CLAIMS

1. A method for targeting a target nucleotide sequence, the method comprising introducing into a cell:

(i) CRISPR type I-D associated proteins Cas5d, Cas6d and Cas7d, or nucleic acids encoding the proteins, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, or a DNA encoding the guide RNA,

wherein Cas5d, Cas6d and Cas7d have target recognition activity,

wherein, in a case where a fusion protein of the Cas5d, Cas6d or Cas7d with a polypeptide other than Cas3d and Cas10d is formed in the cell, the polypeptide other than Cas3d and Cas10d is guided to the target nucleotide sequence by the action of the Cas5d, Cas6d and Cas7d and the guide RNA, and

provided that the method excludes a method to be performed in a human body.

2. A method for altering a target nucleotide sequence, the method comprising introducing into a cell:

(i) CRISPR type I-D associated proteins Cas3d, Cas5d, Cas6d, Cas7d and Cas10d, or nucleic acids encoding the proteins, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, or a DNA encoding the guide RNA,

wherein the target nucleotide sequence is a double-stranded DNA,

wherein Cas5d, Cas6d and Cas7d have target recognition activity, and Cas3d and Cas10d have polynucleotide cleavage activity, and

provided that the method excludes a method to be performed in a human body.

3. The method according to claim 1 or 2, wherein the guide RNA comprises a sequence consisting of 20 to 50 nucleotides which is complementary to the target nucleotide sequence.

4. The method according to claim 2, further comprising introducing a donor polynucleotide into the cell.

5. The method according to any one of claims 2 to 4, wherein the alteration is nucleotide deletion, insertion, or substitution.

6. The method according to any one of claims 1 to 5, wherein the Cas5d recognizes 5'-GTH-3' (H = A, C, or T) as a protospacer adjacent motif (PAM) sequence.

7. The method according to any one of claims 1, 3 and 6, wherein a complex is introduced into the cell, the complex comprises:

(i) CRISPR type I-D associated proteins Cas5d, Cas6d and Cas7d, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, and

thereby the Cas proteins and the guide RNA are introduced into the cell.

8. The method according to any one of claims 2 to 6, wherein a complex is introduced into the cell, the complex comprises:

(i) CRISPR type I-D associated proteins Cas3d, Cas5d, Cas6d, Cas7d and Cas10d, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, and

thereby the Cas proteins and the guide RNA are introduced into the cell.

9. The method according to any one of claims 1, 3 and 6, wherein an expression vector is introduced into the cell, the expression vector comprises:

(i) nucleic acids encoding CRISPR type I-D associated proteins Cas5d, Cas6d and Cas7d, and

(ii) a DNA encoding a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, and

thereby the nucleic acids encoding the Cas proteins and the DNA encoding the guide RNA are introduced into the cell.

10. The method according to any one of claims 2 to 6, wherein an expression vector is introduced into the cell, the expression vector comprises:

(i) nucleic acids encoding CRISPR type I-D associated proteins Cas3d, Cas5d, Cas6d, Cas7d and Cas10d, and

(ii) a DNA encoding a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence, and

thereby the nucleic acids encoding the Cas proteins and the DNA encoding the guide RNA are introduced into the cell.

11. A composition for targeting a target nucleotide sequence, comprising a complex comprising:

i) CRISPR type I-D associated proteins Cas5d, Cas6d and Cas7d, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence,

wherein Cas5d, Cas6d and Cas7d have target recognition activity, and

wherein, in a case where a fusion protein of the Cas5d, Cas6d or Cas7d with a polypeptide other than Cas3d and Cas10d is formed in the targeting, the polypeptide other than Cas3d and Cas10d is guided to the target nucleotide sequence by the action of the Cas5d, Cas6d and Cas7d and the guide RNA.

12. A composition for targeting a target nucleotide sequence, comprising an expression vector comprising:

(i) nucleic acids encoding CRISPR type I-D associated proteins Cas5d, Cas6d and Cas7d, and

(ii) a DNA encoding a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence,

wherein Cas5d, Cas6d and Cas7d have target recognition activity, and

wherein, in a case where a fusion protein of the Cas5d, Cas6d or Cas7d with a polypeptide other than Cas3d and Cas10d is formed in the targeting, the polypeptide other than Cas3d and Cas10d is guided to the target nucleotide sequence by the action of the Cas5d, Cas6d and Cas7d and the guide RNA.

13. A composition for altering a target nucleotide sequence, comprising a complex comprising:

(i) CRISPR type I-D associated proteins Cas3d, Cas5d, Cas6d, Cas7d and Cas10d, and

(ii) a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence,

wherein the target nucleotide sequence is a double-stranded DNA, and

wherein Cas5d, Cas6d and Cas7d have target recognition activity, and Cas3d and Cas10d have polynucleotide cleavage activity.

14. A composition for altering a target nucleotide sequence, comprising an expression vector comprising:

(i) nucleic acids encoding CRISPR type I-D associated proteins Cas3d, Cas5d, Cas6d, Cas7d and Cas10d, and

(ii) a DNA encoding a guide RNA comprising a sequence complementary to the target nucleotide sequence, and common repetitive sequences derived from a CRISPR locus, preceding and following the complementary sequence,

wherein the target nucleotide sequence is a double-stranded DNA, and

wherein Cas5d, Cas6d and Cas7d have target recognition activity, and Cas3d and Cas10d have polynucleotide cleavage activity.

15. The composition according to any one of claims 11 to 14, wherein the guide RNA comprises a sequence consisting of 20 to 50 nucleotides which is complementary to the target nucleotide sequence.