

 Now includes
Q5 Blood Direct PCR Master Mix

Q5[®] High-Fidelity DNA Polymerase

THE FINEST IN FIDELITY – FOR OVER 10 YEARS



 NEW ENGLAND
Biolabs[®]

The finest in fidelity – for over 10 years

How time flies! It has been over 10 years since the release of Q5[®] High-Fidelity DNA Polymerase. In that time, it has set the standard for performance and fidelity (>280 times higher fidelity than *Taq*). Its unique buffer system provides superior performance for a broad range of amplicons, regardless of GC content.

Q5 is featured in multiple products to support a range of applications, and we are proud to announce our newest release for direct sample amplification: **Q5 Blood Direct 2X Master Mix**.



View the full product portfolio and request your free sample at Q5PCR.com

Trust Q5 FOR ALL YOUR HIGH-FIDELITY NEEDS



PCR

- Q5 High-Fidelity DNA Polymerase (NEB #M0491)
- Q5 Hot Start High-Fidelity DNA Polymerase (NEB #M0493)
- Q5U Hot Start High-Fidelity DNA Polymerase (NEB #M0515)
- Q5 High-Fidelity 2X Master Mix (NEB #M0492)
- Q5 Hot Start High-Fidelity 2X Master Mix (NEB #M0494)
- Q5 High-Fidelity PCR Kit (NEB #E0555)



NGS LIBRARY AMPLIFICATION

- NEBNext Ultra™ II Q5 Master Mix (NEB #M0544)
- NEBNext Q5U[®] Master Mix (NEB #M0597)



ARTIC VIRAL SEQUENCING

- One-Step**
LunaScript[®] Multiplex One-Step RT-PCR Kit (NEB #E1555)
- Two-Step**
LunaScript RT SuperMix (NEB #M3010)
- Q5 Hot Start High-Fidelity 2X Master Mix (NEB #M0494)



DIRECT SAMPLE AMPLIFICATION

- Q5 Blood Direct 2X Master Mix (NEB #M0500)



MUTAGENESIS

- Q5 Site-Directed Mutagenesis Kit (NEB #E0554)
- Q5 Site-Directed Mutagenesis Kit (Without Competent Cells) (NEB #E0552)



Mandarin Ducks (*Aix galericulata*) are frequently featured in Chinese art and are regarded as a symbol of fidelity.

Choose Q5[®] High-Fidelity DNA Polymerase for ALL your high-fidelity PCR needs.

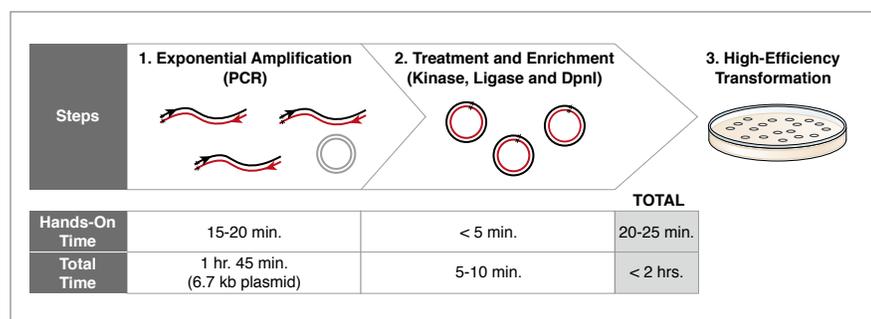
Comparison of high-fidelity polymerases

PRODUCT NAME (SUPPLIER)	POLYMERASE FIDELITY (Reported by supplier)	MAXIMUM AMPLICON LENGTH ⁵	EXTENSION TIME ⁶ (For simple templates ⁴)	EXTENSION TIME ⁶ (For complex templates ⁴)
Q5 High-Fidelity DNA Polymerase (NEB)	~280X <i>Taq</i> ¹	20 kb simple; 10 kb complex	10 s/kb	10 s/kb (< 1 kb) 20–30 s/kb (> 1 kb)
Phusion High-Fidelity DNA Polymerase (NEB)	39X <i>Taq</i> ¹	20 kb simple; 10 kb complex	15 s/kb	30 s/kb

¹ We continue to investigate improved assays to characterize Q5's very low error rate to ensure that we present the most accurate fidelity data possible (Potapov, V. and Ong, J.L. (2017) PLoS ONE. 12(1): e0169774).

Enjoy rapid, site-specific mutagenesis with the Q5 Site-Directed Mutagenesis Kit

This kit utilized the robust Q5 Hot Start High-Fidelity DNA Polymerase along with custom mutagenic primers to create substitutions, deletions and insertions in a wide variety of plasmids in less than 2 hours.



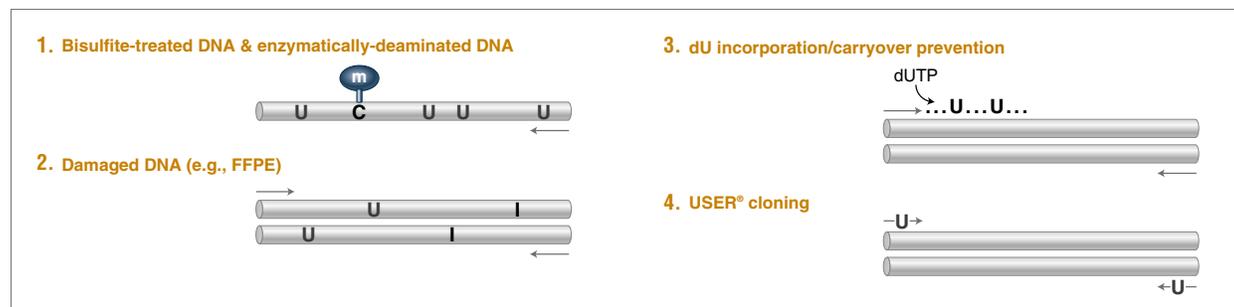
For more information visit neb.com/e0554



The use of a master mix, a unique multi-enzyme KLD enzyme mix, and a fast polymerase ensures that, for most plasmids, the mutagenesis reaction is complete in less than two hours.

Read and amplify DNA templates containing uracil and inosine bases with Q5U[®] Hot Start High-Fidelity DNA Polymerase

A modified version of Q5[®] High-Fidelity DNA Polymerase, Q5U Hot Start High-Fidelity DNA Polymerase contains a mutation in the uracil-binding pocket that enables the ability to read and amplify templates containing uracil and inosine bases, enabling superior amplification of bisulfite-converted, deaminated, or damaged DNA (e.g., FFPE).



For more information visit neb.com/0515



Archaeal family B-type polymerases can incorporate/tolerate a variety of modified nucleotides but will stall upon encountering uracil and inosine residues. Q5U Hot Start High-Fidelity DNA Polymerase is a modified Q5 High-Fidelity DNA polymerase which efficiently incorporates dUTP and amplifies uracil-containing templates. Common applications enabled by Q5U Hot Start High-Fidelity DNA Polymerase are illustrated above.

PCR direct from blood with Q5 Blood Direct 2X Master Mix

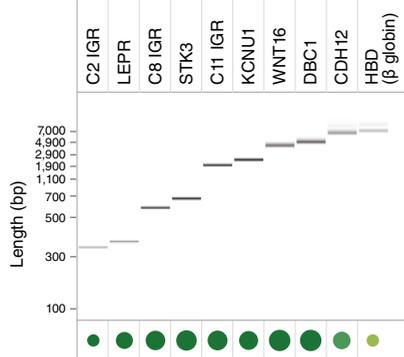
The Q5 Blood Direct 2X Master Mix can amplify a wide variety of targets directly from dried blood spots or up to 30% whole human blood, skipping DNA purification. The master mix includes Q5 Hot Start High-Fidelity DNA Polymerase and dNTPs in an optimized buffer that delivers increased resistance to inhibitors in blood, anti-coagulants, and chemicals on filter papers. It is capable of amplifying products up to 7.5 kb from human whole blood cells preserved with sodium EDTA, potassium EDTA, sodium citrate and sodium heparin, as well samples stored on common preservative filter papers.

To request a sample, visit neb.com/m0500



Q5 Blood Direct 2X Master Mix enables robust amplification directly from whole or dried blood

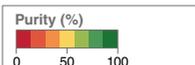
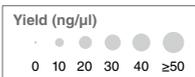
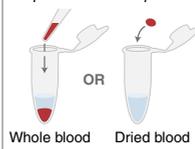
A. Target



B. Preservative

	K ₂ EDTA	Na EDTA	Na heparin	Na citrate
Percent blood				
5	●	●	●	●
10	●	●	●	●
20	●	●	●	●
30	●	●	●	●
Punch type				
903	●	●	●	●
FTA Classic	●	●	●	●
FTA Elute	●	●	●	●

Blood sample types
Added directly;
no pre-treatment required



PCR was performed using Q5 Blood Direct 2X Master Mix under standard recommended conditions with 35 cycles of amplification. Yield and purity were quantitated by microfluidic LabChip[®] analysis and are indicated by dot size and color, respectively, with a large, dark green dot representing the strongest performance.

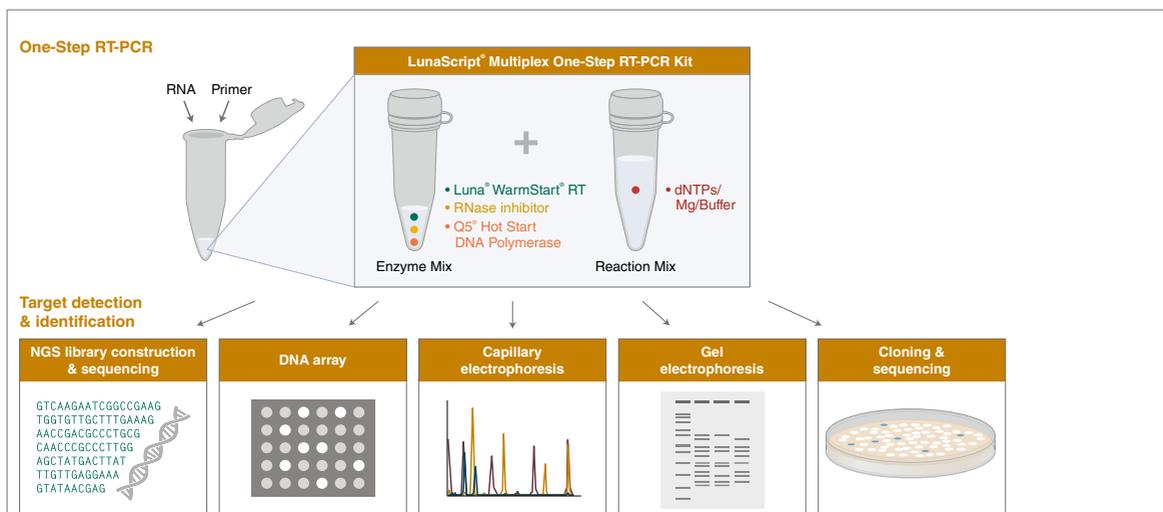
A. Amplification of a variety of human genomic amplicons, 0.3 to 7.5 kb in length, from 10% EDTA-preserved human whole blood. Results are shown as both a virtual gel (top) and corresponding dot plot (bottom). Q5 Blood Direct 2X Master Mix performs well across a broad range of amplicon sizes.

B. Amplification of a 604 bp human genomic amplicon from whole blood (top) or blood dried on filters (bottom). Human whole blood comprised 5-30% of the total reaction volume (50 μl) as indicated. Untreated 1 mm punches from dried blood spots were added directly to 25 μl reactions (one punch per reaction), even where pre-treatment of the punch was recommended by the manufacturer. Q5 Blood Direct 2X Master Mix shows broad tolerance to varying blood volumes, preservatives and punch types.

Superior Multiplexing with Luna and Q5

The LunaScript Multiplex One-Step RT-PCR Kit (NEB #E1555) offers a streamlined protocol for cDNA synthesis and PCR amplification in a single reaction. It features Luna WarmStart RT and Q5 Hot Start High-Fidelity DNA Polymerase. The kit has robust multiplex target amplification capacity and enables various applications such as diagnostics, pathogen detection, and viral genome sequencing (including the ~50 amplicons per reaction used in ARTIC SARS-CoV-2 sequencing protocols).

To request a sample, visit neb.com/e1555



One-Step RT-PCR

RNA Primer

LunaScript[®] Multiplex One-Step RT-PCR Kit

• Luna[®] WarmStart[®] RT
• RNase inhibitor
• Q5[®] Hot Start DNA Polymerase

• dNTPs/
Mg/Buffer

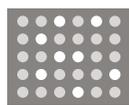
Target detection & identification

NGS library construction & sequencing

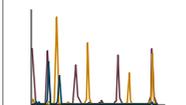
```

GTCAGAAATCGCCGAAG
TGGTGTTCCTTTGAAAG
AACCGACCCCTGGG
CAACCCGCCCTTGG
AGCTATGACTTAT
TTGTTGAGGAAA
GTATAACGAG
    
```

DNA array



Capillary electrophoresis



Gel electrophoresis



Cloning & sequencing



The five quality features of Q5 High-Fidelity DNA Polymerase

1. Extremely low error rates

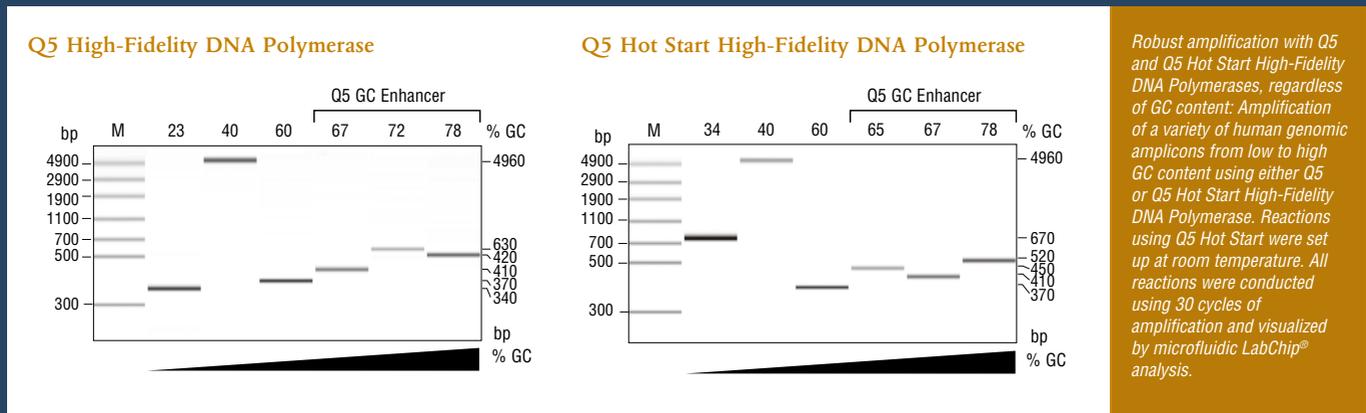
At ~280X higher than *Taq*, Q5 offers unparalleled fidelity for your most important samples.

2. Robust amplification with minimal optimization

High specificity and yield are absolute requirements for today's molecular biology techniques. Q5 delivers both for a wide range of templates.

3. Superior coverage for a broad range of amplicons, regardless of GC content

While other DNA polymerases can have difficulty amplifying high-GC or high-AT amplicons, Q5 displays superior performance for a wide range of templates.

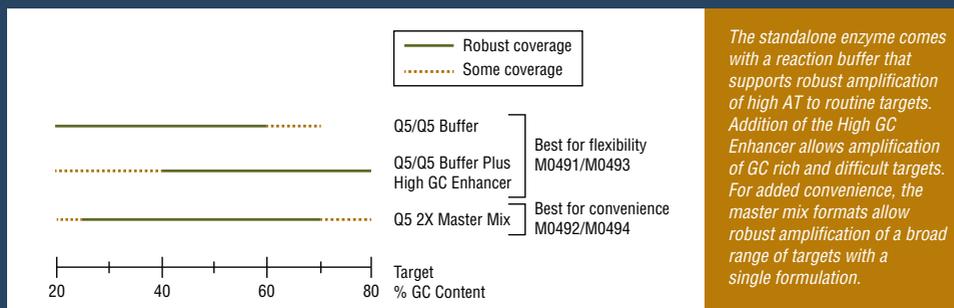


4. Shorter PCR protocols

Achieve precision without sacrificing speed. Q5's unique design incorporating the SSo7d processivity-enhancing domain enables shorter extension times, as low as 10 seconds per kb. Additionally, aptamer-based hot start requires no initial denaturation step and enables room temperature setup.

5. Templates up to 20 kb

With Q5, you can reliably amplify simple templates up to 20 kb. Complex templates up to 10 kb can also be amplified with a high degree of confidence.



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Choose from a Selection of Standalone Enzymes, Master Mixes and Kits

For your high-fidelity PCR needs.

Product	NEB #	Size
Q5 High-Fidelity DNA Polymerase	M0491S/L	100/500 units
Q5 High-Fidelity 2X Master Mix	M0492S/L	100/500 reactions
Q5 Hot Start High-Fidelity DNA Polymerase	M0493S/L	100/500 units
Q5 Hot Start High-Fidelity 2X Master Mix	M0494S/L/X	100/500 reactions
Q5 Blood Direct 2X Master Mix	M0500S/L	100/500 reactions
Q5U Hot Start High-Fidelity DNA Polymerase	M0515S/L	100/500 units
Q5 High-Fidelity PCR Kit	E0555S/L	50/200 reactions
Q5 Site-Directed Mutagenesis Kit (With or Without Competent Cells)	E0554S/E0552S	10 reactions
LunaScript Multiplex One-Step RT-PCR Kit	E1555S/L	50/250 reactions
NEBNext® Ultra II Q5 Master Mix	M0544S/L	50/250 reactions

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PCR Selector

For help with choosing the best polymerase for your PCR, try our PCR selector at PCRselector.neb.com.

Tm Calculator

For help with calculating annealing temperatures, try our Tm Calculator at TmCalculator.neb.com.



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