CLAIMS

1. A pharmaceutical composition for treating or preventing a solid tumor comprising RNA encoding an IL-12sc protein, RNA encoding an IL-15 sushi protein, RNA encoding an IFNα protein, and RNA encoding a GM-CSF protein.
2. The pharmaceutical composition according to claim 1, wherein each of the RNAs in the composition encodes a cytokine, and the cytokines encoded by the RNAs in the composition consist of the IL-12sc protein, the IL-15 sushi protein, the IFNα protein, and the GM-CSF protein.
3. The pharmaceutical composition of claim 1 or 2, wherein the IFNα protein is an IFNα2b protein.
4. The pharmaceutical composition of any one of claims 1-3, wherein (i) the RNA encoding an IL-12sc protein comprises the nucleotide sequence of SEQ ID NO: 17 or 18, or a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO: 17 or 18; (ii) the IL-12sc protein comprises the amino acid sequence of SEQ ID NO: 14, or an amino acid sequence having at least 80% identity to the amino acid sequence of SEQ ID NO: 14; or a combination of (i) and (ii).
5. The pharmaceutical composition of any one of claims 1-4, wherein (i) the RNA encoding an IL-15 sushi protein comprises the nucleotide sequence of SEQ ID NO: 26, or a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO: 26; (ii) the IL-15 sushi protein comprises the amino acid sequence of SEQ ID NO: 24, or an amino acid sequence having at least 80% identity to the amino acid sequence of SEQ ID NO: 24; or a combination of (i) and (ii).
6. The pharmaceutical composition of any one of claims 1-5, wherein (i) the RNA encoding an IFNα protein comprises the nucleotide sequence of SEQ ID NO: 22 or 23, or a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO: 22 or 23; (ii) the IFNα protein comprises the amino acid sequence of SEQ ID NO: 19, or an amino acid sequence having at least 80% identity to the amino acid sequence of SEQ ID NO: 19; or a combination of (i) and (ii).
7. The pharmaceutical composition of any one of claims 1-6, wherein (i) the RNA encoding a GM-CSF protein comprises the nucleotide sequence of SEQ ID NO: 29, or a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO: 29; (ii) the GM-CSF protein comprises the amino acid sequence of SEQ ID NO: 27, or an amino acid sequence having at least 80% identity to the amino acid sequence of SEQ ID NO: 27; or a combination of (i) and (ii).

8. The pharmaceutical composition of any one of claims 1-7, wherein at least one of the RNAs comprises a modified nucleoside in place of at least one uridine.
9. The pharmaceutical composition of any one of claims 1-7, wherein at least one of the RNAs comprises a modified nucleoside in place of each uridine.
10. The pharmaceutical composition of any one of claims 1-7, wherein each of the RNAs comprises a modified nucleoside in place of at least one uridine.
11. The pharmaceutical composition of any one of claims 1-7, wherein each of the RNAs comprises a modified nucleoside in place of each uridine.
12. The pharmaceutical composition of any one of claims 8-11, wherein the modified nucleoside is independently selected from pseudouridine (ψ), N1-methyl-pseudouridine (m1ψ), and 5-methyl-uridine (m5U).
13. The pharmaceutical composition of any one of claims 7-11, wherein at least one of the RNAs comprises more than one type of modified nucleoside, wherein the modified nucleosides are independently selected from pseudouridine (ψ), N1-methyl-pseudouridine (m1ψ), and 5-methyl-uridine (m5U).
14. The pharmaceutical composition of claim 12, wherein the modified nucleoside is N1-methyl-pseudouridine (m1ψ).
15. The pharmaceutical composition of any one of claims 1-14, wherein at least one of the RNAs comprises the 5' cap $m_2^{7,3'\text{-}O}$Gppp($m_1^{2'\text{-}O}$)ApG or 3′-O-Me-m^7G(5')ppp(5')G.
16. The pharmaceutical composition of any one of claims 1-15, wherein each RNA comprises the 5' cap $m_2^{7,3'\text{-}O}$Gppp($m_1^{2'\text{-}O}$)ApG or 3′-O-Me-m^7G(5')ppp(5')G.
17. The pharmaceutical composition of any one of claims 1-16, wherein at least one of the RNAs, comprises a 5' UTR comprising a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6, or a nucleotide sequence having at least 80% identity to a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6.
18. The pharmaceutical composition of any one of claims 1-17, wherein each of the RNAs comprises a 5' UTR comprising a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6, or a nucleotide sequence having at least 80% identity to a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6.
19. The pharmaceutical composition of any one of claims 1-18, wherein at least one of the RNAs, comprises a 3' UTR comprising the nucleotide sequence of SEQ ID NO: 8, or a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO: 8.
20. The pharmaceutical composition of any one of claims 1-19, wherein each of the RNAs comprises a 3' UTR comprising the nucleotide sequence of SEQ ID NO: 8, or a nucleotide sequence having

at least 99%, 98%, 97%, 96%, 95%, 90%, 85%, or 80% identity to the nucleotide sequence of SEQ ID NO: 8.

21. The pharmaceutical composition of any one of claims 1-20, wherein at least one of the RNAs comprises a poly-A tail.
22. The pharmaceutical composition of any one of claims 1-21, wherein each of the RNAs comprises a poly-A tail.
23. The pharmaceutical composition of claim 21 or 22, wherein the poly-A tail comprises at least 100 nucleotides.
24. The pharmaceutical composition of claim 21 or 22, wherein the poly-A tail comprises the poly-A tail shown in SEQ ID NO: 78.
25. The pharmaceutical composition of any one of claims 1-24, wherein one or more RNA comprises:
    a. a 5' cap comprising $m_2^{7,3'\text{-}O}Gppp(m_1^{2'\text{-}O})ApG$ or 3´-O-Me-$m^7G(5')ppp(5')G$;
    b. a 5' UTR comprising (i) a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6, or (ii) a nucleotide sequence having at least 80% identity to a nucleotide sequence selected from the group consisting of SEQ ID NOs: 2, 4, and 6;
    c. a 3' UTR comprising (i) the nucleotide sequence of SEQ ID NO: 8, or (ii) a nucleotide sequence having at least 80% identity to the nucleotide sequence of SEQ ID NO:8; and
    d. a poly-A tail comprising at least 100 nucleotides.
26. The pharmaceutical composition of claim 25, wherein the poly-A tail comprises SEQ ID NO: 78.
27. The pharmaceutical composition of any one of claim 1 to 24, the coding sequence of the RNA encoding an IL-12sc protein consists of the sequence of SEQ ID NO: 18 with an N1-methyl-pseudouridine (m1ψ) in place of each uridine, the coding sequence of the RNA encoding an IL-15 sushi protein consists of the sequence of SEQ ID NO: 26 with an N1-methyl-pseudouridine (m1ψ) in place of each uridine, the coding sequence of the RNA encoding an IFNα protein consists of the sequence of SEQ ID NO: 23 with an N1-methyl-pseudouridine (m1ψ) in place of each uridine, and the coding sequence of the RNA encoding a GM-CSF protein consists of the sequence of SEQ ID NO: 29 with an N1-methyl-pseudouridine (m1ψ) in place of each uridine, wherein each of the RNAs comprises:
    - a 5' cap comprising $m_2^{7,3'\text{-}O}Gppp(m_1^{2'\text{-}O})ApG$ or 3´-O-Me-$m^7G(5')ppp(5')G$;
    - a 5' UTR comprising the nucleotide sequence of SEQ ID NOs: 2, 4, or 6;
    - a 3' UTR comprising the nucleotide sequence of SEQ ID NO: 8; and
    - a poly-A tail comprising the nucleotide sequence of SEQ ID NO: 78; and

    wherein the molar ratio or weight ratio of the RNAs in the composition is 1:1:1:1.

28. The pharmaceutical composition of any one of claims 1-27, wherein the composition further comprises one or more pharmaceutically acceptable carriers, diluents and/or excipients.
29. The pharmaceutical composition of claim 28, wherein the pharmaceutical composition further comprises a pharmaceutically acceptable aqueous solution.
30. The pharmaceutical composition of claim 29, wherein the pharmaceutically acceptable aqueous solution is Ringer's solution.
31. The pharmaceutical composition of claim any one of claims 1-30, wherein the pharmaceutical composition further comprises a lipid moiety complexed with the RNAs.
32. The pharmaceutical composition of claim 31, wherein the lipid moiety is a liposome or lipoplex comprising a cationic lipid and a neutral lipid.
33. A kit for treating or preventing a solid tumor comprising the pharmaceutical composition of any one of claims 1-32, optionally wherein the RNAs are in separate vials.