WHAT IS CLAIMED IS:

1. A method of amplifying a target nucleic acid in a sample, said method comprising

incubating said target nucleic acid in a polymerase chain reaction mixture comprising:

at least one primer,

a hybrid polymerase comprising a polymerase domain and a heterologous DNA binding domain, and

an additive selected from the group consisting of less than 600 mM sarcosine and heparin, in a sufficient amount to improve efficiency of the amplification reaction by at least 10% compared to a reaction mixture lacking the additive,

wherein said incubating is under conditions that permit amplification of said target nucleic acid by said hybrid polymerase.

2. The method of claim 1, wherein said hybrid polymerase comprises a Family B-like polymerase that substantially lacks a 3'-5' exonuclease activity.

3. The method of claim 1, wherein the hybrid polymerase comprises SEQ ID NO:2.

4. The method of claim 1, wherein the hybrid polymerase is complexed with one or more antibodies prior to a heating step during the incubating step.

5. The method of claim 4, wherein the antibody comprises a heavy chain variable region and a light chain variable region, wherein the variable regions comprise complementary determining regions (CDRs), wherein:

(a) the heavy chain variable region CDRs comprise SEQ ID NO:22, SEQ ID NO:23, and SEQ ID NO:24, and the light chain variable region CDRs comprise SEQ ID NO:25, SEQ ID NO:26, and SEQ ID NO:27; or

(b) the heavy chain variable region CDRs comprise SEQ ID NO:28, SEQ ED NO:29, and SEQ ID NO:30, and the light chain variable region CDRs comprise SEQ ID NO:31, SEQ ID NO:32, and SEQ ID NO:33; or

(c) the heavy chain variable region CDRs comprise SEQ ID NO:34, SEQ ID NO:35, and SEQ ID NO:36, and the light chain variable region CDRs comprise SEQ ID NO:37, SEQ ID NO:38, and SEQ ID NO:39.

6. The method of claim 1, wherein the heterologous DNA binding domain is at least 75% identical to SEQ ID NO:3.

7. The method of claim 1, wherein the reaction mixture further comprises a double-stranded DNA binding dye.

8. A polymerase chain reaction mixture comprising:

a hybrid polymerase, wherein said polymerase comprises a polymerase domain and a heterologous DNA binding domain; and

an additive selected from the group consisting of less than 600 mM sarcosine and heparin, in a sufficient amount to improve efficiency of the amplification reaction by at least 10% compared to a reaction mixture lacking the additive.

9. The reaction mixture of claim 8, further comprising at least one oligonucleotide primer.

10. The reaction mixture of claim 8, wherein said hybrid polymerase comprises a Family B-like polymerase that substantially lacks a 3'-5' exonuclease activity.

11. The reaction mixture of claim 8, wherein the polymerase comprises SEQ ID NO:2.

12. The reaction mixture of claim 8, wherein the hybrid polymerase is complexed with an antibody.

13. The reaction mixture of claim 12, wherein the antibody comprises a heavy chain variable region and a light chain variable region, wherein the variable regions comprise complementary determining regions (CDRs), wherein:

(a) the heavy chain variable region CDRs comprise SEQ ID NO:22, SEQ ID NO:23, and SEQ ID NO:24, and the light chain variable region CDRs comprise SEQ ID NO:25, SEQ ID NO:26, and SEQ ID NO:27; or

(b) the heavy chain variable region CDRs comprise SEQ ID NO:28, SEQ ID NO:29, and SEQ ID NO:30, and the light chain variable region CDRs comprise SEQ ID NO:31, SEQ ID NO:32, and SEQ ID NO:33; or

(c) the heavy chain variable region CDRs comprise SEQ ID NO:34, SEQ ID NO:35, and SEQ ID NO:36, and the light chain variable region CDRs comprise SEQ ID NO:37, SEQ ID NO:38, and SEQ ID NO:39.

14. The reaction mixture of claim 8, wherein the heterologous DNA binding domain is at least 75% identical to SEQ ID NO:3.

15. The reaction mixture of claim 8, wherein the reaction mixture further comprises a double-stranded DNA binding dye.

16. A kit comprising:

a hybrid polymerase comprising a polymerase domain and a heterologous DNA binding domain; and

an additive selected from the group consisting of less than 600 mM sarcosine and heparin, in a sufficient amount to improve efficiency of an amplification reaction by at least 10% compared to a reaction mixture lacking the additive.

17. The kit of claim 16, wherein said said hybrid polymerase comprises a Family B-like polymerase that substantially lacks a 3'-5' exonuclease activity.

18. The kit of claim 16, wherein the hybrid polymerase comprise SEQ ID NO:2.

19. The kit of claim 16, further comprising an antibody that is specific for the hybrid polymerase.

20. The kit of claim 19, wherein the antibody comprises a heavy chain variable region and a light chain variable region, wherein the variable regions comprise complementary determining regions (CDRs), wherein:

(a) the heavy chain variable region CDRs comprise SEQ ID NO:22, SEQ ID NO:23, and SEQ ID NO:24, and the light chain variable region CDRs comprise SEQ ID NO:25, SEQ ID NO:26, and SEQ ID NO:27; or

(b) the heavy chain variable region CDRs comprise SEQ ID NO:28, SEQ ID NO:29, and SEQ ID NO:30, and the light chain variable region CDRs comprise SEQ ID NO:31, SEQ ID NO:32, and SEQ ID NO:33; or

(c) the heavy chain variable region CDRs comprise SEQ ID NO:34, SEQ ID NO:35, and SEQ ID NO:36, and the light chain variable region CDRs comprise SEQ ID NO:37, SEQ ID NO:38, and SEQ ID NO:39.

21. The kit of claim 16, wherein the heterologous DNA binding domain is at least 75% identical to SEQ ID NO:3.

22. The kit of claim 16, further comprising one or more of:

one or more different deoxyribonucleotide triphosphates;

a double-stranded DNA binding dye; and

at least one oligonucleotide primer.

~~23. An isolated antibody having binding specificity for a protein consisting of SEQ ID NO:2, wherein the antibody comprises a heavy chain and a light chain variable region, wherein the variable regions comprise complementary determining regions (CDRs), wherein:~~

~~(a) the heavy chain variable region CDRs comprise SEQ ID NO:22, SEQ ID NO:23, and SEQ ID NO:24, and the light chain variable region CDRs comprise SEQ ID NO:25, SEQ ID NO:26, and SEQ ID NO:27; or~~

~~(b) the heavy chain variable region CDRs comprise SEQ ID NO:28, SEQ ID NO:29, and SEQ ID NO:30, and the light chain variable region CDRs comprise SEQ ID NO:31, SEQ ID NO:32, and SEQ ID NO:33; or~~

~~(c) the heavy chain variable region CDRs comprise SEQ ID NO:34, SEQ ED NO:35, and SEQ ID NO:36, and the light chain variable region CDRs comprise SEQ ID NO:37, SEQ ID NO:38, and SEQ ID NO:39.~~

~~24. The antibody of claim 23, wherein the heavy chain and light chain variable regions comprise:~~

~~(a) SEQ ID NO:14 and SEQ ID NO:18, respectively;~~

~~(b) SEQ ID NO:15 and SEQ ID NO:19, respectively;~~

~~(c) SEQ ID NO:16 and SEQ ID NO:20, respectively; or~~

~~(d) SEQ ID NO:17 and SEQ ID NO:21, respectively;~~

~~25. An isolated polynucleotide encoding a polypeptide comprising a heavy chain or light chain variable region of claims 23 or claim 24.~~

~~26. An antibody of claim 23 or claim 24 complexed with a polymerase.~~

23. The method of claim 1, wherein the additive is sarcosine.

24. The method of claim 1, wherein the additive is heparin.

25. The reaction mixture of claim 8, wherein the additive is sarcosine.

26. The reaction mixture of claim 8, wherein the additive is heparin.

27. The kit of claim 16, wherein the additive is sarcosine.

28. The kit of claim 16, wherein the additive is heparin.