CLAIMS

1. A composition comprising a first RNA linked to a second RNA, wherein the first RNA encodes for a cytokine, and wherein the second RNA encodes for a genetic element that modulates expression of a gene associated with tumor proliferation.

2. The composition of claim 1, wherein the cytokine is interleukin-2 (IL-2), IL-12, IL-15, IL-7, a fragment thereof, or a functional variant thereof.

3. The composition of claim 1, wherein the first RNA is a messenger RNA (mRNA).

4. The composition of claim 1, wherein the second RNA is a small interfering RNA (siRNA).

5. The composition of claim 1, wherein the gene associated with tumor proliferation comprises a gene associated with angiogenesis.

6. The composition of claim 5, wherein the gene associated with angiogenesis encodes vascular endothelial growth factor (VEGF), a fragment thereof, or a functional variant thereof.

7. The composition of claim 1, wherein the gene associated with tumor proliferation comprises isocitrate dehydrogenase (IDH1), cyclin-dependent kinase 4 (CDK4), CDK6, epidermal growth factor receptor (EGFR), mechanistic target of rapamycin (mTOR), Kirsten rat sarcoma viral oncogene (KRAS), cluster of differentiation (CD155), programmed cell death-ligand 1 (PD-L1), or myc proto-oncogene (c-Myc).

8. A composition comprising a first RNA linked to a second RNA, wherein the first RNA encodes for a cytokine, and wherein the second RNA encodes for a genetic element that modulates expression of a gene associated with recognition by the immune system.

9. The composition of claim 8, wherein the cytokine is interleukin-2 (IL-2), a fragment thereof, or a functional variant thereof.

10. The composition of claim 8, wherein the first RNA is a messenger RNA (mRNA).

11. The composition of claim 8, wherein the second RNA is a small interfering RNA (siRNA).

12. The composition of claim 11, wherein the siRNA is capable of binding to an mRNA of the gene associated with recognition by the immune system.

13. The composition of claim 12, wherein the gene associated with recognition by immune system encodes MHC class I chain-related sequence A (MICA), a fragment thereof, or a functional variant thereof or wherein the gene associated with recognition by the immune system encodes MHC class I chain-related sequence B (MICB), a fragment thereof, or a functional variant thereof.

14. The composition of claim 12, wherein the gene associated with recognition by the immune system encodes endoplasmic reticulum protein (ERp5), a disintegrin and metalloproteinase (ADAM), matrix metalloproteinase (MMP), a fragment thereof, or a functional variant thereof.

15. A composition comprising:

a first RNA encoding for interleukin-2 (IL-2), IL-15, a fragment thereof, or a functional variant thereof linked to a second RNA encoding for a genetic element that modulates expression of vascular endothelial growth factor A (VEGFA), an isoform of VEGFA, placental growth factor (PIGF), cluster of differentiation 155 (CD155), programmed cell death-ligand 1 (PD-L1), myc proto-oncogene (c-Myc), a fragment thereof, or a functional variant thereof.

16. The composition of claim 15, wherein the first RNA is a messenger RNA (mRNA).

17. The composition of claim 15, wherein the second RNA is a small interfering RNA (siRNA).

18. The composition of claim 17, wherein the siRNA is capable of binding to an mRNA of VEGFA, an isoform of VEGFA, PIGF, CD155, PD-L1, or c-Myc.

19. A composition comprising:

a first RNA encoding for interleukin-2 (IL-2), a fragment thereof, or a functional variant thereof linked to a second RNA encoding for a genetic element that modulates expression of MHC class I chain-related sequence A (MICA), MHC class I chain-related sequence B (MICB), endoplasmic reticulum protein (ERp5), a disintegrin and metalloproteinase (ADAM), matrix metalloproteinase (MMP), a fragment thereof, or a functional variant thereof.

20. The composition of claim 19, wherein the first RNA is a messenger RNA (mRNA).

21. The composition of claim 19, wherein the second RNA is a small interfering RNA (siRNA).

22. The composition of claim 21, wherein the siRNA is capable of binding to an mRNA of MICA, MICB, ERp5, ADAM, or MMP.

23. A composition comprising:

a first RNA encoding for interleukin-12 (IL-12), IL-7, a fragment thereof, or a functional variant thereof linked to a second RNA encoding for a genetic element that modulates expression of isocitrate dehydrogenase (IDH1), cyclin-dependent kinase 4 (CDK4), CDK6, epidermal growth factor receptor (EGFR), mechanistic target of rapamycin (mTOR), Kirsten rat sarcoma viral oncogene (KRAS), programmed cell death-ligand 1 (PD-L1), a fragment thereof, or a functional variant thereof.

24. The composition of claim 23, wherein the first RNA is a messenger RNA (mRNA).

25. The composition of claim 23, wherein the second RNA is a small interfering RNA (siRNA).

26. The composition of claim 25, wherein the siRNA is capable of binding to an mRNA of IDH1, CDK4, CDK6, EGFR, mTOR, KRAS, or PD-L1.

27. A pharmaceutical composition comprising a therapeutically effective amount of the composition of any one of claims 1-26 and a pharmaceutically acceptable excipient.

28. Use of the composition of any one of claims 1-26 or of the pharmaceutical composition of claim 27 in the manufacture of a medicament for the treatment of cancer.

29. The use of claim 28, wherein the cancer is selected from the group consisting of a solid tumor, melanoma, renal cell carcinoma, and head and neck cancer.

30. A composition comprising a recombinant polynucleic acid construct comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-17 and 125-141.

31. A composition according to any one of claims 1-26 for use in modulating the expression of two or more genes in a cell.

32. A cell comprising the composition of any one of claims 1-26.

33. A vector comprising a recombinant polynucleic acid construct encoding the composition of any one of claims 1-26.

34. A method of producing an siRNA and an mRNA from a single RNA transcript in a cell, comprising introducing into the cell the composition of any one of claims 1-26 or the vector of claim 33.

35. A method of modulating protein expression comprising introducing the composition of any one of claims 1-26 or the vector of claim 33 into a cell, wherein the expression of a protein encoded by the second RNA is decreased compared to a cell without the composition of any one of claims 1-26 or the vector of claim 33.

36. A method of modulating protein expression comprising introducing the composition of any one of claims 1-26 or the vector of claim 33 into a cell, wherein the expression of a protein encoded by the first RNA is increased compared to a cell without the composition of any one of claims 1-26 or the vector of claim 33.

37. A method of modulating protein expression comprising introducing the composition of any one of claims 1-26 or the vector of claim 33 into a cell, wherein the expression of a protein encoded by the second RNA is decreased compared to a cell without the composition of any one of claims 1-26 or the vector of claim 33, and wherein the expression of a protein encoded by the first RNA is increased compared to a cell without the composition of any one of claims 1-26 or the vector of claim 33.