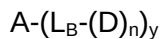


CLAIMS

1. A conjugate of Formula (I) or a pharmaceutically acceptable salt thereof;



Formula (I)

wherein:

A is an antibody fragment that specifically binds to human cKIT, wherein the antibody fragment is a Fab or Fab';

L_B is a linker;

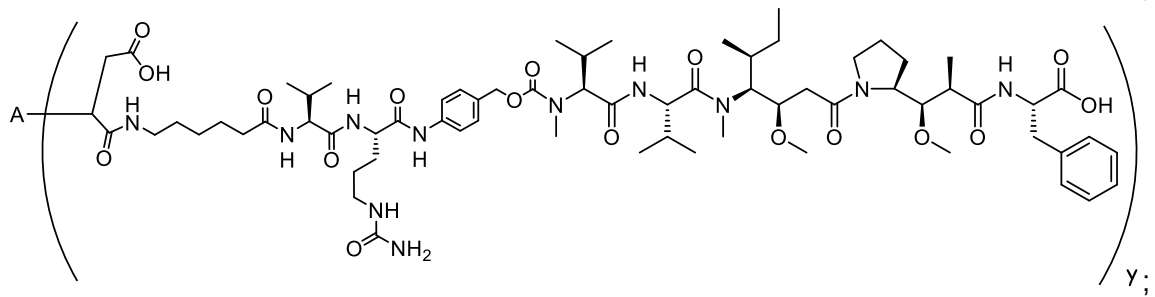
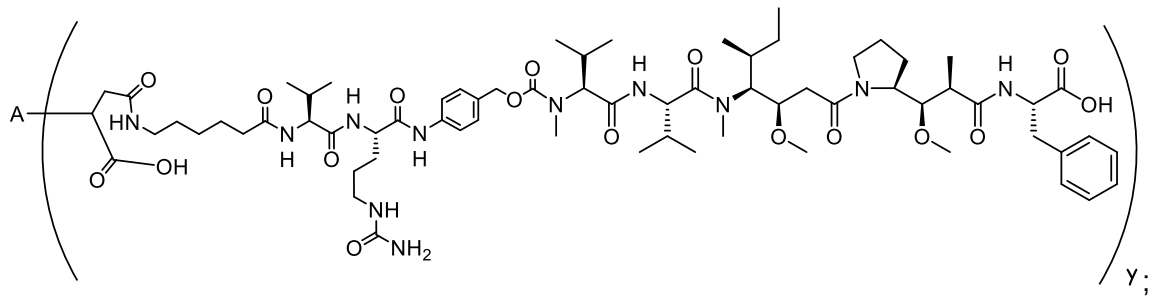
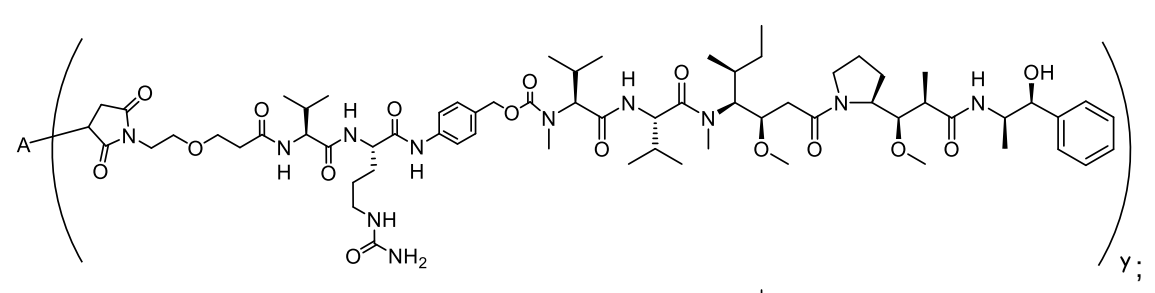
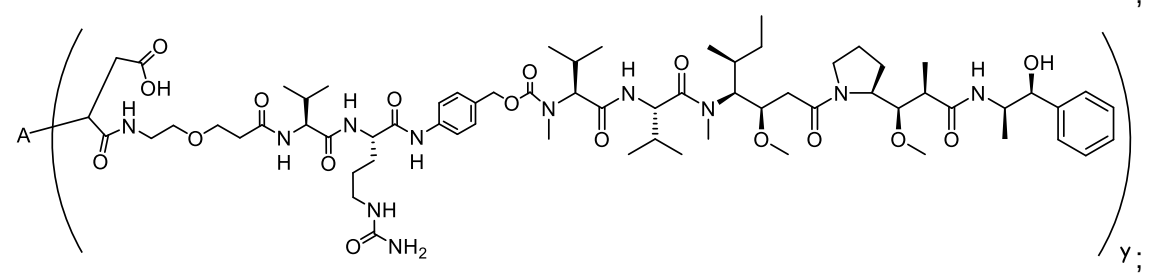
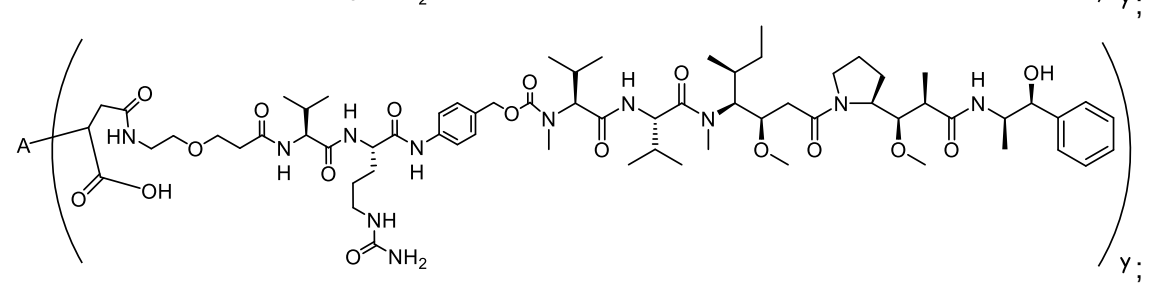
D is a cytotoxic agent;

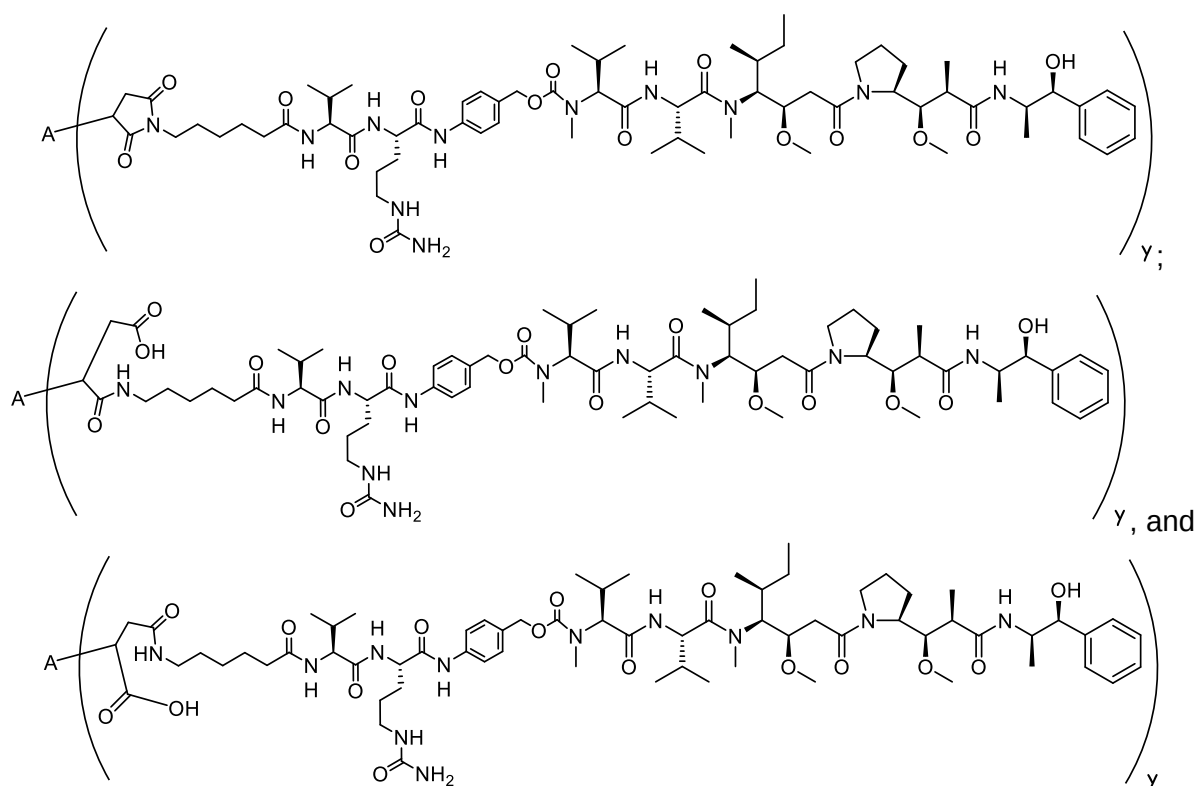
n is an integer from 1 to 10, and

y is an integer from 1 to 10.

2. The conjugate of claim 1, wherein y is 1, 2, 3 or 4.
3. The conjugate of claim 1 or 2, wherein each D is a cytotoxic agent independently selected from an auristatin, an amanitin, a maytansinoid or a saporin.
4. The conjugate of any one of claims 1 to 3, wherein each L_B is independently selected from a cleavable linker or a non-cleavable linker.
5. The conjugate of claim 1 or 2 selected from:







6. The conjugate of any one of claims 1 to 5, wherein the antibody fragment specifically binds to the extracellular domain of human cKIT (SEQ ID NO: 112).
7. The conjugate of any one of claims 1 to 5, wherein the antibody fragment specifically binds to an epitope in domains 1-3 of human cKIT (SEQ ID NO: 113).
8. The conjugate of any of claims 1 to 7, wherein the antibody fragment is selected from any of the following:
 - (1) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 (Heavy Chain Complementarity Determining Region 1) of SEQ ID NO: 1, (b) a HCDR2 (Heavy Chain Complementarity Determining Region 2) of SEQ ID NO: 2, and (c) a HCDR3 (Heavy Chain Complementarity Determining Region 3) of SEQ ID NO: 3; and (ii) a light chain variable region that comprises: (d) a LCDR1 (Light Chain Complementarity Determining Region 1) of SEQ ID NO: 16, (e) a LCDR2 (Light Chain Complementarity Determining Region 2) of SEQ ID NO: 17, and (f) a LCDR3 (Light Chain Complementarity Determining Region 3) of SEQ ID NO: 18;
 - (2) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 4, (b) a HCDR2 of SEQ ID NO: 5, (c) a HCDR3 of SEQ ID NO: 3; and (ii)

- a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 19, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 21;
- (3) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 6, (b) a HCDR2 of SEQ ID NO: 2, (c) a HCDR3 of SEQ ID NO: 3; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 16, (e) a LCDR2 of SEQ ID NO: 17, and (f) a LCDR3 of SEQ ID NO: 18;
 - (4) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 7, (b) a HCDR2 of SEQ ID NO: 8, (c) a HCDR3 of SEQ ID NO: 9; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 22, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 18;
 - (5) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 27, (b) a HCDR2 of SEQ ID NO: 28, (c) a HCDR3 of SEQ ID NO: 29; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 42, (e) a LCDR2 of SEQ ID NO: 17, and (f) a LCDR3 of SEQ ID NO: 43;
 - (6) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 30, (b) a HCDR2 of SEQ ID NO: 31, (c) a HCDR3 of SEQ ID NO: 29; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 44, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 45;
 - (7) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 32, (b) a HCDR2 of SEQ ID NO: 28, (c) a HCDR3 of SEQ ID NO: 29; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 42, (e) a LCDR2 of SEQ ID NO: 17, and (f) a LCDR3 of SEQ ID NO: 43;
 - (8) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 33, (b) a HCDR2 of SEQ ID NO: 34, (c) a HCDR3 of SEQ ID NO: 35; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 46, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 43;
 - (9) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 1, (b) a HCDR2 of SEQ ID NO: 51, (c) a HCDR3 of SEQ ID NO: 3; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 16, (e) a LCDR2 of SEQ ID NO: 17, and (f) a LCDR3 of SEQ ID NO: 18;
 - (10) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 4, (b) a HCDR2 of SEQ ID NO: 52, (c) a HCDR3 of SEQ ID NO: 3; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 19, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 21;
 - (11) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 6, (b) a HCDR2 of SEQ ID NO: 51, (c) a HCDR3 of SEQ ID NO: 3; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 16, (e) a LCDR2 of SEQ ID NO: 17, and (f) a LCDR3 of SEQ ID NO: 18;

- (12) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 7, (b) a HCDR2 of SEQ ID NO: 53, (c) a HCDR3 of SEQ ID NO: 9; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 22, (e) a LCDR2 of SEQ ID NO: 20, and (f) a LCDR3 of SEQ ID NO: 18;
- (13) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 60, (b) a HCDR2 of SEQ ID NO: 61, (c) a HCDR3 of SEQ ID NO: 62; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 75, (e) a LCDR2 of SEQ ID NO: 76, and (f) a LCDR3 of SEQ ID NO: 77;
- (14) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 63, (b) a HCDR2 of SEQ ID NO: 64, (c) a HCDR3 of SEQ ID NO: 62; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 78, (e) a LCDR2 of SEQ ID NO: 79, and (f) a LCDR3 of SEQ ID NO: 80;
- (15) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 65, (b) a HCDR2 of SEQ ID NO: 61, (c) a HCDR3 of SEQ ID NO: 62; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 75, (e) a LCDR2 of SEQ ID NO: 76, and (f) a LCDR3 of SEQ ID NO: 77;
- (16) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 66, (b) a HCDR2 of SEQ ID NO: 67, (c) a HCDR3 of SEQ ID NO: 68; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 81, (e) a LCDR2 of SEQ ID NO: 79, and (f) a LCDR3 of SEQ ID NO: 77;
- (17) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 86, (b) a HCDR2 of SEQ ID NO: 87, (c) a HCDR3 of SEQ ID NO: 88; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 101, (e) a LCDR2 of SEQ ID NO: 102, and (f) a LCDR3 of SEQ ID NO: 103;
- (18) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 89, (b) a HCDR2 of SEQ ID NO: 90, (c) a HCDR3 of SEQ ID NO: 88; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 104, (e) a LCDR2 of SEQ ID NO: 105, and (f) a LCDR3 of SEQ ID NO: 106;
- (19) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 91, (b) a HCDR2 of SEQ ID NO: 87, (c) a HCDR3 of SEQ ID NO: 88; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 101, (e) a LCDR2 of SEQ ID NO: 102, and (f) a LCDR3 of SEQ ID NO: 103;
- (20) a Fab or Fab' comprising (i) a heavy chain variable region that comprises (a) a HCDR1 of SEQ ID NO: 92, (b) a HCDR2 of SEQ ID NO: 93, (c) a HCDR3 of SEQ ID NO: 94; and (ii) a light chain variable region that comprises: (d) a LCDR1 of SEQ ID NO: 107, (e) a LCDR2 of SEQ ID NO: 105, and (f) a LCDR3 of SEQ ID NO: 103;
- (21) a Fab or Fab' comprising a heavy chain variable region (VH) that comprises SEQ ID NO: 10, and a light chain variable region (VL) that comprises SEQ ID NO: 23;

- (22) a Fab or Fab' comprising a VH that comprises SEQ ID NO: 36, and a VL that comprises SEQ ID NO: 47;
- (23) a Fab or Fab' comprising a VH that comprises SEQ ID NO: 54, and a VL that comprises SEQ ID NO: 23;
- (24) a Fab or Fab' comprising a VH that comprises SEQ ID NO: 69, and a VL that comprises SEQ ID NO: 82;
- (25) a Fab or Fab' comprising a VH that comprises SEQ ID NO: 95, and a VL that comprises SEQ ID NO: 108;
- (26) a Fab' comprising a heavy chain that that comprises SEQ ID NO: 14, and a light chain that comprises SEQ ID NO: 25;
- (27) a Fab' comprising a heavy chain that that comprises SEQ ID NO: 40, and a light chain that comprises SEQ ID NO: 49;
- (28) a Fab' comprising a heavy chain that that comprises SEQ ID NO: 58, and a light chain that comprises SEQ ID NO: 25;
- (29) a Fab' comprising a heavy chain that that comprises SEQ ID NO: 73, and a light chain that comprises SEQ ID NO: 84;
- (30) a Fab' comprising a heavy chain that that comprises SEQ ID NO: 99, and a light chain that comprises SEQ ID NO: 110;
- (31) a Fab comprising a heavy chain that comprises SEQ ID NO: 118, and a light chain that comprises SEQ ID NO: 122;
- (32) a Fab comprising a heavy chain that comprises SEQ ID NO: 118, and a light chain that comprises SEQ ID NO: 123;
- (33) a Fab comprising a heavy chain that comprises SEQ ID NO: 124, and a light chain that comprises SEQ ID NO: 128;
- (34) a Fab comprising a heavy chain that comprises SEQ ID NO: 124, and a light chain that comprises SEQ ID NO: 129;
- (35) a Fab comprising a heavy chain that comprises SEQ ID NO: 130, and a light chain that comprises SEQ ID NO: 134;
- (36) a Fab comprising a heavy chain that comprises SEQ ID NO: 130, and a light chain that comprises SEQ ID NO: 135;
- (37) a Fab comprising a heavy chain that comprises SEQ ID NO: 136, and a light chain that comprises SEQ ID NO: 140;

- (38) a Fab comprising a heavy chain that comprises SEQ ID NO: 141, and a light chain that comprises SEQ ID NO: 145;
 - (39) a Fab comprising a heavy chain that comprises an amino acid sequence selected from SEQ ID NO: 119, 120 or 121, and a light chain comprising the amino acid sequence of SEQ ID NO: 25;
 - (40) a Fab comprising a heavy chain that comprises an amino acid sequence selected from SEQ ID NO: 125, 126, or 127, and a light chain comprising the amino acid sequence of SEQ ID NO: 49;
 - (41) a Fab comprising a heavy chain that comprises an amino acid sequence selected from SEQ ID NO: 131, 132, or 133, and a light chain comprising the amino acid sequence of SEQ ID NO: 25;
 - (42) a Fab comprising a heavy chain that comprises an amino acid sequence selected from SEQ ID NO: 137, 138, or 139, and a light chain comprising the amino acid sequence of SEQ ID NO: 84; or
 - (43) a Fab comprising a heavy chain that comprises an amino acid sequence selected from SEQ ID NO: 142, 143, or 144, and a light chain comprising the amino acid sequence of SEQ ID NO: 110.
- 9. The conjugate of any one of claims 1 to 8, wherein the antibody fragment is a Fab' and the linker (L_B) is attached to a native cysteine residue in the hinge region of the Fab'.
 - 10. The conjugate of any one of claims 1 to 9, wherein the half-life of the conjugate is less than about 24-48 hours.
 - 11. A pharmaceutical composition comprising the conjugate of any one of claims 1 to 10 and a pharmaceutically acceptable carrier.
 - 12. The conjugate of any of claims 1-10, or the pharmaceutical composition of claim 11 for use in the ablation of hematopoietic stem cells.
 - 13. Use of a conjugate of any one of claims 1-10, or the pharmaceutical composition of claim 11, in the manufacture of a medicament for ablating hematopoietic stem cells in a patient.
 - 14. Use of a conjugate of any one of claims 1-10, or the pharmaceutical composition of claim 11, in the manufacture of a medicament for conditioning a hematopoietic stem cell transplantation patient, wherein conditioning comprises administering to the patient an effective amount of the conjugate or pharmaceutical composition and allowing a sufficient

period of time for the conjugates to clear from the patient's circulation before performing hematopoietic stem cell transplantation to the patient.

15. The use of any one of claims 13-14, wherein the patient is a hematopoietic stem cell transplantation recipient.
16. The use of any one of claims 13-15, wherein the patient has an inherited immunodeficient disease, an autoimmune disorder, a hematopoietic disorder, or an inborn error of metabolism.
17. The use of claim 16, wherein the hematopoietic disorder is selected from: Acute myeloid leukemia (AML), Acute lymphoblastic leukemia (ALL), acute monocytic leukemia (AMoL), Chronic myeloid leukemia (CML), Chronic lymphocytic leukemia (CLL), Myeloproliferative disorders, Myelodysplastic syndromes, Multiple myeloma, Non-Hodgkin lymphoma, Hodgkin disease, Aplastic anemia, Pure red cell aplasia, Paroxysmal nocturnal hemoglobinuria, Fanconi anemi, Thalassemia major, Sickle cell anemia, Severe combined immunodeficiency, Wiskott-Aldrich syndrome, Hemophagocytic lymphohistiocytosis.
18. The use of claim 16, wherein the inborn error of metabolism is selected from mucopolysaccharidosis, Gaucher disease, metachromatic leukodystrophies, or adrenoleukodystrophies.
19. The use of any one of claims 13-15, wherein the patient has a non-malignant disease or condition selected from Severe aplastic anemia (SAA), Wiskott Aldrich Syndrome, Hurlers Syndrome, FHL, CGD, Kostmanns syndrome, Severe immunodeficiency syndrome (SCID), other autoimmune disorders such as SLE, Multiple sclerosis, IBD, Crolms Disease, Sjogrens syndrome, vasculitis, Lupus, Myasthenia Gravis, Wegeners disease, inborn errors of metabolism and/or other immunodeficiencies.
20. The use of any one of claims 13-15, wherein the patient has a malignant disease or condition selected from myelodysplastic syndromes (MDS), acute lymphoblastic leukemia (ALL), acute myelogenous leukemia (AML), acute monocytic leukemia (AMoL), chronic lymphocytic leukemia (CLL), chronic myelogenous leukemia (CML), hairy cell leukemia (HCL), T-cell prolymphocytic leukemia (T-PLL), large granular lymphocytic leukemia, adult T-cell leukemia, Precursor T-cell leukemia/lymphoma, Burkitt lymphoma, follicular lymphoma, diffuse large B cell lymphoma, mantle cell lymphoma, B-cell chronic lymphocytic

leukemia/lymphoma, MALT lymphoma, Mycosis fungoides, Peripheral T-cell lymphoma not otherwise specified, Nodular sclerosis form of Hodgkin lymphoma Mixed-cellularity subtype of Hodgkin lymphoma.