

Claims:

1. A composition for tethering donor DNA to a nuclease, the composition comprising a nucleic acid comprising donor DNA and a consensus sequence for a DNA binding domain; and at least one of:
 - a fusion protein comprising a nuclease coupled to a DNA binding domain for binding the consensus sequence; and
 - a nucleic acid encoding the fusion protein.
2. The composition of claim 1 wherein the nuclease is a Cas protein, a Transcription activator-like effector nuclease (TALEN), a meganuclease, a Zinc Finger or a MADzyme.
3. The composition of claim 9 wherein the nuclease is a Cas protein.
4. The composition of claim 3 wherein the Cas protein is Cas9
5. The composition of any one of claims 1 to 4 wherein the fusion protein further comprises a nuclear localization sequence.
6. The composition of any one of claims 2 to 5 further comprising a guide RNA that interacts with the Cas protein and a target DNA sequence.
7. The composition of any one of claims 1 to 6 wherein the consensus sequence comprises the Lac operator (SEQ ID NO: 66), the TRP operator (SEQ ID NO: 68), the TET operator (SEQ ID NO 67), the GAL-4 binding site (SEQ ID NO: 1), or the IHF binding site (SEQ ID NO 2).
8. The composition of claim 7 wherein the consensus sequence comprises a sequence with at least 80%, 85%, 90%, 95% or at least 99% identity to the Lac operator, the TRP operator, the TET operator, the GAL-4 binding site, or the IHF binding site

9. The composition of any one of claims 1 to 8 wherein the DNA binding domain comprises the LAC repressor, TET repressor, TRP-repressor, GAL-4, or IHF, or a portion thereof sufficient to bind the consensus sequence.
10. The composition of any one of claims 1 to 9 wherein the DNA binding domain is the LAC repressor, preferably amino acids 43-403 of SEQ ID NO 9.
11. The composition of any one of claims 1 to 10 wherein the nuclease is coupled to the DNA binding domain via a linker.
12. The composition of claim 8 wherein the linker comprises a sequence selected from any one of SEQ ID Nos: 3 to 7, a GGS linker, or amino acids 404-419 of SEQ ID NO 9.
13. The composition of any one of claims 1 to 12 wherein the fusion protein comprises the LAC repressor and Cas9.
14. The composition of any one of claims 1 to 13 comprising a vector, wherein the vector comprises either or both of:
 - a. the nucleic acid comprising the donor DNA and the consensus sequence for a DNA binding domain; and
 - b. the nucleic acid encoding the fusion protein.
15. The composition of claim 14 wherein the vector further comprises a nucleic acid sequence encoding a guide RNA that interacts with the Cas protein and a target DNA sequence.
16. The composition of any one of claims 1 to 15, wherein the fusion protein is nuclease deficient.
17. An isolated host cell comprising the composition of any one of claims 1 to 16.
18. A method for editing DNA in a cell, the method comprising;

contacting the cell with the composition of any one of claims 1 to 15 under conditions suitable for the interaction of the fusion protein with a target DNA sequence.

19. A method for editing DNA in a cell, the method comprising
 - a) contacting the cell with the composition of claim 16 under conditions suitable for the interaction of the fusion protein with a first target DNA sequence; and
 - b) contacting the cell with a nucleic acid editing system adapted to edit the genomic DNA at a second target DNA sequence, under conditions suitable for nucleic acid editing.
20. The method of claim 18 or 19 wherein the target DNA sequence is selected from genomic DNA, mitochondrial DNA, viral DNA, or exogenous DNA.
21. The method of any one of claims 18 to 20 wherein the efficiency of editing is at least 50%, at least 55%, at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90% at least 95%, or at least 99%.
22. The method of any one of claims 18 to 21 wherein the cell is in a subject, preferably a human subject.
23. A kit comprising:
 - a nucleic acid comprising donor DNA and a consensus sequence for a DNA binding domain; and at least one of
 - a fusion protein comprising a nuclease coupled to a DNA binding domain for binding the consensus sequence; and
 - a nucleic acid encoding the fusion protein.
24. The kit of claim 23 wherein the nuclease is a Cas protein, a Transcription activator-like effector nuclease (TALEN), a meganuclease, a Zinc Finger or a MADzyme.
25. The kit of claim 24 wherein the Cas protein is Cas9.