CLAIMS

1. A mutated Cpf1 polypeptide comprising a mutated amino acid residue corresponding to amino acid position S542 of AsCpf1, in which the mutated Cpf1 polypeptide is not naturally-occurring and recognizes a PAM sequence which is not recognized by the corresponding wild-type Cpf1.

2. A mutated Cpf1 polypeptide according to Claim 1, in which the mutated amino acid residue corresponding to amino acid position S542 of AsCpf1 is R.

3. A mutated Cpf1 polypeptide according to Claim 1 or 2, in which the mutated Cpf1 polypeptide further comprises one or more mutated amino acid residues corresponding to amino acid positions K548, M604, K607, or T167 of AsCpf1.

4. A mutated Cpf1 polypeptide according to Claim 3, in which the mutated amino acid residue corresponding to amino acid position K548 of AsCpf1 is R or V.

5. A mutated Cpf1 polypeptide according to Claim 3, in which the mutated amino acid residue corresponding to amino acid position K607 of AsCpf1 is R.

6. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide further comprises one or more mutated amino acid residues corresponding to amino acid positions N547, K550, N551, or N552 of AsCpf1.

7. A mutated Cpf1 polypeptide according to Claim 6, in which the mutated amino acid residue corresponding to amino acid position N552 of AsCpf1 is R.

8. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide is a mutated AsCpf1.

9. A mutated Cpf1 polypeptide according to Claim 8, in which the mutated AsCpf1 comprises an S542R mutation.

10. A mutated Cpf1 polypeptide according to Claim 8 or 9, in which the mutated AsCpf1 comprises a K548R or a K548V mutation.

11. A mutated Cpf1 polypeptide according to Claim 8, 9 or 10, in which the mutated AsCpf1 comprises one of the following combinations of mutations: S542R and K548R; S542R and K548V; S542R and K607R; S542R and K607A; K548R and N552R; K548V and

N552R; K548V and N552G; S542R, K548V and N552R; S542R, K550Y and K607R; S542R, K607R and N547K; S542R, K607R and K548V; S542R, K607R and N551R; S542R, K607R and N552S; S542R, K548V and N552G; S542R, K548R, K550Y and K607R; S542R, K548V, N551R and N552R; S542R, K607R, N547K and K550Y; S542R, K607R, N547K and N551R; S542R, K607R, N547K and N552S; S542R, K607R ,K550Y and N551R; S542R, K607R, K550Y and N552S; S542R, K607R, N551R and N552S; S542R, K548V, N551R and N552G; or S542R, K607R, N547K, K550Y, N551R and N552S.

12. A mutated Cpf1 polypeptide according to any of Claims 8 to 11, in which the mutated AsCpf1 comprises one of the following combinations of mutations: S542R and K548R; S542R and K548V; S542R and K607R; or S542R, K548V and N552R.

13. A mutated Cpf1 polypeptide according to any of Claims 1 to 7, in which the mutated Cpf1 polypeptide is a mutated LbCpf1.

14. A mutated Cpf1 polypeptide according to Claim 13, in which the mutated LbCpf1 comprises a G532R mutation.

15. A mutated Cpf1 polypeptide according to Claim 13 or 14, in which the mutated LbCpf1 comprises a K538R or a K538V mutation.

16. A mutated Cpf1 polypeptide according to Claim 13, 14 or 15, in which the mutated LbCpf1 comprises one of the following combinations of mutations: G532R and K595R; G532R and K538V; or G532R, K538V and Y542R.

17. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide further comprises a mutated amino acid residue corresponding to amino acid position E174 of AsCpf1.

18. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide further comprises a mutated amino acid residue corresponding to amino acid position M537 of AsCpf1.

19. A mutated Cpf1 polypeptide according to Claim 18, in which the mutated amino acid residue corresponds to amino acid position M537 of AsCpf1 is R.

20. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide further comprises a mutated amino acid residue in a catalytic domain.

21. A mutated Cpf1 polypeptide according to Claim 20, in which the mutated Cpf1 polypeptide is a nickase.

22. A mutated Cpf1 polypeptide according to Claim 20, in which the mutated Cpf1 polypeptide is a catalytically inactive Cpf1.

23. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide is fused to a heterologous functional domain.

24. A mutated Cpf1 polypeptide according to Claim 23, in which the heterologous functional domain has one or more of the following activities: methylase activity, demethylase activity, transcription activation activity, transcription repression activity, transcription release factor activity, histone modification activity, RNA cleavage activity, DNA cleavage activity, or nucleic acid binding activity.

25. A mutated Cpf1 polypeptide according to Claim 23, in which the mutated Cpf1 polypeptide is fused to a transcriptional activation domain or a transcriptional repression domain.

26. A mutated Cpf1 polypeptide according to Claim 23, in which the mutated Cpf1 polypeptide is fused to a deaminase domain.

27. A mutated Cpf1 polypeptide according to Claim 26, in which the mutated Cpf1 polypeptide is fused to a cytidine deaminase, in which the cytidine deaminase converts a C to a U in the non-targeted strand of the target DNA.

28. A mutated Cpf1 polypeptide according to Claim 27, in which the cytidine deaminase is fused to the carboxy terminus of the mutated Cpf1 polypeptide.

29. A mutated Cpf1 polypeptide according to Claim 27 or 28, in which the mutated Cpf1 polypeptide or the cytidine deaminase is further fused to a uracil DNA glycosylase inhibitor

30. A mutated Cpf1 polypeptide according to any preceding claim, in which the mutated Cpf1 polypeptide is fused to one or more nuclear localization signals (NLSs).

31. A polynucleotide encoding a mutated Cpf1 polypeptide according to any preceding claim.

32. A polynucleotide according to Claim 31, in which the polynucleotide is codon optimized for expression in a eukaryotic cell.

33. A polynucleotide according to Claim 31 or 32, in which the polynucleotide is an mRNA.

34. An expression vector comprising a polynucleotide according to Claim 31, 32 or 33.

35. A CRISPR-Cas system comprising (a) a mutated Cpf1 polypeptide according to any of Claims 1 to 30 or a polynucleotide encoding the mutated Cpf1 polypeptide and (b) a gRNA capable of forming a CRISPR-Cpf1 complex with the mutated Cpf1 polypeptide.

36. A CRISPR-Cas system according to Claim 35, in which the gRNA comprises a 3' guide sequence linked to a 5' direct repeat sequence.

37. A delivery system comprising a mutated Cpf1 polypeptide according to any of Claims 1 to 30 or a polynucleotide encoding the mutated Cpf1 polypeptide.

38. A delivery system according to Claim 37, in which the delivery system comprises a liposomal, particle, exosomal, microvesicle, gene-gun, or viral delivery system.

39. An isolated eukaryotic host cell comprising a mutated Cpf1 polypeptide according to any of Claims 1 to 30 or a polynucleotide encoding the mutated Cpf1 polypeptide.

40. A method of modifying or targeting a target DNA locus in a eukaryotic cell or cell line *in vitro* or *ex vivo*, the method comprising delivering the CRISPR-Cas system according to Claim 35 or 36 into the eukaryotic cell.