Claims:

1. A method of treating a subject having a CD38-positive hematological malignancy, comprising administering to a patient in need thereof an anti-CD38 antibody in combination with cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP), wherein the anti-CD38 antibody induces *in vitro* killing of CD38-expressing cells by antibody-dependent cell-mediated cytotoxicity (ADCC), antibody-dependent cellular phagocytosis (ADCP), complement dependent cytotoxicity (CDC), apoptosis, or *in vitro* modulation of CD38 enzymatic activity.
2. The method of claim 1, wherein the anti-CD38 antibody induces killing of the CD38-expressing cells by ADCC or CDC *in vitro*.
3. The method of claim 2, wherein the anti-CD38 antibody is of IgG1, IgG2, IgG3 or IgG4 isotype.
4. The method of claim 3, wherein the anti-CD38 antibody has a biantennary glycan structure with fucose content of about 50%, 45%, 40%, 35%, 30%, 25%, 20%, 15%, 14%, 13%, 12%, 11% 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, 1% or 0%.
5. The method of claim 3, wherein the anti-CD38 antibody comprises a substitution in the antibody Fc at amino acid position 256, 290, 298, 312, 356, 330, 333, 334, 360, 378 or 430, wherein residue numbering is according to the EU index.
6. The method of claim 1, wherein the anti-CD38 antibody competes for binding to CD38 with an antibody comprising a heavy chain variable region (VH) of SEQ ID NO: 4 and a light chain variable region (VL) of SEQ ID NO: 5.
7. The method of claim 6, wherein the antibody binds to the region SKRNIQFSCKNIYR (SEQ ID NO: 2) and the region EKVQTLEAWVIHGG (SEQ ID NO: 3) of human CD38 (SEQ ID NO: 1).
8. The method of claim 7, wherein the anti-CD38 antibody comprises the heavy chain complementarity determining regions (HCDR) 1 (HCDR1), 2 (HCDR2) and 3 (HCDR3) sequences of SEQ ID NOs: 6, 7 and 8, respectively.
9. The method of claim 8, wherein the anti-CD38 antibody comprises the light chain complementarity determining regions (LCDR) 1 (LCDR1), 2 (LCDR2) and 3 (LCDR3) sequences of SEQ ID NOs: 9, 10 and 11, respectively.
10. The method of claim 9, wherein the anti-CD38 antibody comprises the heavy chain variable region (VH) of SEQ ID NO: 4 and the light chain variable region (VL) of SEQ ID NO: 5.
11. The method of claim 1, wherein the anti-CD38 antibody comprises a heavy chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical

to that of SEQ ID NO: 12 and a light chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical to that of SEQ ID NO: 13.

12. The method of claim 1, wherein the anti-CD38 antibody comprises the heavy chain of SEQ ID NO: 12 and the light chain of SEQ ID NO: 13.

13. The method of claim 1, wherein the CD38-positive hematological malignancy is multiple myeloma, acute lymphoblastic leukemia (ALL), non-Hodgkin's lymphoma (NHL), diffuse large B-cell lymphoma (DLBCL), Burkitt's lymphoma (BL), follicular lymphoma (FL) or mantle-cell lymphoma (MCL).

14. The method of claim 13, wherein the CD38-positive hematological malignancy is DLBCL.

15. The method of claim 13, wherein the subject is resistant to or has acquired resistance to treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody.

16. The method of claim 13, wherein the subject has discontinued treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody due to side effects.

17. The method of claim 15 or 16, wherein the anti-CD20 antibody is rituximab (RITUXAN®), ofatumumab (ARZERRA®), veltuzumab, ocrelizumab, obinutuzumab (GA-101), PRO131921 or ocratuzumab (AME-133v).

18. The method of claim 17, wherein the anti-CD20 antibody is rituximab.

19. The method of claim 15 or 16, wherein the at least one chemotherapeutic agent is cyclophosphamide, doxorubicin, vincristine, prednisone, ifosfamide, carboplatin or etoposide.

20. The method of claim 19, wherein the at least one chemotherapeutic agent is a combination of cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP).

21. The method of claim 19, wherein the at least one chemotherapeutic agent is a combination of ifosfamide, carboplatin and etoposide (ICE).

22. The method of claim 1, wherein the anti-CD38 antibody, cyclophosphamide, doxorubicin, vincristine and prednisone are administered simultaneously, sequentially or separately.

23. The method of claim 1, wherein the patient is further treated with radiotherapy.

Claims:

1. An anti-CD38 antibody in combination with cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP) for use in the treatment of a CD38 positive hematological malignancy, wherein the anti-CD38 antibody induces *in vitro* killing of CD38-expressing cells by antibody-dependent cell-mediated cytotoxicity (ADCC), antibody-dependent cellular phagocytosis (ADCP), complement dependent cytotoxicity (CDC), apoptosis, or *in vitro* modulation of CD38 enzymatic activity.
2. The combination of claim 1, wherein the anti-CD38 antibody induces killing of the CD38-expressing cells by ADCC or CDC *in vitro*.
3. The combination of claim 2, wherein the anti-CD38 antibody is of IgG1, IgG2, IgG3 or IgG4 isotype.
4. The combination of claim 3, wherein the anti-CD38 antibody has a biantennary glycan structure with fucose content of about 50%, 45%, 40%, 35%, 30%, 25%, 20%, 15%, 14%, 13%, 12%, 11% 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, 1% or 0%.
5. The combination of claim 3, wherein the anti-CD38 antibody comprises a substitution in the antibody Fc at amino acid position 256, 290, 298, 312, 356, 330, 333, 334, 360, 378 or 430, wherein residue numbering is according to the EU index.
6. The combination of claim 1, wherein the anti-CD38 antibody competes for binding to CD38 with an antibody comprising a heavy chain variable region (VH) of SEQ ID NO: 4 and a light chain variable region (VL) of SEQ ID NO: 5.
7. The combination of claim 6, wherein the antibody binds to the region SKRNIQFSCKNIYR (SEQ ID NO: 2) and the region EKVQTLEAWVIHGG (SEQ ID NO: 3) of human CD38 (SEQ ID NO: 1).
8. The combination of claim 7, wherein the anti-CD38 antibody comprises the heavy chain complementarity determining regions (HCDR) 1 (HCDR1), 2 (HCDR2) and 3 (HCDR3) sequences of SEQ ID NOs: 6, 7 and 8, respectively.
9. The combination of claim 8, wherein the anti-CD38 antibody comprises the light chain complementarity determining regions (LCDR) 1 (LCDR1), 2 (LCDR2) and 3 (LCDR3) sequences of SEQ ID NOs: 9, 10 and 11, respectively.
10. The combination of claim 9, wherein the anti-CD38 antibody comprises the heavy chain variable region (VH) of SEQ ID NO: 4 and the light chain variable region (VL) of SEQ ID NO: 5.
11. Thecombination of claim 1, wherein the anti-CD38 antibody comprises a heavy chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical to that of SEQ ID NO: 12 and a light chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical to that of SEQ ID NO: 13.

12. The combination of claim 1, wherein the anti-CD38 antibody comprises the heavy chain of SEQ ID NO: 12 and the light chain of SEQ ID NO: 13.

13. The combination of claim 1, wherein the CD38-positive hematological malignancy is multiple myeloma, acute lymphoblastic leukemia (ALL), non-Hodgkin's lymphoma (NHL), diffuse large B-cell lymphoma (DLBCL), Burkitt's lymphoma (BL), follicular lymphoma (FL) or mantle-cell lymphoma (MCL).

14. The combination of claim 13, wherein the CD38-positive hematological malignancy is DLBCL.

15. The combination of claim 13, wherein a subject that is to be treated is resistant to or has acquired resistance to treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody.

16. The combination of claim 13, wherein a subject that is to be treated has discontinued treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody due to side effects.

17. The combination of claim 15 or 16, wherein the anti-CD20 antibody is rituximab (RITUXAN®), ofatumumab (ARZERRA®), veltuzumab, ocrelizumab, obinutuzumab (GA-101), PRO13192 or ocratuzumab (AME-133v).

18. The combination of claim 17, wherein the anti-CD20 antibody is rituximab.

19. The combination of claim 15 or 16, wherein the at least one chemotherapeutic agent is cyclophosphamide, doxorubicin, vincristine, prednisone, ifosfamide, carboplatin or etoposide.

20. The combination of claim 19, wherein the at least one chemotherapeutic agent is a combination of cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP).

21. The combination of claim 19, wherein the at least one chemotherapeutic agent is a combination of ifosfamide, carboplatin and etoposide (ICE).

22. The combination of claim 1, wherein the anti-CD38 antibody, cyclophosphamide, doxorubicin, vincristine and prednisone are to be administered simultaneously, sequentially or separately.

23. The combination of claim 1, wherein the patient that is to be treated is further treated with radiotherapy.

24. The use of an anti-CD38 antibody in combination with cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP) in the manufacture of a medicament for the treatment of CD38 positive hematological malignancy, wherein the anti-CD38 antibody induces *in vitro* killing of CD38-expressing cells by antibody-dependent cell-mediated cytotoxicity (ADCC), antibody-dependent cellular phagocytosis (ADCP), complement dependent cytotoxicity (CDC), apoptosis, or *in vitro* modulation of CD38 enzymatic activity.

25. The use of claim 24, wherein the anti-CD38 antibody induces killing of the CD38-expressing cells by ADCC or CDC *in vitro*.

26. The use of claim 25, wherein the anti-CD38 antibody is of IgG1, IgG2, IgG3 or IgG4 isotype.

27. The use of claim 26, wherein the anti-CD38 antibody has a biantennary glycan structure with fucose content of about 50%, 45%, 40%, 35%, 30%, 25%, 20%, 15%, 14%, 13%, 12%, 11% 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, 1% or 0%.

28. The use of claim 26, wherein the anti-CD38 antibody comprises a substitution in the antibody Fc at amino acid position 256, 290, 298, 312, 356, 330, 333, 334, 360, 378 or 430, wherein residue numbering is according to the EU index.

29. The use of claim 24, wherein the anti-CD38 antibody competes for binding to CD38 with an antibody comprising a heavy chain variable region (VH) of SEQ ID NO: 4 and a light chain variable region (VL) of SEQ ID NO: 5.

30. The use of claim 29, wherein the antibody binds to the region SKRNIQFSCKNIYR (SEQ ID NO: 2) and the region EKVQTLEAWVIHGG (SEQ ID NO: 3) of human CD38 (SEQ ID NO: 1).

31. The use of claim 30, wherein the anti-CD38 antibody comprises the heavy chain complementarity determining regions (HCDR) 1 (HCDR1), 2 (HCDR2) and 3 (HCDR3) sequences of SEQ ID NOs: 6, 7 and 8, respectively.

32. The use of claim 31, wherein the anti-CD38 antibody comprises the light chain complementarity determining regions (LCDR) 1 (LCDR1), 2 (LCDR2) and 3 (LCDR3) sequences of SEQ ID NOs: 9, 10 and 11, respectively.

33. The use of claim 32, wherein the anti-CD38 antibody comprises the heavy chain variable region (VH) of SEQ ID NO: 4 and the light chain variable region (VL) of SEQ ID NO: 5.

34. The use of claim 24, wherein the anti-CD38 antibody comprises a heavy chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical to that of SEQ ID NO: 12 and a light chain comprising an amino acid sequence that is 95%, 96%, 97%, 98% or 99% identical to that of SEQ ID NO: 13.

35. The use of claim 24, wherein the anti-CD38 antibody comprises the heavy chain of SEQ ID NO: 12 and the light chain of SEQ ID NO: 13.

36. The use of claim 24, wherein the CD38-positive hematological malignancy is multiple myeloma, acute lymphoblastic leukemia (ALL), non-Hodgkin's lymphoma (NHL), diffuse large B-cell lymphoma (DLBCL), Burkitt’s lymphoma (BL), follicular lymphoma (FL) or mantle-cell lymphoma (MCL).

37. The use of claim 36, wherein the CD38-positive hematological malignancy is DLBCL.

38. The use of claim 36, wherein a subject that is to be treated is resistant to or has acquired resistance to treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody.

39. The use of claim 36, wherein a subject that is to be treated has discontinued treatment with at least one chemotherapeutic agent or a combination of at least one chemotherapeutic agent and an anti-CD20 antibody due to side effects.

40. The use of claim 38 or 39, wherein the anti-CD20 antibody is rituximab (RITUXAN®), ofatumumab (ARZERRA®), veltuzumab, ocrelizumab, obinutuzumab (GA-101), PRO13192 or ocratuzumab (AME-133v).

41. The use of claim 40, wherein the anti-CD20 antibody is rituximab.

42. The use of claim 38 or 39, wherein the at least one chemotherapeutic agent is cyclophosphamide, doxorubicin, vincristine, prednisone, ifosfamide, carboplatin or etoposide.

43. The use of claim 42, wherein the at least one chemotherapeutic agent is a combination of cyclophosphamide, doxorubicin, vincristine and prednisone (CHOP).

44. The use of claim 42, wherein the at least one chemotherapeutic agent is a combination of ifosfamide, carboplatin and etoposide (ICE).

45. The use of claim 24, wherein the anti-CD38 antibody, cyclophosphamide, doxorubicin, vincristine and prednisone are to be administered simultaneously, sequentially or separately.

46. The use of claim 24, wherein the patient that is to be treated is further treated with radiotherapy.