Claims

1. A method for determining the efficacy of GPC3-targeting drug therapy for cancer in a patient or determining the continuation of GPC3-targeting drug therapy for a patient, comprising measuring the number of an immunocyte or an expression level of a molecule expressed on the immunocyte in a biological sample isolated from the patient before the start of GPC3-targeting drug therapy and/or the patient treated with the GPC3-targeting drug therapy, wherein when the number of an immunocyte or the expression level of a molecule expressed on the immunocyte is a predetermined value, the efficacy of the GPC3-targeting drug therapy is determined or the continuation of the GPC3-targeting drug therapy is determined.

2. The method according to claim 1, wherein the biological sample is peripheral blood isolated from the patient.

3. The method according to claim 1 or 2, wherein the immunocyte is at least one cell selected from a leukocyte, a monocyte, a neutrophil, and a lymphocyte; optionally wherein the lymphocyte is at least one lymphocyte cell selected from a CD45+ lymphocyte, a CD3+ T cell, a CD4+ T cell, and a CD8+ T cell; or

wherein the lymphocyte is at least one lymphocyte cell selected from a CD16+ NK cell, an NKp46+ NK cell, and a CD56-/CD16+ NK cell.

4. The method according to claim 1 or 2, wherein the molecule expressed on the immunocyte is CD16 or CD107a.

5. The method according to any of claims 1 to 4, wherein the patient has a polymorphism at least one allele having Val at amino acid residue 158 of FcγRIIIA and/or at least one allele having His at amino acid residue 131 of FcγRIIA; optionally
wherein the cancer is liver cancer; optionally
wherein the GPC3-targeting drug is administered to achieve a blood trough level of 200 μg/ml or higher in the cancer patient.

6. The method according to any of claims 1 to 9, wherein the GPC3-targeting drug comprises an anti-GPC3 antibody as an active ingredient; optionally
wherein the anti-GPC3 antibody has antibody-dependent cellular cytotoxicity (ADCC) activity and/or complement-dependent cytotoxicity (CDC) activity.

7. The method according to claim 6, wherein the anti-GPC3 antibody is an anti-GPC3 chimeric antibody or a

humanized anti-GPC3 antibody comprising any of the following (1) to (5):

(1) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 4, 5, and 6, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 7, 8, and 9, respectively;

(2) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 12, 13, and 14, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 15, 16, and 17, respectively;

(3) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 20, 21, and 22, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 23, 24, and 25, respectively;

(4) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 28, 29, and 30, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 31, 32, and 33, respectively; and

(5) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 36, 37, and 38, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 39, 40, and 41, respectively.

8. The method according to claim 6, wherein the anti-GPC3 antibody comprises any of the following (1) to (6):
(1) a heavy chain variable region selected from the group of heavy chain variable regions represented by SEQ ID NOs: 44, 45, 46, 47, 48, 49, and 50 and a light chain variable region represented by SEQ ID NO: 51;
(2) a heavy chain variable region selected from the group of heavy chain variable regions represented by SEQ ID NOs: 44, 45, 46, 47, 48, 49, and 50 and a light chain variable region selected from the group of light chain variable regions represented by SEQ ID NOs: 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, and 66;
(3) a heavy chain variable region represented by SEQ ID NO: 67 and a light chain variable region represented by SEQ ID NO: 68;
(4) a heavy chain variable region represented by SEQ ID NO: 69 and a light chain variable region represented by SEQ ID NO: 70;
(5) a heavy chain variable region represented by SEQ ID NO: 71 and a light chain variable region represented by SEQ ID NO: 72; and
(6) a heavy chain variable region represented by SEQ ID NO: 71 and a light chain variable region represented by SEQ ID NO: 73.

9. The method according to claim 6, wherein the GPC3-targeting drug comprises an anti-GPC3 antibody conjugated with a cytotoxic substance.

10. Use of a GPC3-targeting drug in the manufacture of a medicament for treating cancer, wherein the GPC3-targeting drug is to be administered to a cancer patient in which the number of an immunocyte or an expression level of a molecule expressed on the immunocyte is a predetermined value.

11. The use according to claim 10, wherein the number of an immunocyte or the expression level of a molecule expressed on the immunocyte is the number of an immunocyte or an expression level of a molecule expressed on the immunocyte in a biological sample isolated from the cancer patient.

12. The use of claim 11, wherein the biological sample is isolated from the cancer patient before or after start of administration of the GPC3-targeting drug.

13. The drug according to claim 11 or 12, wherein the biological sample is peripheral blood isolated from the cancer patient.

14. The use according to any of claims 10 to 13, wherein the immunocyte is at least one cell selected from a leukocyte, a monocyte, a neutrophil, and a lymphocyte; optionally wherein the lymphocyte is at least one lymphocyte cell selected from a CD45+ lymphocyte, a CD3+ T cell, a CD4+ T cell, and a CD8+ T cell; or
wherein the lymphocyte is at least one lymphocyte cell selected from a CD16+ NK cell, an NKp46+ NK cell, and a CD56-/CD16+ NK cell.

15. The use according to any of claims 10 to 13, wherein the molecule expressed on the immunocyte is CD16 or CD107a; optionally wherein the patient has at least one amino acid polymorphism that results in Val at residue 158 of FcγRIIIA and/or at least one amino acid polymorphism that results in His at residue 131 of FcγRIIA; optionally wherein the cancer patient is a liver cancer patient; optionally, wherein the GPC3-targeting drug is to be administered to achieve a blood trough level of 200 μg/ml or higher in the cancer patient.

16. The use according to any of claims 10 to 15, wherein the GPC3-targeting drug comprises an anti-GPC3 antibody as an active ingredient.

17. The use according to claim 16, wherein the anti-GPC3 antibody has antibody-dependent cellular cytotoxicity

(ADCC) activity and/or complement-dependent cytotoxicity (CDC) activity.

18. The use according to claim 16 or 17, wherein the anti-GPC3 antibody is an anti-GPC3 chimeric antibody or a humanized anti-GPC3 antibody comprising any of the following (1) to (5):

(1) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 4, 5, and 6, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 7, 8, and 9, respectively;

(2) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 12, 13, and 14, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 15, 16, and 17, respectively;

(3) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 20, 21, and 22, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 23, 24, and 25, respectively;

(4) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 28, 29, and 30, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 31, 32, and 33, respectively; and

(5) heavy chain CDR1, heavy chain CDR2, and heavy chain CDR3 represented by SEQ ID NOs: 36, 37, and 38, respectively, and light chain CDR1, light chain CDR2, and light chain CDR3 represented by SEQ ID NOs: 39, 40, and 41, respectively.

19. The use according to any of claims 16 to 18, wherein the anti-GPC3 antibody comprises any of the following (1) to (6):

(1) a heavy chain variable region selected from the group of heavy chain variable regions represented by SEQ ID NOs: 44, 45, 46, 47, 48, 49, and 50 and a light chain variable region represented by SEQ ID NO: 51;

(2) a heavy chain variable region selected from the group of heavy chain variable regions represented by SEQ ID NOs: 44, 45, 46, 47, 48, 49, and 50 and a light chain variable region selected from the group of light chain variable regions represented by SEQ ID NOs: 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, and 66;

(3) a heavy chain variable region represented by SEQ ID NO: 67 and a light chain variable region represented by SEQ ID NO: 68;

(4) a heavy chain variable region represented by SEQ ID NO: 69 and a light chain variable region represented by SEQ ID NO: 70;

(5) a heavy chain variable region represented by SEQ ID NO: 71 and a light chain variable region represented by SEQ ID NO: 72; and
(6) a heavy chain variable region represented by SEQ ID NO: 71 and a light chain variable region represented by SEQ ID NO: 73.

20. The use according to claim 16, wherein the GPC3-targeting drug comprises an anti-GPC3 antibody conjugated with a cytotoxic substance.