CLAIMS

1. A nucleic acid construct comprising a nucleic acid sequence encoding a modified Chikungunya virus (CHIKV) genome or replicon RNA, wherein the modified CHIKV genome or replicon RNA comprises no nucleic acid sequence encoding viral structural proteins.

2. The nucleic acid construct of claim 1, further comprising one or more expression cassettes, wherein each of the expression cassettes comprises a promoter operably linked to a heterologous nucleic acid sequence.

3. The nucleic acid construct of claim 2, wherein at least one of the expression cassettes comprises a subgenomic (*sg*) promoter operably linked to the heterologous nucleic acid sequence.

4. The nucleic acid construct of claim 3, wherein the *sg* promoter is a 26S subgenomic promoter.

5. The nucleic acid construct of any one of claims 1-4, further comprising one or more untranslated regions (UTRs).

6. The nucleic acid construct of claim 5, wherein at least one of the UTRs is a heterologous UTR.

7. The nucleic acid construct of any one of claims 2-6, wherein at least one of the expression cassettes comprises a coding sequence for a gene of interest (GOI).

8. The nucleic acid construct of claim 7, wherein the GOI encodes a polypeptide selected from the group consisting of a therapeutic polypeptide, a prophylactic polypeptide, a diagnostic polypeptide, a nutraceutical polypeptide, an industrial enzyme, and a reporter polypeptide.

9. The nucleic acid construct of any one of claims 7-8, wherein the GOI encodes a polypeptide selected from the group consisting of an antibody, an antigen, an immune modulator, an enzyme, a signaling protein, and a cytokine.

10. The nucleic acid construct of any one of claims 7-9, wherein the coding sequence of the GOI is optimized for expression at a level higher than the expression level of a reference coding sequence.

11. The nucleic acid construct of any one of claims 1-10, wherein the nucleic acid sequence has at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% sequence identity to a nucleic acid sequence selected from the group consisting of SEQ ID NOS: 1-3.

12. A recombinant cell comprising a nucleic acid construct according to any one of claims 1-11.

13. The recombinant cell of claim 12, wherein the recombinant cell is a eukaryotic cell.

14. The recombinant cell of claim 13, wherein the recombinant cell is an animal cell.

15. The recombinant cell of claim 14, wherein the animal cell is a vertebrate animal cell or an invertebrate animal cell.

16. The recombinant cell of claim 15, wherein the recombinant cell is an insect cell.

17. The recombinant cell of claim 16, wherein the insect cell is a mosquito cell.

18. The recombinant cell of claim 15, wherein the recombinant cell is a mammalian cell.

19. The recombinant cell of claim 15, wherein the recombinant cell is selected from the group consisting of a monkey kidney CV1 cell transformed by SV40 (COS-7), a human embryonic kidney cell (e.g., HEK 293 or HEK 293 cell), a baby hamster kidney cell (BHK), a mouse sertoli cell (e.g., TM4 cells), a monkey kidney cell (CV1), a human cervical carcinoma cell (HeLa), canine kidney cell (MDCK), buffalo rat liver cell (BRL 3A), human lung cell (W138), human liver cell (Hep G2), mouse mammary tumor (MMT 060562), TRI cell, , FS4 cell, a Chinese hamster ovary cell (CHO cell), an African green monkey kidney cell (Vero cell), a human A549 cell, a human cervix cell, a human CHME5 cell, a human PER.C6 cell, a NS0 murine myeloma cell, a human epidermoid larynx cell, a human fibroblast cell, a human HUH-7 cell, a human MRC-5 cell, a human muscle cell, a human endothelial cell, a human astrocyte cell, a human macrophage cell, a human RAW 264.7 cell, a mouse 3T3 cell, a mouse L929 cell, a mouse connective tissue cell, a mouse muscle cell, and a rabbit kidney cell.

20. A cell culture comprising at least one recombinant cell according to any one of claims 12-19, and a culture medium.

21. A transgenic non-human animal comprising a nucleic acid construct according to any one of claims 1-11.

22. The transgenic non-human animal of claim 21, wherein the animal is a vertebrate animal or an invertebrate animal.

23. The transgenic non-human animal of claim 22, wherein the animal is an insect.

24. The transgenic non-human animal of claim 23, wherein the insect is a mosquito.

25. The transgenic non-human animal of claim 22, wherein the animal is a mammalian.

26. A method for producing a polypeptide of interest, comprising (i) rearing a transgenic non-human animal according to any one of claims 21-25, or (ii) culturing a recombinant cell comprising a nucleic acid construct according to any one of claims 8-11 under conditions wherein the transgenic non-human animal or the recombinant cell produces the polypeptide encoded by the GOI.

27. A pharmaceutical composition comprising a pharmaceutically acceptable excipient and:
(a) a nucleic acid construct of any one of claims 8-11; and/or
(b) a recombinant cell of any one of claims 12-19.

28. The pharmaceutical composition of claim 27, comprising the nucleic acid construct of any one of claims 8-11, and a pharmaceutically acceptable excipient.

29. The pharmaceutical composition of claim 27, comprising the recombinant cell of any one of claims 12-19, and a pharmaceutically acceptable excipient.

30. The pharmaceutical composition of any one of claims 27-29, wherein the composition is formulated in a liposome, a lipid-based nanoparticle (LNP), or a polymer nanoparticle.

31. The pharmaceutical composition of any one of claims 27-30, wherein the composition is an immunogenic composition.

32. The pharmaceutical composition of claim 31, wherein the immunogenic composition is formulated as a vaccine.

33. The pharmaceutical composition of any one of claims 27-30, wherein the composition is substantially non-immunogenic to a subject.

34. The pharmaceutical composition of any one of claims 27-33, wherein the pharmaceutical composition is formulated as an adjuvant.

35. The pharmaceutical composition of any one of claims 27-34, wherein the pharmaceutical composition is formulated for one or more of intranasal administration, transdermal administration, intraperitoneal administration, intramuscular administration, intranodal administration, intratumoral administration, intraarticular administration, intravenous administration, subcutaneous administration, intravaginal, intraocular, rectal, and oral administration.

36. Use of:
    (a) a nucleic acid construct of any one of claims 8-11, wherein the gene of interest (GOI) encodes a therapeutic polypeptide or a prophylactic polypeptide;
    (b) a recombinant cell comprising the nucleic acid construct of (a); and/or
    (c) a pharmaceutical composition comprising the nucleic acid construct of (a) and/or the recombinant cell of (b),

    for the preparation of a medicament for eliciting an immune response, or for preventing and/or treating a health condition in a subject, wherein the health condition is a proliferative disorder, autoimmune disease, or a microbial infection.

37. The use of claim 36, wherein the health condition is a proliferative disorder or a microbial infection.

38. The use of any one of claims 36-37, wherein the subject has or is suspected of having a condition associated with proliferative disorder or a microbial infection.

39. The use of any one of claims 36-38, wherein the medicament to be administered results in an increased production of interferon in the subject.

40. The use of any one of claims 36-39, wherein the medicament is to be administered to the subject individually as a single therapy (monotherapy) or as a first therapy in combination with at least one additional therapy.

41. The use of claim 40, wherein the at least one additional therapy is selected from the group consisting of chemotherapy, radiotherapy, immunotherapy, hormonal therapy, toxin therapy, targeted therapy, and surgery.

42. A kit for eliciting an immune response, for the prevention, and/or for the treatment of a health condition, the kit comprising:
    (a) a nucleic acid construct of any one of claims 8-11, wherein the gene of interest (GOI) encodes a therapeutic polypeptide or a prophylactic polypeptide;
    (b) a recombinant cell comprising the nucleic acid construct of (a); and/or
    (c) a pharmaceutical composition comprising the nucleic acid construct of (a) and/or the recombinant cell of (b),

    wherein the health condition is a proliferative disorder, autoimmune disease, or a microbial infection.