CLAIMS

1. An *in vitro* or *ex vivo* method for producing a persistent allogeneic modified immune cell, the method comprising contacting a cell with a base editor comprising a polynucleotide programmable DNA binding polypeptide (napDNAbp), a deaminase, and one or more guide RNAs (gRNAs) that target the base editor to effect an alteration in a nucleic acid molecule, wherein the nucleic acid molecule encodes a polypeptide and/or comprises a regulatory element associated with expression thereof, and wherein the polypeptide is selected from the group consisting of HLA-A, HLA-B, HLA-C, Transporter Associated with Antigen Processing I (TAP1), Transporter Associated with Antigen Processing II (TAP2), Tapasin/TAP Binding Protein (TAPBP), TAP-Binding Protein-Like (TAPBPL), NLR family CARD domain containing 5 (NLRC5)/ MHC class I transactivator (CITA), cluster of differentiation 155 (CD155), MHC class I polypeptide-related sequence A (MICA), MHC class I polypeptide-related sequence B (MICB) polypeptide, nectin cell adhesion molecule 2 (Nectin-2), and UL16 binding protein 1-6 (ULBP), thereby producing the persistent allogeneic modified immune cell.

2. The method of claim 1, wherein the method further comprises contacting the cell with one or more guide RNAs that target the base editor to effect an alteration in a nucleic acid molecule, wherein the nucleic acid molecule encodes a polypeptide and/or comprises a regulatory element associated with expression thereof, and wherein the polypeptide is selected from the group consisting of beta-2 microglobulin, CD48, CD58, Protein Disulfide Isomerase Family A Member 3 (PDIA3/ERp57), and T Cell Receptor Alpha Constant polypeptides.

3. The method of any one of claims 1-2, wherein the method comprises effecting a nucleobase alteration that reduces expression on the cell of a polypeptide selected from the group consisting of HLA-A, HLA-B, and HLA-C.

4. The method of any one of claims 1-2, wherein the one or more gRNAs comprise a nucleotide sequence with at least about 85% sequence identity to
GCACUCACCCGCCCAGGUCU (SEQ ID NO: 817; TSBTx4190),
GACCCGCAUCUCGGCGUCUG (SEQ ID NO: 827; TSBTx4200),

CCUUACCCCAUCUCAGGGUG (SEQ ID NO: 820; TSBTx4193), and/or CUUACCCCAUCUCAGGGUGA (SEQ ID NO: 821; TSBTx4194).

5. The method of any one of claims 1-2, further comprising overexpressing in the cell an inhibitory receptor, or fragment thereof, selected from the group consisting of Human Leukocyte Antigen-E (HLA-E), Human Leukocyte Antigen-G (HLA-G), Programmed Death Ligand 1 (PD-L1), and Cluster of Differentiation 47 (CD47).

6. An *in vitro* or *ex vivo* method for producing a persistent allogeneic modified immune cell, the method comprising:

(a) contacting a cell with a base editor comprising a polynucleotide programmable DNA binding polypeptide (napDNAbp), a deaminase, and one or more guide RNAs (gRNAs) that target a nucleic acid molecule, wherein the nucleic acid molecule encodes a polypeptide or comprises a regulatory element associated with expression of the polypeptide, and wherein the polypeptide is selected from the group consisting of HLA-A, HLA-B, HLA-C, Transporter Associated with Antigen Processing I (TAP1), Transporter Associated with Antigen Processing II (TAP2), Tapasin/TAP Binding Protein (TAPBP), TAP-Binding Protein-Like (TAPBPL), NLR family CARD domain containing 5 (NLRC5)/ MHC class I transactivator (CITA), cluster of differentiation 155 (CD155), MHC class I polypeptide-related sequence A (MICA), MHC class I polypeptide-related sequence B (MICB) polypeptide, nectin cell adhesion molecule 2 (Nectin-2), and UL16 binding protein 1-6 (ULBP); and

(b) overexpressing in the cell an inhibitory receptor, or fragment thereof, selected from the group consisting of Human Leukocyte Antigen-E (HLA-E), Human Leukocyte Antigen-G (HLA-G), Programmed Death Ligand 1 (PD-L1), and Cluster of Differentiation 47 (CD47).

7. The method of claim 6, wherein the method reduces detectable expression of a polypeptide selected from the group consisting of HLA-A, HLA-B, HLA-C, TAP1, TAP2, TAPBP, TAPBPL, NLRC5/CITA, CD155, MICA, and MICB by at least 25%.

8. The method of any one of claims 1-7, wherein the guide RNAs comprise a nucleotide sequence selected from those listed in Tables 1A-1E or from SEQ ID NOs: 1214-2908, 403-412, and 435-446; and/or wherein the base editor is ABE8.20m.

9. An allogeneic modified immune cell produced according to the method of any one of claims 1-8, preferably wherein the allogeneic modified immune cell expresses a chimeric antigen receptor.

10. A pharmaceutical composition comprising an effective amount an allogeneic modified immune cell of claim 9.

11. A composition comprising a guide RNA (gRNA) and a polynucleotide encoding a base editor comprising a polynucleotide programmable DNA binding polypeptide (napDNAbp) domain and a deaminase domain, wherein the gRNA comprises a nucleic acid sequence that is complementary to a polynucleotide, wherein the polynucleotide encodes a polypeptide or comprises a regulatory element associated with expression of the polypeptide, wherein the polypeptide is selected from the group consisting of HLA-A, HLA-B, HLA-C, Transporter Associated with Antigen Processing I (TAP1), Transporter Associated with Antigen Processing II (TAP2), Tapasin/TAP Binding Protein (TAPBP), TAP-Binding Protein-Like (TAPBPL), NLR family CARD domain containing 5 (NLRC5)/ MHC class I transactivator (CITA), cluster of differentiation 155 (CD155), MHC class I polypeptide-related sequence A (MICA), MHC class I polypeptide-related sequence B (MICB) polypeptide, nectin cell adhesion molecule 2 (Nectin-2), and UL16 binding protein 1-6 (ULBP); preferably wherein the guide RNA:

a) comprises a nucleotide sequence selected from the group consisting of GCACUCACCCGCCCAGGUCU (SEQ ID NO: 817; TSBTx4190), GACCCGCAUCUCGGCGUCUG (SEQ ID NO: 827; TSBTx4200), CCUUACCCCAUCUCAGGGUG (SEQ ID NO: 820; TSBTx4193), and CUUACCCCAUCUCAGGGUGA (SEQ ID NO: 821; TSBTx4194); and/or

b) comprises a nucleotide sequence selected from those listed in Tables 1A-1E or from SEQ ID NOs: 1214-2908, 403-412, and 435-446.

12. The composition of claim 11, wherein the composition further comprises a polynucleotide encoding a secreted or membrane-bound HLA-E and/or HLA-G single-chain trimer and/or single-chain dimer; preferably wherein the composition further comprises a polynucleotide encoding a polypeptide(s) with at least 85% sequence identity to an amino acid sequence listed in Table 19 and/or to the following amino acid sequence: MSRSVALAVLALLSLSGLEAVMAPRTLFLGGGGSGGGGSGGGGSIQRTPKIQVYSRHPAENG KSNFLNCYVSGFHPSDIEVDLLKNGERIEKVEHSDLSFSKDWSFYLLYYTEFTPTEKDEYAC RVNHVTLSQPKIVKWDRDMGGGGSGGGGSGGGGSGGGGSGSHSLKYFHTSVSRPGRGEPRFI SVGYVDDTQFVRFDNDAASPRMVPRAPWMEQEGSEYWDRETRSARDTAQIFRVNLRTLRGYY NQSEAGSHTLQWMHGCELGPDGRFLRGYEQFAYDGKDYLTLNEDLRSWTAVDTAAQISEQKS NDASEAEHQRAYLEDTCVEWLHKYLEKGKETLLHLEPPKTHVTHHPISDHEATLRCWALGFY PAEITLTWQQDGEGHTQDTELVETRPAGDGTFQKWAAVVVPSGEEQRYTCHVQHEGLPEPVT LRWKPASQPTIPIMALIVLGGVAGLLLFIGLGIFFCVRC (SEQ ID NO: 1019).

13. A kit comprising an allogeneic modified immune cell of claim 9, the pharmaceutical composition of claim 10, or the composition of any one of claims 11-12 and written instructions for using the allogeneic modified immune cell or the composition.

14. Use of the allogenic modified immune cell of claim 9 in the preparation of a medicament for treating cancer in a subject.

15. An *in vitro* or *ex vivo* method for producing a persistent allogeneic modified immune cell, the method comprising contacting a cell with a polynucleotide programmable DNA binding polypeptide (napDNAbp) and one or more guide RNAs (gRNAs) that target the napDNAbp to cleave a target nucleic acid molecule and introduce an alteration in the target nucleic acid molecule, wherein the target nucleic acid molecule encodes a polypeptide and/or comprises a regulatory element associated with expression thereof, and wherein the polypeptide is selected from the group consisting of HLA-A, HLA-B, HLA-C, Transporter Associated with Antigen Processing I (TAP1), Transporter Associated with Antigen Processing II (TAP2), Tapasin/TAP Binding Protein (TAPBP), TAP-Binding Protein-Like (TAPBPL), NLR family CARD domain containing 5 (NLRC5)/ MHC class I transactivator (CITA), cluster of differentiation 155 (CD155), MHC class I polypeptide-related sequence A (MICA), MHC class I polypeptide-related sequence B (MICB) polypeptide, nectin cell

adhesion molecule 2 (Nectin-2), and UL16 binding protein 1-6 (ULBP), thereby producing the persistent allogeneic modified immune cell.

16. An *in vitro* or *ex vivo* method for producing a persistent allogeneic modified immune cell, the method comprising:

a) contacting a cell with a base editor comprising a polynucleotide programmable DNA binding polypeptide (napDNAbp), a deaminase, and guide RNAs (gRNAs) that target the base editor to effect an alteration in one or more nucleic acid molecules, wherein the one or more nucleic acid molecules encode the following polypeptides and/or comprise regulatory elements associated with expression thereof: CD5, B2M, CD3 gamma, CD3 epsilon, CIITA, and PD-1 (PD1), thereby producing the persistent allogeneic modified immune cell; or

b) contacting a cell with a base editor comprising a polynucleotide programmable DNA binding polypeptide (napDNAbp), a deaminase, and guide RNAs (gRNAs) that target the base editor to effect an alteration in one or more nucleic acid molecules, wherein the one or more nucleic acid molecules encode the following polypeptides and/or comprise regulatory elements associated with expression thereof: HLA-A, HLA-B, and CIITA, thereby producing the persistent allogeneic modified immune cell, wherein the persistent allogeneic modified immune cell surface-expresses HLA-C.

17. An allogeneic modified immune cell produced by the method of claim 16.

18. Use of the allogenic modified immune cell of claim 17 in the preparation of a medicament for treating cancer in a subject.