THAT WHICH IS CLAIMED:

1. A nucleic acid molecule comprising a polynucleotide encoding a deaminase polypeptide, wherein the deaminase polypeptide is encoded by a nucleotide sequence that:

a) has at least 85% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

2. The nucleic acid molecule of claim 1, wherein the deaminase polypeptide is encoded by a nucleotide sequence that:

a) has at least 90% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

3. The nucleic acid molecule of claim 1, wherein the deaminase polypeptide is encoded by a nucleotide sequence that:

a) has at least 95% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

4. The nucleic acid molecule of claim 1, wherein the deaminase polypeptide is encoded by a nucleotide sequence that:

a) is set forth as any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes the amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

5. A fusion protein comprising a DNA-binding polypeptide and a deaminase, the deaminase comprising an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

6. The fusion protein of claim 5, wherein the deaminase comprises an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

7. The fusion protein of claim 5, wherein the deaminase comprises an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

8. The fusion protein of claim 5, wherein the deaminase comprises the amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

9. The fusion protein of claim 5, wherein the deaminase is an adenine deaminase.

10. The fusion protein of any one of claims 5-9, wherein the DNA-binding polypeptide is an RNA-guided, DNA-binding polypeptide, a meganuclease, zinc finger fusion protein, or a TALEN.

11. The fusion protein of claim 10, wherein the RNA-guided, DNA-binding polypeptide is an RNA-guided nuclease (RGN) nickase.

12. The fusion protein of claim 11, wherein the nickase comprises an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

13. The fusion protein of claim 12, wherein the nickase comprises an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

14. The fusion protein of claim 12, wherein the nickase comprises an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

15. The fusion protein of claim 12, wherein the nickase comprises the amino acid sequence set forth as any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

16. The fusion protein of any of claims 5-15, wherein the fusion protein further comprises at least one nuclear localization signal (NLS).

17. The fusion protein of any one of claims 5-16, wherein the fusion protein comprises the amino acid sequence set forth as any one of SEQ ID NOs: 496, 488, and 494.

18. A nucleic acid molecule comprising a polynucleotide encoding a fusion protein comprising a DNA-binding polypeptide and a deaminase, wherein the deaminase is encoded by a nucleotide sequence that:

a) has at least 85% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

19. The nucleic acid molecule of claim 18, wherein the deaminase is encoded by a nucleotide sequence that:

a) has at least 90% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

20. The nucleic acid molecule of claim 18, wherein the deaminase is encoded by a nucleotide sequence that:

a) has at least 95% sequence identity to any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or

b) encodes an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

21. The nucleic acid molecule of claim 18, wherein the deaminase is encoded by a nucleotide sequence that:

a) is set forth as any one of SEQ ID NOs: 451, 443, 449, 11-20, 444-448, 450, and 452-485, or b) encodes the amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

22. The nucleic acid molecule of any one of claims 18-21, wherein the deaminase is an adenine deaminase.

23. The nucleic acid molecule of any of claims 18-22, wherein the polynucleotide encoding the fusion protein is codon optimized for expression in a eukaryotic cell.

24. The nucleic acid molecule of any of claims 18-23, wherein the fusion protein comprises the amino acid sequence set forth as any one of SEQ ID NOs: 496, 488, and 494.

25. A vector comprising the nucleic acid molecule of any one of claims 18-24.

26. The vector of claim 25, further comprising at least one nucleotide sequence encoding a guide RNA (gRNA) capable of hybridizing to a target sequence.

27. A system for modifying a target DNA molecule comprising a target DNA sequence, said system comprising:

a) a fusion protein comprising an RNA-guided nuclease (RGN) polypeptide and a deaminase, wherein the deaminase has an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441, or a nucleotide sequence encoding said fusion protein; and

b) one or more guide RNAs capable of hybridizing to said target DNA sequence or one or more nucleotide sequences encoding the one or more guide RNAs (gRNAs); and

wherein the one or more guide RNAs are capable of forming a complex with the fusion protein in order to direct said fusion protein to bind to said target DNA sequence and modify the target DNA molecule.

28. The system of claim 27, wherein the deaminase has an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

29. The system of claim 27, wherein the deaminase has an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

30. The system of claim 27, wherein the deaminase has the amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441.

31. The system of any one of claims 27-30, wherein the RGN of the fusion protein is a Type II CRISPR-Cas polypeptide or a Type V CRISPR-Cas polypeptide.

32. The system of any one of claims 27-31, wherein the RGN of the fusion protein is an RGN nickase.

33. The system of claim 32, wherein the nickase comprises an amino acid sequence having at least 85% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

34. The system of claim 33, wherein the nickase comprises an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

35. The system of claim 33, wherein the nickase comprises an amino acid sequence having at least 95% sequence identity to any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

36. The system of claim 33, wherein the RGN nickase is any one of SEQ ID NOs: 42, 52-59, 61, 397, and 398.

37. The system of any one of claims 27-36, wherein the fusion protein comprises the amino acid sequence set forth as any one of SEQ ID NOs: 496, 488, and 494.

38. A method for modifying a target DNA molecule comprising a target DNA sequence, said method comprising delivering a system according to any one of claims 27-37 to said target DNA molecule or a cell comprising the target DNA molecule.

39. A method for modifying a target DNA molecule comprising a target sequence comprising:

a) assembling an RGN-deaminase ribonucleotide complex *in vitro* by combining:

i) one or more guide RNAs capable of hybridizing to the target DNA sequence; and

ii) a fusion protein comprising an RNA-guided nuclease polypeptide (RGN), and at least one deaminase, wherein the deaminase has an amino acid sequence having at least 90% sequence identity to any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441;

under conditions suitable for formation of the RGN-deaminase ribonucleotide complex; and

b) contacting said target DNA molecule or a cell comprising said target DNA molecule with the *in vitro*-assembled RGN-deaminase ribonucleotide complex;

wherein the one or more guide RNAs hybridize to the target DNA sequence, thereby directing said fusion protein to bind to said target DNA sequence and modification of the target DNA molecule occurs.

40. The method of claim 39, wherein said modified target DNA molecule comprises an A>N mutation of at least one nucleotide within the target DNA molecule, wherein N is C, G, or T, or an A>G mutation of at least one nucleotide within the target DNA molecule.

41. A deaminase polypeptide comprising an amino acid sequence having at least 85% sequence identity to SEQ ID NO: 407.

42. The deaminase polypeptide of claim 41, wherein the polypeptide comprises an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 407.

43. The deaminase polypeptide of claim 41, wherein the polypeptide comprises an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 407.

44. The deaminase polypeptide of claim 41, wherein the polypeptide comprises the amino acid sequence set forth as SEQ ID NO: 407.

45. A deaminase polypeptide comprising an amino acid sequence having at least 85% sequence identity to SEQ ID NO: 405.

46. The deaminase polypeptide of claim 45, wherein the polypeptide comprises an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 405.

47. The deaminase polypeptide of claim 45, wherein the polypeptide comprises an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 405.

48. The deaminase polypeptide of claim 45, wherein the polypeptide comprises the amino acid sequence set forth in SEQ ID NO: 405.

49. A deaminase polypeptide comprising an amino acid sequence having at least 85% sequence identity to SEQ ID NO: 399.

50. The deaminase polypeptide of claim 49, wherein the polypeptide comprises an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 399.

51. The deaminase polypeptide of claim 49, wherein the polypeptide comprises an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 399.

52. The deaminase polypeptide of claim 49, wherein the polypeptide comprises an amino acid sequence set forth in SEQ ID NO: 399.

53. A ribonucleoprotein (RNP) complex comprising the fusion protein of any one of claims 5-17 and a guide RNA bound to the DNA-binding polypeptide of the fusion protein.

54. A cell comprising the fusion protein of any of claims 5-17, the nucleic acid molecule of any one of claims 18-24, the vector of claim 25 or 26, or the RNP complex of claim 53.

55. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and the fusion protein of any of claims 5-17, the nucleic acid molecule of any one of claims 18-24, the vector of claim 25 or 26, the RNP complex of claim 53, the cell of claim 54, or the system of any one of claims 27-37.

56. A system for modifying a target DNA molecule comprising a target DNA sequence, said system comprising:

a) a fusion protein comprising an RNA-guided nuclease polypeptide (RGN) and a deaminase, wherein the deaminase has an amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441, or a nucleotide sequence encoding said fusion protein; and

b) one or more guide RNAs, or one or more polynucleotides comprising one or more nucleotide sequences encoding the one or more guide RNAs.

57. A complex comprising (i) a fusion protein comprising an RNA-guided nuclease polypeptide (RGN) and a deaminase, wherein the deaminase has an amino acid sequence set forth as any one of SEQ ID NOs: 407, 399, 405, 1-10, 400-404, 406, and 408-441, bound to (ii) a non-natural guide RNA (gRNA).

58. The complex of claim 57, wherein the non-natural gRNA comprises one or more synthetic ribonucleotide analogues.

59. The complex of claim 57 or 58, wherein the non-natural gRNA is a single guide RNA.