

## Claims

1. A method for preparing lymphocytes having improved efficacy and/or reduced adverse effects in treating cancer, the method comprising
  - incubating lymphocytes that have been acquired from a patient through apheresis, with a polynucleotide vector to transduce the lymphocytes to produce transduced lymphocytes;
  - culturing the transduced lymphocytes to obtain a sample of cultured lymphocytes that are to be infused to the patient,
  - wherein the time taken from acquiring the lymphocytes to infusing the sample is not longer than 28 days.
2. Use of a sample of cultured lymphocytes in the preparation of a medicament for preventing and/or reducing the likelihood of prolonged thrombocytopenia in a patient having r/r LBCL, wherein the preparation comprises
  - acquiring lymphocytes from the patient through apheresis;
  - incubating lymphocytes with a polynucleotide vector to transduce the lymphocytes to produce transduced lymphocytes;
  - culturing the transduced lymphocytes to obtain a sample of cultured lymphocytes;
  - wherein the sample is to be infused to the patient, and
  - wherein the time taken from acquiring the lymphocytes to infusing the sample is not longer than 28 days.
3. The method of claim 1 or use of claim 2, wherein the patient has
  - a greater than 55% likelihood of having complete response;
  - a greater than 45% likelihood of having overall survival at 24 months; and/or
  - a lower than 30% likelihood of developing prolonged thrombocytopenia.
4. The method of claim 1 or use of claim 2, wherein the time taken from acquiring the lymphocytes to infusing the sample is not longer than 27 days, 26 days, 25 days, 24 days, 23 days, 22 days, 21 days, 20 days, 19 days, 18 days, 17 days, 16 days, 15 days, 14 days, 13 days, 12 days, 11 days, 10 days, 9 days, 8 days, 7 days, or 6 days.
5. The method or use of any one of claims 1-4, wherein lymphodepleting chemotherapy is, or is to be, administered, and wherein the lymphodepleting chemotherapy is, or is to, administered within 5 days, 4 days, 3 days, 2 days, or 1 days of the infusing step.

6. The method or use of any one of claims 1-5, which does not include cryopreservation of the cultured lymphocytes.
7. The method or use of any one of claims 1-6, wherein the transduced lymphocytes are cultured for less than 72 hours, 48 hours or 36 hours.
8. The method or use of any one of claims 1-7, wherein the incubation is carried out in a closed system, and wherein the closed system has an inner surface area of at least 1500 cm<sup>2</sup>.
9. The method or use of claim 8, wherein the closed system has an inner surface coated with a recombinant human fibronectin, wherein the coating is carried out with a solution that comprises about 1- 10 µg/ml of the recombinant human fibronectin.
10. The method or use of claim 9, wherein the inner surface is further in contact with a second solution comprising the polynucleotide vector, wherein the second solution has a volume of about 200 mL.
11. The method or use of any one of claims 1-10, wherein the lymphocytes are peripheral blood mononuclear cells (PBMCs) or T cells.
12. The method or use of any one of claims 1-11, wherein a total of 10,000 to 1,000,000 cultured lymphocytes per kilogram of the patient are, or are to be, administered to the patient.
13. The method or use of claim 12, wherein a total of 20,000 to 400,000 cultured lymphocytes per kilogram of the patient are, or are to be, administered to the patient.
14. The method of claim 12 or 13, wherein at least 15% of the cultured lymphocytes are transduced with the vector.
15. The method or use of any one of claims 1-14, wherein the vector encodes one or more chimeric antigen receptors (CAR) or one or more T cell receptors (TCR).
16. A method for predicting a likelihood of a complete response in a patient to an immunotherapy, comprising:

determining a period of time from a leukapheresis step of said patient to an administration of said immunotherapy to said patient;  
grouping said patient into one of a plurality of groups based on said determining a period of time, said plurality of groups comprising:  
a first group characterized by a period of time of up to 28 days from said leukapheresis step to said administration of said immunotherapy to said patient;  
a second group characterized by a period of time of between 28 days to 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and  
a third group characterized by a period of time of at least 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and  
determining said likelihood of a complete response in said patient based at least in part on which of said plurality of groups said patient is grouped into,  
wherein said patient has at least about a 55% likelihood of a complete response if said patient is grouped within said first group or said second group, and  
wherein said patient has at least about a 42% likelihood of a complete response if said patient is grouped within said third group.

17. A method for predicting an overall survival rate in a patient to an immunotherapy, comprising:

determining a period of time from a leukapheresis step of said patient to an administration of said immunotherapy to said patient;  
grouping said patient into one of a plurality of groups based on said determining a period of time, said plurality of groups comprising:  
a first group characterized by a period of time of up to 28 days from said leukapheresis step to said administration of said immunotherapy to said patient;  
a second group characterized by a period of time of between 28 days to 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and  
a third group characterized by a period of time of at least 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and

determining said overall survival rate in said patient based at least in part on which of said plurality of groups said patient is grouped into,  
wherein said patient has at least about a 49% overall survival rate if said patient is grouped within said first group,  
wherein said patient has at least about a 48% overall survival rate if said patient is grouped within said second group, and  
wherein said patient has at least about a 30% overall survival rate if said patient is grouped within said third group.

18. A method for predicting a risk of thrombocytopenia in a patient receiving an immunotherapy, comprising:

determining a period of time from a leukapheresis step of said patient to an administration of said immunotherapy to said patient;  
grouping said patient into one of a plurality of groups based on said determining a period of time, said plurality of groups comprising:  
a first group characterized by a period of time of up to 28 days from said leukapheresis step to said administration of said immunotherapy to said patient;  
a second group characterized by a period of time of between 28 days to 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and  
a third group characterized by a period of time of at least 40 days from said leukapheresis step to said administration of said immunotherapy to said patient; and  
determining said risk of thrombocytopenia in said patient based at least in part on which of said plurality of groups said patient is grouped into,  
wherein said patient has about an 18% risk of thrombocytopenia if said patient is grouped within said first group,  
wherein said patient has about a 25% risk of thrombocytopenia if said patient is grouped within said second group, and  
wherein said patient has about a 34% risk of thrombocytopenia if said patient is grouped within said third group.

19. A method for predicting life expectancy and a quality-adjusted life years in a patient that has received an immunotherapy, comprising:

determining a period of time from a leukapheresis step of said patient to an administration of said immunotherapy to said patient, wherein the period of time is a short period or a long period;  
assigning a probability of successful infusion based on the period of time;  
entering the patient information into a survival model to determine the life expectancy and the quality-adjusted life years of the patient.