# CLAIMS

What is claimed is:

1. A method of assaying for a target nucleic acid in a sample, the method comprising:

a) contacting the sample to a single volume comprising:

i) reagents for amplification;

ii) a type V CRISPR/Cas effector protein;

iii) a guide nucleic acid comprising a nucleotide sequence that hybridizes to a nucleic acid segment of an amplification product of the target nucleic acid; and

(iv) a detector DNA molecule;

b) amplifying the target nucleic acid in the single volume; and

c) assaying for a signal produced by cleavage of the detector DNA molecule by the type V CRISPR/Cas effector protein upon hybridization of the guide nucleic acid to the segment of the amplification product of the target nucleic acid in the single volume.

2. The method of claim 1, wherein the reagents for amplification comprise a primer, a polymerase, or a combination thereof.

3. The method of claim 1, wherein the amplifying comprises isothermal amplification.

4. The method of claim 1, whereinthe amplifying comprises one or more of: loop-mediated isothermal amplification (LAMP), helicase-dependent amplification (HDA), recombinase polymerase amplification (RPA), strand displacement amplification (SDA), nucleic acid sequence-based amplification (NASBA), transcription mediated amplification (TMA), nicking enzyme amplification reaction (NEAR), rolling circle amplification (RCA), multiple displacement amplification (MDA), ramification (RAM), circular helicase-dependent amplification (cHDA), single primer isothermal amplification (SPIA), self-sustained sequence replication (3SR), genome exponential amplification reaction (GEAR), isothermal multiple displacement amplification (IMDA), RNA amplification via T7 promoter, or polymerase chain reaction (PCR).

5. The method of claim 1, wherein the single volume is incubated at a single temperature.

6. The method of claim 1, wherein the single volume is incubated from about 37° C. to about 95° C.

7. The method of claim 1, comprising contacting the sample to reagents for reverse transcription and reverse transcribing the target nucleic acid.

8. The method of claim 1, wherein the reagents for reverse transcription comprise a reverse transcriptase and Rnase H.

9. The method of claim 1, wherein the single volume comprises reagents for reverse transcription and the method comprises reverse transcribing the target nucleic acid comprising RNA, amplifying the reverse transcribed target nucleic acid by LAMP, and assaying for the signal upon cleavage of the detector DNA molecule by the type V CRISPR/Cas effector protein.

10. The method of claim 9, wherein the reagents for reverse transcription are in the single volume.

11. The method of claim 1, wherein the target nucleic acid is single stranded or double stranded.

12. The method of claim 1, wherein the target nucleic acid is DNA or RNA.

13. The method of claim 1, wherein the target nucleic acid is a viral nucleic acid or a bacterial nucleic acid.

14. The method of claim 1, wherein the target nucleic acid is a papovavirus, a human papillomavirus (HPV), a hepadnavirus, a Hepatitis B Virus (HBV), a herpesvirus, a varicella zoster virus (VZV), an Epstein Barr virus (EBV), a Kaposi's sarcoma-associated herpesvirus, an adenovirus, a poxvirus, a parvovirus, an influenza virus, or a respiratory syncytial virus nucleic acid.

15. The method of claim 1, wherein the target nucleic acid is from a human cell.

16. The method of claim 1, wherein the target nucleic acid is a human fetal nucleic acid or a cancer cell nucleic acid.

17. The method of claim 1, wherein the type V CRISPR/Cas effector protein is a Cas12 protein comprising a Cas12a polypeptide, a Cas12b polypeptide, a Cas12c polypeptide, a Cas12d polypeptide, a Cas12e polypeptide, a C2c4 polypeptide, a C2c8 polypeptide, a C2c5 polypeptide, a C2c10 polypeptide, or a C2c9 polypeptide.

18. The method of claim 1, wherein the sample comprises a cell or a cell lysate.

19. The method of claim 1, wherein the sample is blood, saliva, biopsy, plasma, serum, bronchoalveolar lavage, sputum, a fecal sample, cerebrospinal fluid, a fine needle aspirate, a buccal swab, a cervical swab, a nasal swab, interstitial fluid, synovial fluid, nasal discharge, tears, buffy coat, or a mucous membrane sample.

20. The method of claim 1, comprising determining an amount of the target nucleic acid.

21. The method of claim 1, wherein the assaying for the signal produced by cleavage of the detector DNA molecule comprises one or more of: visual based detection, sensor based detection, color detection, gold nanoparticle based detection, fluorescence polarization, colloid phase transition/dispersion, electrochemical detection, and semiconductor-based sensing.

22. The method of claim 1, wherein the detector DNA molecule produces the signal prior to cleavage of the detector DNA molecule, and the signal is reduced after cleavage of the detector DNA molecule.

23. The method of claim 1, wherein the signal increases after cleavage of the detector DNA molecule.

24. The method of claim 1, wherein the detector DNA molecule comprises one or more fluorescence-emitting dye pairs.

25. The method of claim 24, wherein the one or more fluorescence-emitting dye pairs includes a fluorescence resonance energy transfer (FRET) pair, a quencher and fluorophore pair, or a combination thereof.

26. The method of claim 1, wherein the detector DNA molecule comprises a modified nucleobase, a modified sugar moiety, a modified nucleic acid linkage, or a combination thereof.

27. The method of claim 1, wherein the guide nucleic acid comprises a constant region comprising the nucleotide sequence set forth in SEQ ID NO:11.