CLAIMS

1. An engineered enucleated erythroid cell comprising a loadable exogenous antigen-presenting polypeptide on its cell surface, wherein the loadable exogenous antigen-presenting polypeptide comprises one or more amino acid substitutions which stabilize the loadable exogenous antigen-presenting polypeptide on the cell surface.

2. The engineered enucleated erythroid cell of claim 1, wherein the loadable exogenous antigen-presenting polypeptide is stabilized in the absence of a polypeptide bound to the exogenous antigen-presenting polypeptide.

3. The engineered enucleated erythroid cell of claim 1 or 2, wherein the engineered enucleated erythroid cell further comprises an exogenous antigenic polypeptide bound to the loadable exogenous antigen-presenting polypeptide.

4. The engineered enucleated erythroid cell of any one of claims 1-3, wherein the loadable exogenous antigen-presenting polypeptide has a higher affinity for an exogenous antigenic polypeptide than for an exogenous displaceable polypeptide.

5. The engineered enucleated erythroid cell of claim 3 or 4, wherein the exogenous antigenic polypeptide comprises an amino acid sequence provided in any one of Tables 7-8, 16-26, and B.

6. The engineered enucleated erythroid cell of any one of claims 3-5, wherein the exogenous antigenic polypeptide is non-covalently attached to the loadable exogenous antigen-presenting polypeptide.

7. The engineered enucleated erythroid cell of any one of claims 3-5, wherein the exogenous antigenic polypeptide is covalently attached to the loadable exogenous antigen-presenting polypeptide.

8. The engineered enucleated erythroid cell of claim 1 or 2, wherein the loadable exogenous antigen-presenting polypeptide comprises a linker, wherein the linker comprises an acceptor sequence for conjugation of an exogenous antigenic polypeptide.

9. The engineered enucleated erythroid cell of any one of claims 1-8, wherein the loadable exogenous antigen-presenting polypeptide comprises a transmembrane domain.

10. The engineered enucleated erythroid cell of claim 1, wherein the engineered enucleated erythroid cell further comprises a displaceable exogenous polypeptide bound to the loadable exogenous antigen-presenting polypeptide.

11. The engineered enucleated erythroid cell of claim 10, wherein the exogenous displaceable polypeptide comprises an amino acid sequence provided in Table 6.

12. The engineered enucleated erythroid cell of claim 10 or 11, wherein the loadable exogenous antigen-presenting polypeptide and the exogenous displaceable polypeptide are comprised in a single-chain fusion protein.

13. The engineered enucleated erythroid cell of claim 12, wherein the single chain fusion protein comprises a transmembrane domain.

14. The engineered enucleated erythroid cell of any one of claims 1-13, wherein the loadable exogenous antigen-presenting polypeptide comprises a human leukocyte antigen α (HLA) heavy chain polypeptide and a beta-2-microglobulin (β2M) polypeptide, or a fragment thereof.

15. The engineered enucleated erythroid cell of claim 14, wherein the HLA heavy chain polypeptide is derived from an HLA class I polypeptide.

16. The engineered enucleated erythroid cell of claim 15, wherein the loadable exogenous antigen-presenting polypeptide comprises:

(i) an amino acid substitution to an alanine at an amino acid residue corresponding to position 84 of an HLA heavy chain polypeptide;

(ii) an amino acid substitution to a cysteine at amino acid residues corresponding to positions 84 and 139 of an HLA heavy chain polypeptide;

(iii) an amino acid substitution to a cysteine at amino acid residues corresponding to positions 51 and 175 of an HLA heavy chain polypeptide;

(iv) at least one pair of amino acid substitutions to cysteine at amino acid residues corresponding to positions 84 and 139, 51 and 175, 5 and 168, 130 and 157, 135 and 140, 11 and 74, 45 and 63, or 33 and 49 of an HLA heavy chain polypeptide;

(v) an amino acid substitution to a cysteine at an amino acid residue corresponding to position 84 of an HLA heavy chain polypeptide, a displaceable exogenous polypeptide, and a linker disposed between the β2M polypeptide and the displaceable exogenous polypeptide, wherein the linker comprises a cysteine; or

(vi) an HLA heavy chain polypeptide derived from an HLA-A*02:01 allele, wherein the HLA heavy chain polypeptide comprises an amino acid substitution to a glutamic acid at an amino acid residue corresponding to position 115 of an HLA heavy chain polypeptide.

17. The engineered enucleated erythroid cell of claim 14, wherein the HLA heavy chain polypeptide is derived from an HLA class II polypeptide.

18. An engineered enucleated erythroid cell comprising a loadable exogenous antigen-presenting polypeptide on its the cell surface, wherein the loadable exogenous antigen-presenting polypeptide comprises one or more amino acid substitutions which stabilize the loadable exogenous antigen-presenting polypeptide on the cell surface for use in therapy.

19. A method of making an engineered enucleated erythroid cell comprising an antigen-loaded exogenous antigen-presenting polypeptide, the method comprising:

a) obtaining an engineered enucleated erythroid cell comprising a loadable exogenous antigen-presenting polypeptide on its cell surface, wherein the loadable exogenous antigen-presenting polypeptide comprises one or more amino acid substitutions which stabilize the loadable exogenous antigen-presenting polypeptide on the cell surface; and

b) contacting the engineered enucleated erythroid cell with an exogenous antigenic polypeptide,

thereby generating the engineered enucleated erythroid cell comprising the antigen-loaded exogenous antigen-presenting polypeptide.

20. A method of making an engineered enucleated erythroid cell comprising a loadable exogenous antigen-presenting polypeptide on its cell surface, the method comprising:

introducing an exogenous nucleic acid encoding the loadable exogenous antigen-presenting polypeptide into a nucleated erythroid precursor cell, wherein the loadable exogenous antigen-presenting polypeptide comprises one or more amino acid substitutions which stabilize the loadable exogenous antigen-presenting polypeptide on the cell surface; and

culturing the nucleated erythroid precursor cell under conditions suitable for enucleation and production of the loadable exogenous antigen-presenting polypeptide, thereby making the engineered enucleated erythroid cell.