~~What is claimed is:~~CLAIMS

1. A cancer vaccine comprising cancer cells, wherein the cancer cells are:

(1) PTEN-deficient;

(2) p53-deficient; and

(3) modified to activate the TGFβ-Smad/p63 signaling pathway.

2. The cancer vaccine of claim 1, wherein

a) the TGFβ-Smad/p63 signaling pathway is activated by contacting the cancer cells with at least one TGFβ superfamily protein;

b) the at least one TGFβ superfamily protein is selected from the group consisting of LAP, TGFβ1, TGFβ2, TGFβ3, TGFβ5, Activin A, Activin AB, Activin AC, Activin B, Activin C, C17ORF99, INHBA, INHBB, Inhibin, Inhibin A, Inhibin B, BMP-1/PCP, BMP-2, BMP-2/BMP-6 Heterodimer, BMP-2/BMP-7 Heterodimer, BMP-2a, BMP-3, BMP-3b/GDF-10, BMP-4, BMP-4/BMP-7 Heterodimer, BMP-5, BMP-6, BMP-7, BMP-8, BMP-8a, BMP-8b, BMP-9, BMP-10, BMP-15/GDF-9B, Decapentaplegic/DPP, Artemin, GDNF, Neurturin, Persephin, Lefty A, Lefty B, MIS/AMH, Nodal, and SCUBE3;

c) the at least one TGFβ superfamily protein is selected from the group consisting of TGFβ1, TGFβ2, and TGFβ3;

d) the cancer cells are contacted with the TGFβ superfamily protein *in vitro*, *in vivo*, and/or *ex vivo*;

e) the TGFβ-Smad/p63 signaling pathway is activated by increasing the copy number, amount, and/or activity of at least one biomarker listed in Table 1, and/or decreasing the copy number, amount, and/or activity of at least one biomarker listed in Table 2 in the cancer cells;

f) the TGFβ-Smad/p63 signaling pathway is activated by increasing nuclear localization of Smad2, and/or association of p63 and Smad2 in the nucleus of the cancer cells;

g) the cancer cells are derived from a solid or hematological cancer;

h) the cancer cells are derived from a cancer cell line;

i) the cancer cells are derived from primary cancer cells;

j) the cancer cells are breast cancer cells;

k) the cancer cells are derived from a triple-negative breast cancer (TNBC);

l) activation of TGFβ-Smad/p63 signaling pathway induces epithelial-to-mesenchymal (EMT) transition in the cancer cells;

m) activation of TGFβ-Smad/p63 signaling pathway upregulates the expression levels of ICOSL, PYCARD, SFN, PERP, RIPK3, CASP9, and/or SESN1 in the cancer cells;

n) activation of TGFβ-Smad/p63 signaling pathway downregulates the expression levels of KSR1, KSR1, EIF4EBP1, ITGA5, EMILIN1, CD200, and/or CSF1 in the cancer cells;

o) the cancer cells are capable of activating co-cultured dendritic cells (DCs) in *in vitro*;

p) the cancer cells are capable of upregulating CD40, CD80, CD86, CD103, CD8, HLA-DR, MHC-II, and/or IL1-β in the co-cultured dendritic cells *in vitro*;

q) the cancer cells are capable of activating co-cultured T cells in the presence of DCs *in vitro*;

r) the cancer cells are capable of increasing secretion of TNFα and/or IFNγ by the co-cultured T cells in the presence of DCs *in vitro*;

s) the cancer cells do not form a tumor in an immune-competent subject;

t) the cancer vaccine triggers cytotoxic T cell-mediated antitumor immunity;

u) the cancer vaccine increases CD4+ T cells and CD8+ T cells in blood and/or tumor microenvironment;

v) the cancer vaccine increases TNFα- and INFγ-secreting CD4+ and CD8+ T cells in blood and/or tumor microenvironment;

w) the cancer vaccine upregulates expression of Icos, Klrc1, Il2rb, Pik3cd, H2-D1, Ccl8, Ifng, Icosl, Il2ra, Cxcr3, Ccr7, Cxcl10, Cd74, H2-Ab1, Hspa1b, Cd45, Lifr, and/or Tnf in tumor tissues;

x) the cancer vaccine increases the amount of tumor-infiltrating dendritic cells;

y) the cancer vaccine upregulates CD80, CD103, and/or MHC-II in tumor-associated DCs.;

z) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells;

aa) the cancer vaccine induces a tumor-specific memory T cell response;

bb) the cancer vaccine increases the percentages of CD4+ central memory (T_{CM}) T cells and/or CD4+ effector memory (T_{EM}) T cells in a spleen and/or lymph nodes;

cc) the cancer vaccine increases the percentage of splenic CD8+ T_{CM} cells;

dd) the cancer vaccine increases the percentage of CD8+ T_{EM} cells in a spleen and/or lymph nodes;

ee) the cancer vaccine increases the amount of tumor infiltrating CD4+ T cells and/or CD8+ T cells;

ff) the cancer vaccine increases the amount of tumor infiltrating CD4+ T_{CM} cells and/or CD4+ T_{EM} cells;

gg) the cancer vaccine increases the amount of tumor infiltrating CD8+ T_{CM} cells and/or CD8+ T_{EM} cells;

hh) the cancer cells are non-replicative;

ii) the cancer vaccine is to be administered to a subject in combination with an immunotherapy and/or cancer therapy, optionally wherein the immunotherapy and/or cancer therapy is to be administered before, after, or concurrently with the cancer vaccine;

jj) the cancer vaccine prevent recurrent and metastatic tumor lesions;

kk) the cancer vaccine is to be administered to the subject intratumorally or subcutaneously;

ll) the subject is an animal model of the cancer, optionally wherein the animal model is a mouse model; and/or

mm) the subject is a mammal, optionally wherein the mammal is in remission for a cancer.

~~3. The cancer vaccine of claim 1 or 2, wherein the at least one TGFβ superfamily protein is selected from the group consisting of LAP, TGFβ1, TGFβ2, TGFβ3, TGFβ5, Activin A, Activin AB, Activin AC, Activin B, Activin C, C17ORF99, INHBA, INHBB, Inhibin, Inhibin A, Inhibin B, BMP-1/PCP, BMP-2, BMP-2/BMP-6 Heterodimer, BMP-2/BMP-7 Heterodimer, BMP-2a, BMP-3, BMP-3b/GDF-10, BMP-4, BMP-4/BMP-7 Heterodimer, BMP-5, BMP-6, BMP-7, BMP-8, BMP-8a, BMP-8b, BMP-9, BMP-10, BMP-15/GDF-9B, Decapentaplegic/DPP, Artemin, GDNF, Neurturin, Persephin, Lefty-A, Lefty-B, MIS/AMH, Nodal, and SCUBE3.~~

~~4. The cancer vaccine of any one of claims 1-3, wherein the at least one TGFβ superfamily protein is selected from the group consisting of TGFβ1, TGFβ2, and TGFβ3.~~

~~5. The cancer vaccine of any one of claims 1-4, wherein the cancer cells are contacted with the TGFβ superfamily protein *in vitro*, *in vivo*, and/or *ex vivo*.~~

~~6~~ 3. The cancer vaccine of claim ~~5~~ 2, wherein

a) the cancer cells are contacted with the TGFβ superfamily protein *in vitro* or *ex vivo*;

b) the cancer cells are to be administered to a subject, wherein the TGFβ superfamily protein is to be administered to the subject to thereby contact the cancer cells *in vivo*, optionally wherein the TGFβ superfamily protein is to be administered before, after, or concurrently with administration of the cancer cells;

c) the copy number, amount, and/or activity of at least one biomarker listed in Table 1 is increased by contacting the cancer cells with a nucleic acid molecule encoding at least one biomarker listed in Table 1 or fragment thereof, a polypeptide of at least one biomarker listed in Table 1 or fragment thereof, or a small molecule that binds to at least one biomarker listed in Table 1;

d) the copy number, amount, and/or activity of at least one biomarker listed in Table 2 is decreased by contacting the cancer cells with a small molecule inhibitor, CRISPR guide RNA (gRNA), RNA interfering agent, antisense oligonucleotide, peptide or peptidomimetic inhibitor, aptamer, antibody, and/or intrabody;

e) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells at the primary site of immunization;

f) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells in a tissue that is distal to the site of immunization;

g) the cancer cells are non-replicative due to irradiation, optionally wherein the irradiation is at a sub-lethal dose;

h) the immunotherapy is cell-based;

i) the immunotherapy comprises a cancer vaccine and/or virus;

j) the immunotherapy inhibits an immune checkpoint, optionally wherein i) the immune checkpoint is selected from the group consisting of CTLA-4, PD-1, VISTA, B7-H2, B7-H3, PD-L1, B7-H4, B7-H6, ICOS, HVEM, PD-L2, CD160, gp49B, PIR-B, KIR family receptors, TIM-1, TIM-3, TIM-4, LAG-3, GITR, 4-IBB, OX-40, BTLA, SIRPalpha (CD47), CD48, 2B4 (CD244), B7.1, B7.2, ILT-2, ILT-4, TIGIT, HHLA2, butyrophilins, and A2aR, or ii) the immune checkpoint is PD1, PD-L1, or CD47;

k) the cancer therapy is selected from the group consisting of radiation, a radiosensitizer, and a chemotherapy;

l) the mammal is a mouse or a human; and/or

m) the mammal is a human.

~~7. The cancer vaccine of claim 5, wherein the cancer cells are administered to a subject, wherein the TGFβ superfamily protein is administered to the subject to thereby contact the cancer cells *in vivo*.~~

~~8. The cancer vaccine of claim 7, wherein the TGFβ superfamily protein is administered before, after, or concurrently with administration of the cancer cells.~~

~~9. The cancer vaccine of any one of claims 1-8, wherein the TGFβ-Smad/p63 signaling pathway is activated by increasing the copy number, amount, and/or activity of at least one biomarker listed in Table 1, and/or descreasing the copy number, amount, and/or activity of at least one biomarker listed in Table 2 in the cancer cells.~~

~~10. The cancer vaccine of claim 9, wherein the copy number, amount, and/or activity of at least one biomarker listed in Table 1 is increased by contacting the cancer cells with a nucleic acid molecule encoding at least one biomarker listed in Table 1 or fragment thereof, a polypeptide of at least one biomarker listed in Table 1 or fragment thereof, or a small molecule that binds to at least one biomarker listed in Table 1.~~

~~11. The cancer vaccine of claim 9, wherein the copy number, amount, and/or activity of at least one biomarker listed in Table 2 is decreased by contacting the cancer cells with a small molecule inhibitor, CRISPR-guide RNA (gRNA), RNA interfering agent, antisense oligonucleotide, peptide or peptidomimetic inhibitor, aptamer, antibody, and/or intrabody.~~

~~12. The cancer vaccine of any one of claims 1-11, wherein the TGFβ-Smad/p63 signaling pathway is activated by increasing nuclear localization of Smad2, and/or association of p63 and Smad2 in the nucleus of the cancer cells.~~

~~13. The cancer vaccine of any one of claims 1-12, wherein the cancer cells are derived from a solid or hematological cancer.~~

~~14. The cancer vaccine of any one of claims 1-13, wherein the cancer cells are derived from a cancer cell line.~~

~~15. The cancer vaccine of any one of claims 1-13, wherein the cancer cells are derived from primary cancer cells.~~

~~16. The cancer vaccine of any one of claims 1-15, wherein the cancer cells are breast cancer cells.~~

~~17. The cancer vaccine of any one of claims 1-16, wherein the cancer cells are derived from a triple-negative breast cancer (TNBC).~~

~~18. The cancer vaccine of any one of claims 1-17, wherein activation of TGFβ-Smad/p63 signaling pathway induces epithelial-to-mesenchymal (EMT) transition in the cancer cells.~~

~~19. The cancer vaccine of any one of claims 1-18, wherein activation of TGFβ-Smad/p63 signaling pathway upregulates the expression levels of ICOSL, PYCARD, SFN, PERP, RIPK3, CASP9, and/or SESN1 in the cancer cells.~~

~~20. The cancer vaccine of any one of claims 1-19, wherein activation of TGFβ-Smad/p63 signaling pathway downregulates the expression levels of KSR1, KSR1, EIF4EBP1, ITGA5, EMILIN1, CD200, and/or CSF1 in the cancer cells.~~

~~21. The cancer vaccine of any one of claims 1-20, wherein the cancer cells are capable of activating co-cultured dendritic cells (DCs) in *in vitro*.~~

~~22. The cancer vaccine of any one of claims 1-21, wherein the cancer cells are capable of upregulating CD40, CD80, CD86, CD103, CD8, HLA-DR, MHC-II, and/or IL1-β in the co-cultured dendritic cells *in vitro*.~~

~~23. The cancer vaccine of any one of claims 1-22, wherein the cancer cells are capable of activating co-cultured T cells in the presence of DCs *in vitro*.~~

~~24. The cancer vaccine of any one of claims 1-23, wherein the cancer cells are capable of increasing secretion of TNFα and/or IFNγ by the co-cultured T cells in the presence of DCs *in vitro*.~~

~~25. The cancer vaccine of any one of claims 1-24, wherein the cancer cells do not form a tumor in an immune-competent subject.~~

~~26. The cancer vaccine of any one of claims 1-25, wherein the cancer vaccine triggers cytotoxic T cell-mediated antitumor immunity.~~

~~27. The cancer vaccine of any one of claims 1-26, wherein the cancer vaccine increases CD4+ T cells and CD8+ T cells in blood and/or tumor microenvironment.~~

~~28. The cancer vaccine of any one of claims 1-27, wherein the cancer vaccine increases TNFα- and INFγ secreting CD4+ and CD8+ T cells in blood and/or tumor microenvironment.~~

~~29. The cancer vaccine of any one of claims 1-28, wherein the cancer vaccine upregulates expression of Icos, Klrc1, Il2rb, Pik3cd, H2-D1, Ccl8, Ifng, Icosl, Il2ra, Cxcr3, Ccr7, Cxcl10, Cd74, H2-Ab1, Hspa1b, Cd45, Lifr, and/or Tnf in tumor tissues.~~

~~30. The cancer vaccine of any one of claims 1-29, wherein the cancer vaccine increases the amount of tumor-infiltrating dendritic cells.~~

~~31. The cancer vaccine of any one of claims 1-30, wherein the cancer vaccine upregulates CD80, CD103, and/or MHC-II in tumor-associated DCs.~~

~~32. The cancer vaccine of any one of claims 1-31, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells.~~

~~33. The cancer vaccine of claim 32, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells at the primary site of immunization.~~

~~34. The cancer vaccine of claim 32, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells in a tissue that is distal to the site of immunization.~~

~~35. The cancer vaccine of any one of claims 1-34, wherein the cancer vaccine induces a tumor-specific memory T cell response.~~

~~36. The cancer vaccine of any one of claims 1-35, wherein the cancer vaccine increases the percentages of CD4+ central memory (T_{CM}) T cells and/or CD4+ effector memory (T_{EM}) T cells in a spleen and/or lymph nodes.~~

~~37. The cancer vaccine of any one of claims 1-36, wherein cancer vaccine increases the percentage of splenic CD8+ T_{CM} cells.~~

~~38. The cancer vaccine of any one of claims 1-37, wherein cancer vaccine increases the percentage of CD8+ T_{EM} cells in a spleen and/or lymph nodes.~~

~~39. The cancer vaccine of any one of claims 1-38, wherein the cancer vaccine increases the amount of tumor infiltrating CD4+ T cells and/or CD8+ T cells.~~

~~40. The cancer vaccine of any one of claims 1-39, wherein the cancer vaccine increases the amount of tumor infiltrating CD4+ T_{CM} cells and/or CD4+ T_{EM} cells.~~

41. The cancer vaccine of any one of claims 1-40, wherein the cancer vaccine increases the amount of tumor infiltrating CD8+ T_{CM}-cells and/or CD8+ T_{EM}-cells.

42. The cancer vaccine of any one of claims 1-41, wherein the cancer cells are non-replicative.

43. The cancer vaccine of claim 42, wherein the cancer cells are non-replicative due to irradiation.

44. The cancer vaccine of claim 43, wherein the irradiation is at a sub-lethal dose.

45. The cancer vaccine of any one of claims 1-44, wherein the cancer vaccine is administered to a subject in combination with an immunotherapy and/or cancer therapy, optionally wherein the immunotherapy and/or cancer therapy is administered before, after, or concurrently with the cancer vaccine.

46. The cancer vaccine of claim 45, wherein the immunotherapy is cell-based.

47. The cancer vaccine of claim 46, wherein the immunotherapy comprises a cancer vaccine and/or virus.

48. The cancer vaccine of claim 47, wherein the immunotherapy inhibits an immune checkpoint.

49. The cancer vaccine of claim 48, wherein the immune checkpoint is selected from the group consisting of CTLA-4, PD-1, VISTA, B7-H2, B7-H3, PD-L1, B7-H4, B7-H6, ICOS, HVEM, PD-L2, CD160, gp49B, PIR-B, KIR family receptors, TIM-1, TIM-3, TIM-4, LAG-3, GITR, 4-IBB, OX-40, BTLA, SIRPalpha (CD47), CD48, 2B4 (CD244), B7.1, B7.2, ILT-2, ILT-4, TIGIT, HHLA2, butyrophilins, and A2aR.

50. The cancer vaccine of claim 49, wherein the immune checkpoint is PD1, PD-L1, or CD47.

~~51. The cancer vaccine of claim 50, wherein the cancer therapy is selected from the group consisting of radiation, a radiosensitizer, and a chemotherapy.~~

~~52~~ 4. A ~~method of preventing occurrence of a cancer, delaying onset of a cancer, preventing reoccurrence of a cancer, and/or treating a cancer in a subject comprising administering to the subject a therapeutically effective amount of~~ composition comprising a cancer vaccine comprising cancer cells for use in preventing occurrence of a cancer, delaying onset of a cancer, preventing reoccurrence of a cancer, and/or treating a cancer in a subject, wherein the cancer cells are:

(1) PTEN-deficient;

(2) p53-deficient; and

(3) modified to activate the TGFβ-Smad/p63 signaling pathway, optionally wherein the subject is afflicted with a cancer.

~~53~~ 5. The ~~method~~ composition of claim~~s 52~~ 4, wherein

a) the TGFβ-Smad/p63 signaling pathway is activated by contacting the cancer cells with at least one TGFβ superfamily protein;

b) the at least one TGFβ superfamily protein is selected from the group consisting of LAP, TGFβ1, TGFβ2, TGFβ3, TGFβ5, Activin A, Activin AB, Activin AC, Activin B, Activin C, C17ORF99, INHBA, INHBB, Inhibin, Inhibin A, Inhibin B, BMP-1/PCP, BMP-2, BMP-2/BMP-6 Heterodimer, BMP-2/BMP-7 Heterodimer, BMP-2a, BMP-3, BMP-3b/GDF-10, BMP-4, BMP-4/BMP-7 Heterodimer, BMP-5, BMP-6, BMP-7, BMP-8, BMP-8a, BMP-8b, BMP-9, BMP-10, BMP-15/GDF-9B, Decapentaplegic/DPP, Artemin, GDNF, Neurturin, Persephin, Lefty A, Lefty B, MIS/AMH, Nodal, and SCUBE3;

c) the at least one TGFβ superfamily protein is selected from the group consisting of TGFβ1, TGFβ2, and TGFβ3;

d) the cancer cells are contacted with the TGFβ superfamily protein *in vitro*, *in vivo*, and/or *ex vivo*;

e) the TGFβ-Smad/p63 signaling pathway is activated by increasing the copy number, amount, and/or activity of at least one biomarker listed in Table 1, and/or decreasing the copy number, amount, and/or activity of at least one biomarker listed in Table 2 in the cancer cells;

f) the TGFβ-Smad/p63 signaling pathway is activated by increasing nuclear localization of Smad2, and/or association of p63 and Smad2 in the nucleus of the cancer cells;

g) the cancer cells are derived from a solid or hematological cancer;

h) the cancer cells are derived from a cancer cell line;

i) the cancer cells are derived from primary cancer cells;

j) the cancer cells are breast cancer cells;

k) the cancer cells are derived from a triple-negative breast cancer (TNBC);

l) the cancer cells are derived from a cancer that is the same type as the cancer treated with the cancer vaccine;

m) the cancer cells are derived from a cancer that is a different type from the cancer treated with the cancer vaccine;

n) the cancer treated with the cancer vaccine is characterized by loss of PTEN, p53, and/or p110, optionally wherein the cancer further expresses Myc;

o) the cancer treated with the cancer vaccine has functional PTEN and/or p53, optionally wherein the cancer has a Kras activating mutation G12D;

p) the cancer vaccine is syngeneic or xenogeneic to the subject;

q) the cancer vaccine is autologous, matched allogeneic, mismatched allogeneic, or congenic to the subject;

r) the cancer treated with the cancer vaccine is selected from the group consisting of breast tumor, ovarian tumor, or brain tumor;

s) activation of TGFβ-Smad/p63 signaling pathway induces epithelial-to-mesenchymal (EMT) transition in the cancer cells;

t) activation of TGFβ-Smad/p63 signaling pathway upregulates the expression levels of ICOSL, PYCARD, SFN, PERP, RIPK3, CASP9, and/or SESN1 in the cancer cells;

u) activation of TGFβ-Smad/p63 signaling pathway downregulates the expression levels of KSR1, KSR1, EIF4EBP1, ITGA5, EMILIN1, CD200, and/or CSF1 in the cancer cells;

v) the cancer cells are capable of activating co-cultured dendritic cells (DCs) in *in vitro*;

w) the cancer cells are capable of upregulating CD40, CD80, CD86, CD103, CD8, HLA-DR, MHC-II, and/or IL1-β in co-cultured dendritic cells *in vitro*;

x) the cancer cells are capable of activating co-cultured T cells in the presence of DCs *in vitro*;

y) the cancer cells are capable of increasing secretion of TNFα and/or IFNγ by co-cultured T cells in the presence of DCs *in vitro*;

z) the cancer cells do not form a tumor in an immune-competent subject;

aa) the cancer vaccine triggers cytotoxic T cell-mediated antitumor immunity;

bb) the cancer vaccine increases CD4+ T cells and CD8+ T cells in blood and/or tumor microenvironment;

cc) the cancer vaccine increases TNFα- and INFγ-secreting CD4+ and CD8+ T cells in blood and/or tumor microenvironment;

dd) the cancer vaccine upregulates expression of Icos, Klrc1, Il2rb, Pik3cd, H2-D1, Ccl8, Ifng, Icosl, Il2ra, Cxcr3, Ccr7, Cxcl10, Cd74, H2-Ab1, Hspa1b, Cd45, Lifr, and/or Tnf in tumor tissues;

ee) the cancer vaccine increases the amount of tumor-infiltrating dendritic cells;

ff) the cancer vaccine upregulates CD80, CD103, and/or MHC-II in tumor-associated DCs;

gg) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells;

hh) the cancer vaccine induces a tumor-specific memory T cell response;

ii) the cancer vaccine increases the percentages of CD4+ central memory (T_{CM}) T cells and/or CD4+ effector memory (T_{EM}) T cells in a spleen and/or lymph nodes;

jj) the cancer vaccine increases the percentage of splenic CD8+ T_{CM} cells;

kk) the cancer vaccine increases the percentage of CD8+ T_{EM} cells in a spleen and/or lymph nodes;

ll) the cancer vaccine increases the amount of tumor infiltrating CD4+ T cells and/or CD8+ T cells;

mm) the cancer vaccine increases the amount of tumor infiltrating CD4+ T_{CM} cells and/or CD4+ T_{EM} cells;

nn) the cancer vaccine increases the amount of tumor infiltrating CD8+ T_{CM} cells and/or CD8+ T_{EM} cells;

oo) the cancer cells are non-replicative;

pp) the method further comprising administering to the subject an immunotherapy and/or cancer therapy, optionally wherein the immunotherapy and/or cancer therapy is to be administered before, after, or concurrently with the cancer vaccine;

qq) the cancer vaccine is to be administered in a pharmaceutically acceptable formulation; and/or

rr) the step of administering occurs *in vivo*, *ex vivo*, or *in vitro*;

ss) the cancer vaccine prevent recurrent and metastatic tumor lesions;

tt) the cancer vaccine is to be administered to the subject intratumorally or subcutaneously;

uu) the subject is an animal model of the cancer, optionally wherein the animal model is a mouse model; and/or

vv) the subject is a mammal, optionally wherein the mammal is in remission for a cancer.

~~54. The method of claim 52 or 53, wherein the at least one TGFβ superfamily protein is selected from the group consisting of LAP, TGFβ1, TGFβ2, TGFβ3, TGFβ5, Activin A, Activin AB, Activin AC, Activin B, Activin C, C17ORF99, INHBA, INHBB, Inhibin, Inhibin A, Inhibin B, BMP-1/PCP, BMP-2, BMP-2/BMP-6 Heterodimer, BMP-2/BMP-7 Heterodimer, BMP-2a, BMP-3, BMP-3b/GDF-10, BMP-4, BMP-4/BMP-7 Heterodimer, BMP-5, BMP-6, BMP-7, BMP-8, BMP-8a, BMP-8b, BMP-9, BMP-10, BMP-15/GDF-9B, Decapentaplegic/DPP, Artemin, GDNF, Neurturin, Persephin, Lefty-A, Lefty-B, MIS/AMH, Nodal, and SCUBE3.~~

~~55. The method of any one of claims 52-54, wherein the at least one TGFβ superfamily protein is selected from the group consisting of TGFβ1, TGFβ2, and TGFβ3.~~

~~56. The method of any one of claims 52-55, wherein the cancer cells are contacted with the TGFβ superfamily protein *in vitro*, *in vivo*, and/or *ex vivo*.~~

~~57~~ 6. The ~~method~~ composition of claim ~~56~~ 5, wherein

a) the cancer cells are contacted with the TGFβ superfamily protein *in vitro* or *ex vivo*;

b) the cancer cells are to be administered to a subject, wherein the TGFβ superfamily protein is to be administered to the subject to thereby contact the cancer cells *in vivo*, optionally wherein the TGFβ superfamily protein is to be administered before, after, or concurrently with administration of the cancer cells;

c) the copy number, amount, and/or activity of at least one biomarker listed in Table 1 is increased by contacting the cancer cells with a nucleic acid molecule encoding at least one biomarker listed in Table 1 or fragment thereof, a polypeptide of at least one biomarker listed in Table 1 or fragment thereof, or a small molecule that binds to at least one biomarker listed in Table 1;

d) the copy number, amount, and/or activity of at least one biomarker listed in Table 2 is decreased by contacting the cancer cells with a small molecule inhibitor, CRISPR guide RNA (gRNA), RNA interfering agent, antisense oligonucleotide, peptide or peptidomimetic inhibitor, aptamer, antibody, and/or intrabody;

e) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells at the primary site of immunization;

f) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells in a tissue that is distal to the site of immunization;

g) the cancer cells are non-replicative due to irradiation, optionally wherein the irradiation is at a sub-lethal dose;

h) the immunotherapy is cell-based;

i) the immunotherapy comprises a cancer vaccine and/or virus;

j) the immunotherapy inhibits an immune checkpoint, optionally wherein i) the immune checkpoint is selected from the group consisting of CTLA-4, PD-1, VISTA, B7-H2, B7-H3, PD-L1, B7-H4, B7-H6, ICOS, HVEM, PD-L2, CD160, gp49B, PIR-B, KIR family receptors, TIM-1, TIM-3, TIM-4, LAG-3, GITR, 4-IBB, OX-40, BTLA, SIRPalpha (CD47), CD48, 2B4 (CD244), B7.1, B7.2, ILT-2, ILT-4, TIGIT, HHLA2, butyrophilins, and A2aR, or ii) the immune checkpoint is PD1, PD-L1, or CD47;

k) the cancer therapy is selected from the group consisting of radiation, a radiosensitizer, and a chemotherapy;

l) the mammal is a mouse or a human; and/or

m) the mammal is a human.

~~58. The method of claim 56, wherein the cancer cells are administered to a subject, wherein the TGFβ superfamily protein is administered to the subject to thereby contact the cancer cells *in vivo*.~~

~~59. The method of claim 58, wherein the TGFβ superfamily protein is administered before, after, or concurrently with administration of the cancer cells.~~

~~60. The method of any one of claims 52-59, wherein the TGFβ-Smad/p63 signaling pathway is activated by increasing the copy number, amount, and/or activity of at least one biomarker listed in Table 1, and/or descreasing the copy number, amount, and/or activity of at least one biomarker listed in Table 2 in the cancer cells.~~

~~61. The method of claim 60, wherein the copy number, amount, and/or activity of at least one biomarker listed in Table 1 is increased by contacting the cancer cells with a nucleic acid molecule encoding at least one biomarker listed in Table 1 or fragment thereof, a polypeptide of at least one biomarker listed in Table 1 or fragment thereof, or a small molecule that binds to at least one biomarker listed in Table 1.~~

~~62. The method of claim 60, wherein the copy number, amount, and/or activity of at least one biomarker listed in Table 2 is decreased by contacting the cancer cells with a small molecule inhibitor, CRISPR-guide RNA (gRNA), RNA interfering agent, antisense oligonucleotide, peptide or peptidomimetic inhibitor, aptamer, antibody, and/or intrabody.~~

~~63. The method of any one of claims 52-62, wherein the TGFβ-Smad/p63 signaling pathway is activated by increasing nuclear localization of Smad2, and/or association of p63 and Smad2 in the nucleus of the cancer cells.~~

~~64. The method of any one of claims 52-63, wherein the cancer cells are derived from a solid or hematological cancer.~~

~~65. The method of any one of claims 52-64, wherein the cancer cells are derived from a cancer cell line.~~

66. The method of any one of claims 52-64, wherein the cancer cells are derived from primary cancer cells.

67. The method of any one of claims 52-66, wherein the cancer cells are breast cancer cells.

68. The method of any one of claims 52-67, wherein the cancer cells are derived from a triple-negative breast cancer (TNBC).

69. The method of any one of claims 52-68, wherein the cancer cells are derived from a cancer that is the same type as the cancer treated with the cancer vaccine.

70. The method of any one of claims 52-68, wherein the cancer cells are derived from a cancer that is a different type from the cancer treated with the cancer vaccine.

71. The method of any one of claims 52-70, wherein the cancer treated with the cancer vaccine is characterized by loss of PTEN, p53, and/or p110, optionally wherein the cancer further expresses Myc.

72. The method of any one of claims 52-70, wherein the cancer treated with the cancer vaccine has functional PTEN and/or p53, optionally wherein the cancer has a Kras activating mutation G12D.

73. The method of any one of claims 52-72, wherein the cancer vaccine is syngeneic or xenogeneic to the subject.

74. The method of any one of claims 52-73, wherein the cancer vaccine is autologous, matched allogeneic, mismatched allogeneic, or congenic to the subject.

75. The method of any one of claims 52-68, wherein the cancer treated with the cancer vaccine is selected from the group consisting of breast tumor, ovarian tumor, or brain tumor.

~~76. The method of any one of claims 52-75, wherein activation of TGFβ-Smad/p63 signaling pathway induces epithelial-to-mesenchymal (EMT) transition in the cancer cells.~~

~~77. The method of any one of claims 52-76, wherein activation of TGFβ-Smad/p63 signaling pathway upregulates the expression levels of ICOSL, PYCARD, SFN, PERP, RIPK3, CASP9, and/or SESN1 in the cancer cells.~~

~~78. The method of any one of claims 52-77, wherein activation of TGFβ-Smad/p63 signaling pathway downregulates the expression levels of KSR1, KSR1, EIF4EBP1, ITGA5, EMILIN1, CD200, and/or CSF1 in the cancer cells.~~

~~79. The method of any one of claims 52-78, wherein the cancer cells are capable of activating co-cultured dendritic cells (DCs) in *in vitro*.~~

~~80. The method of any one of claims 52-79, wherein the cancer cells are capable of upregulating CD40, CD80, CD86, CD103, CD8, HLA-DR, MHC-II, and/or IL1-β in co-cultured dendritic cells *in vitro*.~~

~~81. The method of any one of claims 52-80, wherein the cancer cells are capable of activating co-cultured T cells in the presence of DCs *in vitro*.~~

~~82. The method of any one of claims 52-81, wherein the cancer cells are capable of increasing secretion of TNFα and/or IFNγ by co-cultured T cells in the presence of DCs *in vitro*.~~

~~83. The method of any one of claims 52-82, wherein the cancer cells do not form a tumor in an immune-competent subject.~~

~~84. The method of any one of claims 52-83, wherein the cancer vaccine triggers cytotoxic T cell-mediated antitumor immunity.~~

85. The method of any one of claims 52-84, wherein the cancer vaccine increases CD4+ T cells and CD8+ T cells in blood and/or tumor microenvironment.

86. The method of any one of claims 52-85, wherein the cancer vaccine increases TNFα and INFγ secreting CD4+ and CD8+ T cells in blood and/or tumor microenvironment.

87. The method of any one of claims 52-86, wherein the cancer vaccine upregulates expression of Icos, Klrc1, Il2rb, Pik3cd, H2-D1, Ccl8, Ifng, Icosl, Il2ra, Cxcr3, Ccr7, Cxcl10, Cd74, H2-Ab1, Hspa1b, Cd45, Lifr, and/or Tnf in tumor tissues.

88. The method of any one of claims 52-87, wherein the cancer vaccine increases the amount of tumor-infiltrating dendritic cells.

89. The method of any one of claims 52-88, wherein the cancer vaccine upregulates CD80, CD103, and/or MHC-II in tumor-associated DCs.

90. The method of any one of claims 52-89, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells.

91. The method of claim 90, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells at the primary site of immunization.

92. The method of claim 90, wherein the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells in a tissue that is distal to the site of immunization.

93. The method of any one of claims 52-92, wherein the cancer vaccine induces a tumor-specific memory T cell response.

94. The method of any one of claims 52-93, wherein the cancer vaccine increases the percentages of CD4+ central memory (T_{CM}) T cells and/or CD4+ effector memory (T_{EM}) T cells in a spleen and/or lymph nodes.

95. The method of any one of claims 52-94, wherein cancer vaccine increases the percentage of splenic CD8+ T_{CM} cells.

96. The method of any one of claims 52-95, wherein cancer vaccine increases the percentage of CD8+ T_{EM} cells in a spleen and/or lymph nodes.

97. The method of any one of claims 52-96, wherein the cancer vaccine increases the amount of tumor infiltrating CD4+ T cells and/or CD8+ T cells.

98. The method of any one of claims 52-97, wherein the cancer vaccine increases the amount of tumor infiltrating CD4+ T_{CM} cells and/or CD4+ T_{EM} cells.

99. The method of any one of claims 52-98, wherein the cancer vaccine increases the amount of tumor infiltrating CD8+ T_{CM} cells and/or CD8+ T_{EM} cells.

100. The method of any one of claims 52-99, wherein the cancer cells are non-replicative.

101. The method of claim 100, wherein the cancer cells are non-replicative due to irradiation.

102. The method of claim 101, wherein the irradiation is at a sub-lethal dose.

103. The method of any one of claims 52-102, wherein the method further comprising administering to the subject an immunotherapy and/or cancer therapy, optionally wherein the immunotherapy and/or cancer therapy is administered before, after, or concurrently with the cancer vaccine.

104. The method of claim 103, wherein the immunotherapy is cell-based.

~~105. The method of claim 103, wherein the immunotherapy comprises a cancer vaccine and/or virus.~~

~~106. The method of claim 103, wherein the immunotherapy inhibits an immune checkpoint.~~

~~107. The method of claim 106, wherein the immune checkpoint is selected from the group consisting of CTLA-4, PD-1, VISTA, B7-H2, B7-H3, PD-L1, B7-H4, B7-H6, ICOS, HVEM, PD-L2, CD160, gp49B, PIR-B, KIR family receptors, TIM-1, TIM-3, TIM-4, LAG-3, GITR, 4-IBB, OX-40, BTLA, SIRPalpha (CD47), CD48, 2B4 (CD244), B7.1, B7.2, ILT-2, ILT-4, TIGIT, HHLA2, butyrophilins, and A2aR.~~

~~108. The method of claim 107, wherein the immune checkpoint is PD1, PD-L1, or CD47.~~

~~109. The method of claim 108, wherein the cancer therapy is selected from the group consisting of radiation, a radiosensitizer, and a chemotherapy.~~

~~110~~ 7. A method of assessing the efficacy of the cancer vaccine of claim 1 for treating a subject afflicted with a cancer, comprising:

a) detecting in a subject sample at a first point in time the number of proliferating cells in the cancer and/or the volume or size of a tumor comprising the cancer cells;

b) repeating step a) during at least one subsequent point in time after administration of the cancer vaccine; and

c) comparing the number of proliferating cells in the cancer and/or the volume or size of a tumor comprising the cancer cells detected in steps a) and b), wherein the absence of, or a significant decrease in number of proliferating cells in the cancer and/or the volume or size of a tumor comprising the cancer cells in the subsequent sample as compared to the number and/or the volume or size in the sample at the first point in time, indicates that the cancer vaccine treats cancer in the subject.

~~111~~ 8. The method of claim ~~110~~ 7, wherein

a) between the first point in time and the subsequent point in time, the subject has undergone treatment, completed treatment, and/or is in remission for the cancer;

b) the first and/or at least one subsequent sample is selected from the group consisting of *ex vivo* and *in vivo* samples;

c) the first and/or at least one subsequent sample is a portion of a single sample or pooled samples obtained from the subject;

d) the sample comprises cells, serum, peripheral lymphoid organs, and/or intratumoral tissue obtained from the subject;

e) the method further comprises determining responsiveness to the agent by measuring at least one criteria selected from the group consisting of clinical benefit rate, survival until mortality, pathological complete response, semi-quantitative measures of pathologic response, clinical complete remission, clinical partial remission, clinical stable disease, recurrence-free survival, metastasis free survival, disease free survival, circulating tumor cell decrease, circulating marker response, and RECIST criteria;

f) the cancer vaccine is to be administered in a pharmaceutically acceptable formulation;

g) the step of administering occurs *in vivo*, *ex vivo*, or *in vitro*;

h) the cancer vaccine prevent recurrent and metastatic tumor lesions;

i) the cancer vaccine is to be administered to the subject intratumorally or subcutaneously;

j) the subject is an animal model of the cancer, optionally wherein the animal model is a mouse model; and/or

k) the subject is a mammal, optionally wherein the mammal is in remission for a cancer.

~~112. The method of claim 110 or 111, wherein the first and/or at least one subsequent sample is selected from the group consisting of *ex vivo* and *in vivo* samples.~~

~~113. The method of any one of claims 110-112, wherein the first and/or at least one subsequent sample is a portion of a single sample or pooled samples obtained from the subject.~~

~~114. The method of any one of claims 110-113, wherein the sample comprises cells, serum, peripheral lymphoid organs, and/or intratumoral tissue obtained from the subject.~~

~~115. The method of any one of claims 110-114, further comprising determining responsiveness to the agent by measuring at least one criteria selected from the group consisting of clinical benefit rate, survival until mortality, pathological complete response, semi-quantitative measures of pathologic response, clinical complete remission, clinical partial remission, clinical stable disease, recurrence-free survival, metastasis free survival, disease free survival, circulating tumor cell decrease, circulating marker response, and RECIST criteria.~~

~~116. The method of any one of claims 52-115, wherein the cancer vaccine is administered in a pharmaceutically acceptable formulation.~~

~~117. The method of any one of claims 52-116, wherein the step of administering occurs *in vivo*, *ex vivo*, or *in vitro*.~~

~~118. The cancer vaccine or method of any one of claims 1-117, wherein the cancer vaccine prevent recurrent and metastatic tumor lesions.~~

~~119. The cancer vaccine or method of any one of claims 1-118, wherein the cancer vaccine is administered to the subject intratumorally or subcutaneously.~~

~~120. The cancer vaccine or method of any one of claims 1-119, wherein the subject is an animal model of the cancer, optionally wherein the animal model is a mouse model.~~

~~121. The cancer vaccine or method of any one of claims 1-119, wherein the subject is a mammal, optionally wherein the mammal is in remission for a cancer.~~

~~122~~ 9. The ~~cancer vaccine or~~ method of claim ~~121~~ 8, wherein the mammal is i) a mouse or a human, or ii) is a human.

~~123. The cancer vaccine or method of claim 122, wherein the mammal is a human.~~

10. Use of a cancer vaccine comprising cancer cells in the manufacture of a medicament for preventing occurrence of a cancer, delaying onset of a cancer, preventing reoccurrence of a cancer, and/or treating a cancer in a subject, wherein the cancer cells are:

(1) PTEN-deficient;

(2) p53-deficient; and

(3) modified to activate the TGFβ-Smad/p63 signaling pathway, optionally wherein the subject is afflicted with a cancer.

11. The use of claim 10, wherein

a) the TGFβ-Smad/p63 signaling pathway is activated by contacting the cancer cells with at least one TGFβ superfamily protein;

b) the at least one TGFβ superfamily protein is selected from the group consisting of LAP, TGFβ1, TGFβ2, TGFβ3, TGFβ5, Activin A, Activin AB, Activin AC, Activin B, Activin C, C17ORF99, INHBA, INHBB, Inhibin, Inhibin A, Inhibin B, BMP-1/PCP, BMP-2, BMP-2/BMP-6 Heterodimer, BMP-2/BMP-7 Heterodimer, BMP-2a, BMP-3, BMP-3b/GDF-10, BMP-4, BMP-4/BMP-7 Heterodimer, BMP-5, BMP-6, BMP-7, BMP-8, BMP-8a, BMP-8b, BMP-9, BMP-10, BMP-15/GDF-9B, Decapentaplegic/DPP, Artemin, GDNF, Neurturin, Persephin, Lefty A, Lefty B, MIS/AMH, Nodal, and SCUBE3;

c) the at least one TGFβ superfamily protein is selected from the group consisting of TGFβ1, TGFβ2, and TGFβ3;

d) the cancer cells are contacted with the TGFβ superfamily protein *in vitro*, *in vivo*, and/or *ex vivo*;

e) the TGFβ-Smad/p63 signaling pathway is activated by increasing the copy number, amount, and/or activity of at least one biomarker listed in Table 1, and/or decreasing the copy number, amount, and/or activity of at least one biomarker listed in Table 2 in the cancer cells;

f) the TGFβ-Smad/p63 signaling pathway is activated by increasing nuclear localization of Smad2, and/or association of p63 and Smad2 in the nucleus of the cancer cells;

g) the cancer cells are derived from a solid or hematological cancer;

h) the cancer cells are derived from a cancer cell line;

i) the cancer cells are derived from primary cancer cells;

j) the cancer cells are breast cancer cells;

k) the cancer cells are derived from a triple-negative breast cancer (TNBC);

l) the cancer cells are derived from a cancer that is the same type as the cancer treated with the cancer vaccine;

m) the cancer cells are derived from a cancer that is a different type from the cancer treated with the cancer vaccine;

n) the cancer treated with the cancer vaccine is characterized by loss of PTEN, p53, and/or p110, optionally wherein the cancer further expresses Myc;

o) the cancer treated with the cancer vaccine has functional PTEN and/or p53, optionally wherein the cancer has a Kras activating mutation G12D;

p) the cancer vaccine is syngeneic or xenogeneic to the subject;

q) the cancer vaccine is autologous, matched allogeneic, mismatched allogeneic, or congenic to the subject;

r) the cancer treated with the cancer vaccine is selected from the group consisting of breast tumor, ovarian tumor, or brain tumor;

s) activation of TGFβ-Smad/p63 signaling pathway induces epithelial-to-mesenchymal (EMT) transition in the cancer cells;

t) activation of TGFβ-Smad/p63 signaling pathway upregulates the expression levels of ICOSL, PYCARD, SFN, PERP, RIPK3, CASP9, and/or SESN1 in the cancer cells;

u) activation of TGFβ-Smad/p63 signaling pathway downregulates the expression levels of KSR1, KSR1, EIF4EBP1, ITGA5, EMILIN1, CD200, and/or CSF1 in the cancer cells;

v) the cancer cells are capable of activating co-cultured dendritic cells (DCs) in *in vitro*;

w) the cancer cells are capable of upregulating CD40, CD80, CD86, CD103, CD8, HLA-DR, MHC-II, and/or IL1-β in co-cultured dendritic cells *in vitro*;

x) the cancer cells are capable of activating co-cultured T cells in the presence of DCs *in vitro*;

y) the cancer cells are capable of increasing secretion of TNFα and/or IFNγ by co-cultured T cells in the presence of DCs *in vitro*;

z) the cancer cells do not form a tumor in an immune-competent subject;

aa) the cancer vaccine triggers cytotoxic T cell-mediated antitumor immunity;

bb) the cancer vaccine increases CD4+ T cells and CD8+ T cells in blood and/or tumor microenvironment;

cc) the cancer vaccine increases TNFα- and INFγ-secreting CD4+ and CD8+ T cells in blood and/or tumor microenvironment;

dd) the cancer vaccine upregulates expression of Icos, Klrc1, Il2rb, Pik3cd, H2-D1, Ccl8, Ifng, Icosl, Il2ra, Cxcr3, Ccr7, Cxcl10, Cd74, H2-Ab1, Hspa1b, Cd45, Lifr, and/or Tnf in tumor tissues;

ee) the cancer vaccine increases the amount of tumor-infiltrating dendritic cells;

ff) the cancer vaccine upregulates CD80, CD103, and/or MHC-II in tumor-associated DCs;

gg) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells;

hh) the cancer vaccine induces a tumor-specific memory T cell response;

ii) the cancer vaccine increases the percentages of CD4+ central memory (T_{CM}) T cells and/or CD4+ effector memory (T_{EM}) T cells in a spleen and/or lymph nodes;

jj) the cancer vaccine increases the percentage of splenic CD8+ T_{CM} cells;

kk) the cancer vaccine increases the percentage of CD8+ T_{EM} cells in a spleen and/or lymph nodes;

ll) the cancer vaccine increases the amount of tumor infiltrating CD4+ T cells and/or CD8+ T cells;

mm) the cancer vaccine increases the amount of tumor infiltrating CD4+ T_{CM} cells and/or CD4+ T_{EM} cells;

nn) the cancer vaccine increases the amount of tumor infiltrating CD8+ T_{CM} cells and/or CD8+ T_{EM} cells;

oo) the cancer cells are non-replicative;

pp) the method further comprising administering to the subject an immunotherapy and/or cancer therapy, optionally wherein the immunotherapy and/or cancer therapy is to be administered before, after, or concurrently with the cancer vaccine;

qq) the cancer vaccine is to be administered in a pharmaceutically acceptable formulation; and/or

rr) the step of administering occurs *in vivo*, *ex vivo*, or *in vitro*;

ss) the cancer vaccine prevent recurrent and metastatic tumor lesions;

tt) the cancer vaccine is to be administered to the subject intratumorally or subcutaneously;

uu) the subject is an animal model of the cancer, optionally wherein the animal model is a mouse model; and/or

vv) the subject is a mammal, optionally wherein the mammal is in remission for a cancer.

12. The use of claim 11, wherein

a) the cancer cells are contacted with the TGFβ superfamily protein *in vitro* or *ex vivo*;

b) the cancer cells are to be administered to a subject, wherein the TGFβ superfamily protein is to be administered to the subject to thereby contact the cancer cells *in vivo*, optionally wherein the TGFβ superfamily protein is to be administered before, after, or concurrently with administration of the cancer cells;

c) the copy number, amount, and/or activity of at least one biomarker listed in Table 1 is increased by contacting the cancer cells with a nucleic acid molecule encoding at least one biomarker listed in Table 1 or fragment thereof, a polypeptide of at least one biomarker listed in Table 1 or fragment thereof, or a small molecule that binds to at least one biomarker listed in Table 1;

d) the copy number, amount, and/or activity of at least one biomarker listed in Table 2 is decreased by contacting the cancer cells with a small molecule inhibitor, CRISPR guide RNA (gRNA), RNA interfering agent, antisense oligonucleotide, peptide or peptidomimetic inhibitor, aptamer, antibody, and/or intrabody;

e) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells at the primary site of immunization;

f) the cancer vaccine reduces the number of proliferating cells in a cancer and/or reduces the volume or size of a tumor comprising cancer cells in a tissue that is distal to the site of immunization;

g) the cancer cells are non-replicative due to irradiation, optionally wherein the irradiation is at a sub-lethal dose;

h) the immunotherapy is cell-based;

i) the immunotherapy comprises a cancer vaccine and/or virus;

j) the immunotherapy inhibits an immune checkpoint, optionally wherein i) the immune checkpoint is selected from the group consisting of CTLA-4, PD-1, VISTA, B7-H2, B7-H3, PD-L1,

B7-H4, B7-H6, ICOS, HVEM, PD-L2, CD160, gp49B, PIR-B, KIR family receptors, TIM-1, TIM-3, TIM-4, LAG-3, GITR, 4-IBB, OX-40, BTLA, SIRPalpha (CD47), CD48, 2B4 (CD244), B7.1, B7.2, ILT-2, ILT-4, TIGIT, HHLA2, butyrophilins, and A2aR, or ii) the immune checkpoint is PD1, PD-L1, or CD47;

k) the cancer therapy is selected from the group consisting of radiation, a radiosensitizer, and a chemotherapy;

l) the mammal is a mouse or a human; and/or

m) the mammal is a human.