CLAIMS

I claim:

1. Use of a therapeutically effective amount of a Zn(II) agent comprising Zn(II)/γ-polyglutamic acid and/or Zn(II)/α-polyglutamic acid, and an immune-oncology agent in the preparation of a medicament for combination therapy for the treatment of a tumor in a patient, wherein the immune-oncology agent is an immune checkpoint inhibitor.

2. The use according to claim 1, wherein said immune checkpoint inhibitor is an anti-cytotoxic T-lymphocyte antigen-4 (CTLA-4) antibody or an antigen-binding portion thereof that binds specifically to CTLA-4 and inhibits CTLA-4 activity; or a programmed cell death-1 (PD-1) antibody or an antigen-binding portion thereof that binds specifically to a PD-1 receptor and inhibits PD-1 activity.

3. The use according to claim 2, wherein said tumor includes tumor cells that have genetic instability mutations and/or genetic instability due to gene overexpression.

4. The use according to claim 3, wherein said genetic instability mutations are dysfunctional mutations in one or more genes selected from ATM; ATR; PAXIP1; BRCA1; BRCA2; WRN; RFC1; RPA1; ERCC1; ERCC4; ERCC6; MGMT; PARP1; PARP2; NEIL3; XRCC1; MLH1; PMS2; TP53; CREBBP; JAK1; NFKB1; MSH2; MSH3; MSH6; and MLH3.

5. Use of a therapeutically effective amount of a Zn(II) agent comprising Zn(II)/γ-polyglutamic acid and/or Zn(II)/α-polyglutamic acid in the preparation of a medicament for increasing the tumor infiltrating leukocyte population of CD4+T cells and CD8+T cells in a tumor in a patient.

6. Use of a therapeutically effective amount of a Zn(II) agent comprising Zn(II)/γ-polyglutamic acid and/or Zn(II)/α-polyglutamic acid, and an immune-oncology agent in the preparation of a medicament for combination therapy for increasing the tumor infiltrating leukocyte population of CD4+T cells and CD8+T cells in a tumor in a patient.

7. The use according to claim 6, wherein said immune-oncology agent is an immune checkpoint inhibitor.

8. The use according to claim 7, wherein said immune checkpoint inhibitor is an anti-cytotoxic T-lymphocyte antigen-4 (CTLA-4) antibody or an antigen-binding portion thereof

that binds specifically to CTLA-4 and inhibits CTLA-4 activity; or a programmed cell death-1 (PD-1) antibody or an antigen-binding portion thereof that binds specifically to a PD-1 receptor and inhibits PD-1 activity.

9. Use of a therapeutically effective amount of (i) a Zn(II)/polyglutamic acid agent and (ii) an immune-oncology agent that targets a T-lymphocyte marker, a macrophage marker, or a natural killer cell marker in the preparation of a medicament for combination therapy for the treatment of a tumor in a patient.

10. The use of claim 9, wherein the T-lymphocyte marker comprises at least one of the following: lymphocyte activation gene 3 (LAG-3); T-cell immunoglobulin- and mucin-domain-containing molecule 3 (TIM-3); T-cell immunoglobulin and ITIM domain (TIGIT); B7-H3 (CD276); V-domain containing Ig suppressor of T-cell activation (VISTA); inducible T-cell costimulator (ICOS); CD27; and glucocorticoid-induced TNF receptor (GITR).

11. The use of claim 9, wherein the macrophage marker comprises at least one of the following: CD47 and indoleamine-2,3-dioxygenase (IDO).

12. The use of claim 9, wherein the natural killer cell marker comprises at least one of the following: killer immunoglobulin-like receptor (KIR) and CD94/NKG2A.

13. The use of any one of claims 9 to 12, wherein said Zn(II)/polyglutamic acid agent comprises polyglutamic acid conjugated to a tumor-targeting moiety and/or a charge-carrying moiety.

14. The use of claim 13, wherein said polyglutamic acid conjugated to a tumor-targeting moiety and/or a charge-carrying moiety is γ-polyglutamic acid.

15. The use of claim 13, wherein said polyglutamic acid conjugated to a tumor-targeting moiety and/or a charge-carrying moiety is α-polyglutamic acid.

16. The use of claim 13, wherein the molecular weight of said polyglutamic acid is in the range of about 2.5 kDa to about 60 kDa.

17. The use according to claim 3, wherein said genetic instability due to overexpression is caused by overexpression of APOBEC3B.