CLAIMS

1. Use of autologous cytotoxic T cells (CTLs) expressing a T cell receptor that specifically binds to an EBV peptide presented on a class I MHC in the manufacture of a medicament for treating or preventing multiple sclerosis (MS) in a subject.

2. The use of claim 1, wherein at least 5%, at least 10%, at least 15%, or at least 20% of the CTLs express CD107a.

3. The use of claim 1 or 2, wherein at least 5%, at least 10%, at least 15%, or at least 20%, of the CTLs express IFNγ.

4. The use of any one of claims 1 to 3, wherein at least 5%, at least 10%, at least 15%, or at least 20% of the CTLs express TNF.

5. The use of any one of claims 1 to 4, wherein at least 1%, at least 5%, at least 10%, or at least 15% of the CTLs express IL-2.

6. The use of claim 1, wherein at least 30%, at least 40%, at least 50%, or at least 70% of the CTLs express CD107a, IFNγ, TNFa, and IL-2.

7. Use of cytotoxic T cells (CTLs) in the manufacture of a medicament for treating or preventing multiple sclerosis (MS) in a subject, wherein the CTLs are prepared according to a method comprising:

isolating a sample comprising cytotoxic T cells (CTLs) expressing a T cell receptor that specifically binds to an EBV peptide presented on a class I MHC from the subject.

8. Use of peptide-specific autologous CTLs in the manufacture of a medicament for treating or preventing multiple sclerosis (MS) in a subject, wherein the CTLs are prepared according to a method comprising:

incubating a sample comprising autologous cytotoxic T cells (CTLs) with antigen-presenting cells (APCs) presenting an EBV peptide, thereby inducing proliferation of peptide-specific T cells in the sample.

9. Use of peptide-specific autologous CTLs in the manufacture of a medicament for treating or preventing multiple sclerosis (MS) in a subject, wherein the CTLs are prepared according to a method comprising:

a) incubating antigen-presenting cells (APCs) with a nucleic acid construct encoding for an EBV peptide, thereby inducing the APCs to present an EBV peptide; and

b) inducing peptide-specific CTL proliferation by incubating a sample comprising autologous CTLs with the antigen-presenting cells (APCs), thereby inducing the autologous CTLs to proliferate.

10. The use of claim 9, wherein the nucleic acid construct is AdE1-LMPpoly.

11. The use of any one of claims 8 to 10, wherein the method further comprises analyzing the expression of CD107a by the proliferated peptide-specific autologous CTLs, and at least 5%, at least 10%, at least 15%, or at least 20% of the proliferated peptide-specific autologous CTLs express CD107a.

12. The use of any one of claims 8 to 11, wherein the method further comprises analyzing the expression of IFNγ by the proliferated peptide-specific autologous CTLs, and at least 5%, at least 10%, at least 15%, or at least 20% of the proliferated peptide-specific autologous CTLs express IFNγ.

13. The use of any one of claims 8 to 12, wherein the method further comprises analyzing the expression of TNF by the proliferated peptide-specific autologous CTLs, and at least 5%, at least 10%, at least 15%, or at least 20% of the proliferated peptide-specific autologous CTLs express TNF.

14. The use of any one of claims 8 to 13, wherein the method further comprises analyzing the expression of IL-2 by the proliferated peptide-specific autologous CTLs, and at least 1%, at least 5%, at least 10%, or at least 15% of the proliferated peptide-specific autologous CTLs express IL-2.

15. The use of any one of claims 8 to 14, wherein the method further comprises analyzing the expression of CD107a, TNF, IFNγ, and IL-2 by the proliferated peptide-specific autologous CTLs, and at least 20%, at least 30%, at least 40%, or at least 50% of the proliferated peptide-specific autologous CTLs express CD107a, TNF, IFNγ, and IL-2.

16. The use of any one of claims 8 to 15, wherein the APCs comprise B cells, antigen-presenting T-cells dendritic cells, artificial antigen-presenting cells, or aK562 cells.

17. The use of any one of claims 1 to 16, wherein the EBV peptide comprises an amino acid sequence listed in Table 1.

18. The use of any one of claims 1 to 16, wherein the EBV peptide comprises a LMP1 peptide or fragment thereof, a LMP2A peptide or fragment thereof, or an EBNA1 peptide or fragment thereof.

19. The use of any one of the preceding claims, wherein a dose comprises about 5×10^6 CTLs, about 1×10^7 CTLs, about 1.5×10^7 CTLs, or about 2×10^7 CTLs.

20. Use of autologous cytotoxic T cells (CTLs) expressing a T cell receptor that specifically binds to an EBV peptide presented on a class I MHC in the manufacture of a medicament for reducing anti-EBV IgG levels in the CSF in a subject with MS.

21. The use of any one of the preceding claims, wherein the MS is relapsing-remitting MS, secondary progressive MS, primary progressive MS, or progressively relapsing MS.

22. A method of selecting a subject for adoptive immunotherapy, comprising:

(a) obtaining a sample comprising T cells from the subject,

(b) isolating the autologous T cells in the sample,

(c) determining percent of autologous T cells in the sample that express CD107A, and if at least a certain percentage of the autologous T cells express CD107A, selecting the subject for adoptive immunotherapy.

23. The method of claim 22, wherein if at least 1%, at least 3%, at least 5%, or at least 10% of the autologous T cells express CD107A, selecting the subject for adoptive immunotherapy.

24. A method of selecting a subject for adoptive immunotherapy, comprising:

(a) obtaining a sample comprising T cells from the subject,

(b) isolating the autologous T cells in the sample,

(c) determining percent of autologous T cells in the sample that express TNF, and if at least a certain percentage of the autologous T cells express TNF, selecting the subject for adoptive immunotherapy.

25. The method of claim 24, wherein if at least 1% at least 3%, at least 5%, or at least 10% of the autologous T cells express TNF, selecting the subject for adoptive immunotherapy.

26. A method of selecting a subject for adoptive immunotherapy, comprising:

(a) obtaining a sample comprising T cells from the subject,

(b) isolating the autologous T cells in the sample,

(c) determining percent of autologous T cells in the sample that express IL-2, and if at least a certain percentage of the autologous T cells express IL-2, selecting the subject for adoptive immunotherapy.

27. The method of claim 26, wherein if at least 1%, at least 3%, at least 5%, or at least 10% of the autologous T cells express IL-2, selecting the subject for adoptive immunotherapy.

28. A method of selecting a subject for adoptive immunotherapy, comprising:

(a) obtaining a PMBC sample from the subject,

(b) isolating the autologous T cells in the sample,

(c) determining percent of autologous T cells in the sample that express CD107a, IFNγ, TNFa, and IL-2, and if at least a certain percentage of the autologous T cells express CD107a, IFNγ, TNFa, and IL-2, selecting the subject for adoptive immunotherapy.

29. The method of claim 28, wherein if at least 1%, at least 3%, at least 5%, or at least 10% of the autologous T cells express CD107a, IFNγ, TNFa, and IL-2, selecting the subject for adoptive immunotherapy.