ProPrime Taq DNA Polymerase

Cat. No.: FP1508914 | Pack size: 250 U / 2.5 KU / 25 KU | Storage: -20 °C

Overview

ProPrime Taq DNA Polymerase is a mutant Taq enzyme generated by site-directed mutagenesis of wild-type Taq DNA polymerase. Compared with wild-type enzyme, it has higher template affinity and stronger resistance to endogenous and exogenous inhibitors.

The enzyme is antibody-modified with three monoclonal antibodies that block polymerase and 5'-3' exonuclease activity before heat activation. After heating at 95 °C for 2 min 30 sec, activity is released, providing hot-start performance for qPCR, direct whole blood amplification, anti-interference amplification, rapid PCR, and ARMS applications.

Key Features

- Mutant Taq DNA polymerase with improved template affinity and inhibitor tolerance
- Three-antibody hot-start modification for both polymerase and exonuclease activities
- Suitable for probe-based qPCR and direct amplification workflows
- Tolerates challenging sample matrices such as whole blood and crude extracts after validation
- Fast extension capability for rapid PCR and low-template detection

Product Specifications

Parameter	Specification	Notes
Product name	ProPrime Taq DNA Polymerase	Antibody-modified mutant Taq enzyme
Cat. No.	FP1508914	Available pack sizes: 250 U, 2.5 KU, 25 KU
Grade & purity	Suitable for molecular biology; EnzymoPure™; for DNA and RNA applications	Supplied enzyme concentration: 5 U/μL
Application	PCR; qPCR	Probe-based qPCR and direct amplification workflows

Parameter	Specification	Notes
Activation	95 °C for 2 min 30 sec	No special inactivation step required
Storage conditions	Store at -20 °C; avoid repeated freezing and thawing	Aliquot upon receipt when repeated use is expected
Shipping	Ice chest + ice pads	Store at -20 °C immediately upon receipt

Product Contents & Storage

Cat. No.	Component	250 U	2.5 KU	25 KU	Storage
FP1508914A	ProPrime Taq DNA Polymerase (5 U/μL)	50 μL	500 μL	5 mL	-20 °C
FP1508914B	5× GN Buffer (without Mg^{2+})	1.0 mL	10 × 1.0 mL	100 mL	-20 °C
FP1508914C	100 mM Mg^{2+}	100 μL	1.0 mL	10 mL	-20 °C

Shelf life: Store at -20 °C long term. Upon receipt, aliquot when repeated use is expected.

Note: *Avoid repeated freeze/thaw cycles. Keep the enzyme on ice during setup and protect fluorescent probes from light.*

Materials Required But Not Supplied

Item	Recommended Specification	Purpose
Template DNA	Purified DNA, whole blood, or validated crude sample	PCR/qPCR template
dNTP mix	25 mM each	DNA synthesis substrates
Forward and reverse primers	10 μM working solutions	Target amplification

Item	Recommended Specification	Purpose
Probe	10 μM working solution	Probe-based qPCR detection
ddH_2O	Nuclease-free	Reaction volume adjustment
PCR/qPCR tubes or plates	Instrument compatible	Reaction vessel
Thermal cycler or real-time PCR instrument	Compatible with assay format	Amplification and fluorescence acquisition

Preparation Before Use

1. Thaw and mix all required solutions at room temperature or 4 °C, then place on ice.
2. Scale reaction volumes proportionally as needed while maintaining final concentrations.
3. Prepare qPCR reactions on ice or in an ice box and protect probes from light.
4. Avoid vigorous shaking; mix gently by pipetting or slight vortexing and briefly centrifuge.

Protocol

Step 1 — qPCR Reaction Setup (50 μL)

Recommended template amounts in a 50 μL reaction: mammalian genomic DNA 0.1-1 μg; E. coli genomic DNA 10-100 ng; plasmid DNA 0.1-10 ng. Recommended Mg^{2+} range is 2-6 mM.

Component	Volume Added	Final Concentration
5× GN Buffer (without Mg^{2+})	10 μL	1×
dNTPs (25 mM each)	0.4 μL	0.2 mM
Template DNA	5-10 μL	-
Forward Primer (10 μM)	1 μL	0.2 μM
Reverse Primer (10 μM)	1 μL	0.2 μM
Probe (10 μM)	0.5 μL	0.1 μM
ProPrime Taq DNA Polymerase (5 U/μL)	0.5 μL	2.5 U/50 μL

Component	Volume Added	Final Concentration
$MgCl_2$ (100 mM)	1 µL	2 mM
ddH_2O	To 50 µL	-
Total Volume	50 µL	-

Step 2 — Conventional Qualitative PCR Program

Step Name	Temperature	Time	Cycles
Heat Shock	95 °C	2 min 30 sec	1
Denaturation	95 °C	20 sec	30-35
Annealing	55 °C	20 sec	30-35
Extension	72 °C	40 sec	30-35
Final Extension	72 °C	7 min	1
Storage	12 °C	∞	1

Step 3 — Fluorescent Quantitative PCR Program

Step Name	Temperature	Time	Cycles
Heat Shock	95 °C	2 min 30 sec	1
Denaturation	95 °C	15 sec	35-40
Annealing + Extension	55 °C	40 sec	35-40

Note: *Adjust thermal cycling according to template complexity, primer/probe design, amplicon length, and GC content.*

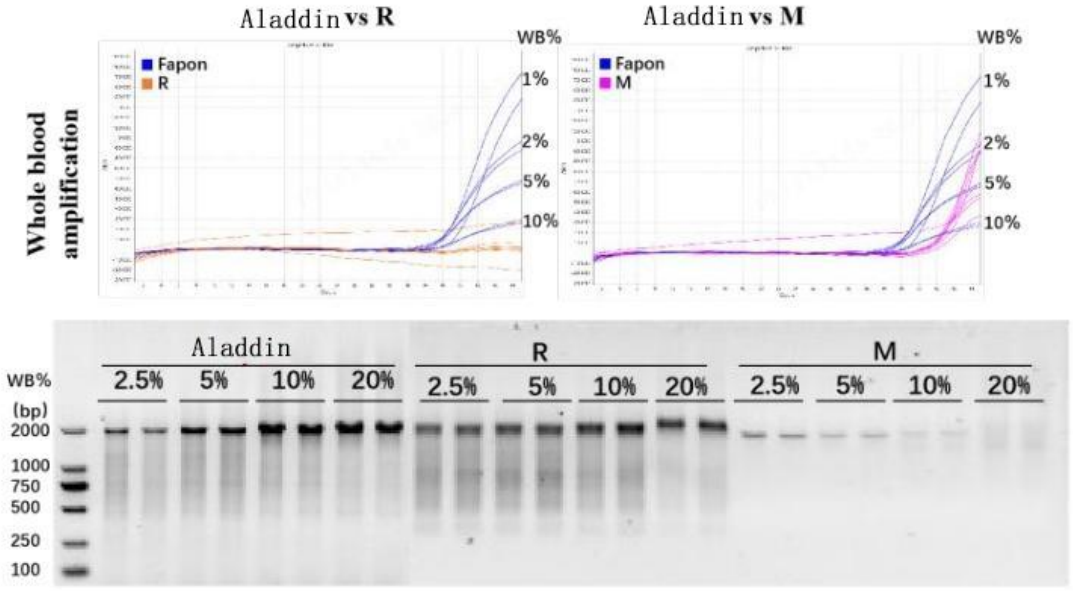
Step 4 — Direct Whole Blood and Rapid PCR Notes

- For PCR using whole blood as template, keep whole blood at or below 20% (v/v) of the reaction volume.
- For qPCR using whole blood, keep whole blood at or below 5% (v/v) because excessive blood can affect fluorescence collection.

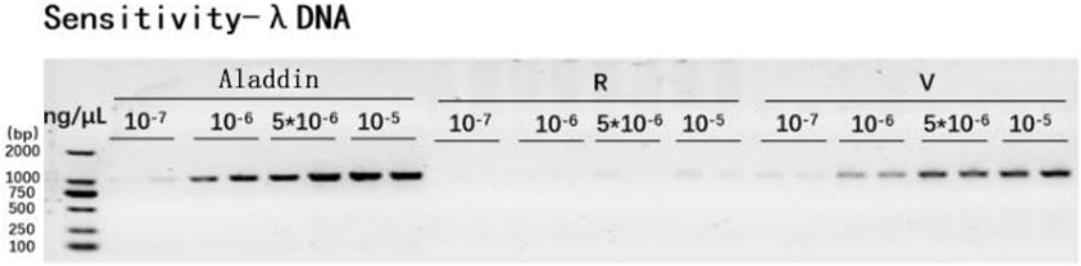
- For rapid PCR, the fastest recommended extension starting point is approximately 15 sec per kb; extend to 45 sec per kb if amplification is not satisfactory.
- For complex templates, initial denaturation may be adjusted as needed.

Experimental Examples

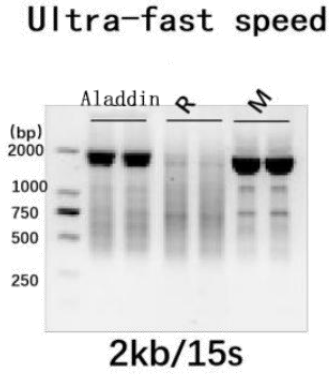
1. In direct whole blood amplification, the tolerance to whole blood of two competing products and Aladdin Taq DNA Polymerase was compared. The results showed that Aladdin Taq DNA Polymerase had stronger tolerance to whole blood: it could tolerate 10% whole blood in qPCR projects and 20% whole blood in PCR projects.



2. Using λDNA as the template to amplify a 1 kb target fragment, Aladdin antibody-modified enzyme exhibits higher amplification sensitivity, and its amplification efficiency with low template is significantly better than that of two competing products.



3. Using human genomic DNA as the template to amplify a 2 kb target fragment, the Aladdin antibody-modified enzyme can amplify the target fragment in a shorter extension time, with an average extension rate of 7.5 seconds per kilobase (s/kb), making it suitable for rapid PCR.



Safety & Precautions

- Use validated primers and probes and include no-template controls for qPCR runs.
- Protect fluorescent probes from light and verify the acquisition step on the real-time PCR instrument.
- When using crude or inhibitor-rich samples, validate matrix tolerance and template input for each assay.
- Read the current SDS before use and wear appropriate personal protective equipment.

Quality Control

QC Item	Method	Acceptable Range
Component completeness	Visual inspection on receipt	Components, labels, pack size, lot number, and expiry information match the product contents table
Enzyme concentration	Approved product specification and activity assignment	ProPrime Taq DNA Polymerase supplied at 5 U/µL

QC Item	Method	Acceptable Range
Functional performance	PCR/qPCR amplification with qualified template	Expected amplification in positive reactions; no amplification in appropriate negative controls
Nuclease status	DNase/RNase functional testing where applicable	Meets approved specification for molecular biology applications
Storage verification	Review receipt condition and storage record	Cold-chain shipment received intact and stored at -20 °C immediately

Troubleshooting

Issue	Possible Causes	Corrective Action
No or weak amplification	• Template quantity or quality not suitable • Missing component or incorrect reaction setup • Annealing temperature or Mg^{2+} concentration not optimized • Enzyme damaged by improper storage	• Verify template integrity and amount • Check reaction setup against the table • Optimize annealing temperature and Mg^{2+} concentration • Use fresh aliquots and avoid repeated freeze/thaw cycles
Nonspecific bands or smearing	• Primer specificity is poor • Template amount too high • Annealing temperature too low • Too many cycles or excess enzyme	• Redesign primers and verify with BLAST • Reduce template input • Increase annealing temperature or use hot-start workflow • Reduce cycle number or enzyme amount after validation

Issue	Possible Causes	Corrective Action
Primer-dimer formation	• Complementarity at primer 3'-ends • Primer concentration too high • Room-temperature setup before hot-start activation	• Redesign primers to reduce 3'-end complementarity • Reduce primer concentration within validated range • Assemble reactions on ice and start cycling promptly
Poor qPCR baseline or fluorescence	• Probe or dye degradation • Incorrect ROX setting or acquisition step • Inhibitory template matrix	• Protect fluorescent reagents from light • Verify instrument dye/ROX settings and acquisition step • Dilute template or improve sample cleanup

Recommended Applications

Hot-start qPCR · direct whole blood amplification · anti-interference amplification · rapid PCR · ARMS assays · low-template detection

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