We Claim:

1. Use of a therapeutically effective amount of a T cell product comprising autologous T cells expressing an anti-CD19 chimeric antigen receptor (CAR) in the manufacture of a medicament for treating mantle cell lymphoma (MCL) or B cell acute lymphoblastic leukemia (ALL) in a subject in need thereof, wherein the anti-CD19 CAR comprises an anti-CD19 single-chain variable fragment (scFv) comprising the heavy chain and light chain variable regions of FMC63, a CD28 intracellular signaling region, and CD3-zeta signaling domain.

2. The use of claim 1, wherein the MCL or B cell ALL is relapsed or refractory (R/R) MCL or B cell ALL.

3. The use of claim 2, wherein the MCL is classical, blastoid, and pleomorphic MCL.

4. The use of any one of claims 1 to 3, wherein the MCL or B cell ALL is refractory to, or has relapsed following, one or more of chemotherapy, radiotherapy, immunotherapy, an autologous stem cell transplant (SCT), or any combination thereof.

5. The use of any one of claims 1 to 4, wherein the MCL or B cell ALL is refractory to, or has relapsed following, one or more of autologous SCT, anti-CD20 antibody, anthracycline- or bendamustine-containing chemotherapy, and/or a Bruton Tyrosine Kinase inhibitor (BTKi).

6. The use of claim 5, wherein the BTKi is ibrutinib or acalabrutinib.

7. The use of any one of claims 1 to 6, wherein the R/R B cell ALL is defined as refractory to first-line therapy, relapsed ≤12 months after first remission, relapsed or refractory after ≥2 prior lines of systemic therapy, or relapsed after allogeneic stem cell transplant (SCT).

8. The use of any one of claims 1 to 7, wherein if the B cell ALL subject has received prior blinatumomab, the subject is required to have leukemic blasts with CD19 expression ≥90%.

9. The use of any one of claims 1 to 8, wherein the subject receives, or will receive, a bridging therapy for MCL after leukapheresis and before lymphodepleting chemotherapy, wherein

the bridging therapy is selected from treatment of dexamethasone, methylprednisolone, ibrutinib, and/or acalabrutinib; an immunomodulator; R-CHOP, bendamustine; alkylating agents; and/or platinum-based agents; wherein the MCL bridging therapy is completed in 5 days or less, and

the lymphodepleting chemotherapy regimen is cyclophosphamide 500 mg/m2 intravenously and fludarabine 30 mg/m2 intravenously,

both to be given, on each of the fifth, fourth, and third days before infusion.

10. The use of any one of claims 1 to 9, wherein the B cell ALL subject is to receive a lymphodepleting regimen of fludarabine intravenous (IV) 25 mg/m^2/day on each of the fourth, third, second days before T cell infusion, and cyclophosphamide IV 900 mg/m^2/day on the second day before infusion.

11. The use of any one of claims 1 to 10, wherein the autologous T cells comprise CD4+ and CD8+ CAR T cells that are prepared from peripheral blood mononuclear cells (PBMCs) by positive enrichment and consequent partial or complete depletion of circulating cancer cells for T cells prior to transduction of a polynucleotide encoding the CAR.

12. The use of claim 11, wherein the PBMC are enriched for T cells by positive selection for CD4+ and CD8+ cells, activated with anti-CD3 and anti-CD28 antibodies in the presence of IL-2, and then transduced with a replication-incompetent viral vector containing FMC63-28Z CAR, a chimeric antigen receptor (CAR) comprising an anti-CD19 single-chain variable fragment (scFv), CD28 and CD3-zeta domains.

13. The use of claim 11 or claim 12, wherein the T cells comprise fewer cancer cells than T cells comprising T cells from a leukapheresis product that have not been positively selected for CD4+ and CD8+ T cells.

14. The use of any one of claims 11 to 13, wherein the autologous T cells comprise more naïve-like T cells than T cells from a leukapheresis product that have not been positively selected/enriched for CD4+ and CD8+ T cells.

15. The use of claim 14, wherein the autologous T cells, relative to T cells from a leukapheresis product that have not been positively selected/enriched for CD4+ and CD8+ cells, further have decreased IFN-gamma production and/or decreased percentage of CD3- cells.

16. The use of any one of claims 1 to 15, wherein

the MCL subject is to be administered, one or more doses of 1.8×10^6, 1.9×10^6, or 2×10^6 CAR positive viable T cells per kg body weight, with a maximum of 2×10^8 CAR positive viable T cells (for patients 100 kg and above) and

the B cell ALL subject is to be administered 0.5×10^6, 1×10^6, or 2×10^6 CAR positive viable T cells per kg body weight, with a maximum of 2×10^8 CAR positive viable T cells for patients 100 kg and above.

17. The use of any one of claims 1 to 16, wherein if the subject has achieved complete response to the first infusion, the subject may receive a second infusion of anti-CD19 CAR T cells, if progressing following >3 months of remission, provided CD19 expression has been retained and neutralizing antibodies against the CAR are not suspected, wherein response is assessed using the Lugano classification.

18. The use of any one of claims 1 to 17, wherein the subject is to be monitored for signs and symptoms of cytokine release syndrome (CRS) and neurologic toxicity after T cell administration.

19. The use of claim 18, wherein the subject is to be monitored daily for at least seven days, or for four weeks, following infusion for signs and symptoms of the CRS and neurologic toxicity.

20. The use of claim 18 or 19, wherein the signs or symptoms associated with the CRS include fever, chills, fatigue, tachycardia, nausea, hypoxia, and hypotension and the signs or

symptoms associated with neurologic events include encephalopathy, seizures, changes in level of consciousness, speech disorders, tremors, and confusion.

21. The use of any one of claims 1 to 20, wherein the MCL subject is a high-risk patient as determined by a Ki-67 tumor proliferation index ≥50% and/or presence of a *TP53* mutation.