Claims

[Claim 1]

A guide RNA that complementarily binds to a nucleic acid sequence encoding β2-microglobulin (B2M), the guide RNA comprising any one nucleic acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 6, SEQ ID NO: 17, and SEQ ID NO: 26.

[Claim 2]

A guide RNA that complementarily binds to a nucleic acid sequence encoding HLA-DQ, the guide RNA comprising any one nucleic acid sequence selected from the group consisting of SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 87, and SEQ ID NO: 90.

[Claim 3]

A guide RNA that complementarily binds to a nucleic acid sequence encoding HLA-DP, the guide RNA comprising the nucleic acid sequence of SEQ ID NO: 123 or SEQ ID NO: 129.

[Claim 4]

A guide RNA that complementarily binds to a nucleic acid sequence encoding HLA-DR, the guide RNA comprising any one nucleic acid sequence selected from the group consisting of SEQ ID NO: 186, SEQ ID NO: 188, and SEQ ID NO: 225.

[Claim 5]

A composition for inhibiting gene expression comprising as active ingredients:

the guide RNA of any one of claims 1 to 4 or a nucleotide sequence encoding the guide RNA; and

an RNA-guided endonuclease or a nucleotide sequence encoding the RNA-guided endonuclease.

[Claim 6]

The composition of claim 5, wherein the RNA-guided endonuclease is any one selected from the group consisting of Cas1, Cas1B, Cas2, Cas3, Cas4, Cas5, Cas6, Cas7, Cas8, Cas9, Cas10, Cas12a, Cas12b, Cas12c, Cas12d, Cas12e, Cas 13a, Cas 13b, Cas 13c, Cas 13d, Cpf1, Csy1, Csy2, Csy3, Cse1, Cse2, Csc1, Csc2, Csa5, Csn2, Csm2, Csm3, Csm4, Csm5, Csm6, Cmr1, Cmr3, Cmr4, Cmr5, Cmr6, Csb1, Csb2, Csb3, Csx17, Csx14, Csx10, Csx16, CsaX, Csx3, Csx1, Csx15, Csf1, Csf2, Csf3, and Csf4.

[Claim 7]

A transformed cell in which expression of MHC I cell membrane receptor and MHC II cell membrane receptor is inhibited;

wherein the transformed cell expresses a peptide antigen on the cell membrane surface;

wherein the peptide antigen is G-peptide;

wherein the G-peptide is bound to a modified MHC I cell membrane receptor;

wherein the modified MHC I cell membrane receptor has a structure in which HLA-

E and B2M are linked;

wherein modification in a gene encoding the MHC I cell membrane receptor is performed using the guide RNA of claim 1;

wherein modification in DQ, DP, and DR genes encoding the MHC II cell membrane receptor is performed using the guide RNAs of claims 2, 3, and 4, respectively;

wherein the transformed cell is a therapeutic allogeneic cell; and

wherein the therapeutic allogeneic cell is an immune cell or stem cell.

[Claim 8]

The transformed cell of claim 7, wherein the C-terminus of the B2M is linked, via a first linker, to the N-terminus of α1 of the HLA-E, and the C-terminus of the G-peptide is linked, via a second linker, to the N-terminus of the B2M in the modified MHC I cell membrane receptor.

[Claim 9]

The transformed cell of claim 8, wherein the G-peptide has the sequence of SEQ ID NO: 236.

[Claim 10]

The transformed cell of claim 8, wherein the HLA-E has the sequence of SEQ ID NO: 240.

[Claim 11]

The transformed cell of claim 8, wherein the B2M has the sequence of SEQ ID NO: 237.

[Claim 12]

The transformed cell of claim 8, wherein the first linker has the sequence of SEQ ID NO: 238.

[Claim 13]

The transformed cell of claim 8, wherein the second linker has the sequence of SEQ ID NO: 241.

[Claim 14]

The transformed cell of claim 7, wherein the immune cell is an NK cell or T cell.

[Claim 15]

A pharmaceutical composition for use in the treatment of cancer, an infectious disease, a degenerative disease, a hereditary disease, or an immune disease, comprising as an active ingredient the transformed cell of claim 7.

[Claim 16]

The pharmaceutical composition for the use of claim 15, wherein the cancer is any one selected from the group consisting of chronic lymphocytic leukemia

(CLL), B-cell acute lymphocytic leukemia (B-ALL), acute lymphoblastic leukemia, acute myeloid leukemia, lymphoma, non-Hodgkin's lymphoma (NHL), multiple myeloma, blood cancer, gastric cancer, liver cancer, pancreatic cancer, colorectal cancer, lung cancer, breast cancer, ovarian cancer, skin cancer, melanoma, sarcoma, prostate cancer, esophageal cancer, hepatocellular carcinoma, astrocytoma, mesothelioma, head and neck cancer, and medulloblastoma.

[Claim 17]

The pharmaceutical composition for the use of claim 15, wherein the infectious disease is any one selected from the group consisting of hepatitis B, hepatitis C, human papilloma virus (HPV) infection, cytomegalovirus infection, Epstein Barr virus (EBV) infection, viral respiratory disease, and influenza.

[Claim 18]

The pharmaceutical composition for the use of any one of claims 15 to 17, wherein the pharmaceutical composition is to be administered via any one route selected from the group consisting of intravenous, intramuscular, intradermal, subcutaneous, intraperitoneal, intraarteriolar, intraventricular, intralesional, intrathecal, topical, and combinations thereof.

[Claim 19]

A use of the transformed cell of claim 7 in the manufacture of a pharmaceutical composition for treating cancer, an infectious disease, a degenerative disease, a hereditary disease, or an immune disease, wherein expression of MHC I cell membrane receptor and MHC II cell membrane receptor is inhibited in the transformed cell, and the transformed cell expresses a peptide antigen bound to a

modified MHC I cell membrane receptor on the cell membrane surface.

[Claim 20]

The use of claim 19 wherein the pharmaceutical composition is to be administered via any one route selected from the group consisting of intravenous, intramuscular, intradermal, subcutaneous, intraperitoneal, intraarteriolar, intraventricular, intralesional, intrathecal, topical, and combinations thereof.

[Claim 21]

A pharmaceutical composition for use in therapy comprising as an active ingredient the transformed cell of claim 7.