

What we claim is:

1. A method for preparing a therapeutic T cell specifically targeting a cancer-associated antigen, comprising co-expressing an exogenous cancer-associated antigen-specific receptor protein and a dominant negative TGF- β type II receptor in the T cell;

comprising transducing the T cell with a lentiviral particle comprising a lentiviral vector, wherein the lentiviral vector comprises a nucleotide sequence encoding a fusion polypeptide comprising the exogenous antigen-specific receptor protein and the dominant negative TGF- β type II receptor linked by a self-cleavable peptide, thereby co-expressing the exogenous antigen-specific receptor protein and the dominant negative TGF- β type II receptor in the T cell,

wherein the nucleotide sequence encoding the fusion polypeptide is operably linked to a truncated EF1 α promoter;

wherein the truncated EF1 α promoter consists of the nucleotide sequence set forth in SEQ ID NO: 13.

2. The method of claim 1, wherein the dominant negative TGF- β type II receptor lacks the intracellular signaling domain of TGF- β type II receptor, ~~for example,~~ and the dominant negative TGF- β type II receptor comprises the amino acid sequence set forth in SEQ ID NO:18.

3. The method of claim 1 or 2, wherein the exogenous cancer-associated antigen-specific receptor protein is selected from T cell receptor (TCR) and chimeric antigen receptor (CAR).

4. The method of claim 3, wherein the TCR specifically binds to the cancer-associated antigen, the CAR comprises an extracellular antigen binding domain against the cancer-associated antigen.

5. The method of claim 4, wherein the CAR comprises an extracellular antigen binding domain ~~such as a scFv~~ which specifically binds to the cancer-associated antigen, a CD8 hinge and transmembrane domain, a CD3 ζ signaling domain, and a 4-1BB costimulatory domain.

6. The method of any one of claims 1-5, wherein the cancer-associated antigen is selected from CD16, CD64, CD78, CD96, CLL1, CD116, CD117, CD71, CD45, ~~CD71,~~ CD123, CD138, ErbB2 (HER2/neu), carcinoembryonic antigen (CEA), epithelial cell adhesion molecule (EpCAM), epidermal growth factor receptor (EGFR), EGFR variant III (EGFRvIII), CD19, CD20, CD30, CD40, disialylganglioside GD2, ductal epithelial mucin, gp36, TAG-72, glycosphingolipid, glioma-related antigens, β -human chorionic gonadotropin, α -fetoglobulin (AFP), lectin-responsive AFP, thyroglobulin, RAGE-1, MN-CA IX, human telomerase reverse transcriptase, RU1, RU2 (AS), intestinal carboxyl esterase, mut hsp70-2,

M-CSF, prostase, prostatase specific antigen (PSA), PAP, NY-ESO-1, LAGA-1a, p53, Prostein, PSMA, survival and telomerase, prostate cancer tumor antigen-1 (PCTA-1), MAGE, ELF2M, neutrophil elastase, ephrin B2, CD22, insulin growth factor (IGF1)-I, IGF-II, IGF1 receptor, mesothelin, major histocompatibility complex (MHC) molecules that present tumor-specific peptide epitopes, 5T4, ROR1, Nkp30, NKG2D, tumor stromal antigen, fibronectin extra domain A (EDA) and extra domain B (EDB), tenascin-C A1 domain (TnC A1), fibroblast-associated protein (fap), CD3, CD4, CD8, CD24 , CD25, CD33, CD34, CD133, ~~CD138~~, Foxp3, B7-1 (CD80), B7-2 (CD86), GM-CSF, cytokine receptor, endothelial factor, BCMA (CD269, TNFRSF17), TNFRSF17 (UNIPROT Q02223), SLAMF7 (UNIPROT Q9NQ25), GPRC5D (UNIPROT Q9NZD1), FKBP11 (UNIPROT Q9NYL4), KAMP3,

ITGA8 (UNIPROT P53708) and FCRL5 (UNIPROT Q68SN8).

7. The method of claim 6, wherein the CAR comprises an extracellular antigen binding domain against CD19, for example, the CAR comprises the amino acid sequence set forth in SEQ ID NO:16.

8. The method of ~~any one of claims 1-7, comprising transducing the T cell with a lentiviral particle comprising a lentiviral vector, wherein the lentiviral vector comprises a nucleotide sequence encoding a fusion polypeptide comprising the exogenous antigen-specific receptor protein and the dominant negative TGF- β type II receptor linked by a self-cleavable peptide, thereby co-expressing the exogenous antigen-specific receptor protein and the dominant negative TGF- β type II receptor in the T cell.~~ claim 7, wherein the self-cleavable peptide is a 2A polypeptide, selected from P2A, F2A, E2A, or T2A polypeptide, or a functional variant thereof.

9. The method of claim ~~8, wherein the self-cleavable peptide is a 2A polypeptide, for example, the self-cleavable peptide is selected from P2A, F2A, E2A, or T2A polypeptide, or a functional variant thereof.~~ 1 or 8, wherein the lentiviral vector further comprises at least one element selected from a 5' LTR, a ψ element, an RRE element, a cPPT/CTS element, a WPRE element and a 3' LTR.

10. The method of claim ~~8 or 9, wherein the nucleotide sequence encoding the fusion polypeptide is operably linked to a truncated EF1 α promoter, for example, the truncated EF1 α promoter comprises the nucleotide sequence set forth in SEQ ID NO: 13.~~ 9, wherein the lentiviral vector comprises a 5'LTR, a ψ element, an RRE element, a cPPT/CTS element, the truncated EF1 α promoter, the nucleotide sequence encoding the fusion polypeptide, a WPRE element and a 3'LTR, which are operably linked.

11. The method of ~~any one of claims 8-10, wherein the lentiviral vector further comprises at least one element selected from a 5' LTR, a ψ element, an RRE element, a cPPT/CTS element, a WPRE element and a 3' LTR.~~ claim 9 or 10, wherein the 5'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 3 or 11; the ψ element comprises the nucleotide sequence set forth in SEQ ID NO: 4 or 12; the RRE element comprises the nucleotide sequence set forth in SEQ ID NO: 5; the cPPT/CTS element comprises the nucleotide sequence set forth in SEQ ID NO: 6; the WPRE element comprises a nucleotide sequence set forth in SEQ ID NO: 9 or 14; the 3'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 10 or 15.

12. The method of claim ~~11, wherein the lentiviral vector comprises a 5'LTR, a ψ element, an RRE element, a cPPT/CTS element, a truncated EF1 α promoter, a nucleotide~~

~~sequence encoding the fusion polypeptide, a WPRE element and a 3'LTR, which are operably linked.~~ 13, wherein the lentiviral vector comprises a 5'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 11, a ψ element comprising the nucleotide sequence set forth in SEQ ID NO: 12, an RRE element comprising the nucleotide sequence set forth in SEQ ID NO: 5, a cPPT/CTS element comprising the nucleotide sequence set forth in SEQ ID NO: 6, a nucleotide sequence encoding the fusion polypeptide, a WPRE element comprising the nucleotide sequence set forth in SEQ ID NO: 14, and a 3' LTR comprising the nucleotide sequence set forth in SEQ ID NO: 15, which are operably linked.

~~13. The method of claim 11 or 12, wherein the 5'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 3 or 11; the ψ element comprises the nucleotide sequence set forth in SEQ ID NO: 4 or 12; the RRE element comprises the nucleotide sequence set forth in SEQ ID NO: 5; the cPPT/CTS element comprises the nucleotide sequence set forth in SEQ ID NO: 6; the WPRE element comprises a nucleotide sequence set forth in SEQ ID NO: 9 or 14; the 3'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 10 or 15. A therapeutic T cell specifically targeting a cancer-associated antigen which co-expresses an exogenous cancer-associated antigen-specific receptor protein and a dominant negative TGF- β type II receptor, wherein the therapeutic T cell comprises a lentiviral vector comprising a nucleotide sequence encoding a fusion polypeptide comprising the exogenous cancer-associated antigen-specific receptor protein and the dominant negative TGF- β Type II receptor linked by a self-cleavable peptide;~~

wherein the nucleotide sequence encoding the fusion polypeptide is operably linked to a truncated EF1 α promoter;

wherein the dominant negative TGF- β type II receptor lacks the intracellular signaling domain of TGF- β type II receptor,

wherein the truncated EF1 α promoter consists of the nucleotide sequence set forth in SEQ ID NO: 13.

~~14. The method of claim 13, wherein the lentiviral vector comprises a 5'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 11, a ψ element comprising the nucleotide sequence set forth in SEQ ID NO: 12, an RRE element comprising the nucleotide sequence set forth in SEQ ID NO: 5, a cPPT/CTS element comprising the nucleotide sequence set forth in SEQ ID NO: 6, a truncated EF1 α promoter comprising the nucleotide sequence set forth in~~

~~SEQ ID NO: 13, a nucleotide sequence encoding the fusion polypeptide, a WPRE element comprising the nucleotide sequence set forth in SEQ ID NO: 14, and a 3' LTR comprising the nucleotide sequence set forth in SEQ ID NO: 15, which are operably linked. The therapeutic T cell specifically targeting a cancer-associated antigen of claim 16, wherein the dominant negative TGF- β type II receptor comprises the amino acid sequence set forth in SEQ ID NO: 18.~~

15. ~~A~~The therapeutic T cell specifically targeting a cancer-associated antigen ~~which is produced by the method of any one of claims 1-14.~~ of claim 13 or 14, wherein the exogenous cancer-associated antigen-specific receptor protein is selected from T cell receptor (TCR) and chimeric antigen receptor (CAR).

16. ~~A therapeutic T cell specifically targeting a cancer associated antigen which co-expresses an exogenous cancer associated antigen-specific receptor protein and a dominant negative TGF- β type II receptor, wherein the therapeutic T cell comprises a lentiviral vector comprising a nucleotide sequence encoding a fusion polypeptide comprising the exogenous cancer associated antigen-specific receptor protein and the dominant negative TGF- β Type II receptor linked by a self-cleavable peptide. The therapeutic T cell specifically targeting a cancer-associated antigen of claim 15, the TCR specifically binds to a cancer-associated antigen, the CAR comprises an extracellular antigen binding domain against the cancer-associated antigen.~~

17. ~~The therapeutic T cell specifically targeting a cancer-associated antigen of claim 16, wherein the dominant negative TGF- β type II receptor lacks the intracellular signaling domain of TGF- β type II receptor, for example, the dominant negative TGF- β type II receptor comprises the amino acid sequence set forth in SEQ ID NO: 18.~~ 15, the CAR comprises an extracellular antigen binding domain which specifically binds to the cancer-associated antigen, an CD8 hinge and transmembrane domain, a CD3 ζ signaling domain, and a 4-1BB costimulatory domain.

18. ~~The therapeutic T cell specifically targeting a cancer associated antigen of claim 16 or 17, wherein the exogenous cancer associated antigen-specific receptor protein is selected from T cell receptor (TCR) and chimeric antigen receptor (CAR).~~ The therapeutic T cell specifically targeting a cancer-associated antigen of any one of claims 13-17, wherein the cancer-associated antigen is selected from CD16, CD64, CD78, CD96, CLL1, CD116, CD117, CD71, CD45, CD123, CD138, ErbB2 (HER2/neu), carcinoembryonic antigen (CEA), epithelial cell adhesion molecule (EpCAM) , epidermal growth factor receptor (EGFR), EGFR variant III (EGFRvIII), CD19, CD20, CD30, CD40, disialylganglioside GD2, ductal

epithelial mucin, gp36, TAG-72, glycosphingolipid, glioma-related antigens, β -human chorionic gonadotropin, α -fetoglobulin (AFP), lectin-responsive AFP, thyroglobulin, RAGE-1, MN-CA IX, human telomerase reverse transcriptase, RU1, RU2 (AS), intestinal carboxyl esterase, mut hsp70-2, M-CSF, prostase, prostatase specific antigen (PSA), PAP, NY-ESO-1, LAGA-1a, p53, Prostein, PSMA, survival and telomerase, prostate cancer tumor antigen-1 (PCTA-1), MAGE, ELF2M, neutrophil elastase, ephrin B2, CD22, insulin growth factor (IGF1)-I, IGF-II, IGFI receptor, mesothelin, major histocompatibility complex (MHC) molecules that present tumor-specific peptide epitopes, 5T4, ROR1, Nkp30, NKG2D, tumor stromal antigen, fibronectin extra domain A (EDA) and extra domain B (EDB), tenascin-C A1 domain (TnC A1), fibroblast-associated protein (fap), CD3, CD4, CD8, CD24, CD25, CD33, CD34, CD133, Foxp3, B7-1 (CD80), B7-2 (CD86), GM-CSF, cytokine receptor, endothelial factor, BCMA (CD269, TNFRSF17), TNFRSF17 (UNIPROT Q02223), SLAMF7 (UNIPROT Q9NQ25), GPRC5D (UNIPROT Q9NZD1), FKBP11 (UNIPROT Q9NYL4), KAMP3, ITGA8 (UNIPROT P53708) and FCRL5 (UNIPROT Q68SN8).

19. The therapeutic T cell specifically targeting a cancer-associated antigen of claim ~~18~~, ~~the TCR specifically binds to a cancer-associated antigen, the CAR comprises an extracellular antigen binding domain against the cancer-associated antigen.~~ 21, wherein the CAR comprises an extracellular antigen binding domain against CD19, wherein the CAR comprises the amino acid sequence set forth in SEQ ID NO:16.

20. The therapeutic T cell specifically targeting a cancer-associated antigen of ~~claim 19,~~ ~~the CAR comprises an extracellular antigen binding domain such as an scFv which specifically binds to the cancer-associated antigen, an CD8 hinge and transmembrane domain, a CD3 ζ signaling domain, and a 4-1BB costimulatory domain.~~ any one of claims 13-19, wherein the self-cleavable peptide is a 2A polypeptide.

21. The therapeutic T cell specifically targeting a cancer-associated antigen of any one of claims ~~16-20, wherein the cancer-associated antigen is selected from CD16, CD64, CD78, CD96, CLL1, CD116, CD117, CD71, CD45, CD71, CD123, CD138, ErbB2 (HER2/neu), carcinoembryonic antigen (CEA), epithelial cell adhesion molecule (EpCAM), epidermal growth factor receptor (EGFR), EGFR variant III (EGFRvIII), CD19, CD20, CD30, CD40, disialylganglioside GD2, ductal epithelial mucin, gp36, TAG-72, glycosphingolipid, glioma-related antigens, β -human chorionic gonadotropin, α -fetoglobulin (AFP), lectin-responsive AFP, thyroglobulin, RAGE-1, MN-CA IX, human telomerase reverse transcriptase, RU1, RU2 (AS), intestinal carboxyl esterase, mut hsp70-2, M-CSF, prostase,~~

~~prostatase specific antigen (PSA), PAP, NY-ESO-1, LAGA-1a, p53, Prostein, PSMA, survival and telomerase, prostate cancer tumor antigen-1 (PCTA-1), MAGE, ELF2M, neutrophil elastase, ephrin B2, CD22, insulin growth factor (IGF1)-I, IGF-II, IGF1 receptor, mesothelin, major histocompatibility complex (MHC) molecules that present tumor-specific peptide epitopes, 5T4, ROR1, Nkp30, NKG2D, tumor stromal antigen, fibronectin extra domain A (EDA) and extra domain B (EDB), tenascin-C A1 domain (TnC A1), fibroblast-associated protein (fap), CD3, CD4, CD8, CD24, CD25, CD33, CD34, CD133, CD138, Foxp3, B7-1 (CD80), B7-2 (CD86), GM-CSF, cytokine receptor, endothelial factor, BCMA (CD269, TNFRSF17), TNFRSF17 (UNIPROT Q02223), SLAMF7 (UNIPROT Q9NQ25), GPRC5D (UNIPROT Q9NZD1), FKBP11 (UNIPROT Q9NYL4), KAMP3, ITGA8 (UNIPROT P53708) and FCRL5 (UNIPROT Q68SN8).~~ 13-20, wherein the lentiviral vector further comprises at least one element selected from a 5'LTR, a ψ element, an RRE element, a cPPT/CTS element, a WPRE element and a 3'LTR.

22. The therapeutic T cell specifically targeting a cancer-associated antigen of claim 21, wherein ~~the CAR comprises an extracellular antigen binding domain against CD19, for example, the CAR comprises the amino acid sequence set forth in SEQ ID NO:16.~~ the lentiviral vector comprises a 5'LTR, a ψ element, an RRE element, a cPPT/CTS element, a truncated EF1 α promoter, a nucleotide sequence encoding the fusion polypeptide, a WPRE element and a 3'LTR, which are operably linked.

23. The therapeutic T cell specifically targeting a cancer-associated antigen of ~~any one of claims 16-22, wherein the self-cleavable peptide is a 2A polypeptide, for example, the self-cleavable peptide is selected from P2A, F2A, E2A or T2A polypeptide, or a functional variant thereof.~~ claim 21 or 22, wherein the 5'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 3 or 11; the ψ element comprises the nucleotide sequence set forth in SEQ ID NO: 4 or 12; the RRE element comprises the nucleotide sequence set forth in SEQ ID NO: 5; the cPPT/CTS element comprises the nucleotide sequence set forth in SEQ ID NO: 6; the WPRE element comprises the nucleotide sequence set forth in SEQ ID NO: 9 or 14; the 3'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 10 or 15.

24. The therapeutic T cell specifically targeting a cancer-associated antigen of ~~any one of claims 16-23, wherein the nucleotide sequence encoding the fusion polypeptide is operably linked to a truncated EF1 α promoter, for example, the truncated EF1 α promoter is an EF1 α core promoter comprising the nucleotide sequence set forth in SEQ ID NO:13.~~ claim 23, wherein the lentiviral vector comprises a 5'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 11, a ψ element comprising the nucleotide sequence set forth in SEQ ID NO:

12, an RRE element comprising the nucleotide sequence set forth in SEQ ID NO: 5, a cPPT/CTS element comprising the nucleotide sequence set forth in SEQ ID NO: 6, a nucleotide sequence encoding the fusion polypeptide, a WPRE element comprising the nucleotide sequence set forth in SEQ ID NO: 14, a 3'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 15, which are operably linked.

~~25. The therapeutic T cell specifically targeting a cancer associated antigen of one of claims 16-24, wherein the lentiviral vector further comprises at least one element selected from a 5'LTR, a ψ element, an RRE element, a cPPT/CTS sequence, a WPRE element and a 3'LTR.~~

~~26. The therapeutic T cell specifically targeting a cancer associated antigen of claim 25, wherein the lentiviral vector comprises a 5'LTR, a ψ element, an RRE element, a cPPT/CTS element, a truncated EF1 α promoter, a nucleotide sequence encoding the fusion polypeptide, a WPRE element and a 3'LTR, which are operably linked.~~

~~27. The therapeutic T cell specifically targeting a cancer associated antigen of claim 25 or 26, wherein the 5'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 3 or 11; the ψ element comprises the nucleotide sequence set forth in SEQ ID NO: 4 or 12; the RRE element comprises the nucleotide sequence set forth in SEQ ID NO: 5; the cPPT/CTS element~~

~~comprises the nucleotide sequence set forth in SEQ ID NO: 6; the WPRE element comprises the nucleotide sequence set forth in SEQ ID NO: 9 or 14; the 3'LTR comprises the nucleotide sequence set forth in SEQ ID NO: 10 or 15.~~

~~28. The therapeutic T cell specifically targeting a cancer-associated antigen of claim 27, wherein the lentiviral vector comprises a 5'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 11, a ψ element comprising the nucleotide sequence set forth in SEQ ID NO: 12, an RRE element comprising the nucleotide sequence set forth in SEQ ID NO: 5, a ePPT/CTS element comprising the nucleotide sequence set forth in SEQ ID NO: 6, a truncated EF1 α promoter comprising the nucleotide sequence set forth in SEQ ID NO: 13, a nucleotide sequence encoding the fusion polypeptide, a WPRE element comprising the nucleotide sequence set forth in SEQ ID NO: 14, a 3'LTR comprising the nucleotide sequence set forth in SEQ ID NO: 15, which are operably linked.~~

~~29~~25. A pharmaceutical composition comprising the therapeutic T cell specifically targeting a cancer-associated antigen of any one of claims ~~15~~13-2824, and a pharmaceutically acceptable carrier.

~~30~~26. Use of the therapeutic T cell specifically targeting a cancer-associated antigen of any one of claims ~~15~~13-2824 or the pharmaceutical composition of claim ~~29~~25 in the preparation of a medicament for treating cancer in a subject.

~~31~~27. ~~A method of treating cancer in a subject, comprising administering to the subject a therapeutically effective amount of the therapeutic T cell specifically targeting a cancer-associated antigen of any one of claims 15-28 or the pharmaceutical composition of claim 29.~~ The method of any one of claims 1-12, wherein the cancer is selected from lung cancer, ovarian cancer, colon cancer, rectal cancer, melanoma, kidney cancer, bladder cancer, breast cancer, liver cancer, lymphoma, hematological malignancies, head and neck cancers, glial tumor, stomach cancer, nasopharyngeal cancer, throat cancer, cervical cancer, uterine body tumor, osteosarcoma and other cancers that include: bone cancer, pancreatic cancer, skin cancer, prostate cancer, skin or intraocular malignant melanoma, uterine cancer, anal cancer, testicular cancer, fallopian tube cancer, endometrial cancer, vaginal cancer, vaginal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, esophageal cancer, small intestine cancer, endocrine system cancer, thyroid cancer, parathyroid cancer, adrenal cancer, soft tissue sarcoma, urethral cancer, penile cancer, chronic or acute leukemia (including acute myeloid leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia), childhood solid tumors, lymphocytic lymphoma, bladder cancer, kidney or ureteral cancer, renal pelvis cancer, central nervous system (CNS) tumor, primary CNS lymphoma,

tumor angiogenesis, spinal tumor, brainstem glioma, pituitary adenoma, Kaposi's sarcoma, epidermal carcinoma, squamous cell carcinoma, T cell lymphoma, and environmentally induced cancers, including asbestos-induced cancers, and combinations of the cancers.

~~3228. The method, the therapeutic T cell, the pharmaceutical composition or the use of any one of the preceding claims, wherein the cancer is selected from lung cancer, ovarian cancer, colon cancer, rectal cancer, melanoma, kidney cancer, bladder cancer, breast cancer, liver cancer, lymphoma, hematological malignancies, head and neck cancers, glial tumor, stomach cancer, nasopharyngeal cancer, throat cancer, cervical cancer, uterine body tumor and osteosarcoma. Examples of other cancers that can be treated with the method or pharmaceutical composition of the present invention include: bone cancer, pancreatic cancer, skin cancer, prostate cancer, skin or intraocular malignant melanoma, uterine cancer, anal cancer, testicular cancer, fallopian tube cancer, endometrial cancer, vaginal cancer, vaginal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, esophageal cancer, small intestine cancer, endocrine system cancer, thyroid cancer, parathyroid cancer, adrenal cancer, soft tissue sarcoma, urethral cancer, penile cancer, chronic or acute leukemia (including acute myeloid-~~

~~leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia), childhood solid tumors, lymphocytic lymphoma, bladder cancer, kidney or ureteral cancer, renal pelvis cancer, central nervous system (CNS) tumor, primary CNS lymphoma, tumor angiogenesis, spinal tumor, brainstem glioma, pituitary adenoma, Kaposi's sarcoma, epidermal carcinoma, squamous cell carcinoma, T cell lymphoma, and environmentally induced cancers, including asbestos-induced cancers, and combinations of the cancers. In a specific embodiment, the cancer is B-cell acute lymphoblastic leukemia (B-ALL).~~ The therapeutic T cell of any one of claims 13-24 of any one of claims 1-12, wherein the cancer is selected from lung cancer, ovarian cancer, colon cancer, rectal cancer, melanoma, kidney cancer, bladder cancer, breast cancer, liver cancer, lymphoma, hematological malignancies, head and neck cancers, glial tumor, stomach cancer, nasopharyngeal cancer, throat cancer, cervical cancer, uterine body tumor, osteosarcoma, and other cancers that include: bone cancer, pancreatic cancer, skin cancer, prostate cancer, skin or intraocular malignant melanoma, uterine cancer, anal cancer, testicular cancer, fallopian tube cancer, endometrial cancer, vaginal cancer, vaginal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, esophageal cancer, small intestine cancer, endocrine system cancer, thyroid cancer, parathyroid cancer, adrenal cancer, soft tissue sarcoma, urethral cancer, penile cancer, chronic or acute leukemia (including acute myeloid leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia), childhood solid tumors, lymphocytic lymphoma, bladder cancer, kidney or ureteral cancer, renal pelvis cancer, central nervous system (CNS) tumor, primary CNS lymphoma, tumor angiogenesis, spinal tumor, brainstem glioma, pituitary adenoma, Kaposi's sarcoma, epidermal carcinoma, squamous cell carcinoma, T cell lymphoma, and environmentally induced cancers, including asbestos-induced cancers, and combinations of the cancers.

29. The pharmaceutical composition of claim 25, wherein the cancer is selected from lung cancer, ovarian cancer, colon cancer, rectal cancer, melanoma, kidney cancer, bladder cancer, breast cancer, liver cancer, lymphoma, hematological malignancies, head and neck cancers, glial tumor, stomach cancer, nasopharyngeal cancer, throat cancer, cervical cancer, uterine body tumor, osteosarcoma, and other cancers that include: bone cancer, pancreatic cancer, skin cancer, prostate cancer, skin or intraocular malignant melanoma, uterine cancer, anal cancer, testicular cancer, fallopian tube cancer, endometrial cancer, vaginal cancer, vaginal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, esophageal cancer, small intestine cancer, endocrine system cancer, thyroid cancer, parathyroid cancer, adrenal cancer, soft tissue sarcoma, urethral cancer, penile cancer, chronic or acute leukemia (including acute

myeloid leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia), childhood solid tumors, lymphocytic lymphoma, bladder cancer, kidney or ureteral cancer, renal pelvis cancer, central nervous system (CNS) tumor, primary CNS lymphoma, tumor angiogenesis, spinal tumor, brainstem glioma, pituitary adenoma, Kaposi's sarcoma, epidermal carcinoma, squamous cell carcinoma, T cell lymphoma, and environmentally induced cancers, including asbestos-induced cancers, and combinations of the cancers.

30. The Use of claim 26, wherein the cancer is selected from lung cancer, ovarian cancer, colon cancer, rectal cancer, melanoma, kidney cancer, bladder cancer, breast cancer, liver cancer, lymphoma, hematological malignancies, head and neck cancers, glial tumor, stomach cancer, nasopharyngeal cancer, throat cancer, cervical cancer, uterine body tumor, osteosarcoma, and other cancers that include: bone cancer, pancreatic cancer, skin cancer, prostate cancer, skin or intraocular malignant melanoma, uterine cancer, anal cancer, testicular cancer, fallopian tube cancer, endometrial cancer, vaginal cancer, vaginal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, esophageal cancer, small intestine cancer, endocrine system cancer, thyroid cancer, parathyroid cancer, adrenal cancer, soft tissue sarcoma, urethral cancer, penile cancer, chronic or acute leukemia (including acute myeloid leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia), childhood solid tumors, lymphocytic lymphoma, bladder cancer, kidney or ureteral cancer, renal pelvis cancer, central nervous system (CNS) tumor, primary CNS lymphoma, tumor angiogenesis, spinal tumor, brainstem glioma, pituitary adenoma, Kaposi's sarcoma, epidermal carcinoma, squamous cell carcinoma, T cell lymphoma, and environmentally induced cancers, including asbestos-induced cancers, and combinations of the cancers.