fatty acid binding protein FABP, leucine aminopeptidases LAP of Fasciola hepatica and Fasciola gigantica; prion protein FFI prion; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP (peptides N, N1, N2, and N3), activation associated protein-1 ASP-1, Thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceraldehyde-3-phosphate dehydrogenase GAPDH, cuticular collagen Col-4, secreted larval acidic proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific gene product OvB20, onchocystatin CPI-2, Cox-2 of the Filarioidea superfamily; phospholipase C PLC, heat-labile enterotoxin B, Iota toxin component Ib, protein CPE1281 , pyruvate ferredoxin oxidoreductase, elongation factor G EF-G, perfringolysin O Pfo, glyceraldehyde-3-phosphate dehydrogenase GapC, Fructose-bisphosphate aldolase Alf2, clostridium perfringens enterotoxin CPE, alpha toxin AT, alpha toxoid ATd, epsilon-toxoid ETd, protein HP, large cytotoxin TpeL, endo-beta-N-acetylglucosaminidase Naglu, phosphoglyceromutase Pgm of Clostridium perfringens; leukotoxin lktA, adhesion FadA, outer membrane protein RadD, high-molecular weight arginine-binding protein of Fusobacterium genus; phospholipase C PLC, heat-labile enterotoxin B,

Iota toxin component Ib, protein CPE1281, pyruvate ferredoxin oxidoreductase, elongation factor G EF-G, perfringolysin O Pfo, glyceraldehyde-3-phosphate dehydrogenase GapC, fructose-bisphosphate aldolase Alf2, clostridium perfringens enterotoxin CPE, alpha toxin AT, alpha toxoid ATd, epsilon-toxoid ETd, protein HP, large cytotoxin TpeL, endo-beta-N-acetylglucosaminidase Naglu, phosphoglycero-mutase Pgm, for example of Clostridium perfringens and other Clostridium species; lipase A, lipase B, peroxidase Dec1 of Geotrichum candidum; prion protein GSS prion; cyst wall proteins CWP1, CWP2, CWP3, variant surface protein VSP, VSP1, VSP2, VSP3, VSP4, VSP5, VSP6, 56 kDa antigen, pyruvate ferredoxin oxido-reductase PFOR, alcohol dehydrogenase E ADHE, alpha-giardin, alpha8-giardin, alpha1-guiardin, beta-giardin, cystein proteases, glutathione-S-transferase GST, arginine deiminase ADI, fructose-1,6-bisphosphat aldolase FBA, Giardia trophozoite antigens GTA (GTA1, GTA2), ornithine carboxyl transferase OCT, striated fiber-asseblin-like protein SALP, uridine phosphoryl-like protein UPL, alpha-tubulin, beta-tubulin of Giardia intestinalis; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A BimA, bacterial Elongation factor-Tu EF-Tu, 17 kDa OmpA-like protein, boaA coding protein of Burkholderia mallei; cyclophilin CyP, 24 kDa third-stage larvae protien GS24, excretion-secretion products ESPs (40, 80, 120 and 208 kDa) of Gnathostoma spinigerum and Gnathostoma hispidum; pilin proteins, minor pilin-associated subunit pilC, major pilin subunit and variants pilE, pilS, phase variation protein porA, Porin B PorB, protein TraD, Neisserial outer membrane antigen H.8, 70kDa antigen, major outer membrane protein PI, outer membrane proteins PlA and PlB, W antigen, surface protein A NspA, transferrin binding protein TbpA, transferrin binding protein TbpB , PBP2, mtrR coding protein, ponA coding protein, membrane permease FbpBC, FbpABC protein system, LbpAB proteins, outer membrane protein Opa, outer membrane transporter FetA, iron-repressed regulator MpeR of Neisseria gonorrhoeae; outer membrane protein A OmpA, outer membrane protein C OmpC, outer membrane protein K17 OmpK17 of Klebsiella granulomatis; fibronectin-binding protein Sfb, fibronectin/fibrinogen-binding protein FBP54, fibronectin-binding protein FbaA, M protein type 1 Emm1, M protein type 6 Emm6,

immunoglobulin-binding protein 35 Sib35, Surface protein R28 Spr28, superoxide dismutase SOD, C5a peptidase ScpA, antigen I/II AgI/II, adhesin AspA, G-related alpha2-macroglobulin-binding protein GRAB, surface fibrillar protein M5 of Streptococcus pyogenes; C protein β antigen, arginine deiminase proteins, adhesin BibA, 105 kDA protein BPS, surface antigens c, surface antigens R, surface antigens X, trypsin-resistant protein R1, trypsin-resistant protein R3, trypsin-resistant protein R4, surface immunogenic protein Sip, surface protein Rib, Leucine-rich repeats protein LrrG, serine-rich repeat protein Srr-2, C protein alpha-antigen Bca, Beta antigen Bag, surface antigen Epsilon, alpha-like protein ALP1, alpha-like protein ALP5 surface antigen delta, alpha-like protein ALP2, alpha-like protein ALP3, alpha-like protein ALP4, Cbeta protein Bac of Streptococcus agalactiae; transferrin-binding protein 2 Tbp2, phosphatase P4, outer membrane protein P6, peptidoglycan-associated lipoprotein Pal, protein D, protein E, adherence and penetration protein Hap, outer membrane protein 26 Omp26, outer membrane protein P5 (Fimbrin), outer membrane protein D15, outer membrane protein OmpP2, 5'-nucleotidase NucA, outer membrane protein P1, outer membrane protein P2, outer membrane lipoprotein Pcp, Lipoprotein E, outer membrane protein P4, fuculokinase FucK, [Cu,Zn]-superoxide dismutase SodC, protease HtrA, protein O145, alpha-galactosylceramide of Haemophilus influenzae; polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C (Enteroviruses, mainly Coxsackie A virus and Enterovirus 71 (EV71), Hand, foot and mouth disease (HFMD)); RNA polymerase L, protein L, glycoprotein Gn, glycoprotein Gc, nucleocapsid protein S, envelope glycoprotein G1, nucleoprotein NP, protein N, polyprotein M of Sin Nombre virus, Hantavirus; heat shock protein HspA, heat shock protein HspB, citrate synthase GltA, protein UreB, heat shock protein Hsp60, neutrophil-activating protein NAP, catalase KatA, vacuolating cytotoxin VacA, urease alpha UreA, urease beta Ureb, protein Cpn10, protein groES, heat shock protein Hsp10, protein MopB, cytotoxicity-associated 10 kDa protein CAG, 36 kDa antigen, beta-lactamase HcpA, Beta-lactamase HcpB of Helicobacter pylori; integral membrane proteins, aggregation-prone proteins, O-antigen, toxin-antigens Stx2B, toxin-antigen Stx1B, adhesion-antigen fragment Int28, protein EspA, protein EspB, Intimin, protein Tir, protein IntC300, protein Eae

of Escherichia coli O157:H7, O111 and O104:H4; RNA polymerase L, protein L, glycoprotein Gn, glycoprotein Gc, nucleocapsid protein S, envelope glycoprotein G1, nucleoprotein NP, protein N, polyprotein M of Bunyaviridae family; glycoprotein G, matrix protein M, nucleoprotein N, fusion protein F, polymerase L, protein W, proteinC, phosphoprotein p, non-structural protein V of Henipavirus, Hendra virus or Nipah virus; polyprotein, glycoproten Gp2, hepatitis A surface antigen HBAg, protein 2A, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, protein P1B, protein P2A, protein P3AB, protein P3D of Hepatitis A Virus; hepatitis B surface antigen HBsAg, Hepatitis B core antigen HbcAg, polymerase, protein Hbx, preS2 middle surface protein, surface protein L, large S protein, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4 of Hepatitis B Virus (HBV); envelope glycoprotein E1 gp32 gp35 , envelope glycoprotein E2 NS1 gp68 gp70, capsid protein C , core protein Core, polyprotein, virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, antigen G, protein NS3, protein NS5A of Hepatitis C Virus; virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, large hepaptitis delta antigen, small hepaptitis delta antigen of Hepatitis D Virus; virus protein VP1, virus protein VP2, virus protein VP3, virus protein VP4, capsid protein E2 of Hepatitis E Virus; glycoprotein L UL1, uracil-DNA glycosylase UL2, protein UL3, protein UL4, DNA replication protein UL5, portal protein UL6, virion maturation protein UL7, DNA helicase UL8, replication origin-binding protein UL9, glycoprotein M UL10, protein UL11, alkaline exonuclease UL12, serine-threonine protein kinase UL13, tegument protein UL14, terminase UL15, tegument protein UL16, protein UL17, capsid protein VP23 UL18, major capsid protein VP5 UL19, membrane protein UL20, tegument protein UL21, Glycoprotein H (UL22), Thymidine Kinase UL23, protein UL24, protein UL25, capsid protein P40 (UL26, VP24, VP22A), glycoprotein B (UL27), ICP18.5 protein (UL28), major DNA-binding protein ICP8 (UL29), DNA polymerase UL30, nuclear matrix protein UL31, envelope glycoprotein UL32, protein UL33, inner nuclear membrane protein UL34, capsid protein VP26 (UL35), large tegument protein UL36, capsid assembly protein UL37, VP19C protein (UL38), ribonucleotide reductase (Large subunit) UL39, ribonucleotide reductase (Small subunit) UL40, tegument protein/virion host shutoff VHS protein (UL41), DNA polymerase

processivity factor UL42, membrane protein UL43, glycoprotein C (UL44), membrane protein UL45, tegument proteins VP11/12 (UL46), tegument protein VP13/14 (UL47), virion maturation protein VP16 (UL48, Alpha-TIF), envelope protein UL49, dUTP diphosphatase UL50, tegument protein UL51, DNA helicase/primase complex protein UL52, glycoprotein K (UL53), transcriptional regulation protein IE63 (ICP27, UL54), protein UL55, protein UL56, viral replication protein ICP22 (IE68, US1), protein US2, serine/threonine-protein kinase US3, glycoprotein G (US4), glycoprotein J (US5), glycoprotein D (US6), glycoprotein I (US7), glycoprotein E (US8), tegument protein US9, capsid/tegument protein US10, Vmw21 protein (US11), ICP47 protein (IE12, US12), major transcriptional activator ICP4 (IE175, RS1), E3 ubiquitin ligase ICP0 (IE110), latency-related protein 1 LRP1, latency-related protein 2 LRP2, neurovirulence factor RL1 (ICP34.5), latency-associated transcript LAT of Herpes simplex virus 1 and 2 (HSV-1 and HSV-2); heat shock protein Hsp60, cell surface protein H1C, dipeptidyl peptidase type IV DppIV, M antigen, 70 kDa protein, 17 kDa histone-like protein of Histoplasma capsulatum; fatty acid and retinol binding protein-1 FAR-1, tissue inhibitor of metalloproteinase TIMP (TMP), cysteine proteinase ACEY-1, cysteine proteinase ACCP-1, surface antigen Ac-16, secreted protein 2 ASP-2, metalloprotease 1 MTP-1, aspartyl protease inhibitor API-1, surface-associated antigen SAA-1, surface-associated antigen SAA-2, adult-specific secreted factor Xa, serine protease inhibitor anticoagulant AP, cathepsin D-like aspartic protease ARR-1, glutathione S-transferase GST, aspartic protease APR-1, acetylcholinesterase AChE of Ancylostoma duodenale and Necator americanus; protein NS1, protein NP1, protein VP1, protein VP2, protein VP3 of Human bocavirus (HBoV); major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of Ehrlichia ewingii; major surface proteins 1-5 (MSP1a, MSP1b, MSP2, MSP3, MSP4, MSP5), type IV secreotion system proteins VirB2, VirB7, VirB11, VirD4 of Anaplasma

phagocytophilum; protein NS1, small hydrophobic protein NS2, SH protein, fusion protein F, glycoprotein G, matrix protein M, matrix protein M2-1, matrix protein M2-2, phosphoprotein P, nucleoprotein N, polymerase L of Human metapneumovirus (hMPV); major surface protein 2 MSP2, major surface protein 4 MSP4, MSP variant SGV1, MSP variant SGV2, outer membrane protein OMP, outer membrande protein 19 OMP-19, major antigenic protein MAP1, major antigenic protein MAP1-2, major antigenic protein MAP1B, major antigenic protein MAP1-3, Erum2510 coding protein, protein GroEL, protein GroES, 30-kDA major outer membrane proteins, GE 100-kDa protein, GE 130-kDa protein, GE 160-kDa protein of Ehrlichia chaffeensis; replication protein E1, regulatory protein E2, protein E3, protein E4, protein E5, protein E6, protein E7, protein E8, major capsid protein L1, minor capsid protein L2 of Human papillomavirus (HPV); fusion protein F, hemagglutinin-neuramidase HN, glycoprotein G, matrix protein M, phosphoprotein P, nucleoprotein N, polymerase L of Human parainfluenza viruses (HPIV); Hemagglutinin (HA), Neuraminidase (NA), Nucleoprotein (NP), M1 protein, M2 protein, NS1 protein, NS2 protein (NEP protein: nuclear export protein), PA protein, PB1 protein (polymerase basic 1 protein), PB1-F2 protein and PB2 protein of the Orthomyxoviridae family, Influenza virus (flu); genome polyprotein, protein E, protein M, capsid protein C of Japanese encephalitis virus; RTX toxin, type IV pili, major pilus subunit PilA, regulatory transcription factors PilS and PilR, protein sigma54, outer membrane proteins of Kingella kingae; prion protein Kuru prion; nucleoprotein N, polymerase L, matrix protein Z, glycoprotein GP of Lassa virus; peptidoglycan-associated lipoprotein PAL, 60 kDa chaperonin Cpn60 (groEL, HspB), type IV pilin PilE, outer membrane protein MIP, major outer membrane protein MompS, zinc metalloproteinase MSP of Legionella pneumophila; P4 nuclease, protein WD, ribonucleotide reductase M2, surface membrane glycoprotein Pg46, cysteine proteinase CP, glucose-regulated protein 78 GRP-78, stage-specific S antigen-like protein A2, ATPase F1, beta-tubulin, heat shock protein 70 Hsp70, KMP-11, glycoprotein GP63, protein BT1, nucleoside hydrolase NH, cell surface protein B1, ribosomal protein P1-like protein P1, sterol 24-c-methyltransferase SMT, LACK protein, histone H1, SPB1 protein, thiol specific antioxidant TSA, protein antigen STl1, signal peptidase SP, histone H2B, suface antigen PSA-2, cystein proteinase b

Cpb of the Leishmania genus; major membrane protein I, serine-rich antigen 45 kDa, 10 kDa caperonin GroES, HSP kDa antigen, amino-oxononanoate synthase AONS, protein recombinase A RecA, Acetyl-/propionyl-coenzyme A carboxylase alpha, alanine racemase, 60 kDa chaperonin 2, ESAT-6-like protein EcxB (L-ESAT-6), protein Lsr2, protein ML0276, Heparin-binding hemagglutinin HBHA, heat-shock protein 65 Hsp65, mycP1 or ML0041 coding protein , htrA2 or ML0176 coding protein , htrA4 or ML2659 coding protein, gcp or ML0379 coding protein, clpC or ML0235 coding protein of Mycobacterium leprae; outer membrane protein LipL32, membrane protein LIC10258, membrane protein LP30, membrane protein LIC12238, Ompa-like protein Lsa66, surface protein LigA, surface protein LigB, major outer membrane protein OmpL1, outer membrane protein LipL41, protein LigAni, surface protein LcpA, adhesion protein LipL53, outer membrane protein UpL32, surface protein Lsa63, flagellin FlaB1, membran lipoprotein LipL21, membrane protein pL40, leptospiral surface adhesin Lsa27, outer membrane protein OmpL36, outer membrane protein OmpL37, outer membrane protein OmpL47, outer membrane protein OmpL54, acyltransferase LpxA of the Leptospira genus; listeriolysin O precursor Hly (LLO), invasion-associated protein Iap (P60), Listeriolysin regulatory protein PrfA, Zinc metalloproteinase Mpl, Phosphatidyl-inositol-specific phospholipase C PLC (PlcA, PlcB), O-acetyltransferase Oat, ABC-transporter permease Im.G_1771, adhesion protein LAP, LAP receptor Hsp60, adhesin LapB, haemolysin listeriolysin O LLO, protein ActA, Internalin A InlA, protein lnlB of Listeria monocytogenes; outer surface protein A OspA, outer surface protein OspB, outer surface protein OspC, decorin binding protein A DbpA, decorin binding protein B DbpB, flagellar filament 41 kDa core protein Fla, basic membrane protein A BmpA (Immunodominant antigen P39), outer surface 22 kDa lipoprotein precursor (antigen IPLA7), variable surface lipoprotein vlsE, for example of Borrelia burgdorferi and other Borrelia species; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP (peptides N, N1, N2, and N3), activation associated protein-1 ASP-1, thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceralde-

hyde-3-phosphate dehydrogenase GAPDH, cuticular collagen Col-4, Secreted Larval Acidic Proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific gene product OvB20, onchocystatin CPI-2, protein Cox-2 (Wuchereria bancrofti and Brugia malayi, Lymphatic filariasis (Elephantiasis)); glycoprotein GP, matrix protein Z, polymerase L, nucleoprotein N of Lymphocytic choriomeningitis virus (LCMV); thrombospondin-related anonymous protein TRAP, SSP2 Sporozoite surface protein 2, apical membrane antigen 1 AMA1, rhoptry membrane antigen RMA1, acidic basic repeat antigen ABRA, cell-traversal protein PF, protein Pvs25, merozoite surface protein 1 MSP-1, merozoite surface protein 2 MSP-2, ring-infected erythrocyte surface antigen RESALiver stage antigen 3 LSA-3, protein Eba-175, serine repeat antigen 5 SERA-5, circumsporozoite protein CS, merozoite surface protein 3 MSP3, merozoite surface protein 8 MSP8, enolase PF10, hepatocyte erythrocyte protein 17 kDa HEP17, erythrocyte membrane protein 1 EMP1, protein Kbetamerozoite surface protein 4/5 MSP 4/5, heat shock protein Hsp90, glutamate-rich protein GLURP, merozoite surface protein 4 MSP-4, protein STARP, circumsporozoite protein-related antigen precursor CRA (Plasmodium genus, Malaria); nucleoprotein N, membrane-associated protein VP24, minor nucleoprotein VP30, polymerase cofactor VP35, polymerase L, matrix protein VP40, envelope glycoprotein GP of Marburg virus; protein C, matrix protein M, phosphoprotein P, non-structural protein V, hemagglutinin glycoprotein H, polymerase L, nucleoprotein N, fusion protein F of Measles virus; members of the ABC transporter family (LolC, OppA, and PotF), putative lipoprotein releasing system transmembrane protein LolC/E, flagellin FliC, Burkholderia intracellular motility A BimA, bacterial Elongation factor-Tu EF-Tu, 17 kDa OmpA-like protein, boaA coding protein, boaB coding protein of Burkholderia pseudomallei; pilin proteins, minor pilin-associated subunit pilC, major pilin subunit and variants pilE, pilS, phase variation protein porA, Porin B PorB, protein TraD, Neisserial outer membrane antigen H.8, 70kDa antigen, major outer membrane protein PI, outer membrane proteins PlA and PlB, W antigen, surface protein A NspA, transferrin binding protein TbpA, transferrin binding protein TbpB , PBP2, mtrR coding protein, ponA coding protein, membrane permease FbpBC, FbpABC protein system, LbpAB

proteins, outer membrane protein Opa, outer membrane transporter FetA, iron-repressed regulator MpeR, factor H-binding protein fHbp, adhesin NadA, protein NhbA, repressor FarR of Neisseria meningitidis; 66 kDa protein, 22 kDa protein, for example of Metagonimus yokagawai; polar tube proteins (34, 75, and 170 kDa in Glugea, 35, 55 and 150kDa in Encephalitozoon), kinesin-related protein, RNA polymerase II largest subunit, similar of integral membrane protein YIPA, anti-silencing protein 1, heat shock transcription factor HSF, protein kinase, thymidine kinase, NOP-2 like nucleolar protein of Microsporidia phylum; CASP8 and FADD-like apoptosis regulator, Glutathione peroxidase GPX1, RNA helicase NPH-II NPH2, Poly(A) polymerase catalytic subunit PAPL, Major envelope protein P43K, early transcription factor 70 kDa subunit VETFS, early transcription factor 82 kDa subunit VETFL, metalloendopeptidase G1-type, nucleoside triphosphatase I NPH1, replication protein A28-like MC134L, RNA polymease 7 kDa subunit RPO7 of Molluscum contagiosum virus (MCV); matrix protein M, phosphoprotein P/V, small hydrophobic protein SH, nucleoprotein N, protein V, fusion glycoprotein F, hemagglutinin-neuraminidase HN, RNA polymerase L of Mumps virus; Outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D, crystalline surface layer protein SLP, protective surface protein antigen SPA of Rickettsia typhi; adhesin P1, adhesion P30, protein p116, protein P40, cytoskeletal protein HMW1, cytoskeletal protein HMW2, cytoskeletal protein HMW3, MPN152 coding protein, MPN426 coding protein, MPN456 coding protein, MPN-500coding protein of Mycoplasma pneumoniae; NocA, Iron dependent regulatory protein, VapA, VapD, VapF, VapG, caseinolytic protease, filament tip-associated 43-kDa protein, protein P24, protein P61, 15-kDa protein, 56-kDa protein, for example of Nocardia asteroides and other Nocardia species; venom allergen homolog-like protein VAL-1, abundant larval transcript ALT-1, abundant larval transcript ALT-2, thioredoxin peroxidase TPX, vespid allergen homologue VAH, thiordoxin peroxidase 2 TPX-2, antigenic protein SXP, such as peptides N, N1, N2, and N3, activation associated protein-1 ASP-1, Thioredoxin TRX, transglutaminase BmTGA, glutathione-S-transferases GST, myosin, vespid allergen homologue VAH, 175 kDa collagenase, glyceraldehyde-3-phosphate dehydrogenase GAPDH, cuticular

collagen Col-4, Secreted Larval Acidic Proteins SLAPs, chitinase CHI-1, maltose binding protein MBP, glycolytic enzyme fructose-1,6-bisphosphate aldolase Fba, tropomyosin TMY-1, nematode specific gene product OvB20, onchocystatin CPI-2, Cox-2 of Onchocerca volvulus; 43 kDa secreted glycoprotein, glycoprotein gp0, glycoprotein gp75, antigen Pb27, antigen Pb40, heat shock protein Hsp65, heat shock protein Hsp70, heat shock protein Hsp90, protein P10, triosephosphate isomerase TPI, N-acetyl-glucosamine-binding lectin Paracoccin, 28 kDa protein Pb28 of Paracoccidioides brasiliensis; 28-kDa cruzipain-like cystein protease Pw28CCP, for example of Paragonimus westermani and other Paragonimus species; outer membrane protein OmpH, outer membrane protein Omp28, protein PM1539, protein PM0355, protein PM1417, repair protein MutL, protein BcbC, protein PM0305, formate dehydrogenase-N, protein PM0698, protein PM1422, DNA gyrase, lipoprotein PlpE, adhesive protein Cp39, heme aquisition system receptor HasR, 39 kDa capsular protein, iron-regulated OMP IROMP, outer membrane protein OmpA87, fimbrial protein Ptf, fimbrial subunit protein PtfA, transferrin binding protein Tbpl, esterase enzyme MesA, Pasteurella multocida toxin PMT, adhesive protein Cp39 of the Pasteurella genus; filamentous hemagglutinin FhaB, adenylate cyclase CyaA, pertussis toxin subunit 4 precursor PtxD, pertactin precursor Prn, toxin subunit 1 PtxA, protein Cpn60, protein brkA, pertussis toxin subunit 2 precursor PtxB, pertussis toxin subunit 3 precursor PtxC, pertussis toxin subunit 5 precursor PtxE, pertactin Prn, protein Fim2, protein Fim3 of Bordetella pertussis; F1 capsule antigen, virulence-associated V antigen, secreted effector protein LcrV, V antigen, outer membrane protease Pla, secreted effector protein YopD, putative secreted protein-tyrosine phosphatase YopH, needle complex major subunit YscF, protein kinase YopO, putative autotransporter protein YapF, inner membrane ABC-transporter YbtQ (Irp7), putative sugar binding protein YPO0612, heat shock protein 90 HtpG, putative sulfatase protein YdeN, outer-membrane lipoprotein carrier protein LolA, secretion chaperone YerA, putative lipoprotein YPO0420, hemolysin activator protein HpmB, pesticin/yersiniabactin outer membrane receptor Psn, secreted effector protein YopE, secreted effector protein YopF, secreted effector protein YopK, outer membrane protein YopN , outer membrane protein YopM, Coagulase/fibrinolysin precursor Pla of Yersinia pestis; protein PhpA, surface

adhesin PsaA, pneumolysin Ply, ATP-dependent protease Clp, lipoate-protein ligase LplA, cell wall surface anchored protein psrP, sortase SrtA, glutamyl-tRNA synthetase GltX, choline binding protein A CbpA, pneumococcal surface protein A PspA, pneumococcal surface protein C PspC, 6-phosphogluconate dehydrogenase Gnd, iron-binding protein PiaA, Murein hydrolase LytB, proteon LytC, protease A1 of Streptococcus pneumoniae; major surface protein B, kexin-like protease KEX1, protein A12, 55 kDa antigen P55, major surface glycoprotein Msg of Pneumocystis jirovecii; genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of Poliovirus; protein Nfa1, exendin-3, secretory lipase, cathepsin B-like protease, cysteine protease, cathepsin, peroxiredoxin, protein Cry1Ac, for example of Naegleria fowleri; agnoprotein, large T antigen, small T antigen, major capsid protein VP1, minor capsid protein Vp2 of JC virus; low calcium response protein E LCrE, chlamydial outer protein N CopN, serine/threonine-protein kinase PknD, acyl-carrier-protein S-malonyltransferase FabD, single-stranded DNA-binding protein Ssb, major outer membrane protein MOMP, outer membrane protein 2 (Omp2), polymorphic membrane protein family, such as Pmp1, Pmp2, Pmp3, Pmp4, Pmp5, Pmp6, Pmp7, Pmp8, Pmp9, Pmp10, Pmp11, Pmp12, Pmp13, Pmp14, Pmp15, Pmp16, Pmp17, Pmp18, Pmp19, Pmp20, Pmp21 of Chlamydophila psittaci; outer membrane protein P1, heat shock protein B HspB, peptide ABC transporter, GTP-binding protein, protein IcmB, ribonuclease R, phosphatas SixA, protein DsbD, outer membrane protein TolC, DNA-binding protein PhoB, ATPase DotB, heat shock protein B (HspB), membrane protein Com1, 28 kDa protein, DNA-3-methyladenine glycosidase I, outer membrane protein OmpH, outer membrane protein AdaA, glycine cleavage system T-protein of Coxiella burnetii; nucleoprotein N, large structural protein L, phophoprotein P, matrix protein M, glycoprotein G of Rabies virus; fusionprotein F, nucleoprotein N, matrix protein M, matrix protein M2-1, matrix protein M2-2, phosphoprotein P, small hydrophobic protein SH, major surface glycoprotein G, polymerase L, non-structural protein 1 NS1, non-structural protein 2 NS2 of Respiratory syncytial virus (RSV); genome polyprotein, polymerase 3D, viral capsid protein VP1, viral capsid protein VP2, viral capsid protein VP3, viral capsid protein VP4, protease 2A, protease 3C of Rhinovirus; outer membrane (OM)

proteins, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, protein PS120, intracytoplasmic protein D, protective surface protein antigen SPA of the Rickettsia genus; outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D of Rickettsia akari; envelope glycoprotein GP, polymerase L, nucleoprotein N, non-structural protein NSS of Rift Valley fever virus; outer membrane proteins OM, cell surface antigen OmpA, cell surface antigen OmpB (sca5), cell surface protein SCA4, cell surface protein SCA1, intracytoplasmic protein D of Rickettsia rickettsii; non-structural protein 6 NS6, non-structural protein 2 NS2, intermediate capsid protein VP6, inner capsid protein VP2, non-structural protein 3 NS3, RNA-directed RNA polymerase L, protein VP3, non-structural protein 1 NS1, non-structural protein 5 NS5, outer capsid glycoprotein VP7, non-structural glycoprotein 4 NS4, outer capsid protein VP4 of Rotavirus; polyprotein P200, glycoprotein E1, glycoprotein E2, protein NS2, capsid protein C of Rubella virus; chaperonin GroEL (MopA), inositol phosphate phosphatase SopB, heat shock protein HslU, chaperone protein DnaJ, protein TviB, protein IroN, flagellin FliC, invasion protein SipC, glycoprotein gp43, outer membrane protein LamB, outer membrane protein PagC, outer membrane protein TolC, outer membrane protein NmpC, outer membrane protein FadL, transport protein SadA, transferase WgaP, effector proteins SifA, SteC, SseL, SseJ and SseF of the Salmonella genus; protein 14, non-structural protein NS7b, non-structural protein NS8a, protein 9b, protein 3a, nucleoprotein N, non-structural protein NS3b, non-structural protein NS6, protein 7a, non-structural protein NS8b, membrane protein M, envelope small membrane protein EsM, replicase polyprotein 1a, spike glycoprotein S, replicase polyprotein 1ab of SARS coronavirus; serine protease, Atypical Sarcoptes Antigen 1 ASA1, glutathione S-transferases (GST), cystein protease, serine protease, apolipoprotein of Sarcoptes scabiei; glutathione S-transferases (GST), paramyosin, hemoglbinase SM32, major egg antigen, 14 kDa fatty acid-binding protein Sm14, major larval surface antigen P37, 22,6 kDa tegumental antigen, calpain CANP, triphospate isomerase Tim, surface protein 9B, outer capsid protein VP2, 23 kDa integral membrane protein Sm23, Cu/Zn-superoxide dismutase, glycoprotein Gp, myosin of the Schistosoma genus; 60 kDa

chaperonin, 56 kDa type-specific antigen, pyruvate phosphate dikinase, 4-hydroxybenzoate octaprenyltransferase of Orientia tsutsugamushi; dehydrogenase GuaB, invasion protein Spa32, invasin IpaA, invasin IpaB, invasin IpaC, invasin IpaD, invasin IpaH, invasin IpaJ of the Shigella genus; protein P53, virion protein US10 homolog, transcriptional regulator IE63, transcriptional transactivator IE62, protease P33, alpha trans-inducing factor 74 kDa protein, deoxyuridine 5'-triphosphate nucleotidohydrolase, transcriptional transactivator IE4, membrane protein UL43 homolog, nuclear phosphoprotein UL3 homolog, nuclear protein UL4 homolog, replication origin-binding protein, membrane protein 2, phosphoprotein 32, protein 57,DNA polymerase processivity factor, portal protein 54, DNA primase, tegument protein UL14 homolog, tegument protein UL21 homolog, tegument protein UL55 homolog, tripartite terminase subunit UL33 homolog, tripartite terminase subunit UL15 homolog, capsid-binding protein 44, virion-packaging protein 43 of Varicella zoster virus (VZV); truncated 3-beta hydroxy-5-ene steroid dehydrogenase homolog, virion membrane protein A13, protein A19, protein A31, truncated protein A35 homolog, protein A37.5 homolog, protein A47, protein A49, protein A51, semaphorin-like protein A43, serine proteinase inhibitor 1, serine proteinase inhibitor 2, serine proteinase inhibitor 3, protein A6, protein B15, protein C1, protein C5, protein C6, protein F7, protein F8, protein F9, protein F11, protein F14, protein F15, protein F16 of Variola major and Variola minor; adhesin/glycoprotein gp70, proteases of Sporothrix schenckii; heme-iron binding protein IsdB, collagen adhesin Cna, clumping factor A (ClfA), protein MecA, fibronectin-binding protein A (FnbA), enterotoxin type A (EntA), enterotoxin type B (EntB), enterotoxin type C EntC1, enterotoxin type C EntC2, enterotoxin type D (EntD), enterotoxin type E (EntE), Toxic shock syndrome toxin-1 (TSST-1), Staphylokinase, Penicillin binding protein 2a (PBP2a, MecA), secretory antigen SssA of the Staphylococcus genus, such as Staphylococcus aureus; antigen Ss-IR, antigen NIE, strongylastacin, Na+-K+ ATPase Sseat-6, tropomysin SsTmy-1, protein LEC-5, 41 kDa aantigen P5, 41-kDa larval protein, 31-kDa larval protein, 28-kDa larval protein of Strongyloides stercoralis; glycerophosphodiester phosphodiesterase GlpQ (Gpd), outer membrane protein TmpB, protein Tp92, antigen TpF1, repeat protein Tpr, repeat protein F TprF, repeat protein G TprG, repeat protein I TprI, repeat protein J TprJ, repeat protein K

TprK, treponemal membrane protein A (TmpA), lipoprotein, 15 kDa Tpp15, 47 kDa membrane antigen, miniferritin TpF1, adhesin Tp0751, lipoprotein TP0136, protein TpN17, protein TpN47, outer membrane protein TP0136, outer membrane protein TP0155, outer membrane protein TP0326, outer membrane protein TP0483, outer membrane protein TP0956 of Treponema pallidum; Cathepsin L-like proteases, 53/25-kDa antigen, 8kDa family members, cysticercus protein with a marginal trypsin-like activity TsAg5, oncosphere protein TSOL18, oncosphere protein TSOL45-1A, lactate dehydrogenase A LDHA, lactate dehydrogenase B LDHB of the Taenia genus; tetanus toxin TetX, tetanus toxin C TTC, 140 kDa S layer protein, flavoprotein beta-subunit CT3, phospholipase (lecithinase), phosphocarrier protein HPr of Clostridium tetani; genome polyprotein, protein E, protein M, capsid protein C of Tick-borne encephalitis virus (TBEV); 58-kDa antigen, 68-kDa antigens, Toxocara larvae excretory-secretory antigen TES, 32-kDa glycoprotein, glycoprotein TES-70, glycoprotein GP31, excretory-secretory antigen TcES-57, perienteric fluid antigen Pe, soluble extract antigens Ex, excretory/secretory larval antigens ES, antigen TES-120, polyprotein allergen TBA-1, cathepsin L-like cysteine protease c-cpl-1, 26-kDa protein of Toxocara canis or Toxocara cati; microneme proteins, such as MIC1, MIC2, MIC3, MIC4, MIC5, MIC6, MIC7, or MIC8, rhoptry protein Rop2, rhoptry proteins, such as Rop1, Rop2, Rop3, Rop4, Rop5, Rop6, Rop7, Rop16, or Rjop17, protein SR1,surface antigen P22, major antigen p24, major surface antigen p30, dense granule proteins, such as GRA1, GRA2, GRA3, GRA4, GRA5, GRA6, GRA7, GRA8, GRA9, or GRA10, 28 kDa antigen, surface antigen SAG1, SAG2 related antigen, nucleoside-triphosphatase 1, nucleoside-triphosphatase 2, protein Stt3, HesB-like domain-containing protein, rhomboid-like protease 5, toxomepsin 1 of Toxoplasma gondii; 43 kDa secreted glycoprotein, 53 kDa secreted glycoprotein, paramyosin, antigen Ts21, antigen Ts87, antigen p46000, TSL-1 antigens, caveolin-1 CAV-1, 49 kDa newborn larva antigen, prosaposin homologue, serine protease, serine proteinase inhibitor, 45 -kDa glycoprotein Gp45 of Trichinella spiralis; Myb-like transcriptional factors (Myb1, Myb2, Myb3), adhesion protein AP23, adhesion protein AP33, adhesin protein AP33-3, adhesins AP51, adhesin AP65, adhesion protein AP65-1, alpha-actinin, kinesin-associated protein, teneurin, 62 kDa proteinase, subtilisin-like serine protease SUB1, cysteine proteinase gene 3 CP3,

alpha-enolase Eno1, cysteine proteinase CP30, heat shock proteins Hsp70 and Hsp60, immunogenic protein P270 of Trichomonas vaginalis; beta-tubulin, 47-kDa protein, secretory leucocyte-like proteinase-1 SLP-1, 50-kDa protein TT50, 17 kDa antigen, 43/47 kDa protein of Trichuris trichiura; protein ESAT-6 (EsxA), 10 kDa filtrate antigen EsxB, secreted antigen 85-B FBPB, fibronectin-binding protein A FbpA (Ag85A), serine protease PepA, PPE family protein PPE18, fibronectin-binding protein D FbpD, immunogenic protein MPT64, secreted protein MPT51, catalase-peroxidase-peroxynitritase T KATG, periplasmic phosphate-binding lipoprotein PSTS3 (PBP-3, Phos-1), iron-regulated heparin binding hemagglutinin Hbha, PPE family protein PPE14, PPE family protein PPE68, protein Mtb72F, protein Apa, immunogenic protein MPT63, periplasmic phosphate-binding lipoprotein PSTS1 (PBP-1), molecular chaperone DnaK, cell surface lipoprotein Mpt83, lipoprotein P23, phosphate transport system permease protein pstA, 14 kDa antigen, fibronectin-binding protein C FbpC1, Alanine dehydrogenase TB43, Glutamine synthetase 1, ESX-1 protein, protein CFP10, TB10.4 protein, protein MPT83, protein MTB12, protein MTB8, Rpf-like proteins, protein MTB32, protein MTB39, crystallin, heat-shock protein HSP65, protein PST-S, for example of Mycobacterium tuberculosis; outer membrane protein FobA, outer membrane protein FobB, intracellular growth locus lglC1, intracellular growth locus IglC2, aminotransferase Wbtl, chaperonin GroEL, 17 kDa major membrane protein TUL4, lipoprotein LpnA, chitinase family 18 protein, isocitrate dehydrogenase, Nif3 family protein, type IV pili glycosylation protein, outer membrane protein tolC, FAD binding family protein, type IV pilin multimeric outer membrane protein, two component sensor protein KdpD, chaperone protein DnaK, protein TolQ of Francisella tularensis; MB antigen, urease, protein GyrA, protein GyrB, protein ParC, protein ParE, lipid associated membrane proteins LAMP, thymidine kinase TK, phospholipase PL-A1, phospholipase PL-A2, phospholipase PL-C, surface-expressed 96-kDa antigen of Ureaplasma urealyticum; non-structural polyprotein, structural polyprotein, capsid protein CP, protein E1, protein E2, protein E3, protease P1, protease P2, protease P3 of Venezuelan equine encephalitis virus; glycoprotein GP, matrix protein Z, polymerase L, nucleoprotein N of Guanarito virus; polyprotein, protein E, protein M, capsid protein C, protease NS3, protein NS1, protein NS2A,

protein AS2B, brotein NS4A, protein NS4B, protein NS5 of West Nile virus; capsid protein CP, protein E1, protein E2, protein E3, protease P2 of Western equine encephalitis virus; genome polyprotein, protein E, protein M, capsid protein C, protease NS3, protein NS1, protein NS2A, protein AS2B, protein NS4A, protein NS4B, protein NS5 of Yellow fever virus; putative Yop targeting protein YobB, effector protein YopD, effector protein YopE, protein YopH, effector protein YopJ, protein translocation protein YopK, effector protein YopT, protein YpkA, flagellar biosyntheses protein FlhA, peptidase M48, potassium efflux system KefA, transcriptional regulator RovA, adhesin Ifp, translocator portein LcrV, protein PcrV, invasin Inv, outer membrane protein OmpF-like porin, adhesin YadA, protein kinase C, phospholipase C1, protein PsaA, mannosyltransferase-like protein WbyK, protein YscU, antigen YPMa of Yersinia pseudotuberculosis; effector protein YopB, 60 kDa chaperonin, protein WbcP, tyrosin-protein phosphatase YopH, protein YopQ, enterotoxin, Galactoside permease, reductaase NrdE, protein YasN, Invasin Inv, adhesin YadA, outer membrane porin F OmpF, protein UspA1, protein EibA, protein Hia, cell surface protein Ail, chaperone SycD, protein LcrD, protein LcrG, protein LcrV, protein SycE, protein YopE, regulator protein TyeA, protein YopM, protein YopN, protein YopO, protein YopT, protein YopD, protease ClpP, protein MyfA, protein FilA, and protein PsaA of Yersinia enterocolitica.

28. The method according to claim 24, wherein the cancer or tumor is selected from the group consisting of Acute lymphoblastic leukemia, Acute myeloid leukemia, Adrenocortical carcinoma, AIDS-related cancers, AIDS-related lymphoma, Anal cancer, Appendix cancer, Astrocytoma, Basal cell carcinoma, Bile duct cancer, Bladder cancer, Bone cancer, Osteosarcoma/Malignant fibrous histiocytoma, Brainstem glioma, Brain tumor, cerebellar astrocytoma, cerebral astrocytoma/malignant glioma, ependymoma, medulloblastoma, supratentorial primitive neuroectodermal tumors, visual pathway and hypothalamic glioma, Breast cancer, Bronchial adenomas/carcinoids, Burkitt lymphoma, childhood Carcinoid tumor, gastrointestinal Carcinoid tumor, Carcinoma of unknown primary, primary Central nervous system lymphoma, childhood Cerebellar astrocytoma, childhood Cerebral astrocytoma/Malignant glioma, Cervical cancer, Childhood cancers,

Chronic lymphocytic leukemia, Chronic myelogenous leukemia, Chronic myeloproliferative disorders, Colon Cancer, Cutaneous T-cell lymphoma, Desmoplastic small round cell tumor, Endometrial cancer, Ependymoma, Esophageal cancer, Ewing's sarcoma in the Ewing family of tumors, Childhood Extracranial germ cell tumor, Extragonadal Germ cell tumor, Extrahepatic bile duct cancer, Intraocular melanoma, Retinoblastoma, Gallbladder cancer, Gastric (Stomach) cancer, Gastrointestinal Carcinoid Tumor, Gastrointestinal stromal tumor (GIST), extracranial, extragonadal, or ovarian Germ cell tumor, Gestational trophoblastic tumor, Glioma of the brain stem, Childhood Cerebral Astrocytoma, Childhood Visual Pathway and Hypothalamic Glioma, Gastric carcinoid, Hairy cell leukemia, Head and neck cancer, Heart cancer, Hepatocellular (liver) cancer, Hodgkin lymphoma, Hypopharyngeal cancer, childhood Hypothalamic and visual pathway glioma, Intraocular Melanoma, Islet Cell Carcinoma (Endocrine Pancreas), Kaposi sarcoma, Kidney cancer (renal cell cancer), Laryngeal Cancer, Leukemias, acute lymphoblastic Leukemia, acute myeloid Leukemia, chronic lymphocytic Leukemia, chronic myelogenous Leukemia, hairy cell Leukemia, Lip and Oral Cavity Cancer, Liposarcoma, Liver Cancer, Non-Small Cell Lung Cancer, Small Cell Lung Cancer, Lymphomas, AIDS-related Lymphoma, Burkitt Lymphoma, cutaneous T-Cell Lymphoma, Hodgkin Lymphoma, Non-Hodgkin Lymphomas, Primary Central Nervous System Lymphoma, Waldenström Macroglobulinemia, Malignant Fibrous Histiocytoma of Bone/Osteosarcoma, Childhood Medulloblastoma, Melanoma, Intraocular (Eye) Melanoma, Merkel Cell Carcinoma, Adult Malignant Mesothelioma, Childhood Mesothelioma, Metastatic Squamous Neck Cancer with Occult Primary, Mouth Cancer, Childhood Multiple Endocrine Neoplasia Syndrome, Multiple Myeloma/Plasma Cell Neoplasm, Mycosis Fungoides, Myelodysplastic Syndromes, Myelodysplastic/Myeloproliferative Diseases, Chronic Myelogenous Leukemia, Adult Acute Myeloid Leukemia, Childhood Acute Myeloid Leukemia, Multiple Myeloma (Cancer of the Bone-Marrow), Chronic Myeloproliferative Disorders, Nasal cavity and paranasal sinus cancer, Nasopharyngeal carcinoma, Neuroblastoma, Oral Cancer, Oropharyngeal cancer, Osteosarcoma/malignant fibrous histiocytoma of bone, Ovarian cancer, Ovarian epithelial cancer (Surface epithelial-stromal tumor), Ovarian germ cell tumor, Ovarian low malignant potential

tumor, Pancreatic cancer, islet cell Pancreatic cancer, Paranasal sinus and nasal cavity cancer, Parathyroid cancer, Penile cancer, Pharyngeal cancer, Pheochromocytoma, Pineal astrocytoma, Pineal germinoma, childhood Pineoblastoma and supratentorial primitive neuroectodermal tumors, Pituitary adenoma, Plasma cell neoplasia/Multiple myeloma, Pleuropulmonary blastoma, Primary central nervous system lymphoma, Prostate cancer, Rectal cancer, Renal cell carcinoma (kidney cancer), Cancer of the Renal pelvis and ureter, Retinoblastoma, childhood Rhabdomyosarcoma, Salivary gland cancer, Sarcoma of the Ewing family of tumors, Kaposi Sarcoma, soft tissue Sarcoma, uterine Sarcoma, Sézary syndrome, Skin cancer (nonmelanoma), Skin cancer (melanoma), Merkel cell Skin carcinoma, Small intestine cancer, Squamous cell carcinoma, metastatic Squamous neck cancer with occult primary, childhood Supratentorial primitive neuroectodermal tumor, Testicular cancer, Throat cancer, childhood Thymoma, Thymoma and Thymic carcinoma, Thyroid cancer, childhood Thyroid cancer, Transitional cell cancer of the renal pelvis and ureter, gestational Trophoblastic tumor, Urethral cancer, endometrial Uterine cancer, Uterine sarcoma, Vaginal cancer, childhood Visual pathway and hypothalamic glioma, Vulvar cancer, Waldenström macroglobulinemia, and childhood Wilms tumor (kidney cancer).

29. The method according to any one of claims 1 to 24 and 28, wherein each of the *m* different DNA molecule species encodes for one of the *n* different RNA molecule species, wherein each of the *n* different RNA molecule species encodes a different cancer or tumor antigen selected from the group consisting of 5T4, 707-AP, 9D7, AFP, AlbZIP HPG1, alpha-5-beta-1-integrin, alpha-5-beta-6-integrin, alpha-actinin-4/m, alpha-methylacyl-coenzyme A racemase, ART-4, ARTC1/m, B7H4, BAGE-1, BCL-2, bcr/abl, beta-catenin/m, BING-4, BRCA1/m, BRCA2/m, CA 15-3/CA 27-29, CA 19-9, CA72-4, CA125, calreticulin, CAMEL, CASP-8/m, cathepsin B, cathepsin L, CD19, CD20, CD22, CD25, CDE30, CD33, CD4, CD52, CD55, CD56, CD80, CDC27/m, CDK4/m, CDKN2A/m, CEA, CLCA2, CML28, CML66, COA-1/m, coactosin-like protein, collage XXIII, COX-2, CT-9/BRD6, Cten, cyclin B1, cyclin D1, cyp-B, CYPB1, DAM-10, DAM-6, DEK-CAN, EFTUD2/m, EGFR, ELF2/m, EMMPRIN, EpCam, EphA2, EphA3, ErbB3, ETV6-AML1, EZH2, FGF-5,

FN, Frau-1, G250, GAGE-1, GAGE-2, GAGE-3, GAGE-4, GAGE-5, GAGE-6, GAGE7b, GAGE-8, GDEP, GnT-V, gp100, GPC3, GPNMB/m, HAGE, HAST-2, hepsin, Her2/neu, HERV-K-MEL, HLA-A*0201-R17I, HLA-A11/m, HLA-A2/m, HNE, homeobox NKX3.1, HOM-TES-14/SCP-1, HOM-TES-85, HPV-E6, HPV-E7, HSP70-2M, HST-2, hTERT, iCE, IGF-1R, IL-13Ra2, IL-2R, IL-5, immature laminin receptor, kallikrein-2, kallikrein-4, Ki67, KIAA0205, KIAA0205/m, KK-LC-1, K-Ras/m, LAGE-A1, LDLR-FUT, MAGE-A1, MAGE-A2, MAGE-A3, MAGE-A4, MAGE-A6, MAGE-A9, MAGE-A10, MAGE-A12, MAGE-B1, MAGE-B2, MAGE-B3, MAGE-B4, MAGE-B5, MAGE-B6, MAGE-B10, MAGE-B16, MAGE-B17, MAGE-C1, MAGE-C2, MAGE-C3, MAGE-D1, MAGE-D2, MAGE-D4, MAGE-E1, MAGE-E2, MAGE-F1, MAGE-H1, MAGEL2, mammaglobin A, MART-1/melan-A, MART-2, MART-2/m, matrix protein 22, MC1R, M-CSF, ME1/m, mesothelin, MG50/PXDN, MMP11, MN/CA IX-antigen, MRP-3, MUC-1, MUC-2, MUM-1/m, MUM-2/m, MUM-3/m, myosin class I/m, NA88-A, N-acetylglucosaminyltransferase-V, Neo-PAP, Neo-PAP/m, NFYC/m, NGEP, NMP22, NPM/ALK, N-Ras/m, NSE, NY-ESO-B, NY-ESO-1, OA1, OFA-iLRP, OGT, OGT/m, OS-9, OS-9/m, osteocalcin, osteopontin, p15, p190 minor bcr-abl, p53, p53/m, PAGE-4, PAI-1, PAI-2, PAP, PART-1, PATE, PDEF, Pim-1-Kinase, Pin-1, Pml/PARalpha, POTE, PRAME, PRDX5/m, prostein, proteinase-3, PSA, PSCA, PSGR, PSM, PSMA, PTPRK/m, RAGE-1, RBAF600/m, RHAMM/CD168, RU1, RU2, S-100, SAGE, SART-1, SART-2, SART-3, SCC, SIRT2/m, Sp17, SSX-1, SSX-2/HOM-MEL-40, SSX-4, STAMP-1, STEAP-1, survivin, survivin-2B, SYT-SSX-1, SYT-SSX-2, TA-90, TAG-72, TARP, TEL-AML1, TGFbeta, TGFbetaRII, TGM-4, TPI/m, TRAG-3, TRG, TRP-1, TRP-2/6b, TRP/INT2, TRP-p8, tyrosinase, UPA, VEGFR1, VEGFR-2/FLK-1, and WT1. Such tumour antigens preferably may be selected from the group consisting of p53, CA125, EGFR, Her2/neu, hTERT, PAP, MAGE-A1, MAGE-A3, Mesothelin, MUC-1, GP100, MART-1, Tyrosinase, PSA, PSCA, PSMA, STEAP-1, VEGF, VEGFR1, VEGFR2, Ras, CEA or WT1, and more preferably from PAP, MAGE-A3, WT1, and MUC-1, preferably selected from the group consisting of MAGE-A1, e.g. MAGE-A1 according to accession number M77481, MAGE-A2, MAGE-A3, MAGE-A6, e.g. MAGE-A6 according to accession number NM_005363, MAGE-C1, MAGE-C2, melan-A, e.g. melan-A

according to accession number NM_005511, GP100, e.g. GP100 according to accession number M77348, tyrosinase, e.g. tyrosinase according to accession number NM_000372, surviving, e.g. survivin according to accession number AF077350, CEA, e.g. CEA according to accession number NM_004363, Her-2/neu, e.g. Her-2/neu according to accession number M11730, WT1, e.g. WT1 according to accession number NM_000378, PRAME, e.g. PRAME according to accession number NM_006115, EGFRI (epidermal growth factor receptor 1), e.g. EGFRI (epidermal growth factor receptor 1) according to accession number AF288738, MUC1, mucin-1, e.g. mucin-1 according to accession number NM_002456, SEC61G, e.g. SEC61G according to accession number NM_014302, hTERT, e.g. hTERT accession number NM_198253, 5T4, e.g. 5T4 according to accession number NM_006670, TRP-2, e.g. TRP-2 according to accession number NM_001922, STEAP1, PCA, PSA, and PSMA.