WATCHMAKER GENOMICS

STELLARTAQ DNA POLYMERASE

StellarTaq™ DNA Polymerase (DNAP) is engineered for extreme inhibitor tolerance, speed, and specificity. The polymerase catalyzes 5' → 3' DNA synthesis, is deficient in 3' → 5' exonuclease activity, and has 5' → 3' exonuclease making it suitable for probe digestion. It amplifies uracil-containing templates, incorporates modified bases, and performs A-tailing on DNA products. Available in hot start, non-hot start, and glycerol-free formats.

KEY FEATURES & BENEFITS

- **Extreme inhibitor tolerance** offers robust amplification across a range of clinically relevant sample types, including urine, blood, sputum, and bile
- **High speed** enables fast PCR applications
- Hot start mechanism ensures **high specificity**
- Custom formats, including with and without hot start, high concentrate, and **glycerol-free** to support lyophilization

ADVANTAGES OF PARTNERING WITH WATCHMAKER

- Purpose-designed enzymes deliver outstanding performance from prototype to large volume production and across lots
- Expedited custom labeling and kitting formats from bulk to finished goods
- Application-relevant kit-based lot testing
- IS013485-compliant Quality Management System
- Flexible terms designed with both start-up and large organizational needs in mind

APPLICATIONS

- Pathogen detection, including infectious diseases
- PCR in the presence of inhibitors
- RT-qPCR
- Fast PCR
- PCR amplification of DNA fragments ≤5 kb
- Probe and intercalating dye-based qPCR
- PCR applications where specificity is important

EXTREME INHIBITOR TOLERANCE FOR SENSITIVE PERFORMANCE WITH A RANGE OF BIOLOGICAL SAMPLES

Inhibitors — ubiquitous in biological samples — can interfere with amplification, leading to unreliable results and false negatives. Using an inhibitor-tolerant polymerase ensures reliable amplification even in the presence of challenging substances found in clinically relevant samples, essential for accurate pathogen detection. StellarTaq delivers leading inhibitor-tolerance for accurate and reproducible results every time.

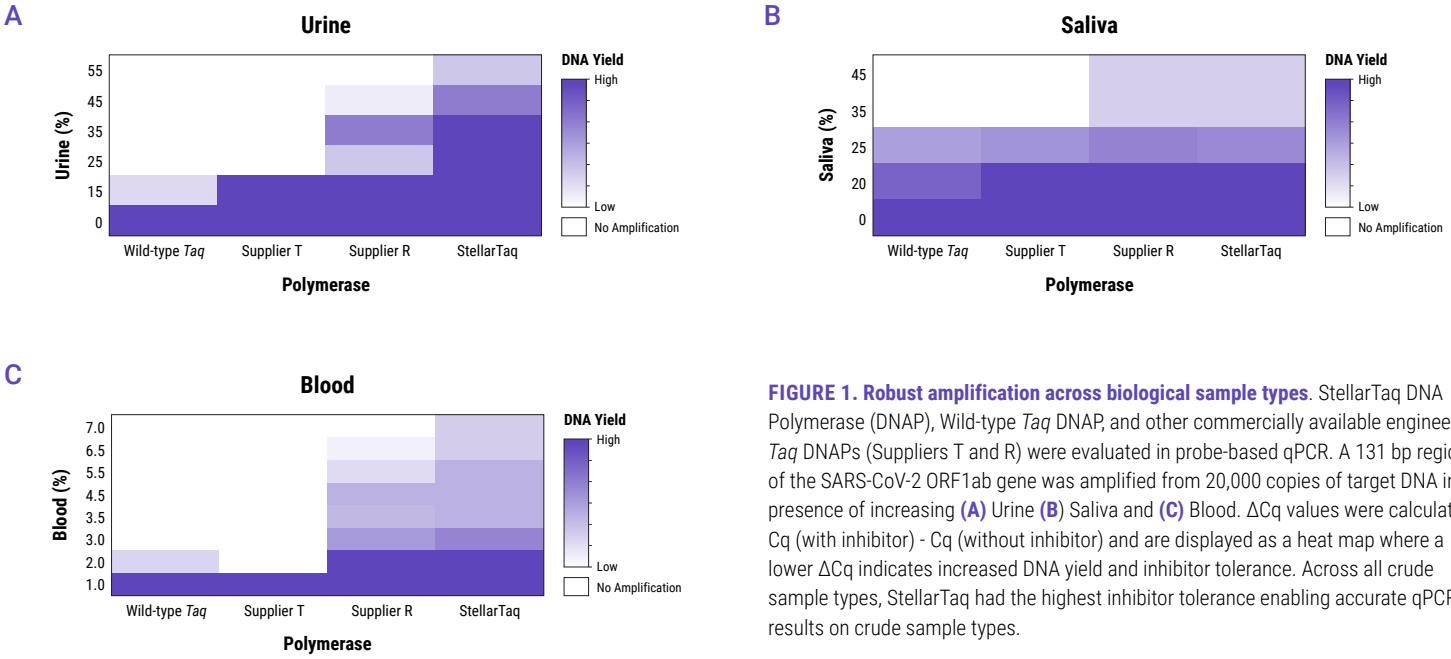

FIGURE 1. Robust amplification across biological sample types. StellarTaq DNA Polymerase (DNAP), Wild-type *Taq* DNAP, and other commercially available engineered *Taq* DNAPs (Suppliers T and R) were evaluated in probe-based qPCR. A 131 bp region of the SARS-CoV-2 ORF1ab gene was amplified from 20,000 copies of target DNA in the presence of increasing **(A)** Urine **(B)** Saliva and **(C)** Blood. ΔCq values were calculated: Cq (with inhibitor) - Cq (without inhibitor) and are displayed as a heat map where a lower ΔCq indicates increased DNA yield and inhibitor tolerance. Across all crude sample types, StellarTaq had the highest inhibitor tolerance enabling accurate qPCR results on crude sample types.

FAST POLYMERIZATION FOR RAPID RESULTS

Fast PCR is essential for pathogen detection, providing rapid identification of contaminating bacteria and viruses. StellarTaq provides significant improvements in polymerization speed to better support fast PCR assays. Its reduced reaction time enhances workflow efficiency, boosts lab throughput, and enables timely decision-making.

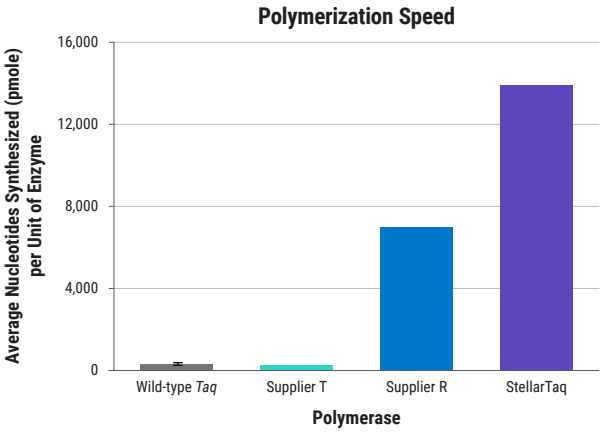

FIGURE 2. Get rapid results. StellarTaq DNAP, Wild-type *Taq* DNAP and other commercially available engineered *Taq* DNAPs (Suppliers T and R) were evaluated for polymerization speed by assessing extension of a pre-primed, ssDNA template at 72°C. Relative polymerization speed was measured over time by monitoring the fluorescence of an intercalating dye. StellarTaq had the fastest polymerization speed which enables faster workflows and ultra-fast PCR.

REDUCED INHIBITION FROM REVERSE TRANSCRIPTASES FOR ROBUST RT-QPCR

For challenging or crude samples in viral pathogen detection, increasing reverse transcriptase concentration can boost yield and sensitivity — but too much can inhibit PCR efficiency. StellarTaq is designed to tolerate a wider range of RT concentrations, ensuring consistent, high-performance qPCR without compromise.

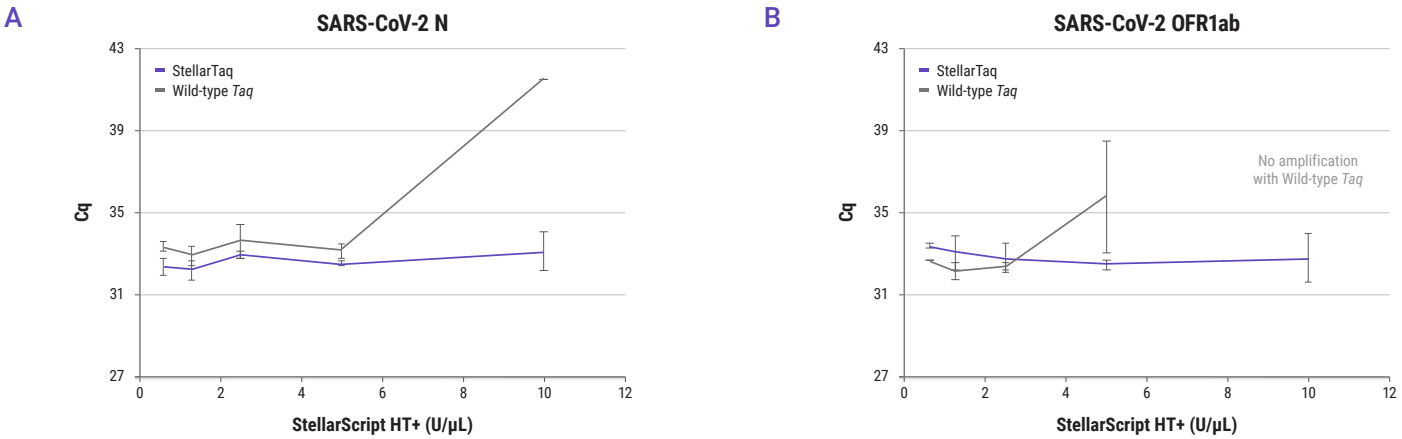

FIGURE 3. Efficient amplification in the presence of reverse transcriptase. The impact of increasing reverse transcriptase concentration (StellarScript® HT+) was assessed for StellarTaq DNAP and Wild-type *Taq* DNAP using a one-step multiplex RT-qPCR assay amplifying **(A)** a 67 bp region of SARS-COV2 N and **(B)** a 131 bp region of SARS-COV2 ORF1ab from 10 copies of target RNA. 1 ng of Universal Human Reference RNA was added to mimic a biological sample. StellarTaq had increased yield and sensitivity at higher concentrations of StellarScript HT+.

STELLARSCRIPT HT+ FOR VIRAL PATHOGEN DETECTION

Viral pathogen detection is challenging due to sample inhibitors that reduce reverse transcription efficiency and the complex secondary structures of viral RNA. StellarScript HT+ offers exceptional inhibitor tolerance and high thermostability, enabling reverse transcription at elevated temperatures to overcome RNA folding and ensure robust cDNA synthesis. This delivers consistent, high-sensitivity RT-qPCR performance across diverse and difficult sample types.

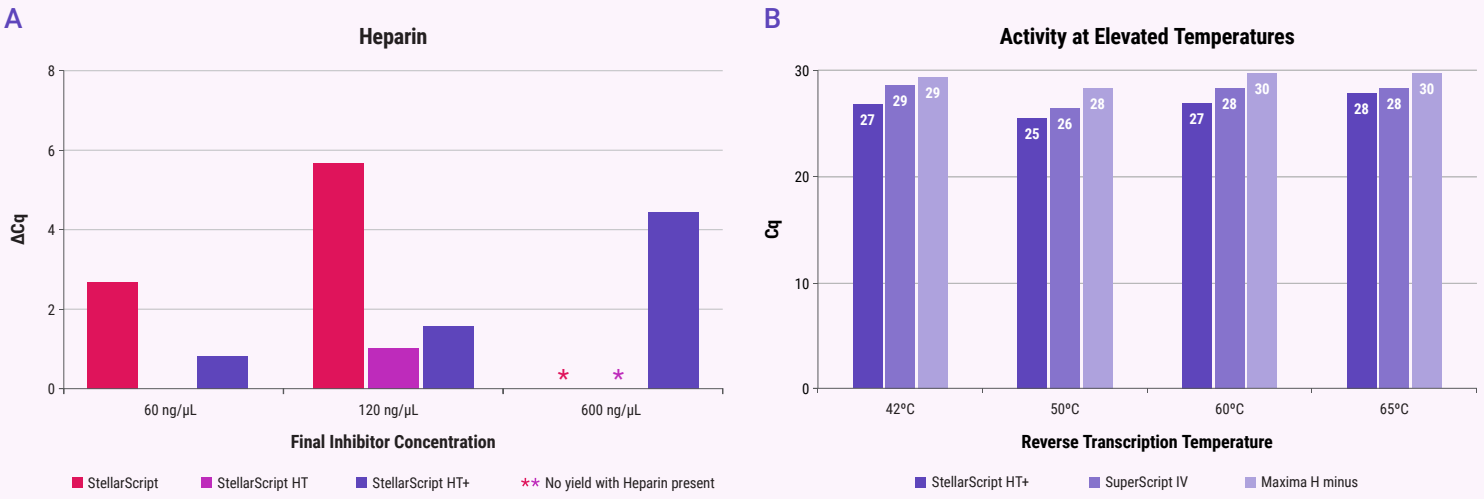

FIGURE 4. StellarScript HT+ for improved inhibitor tolerance and thermostability. (A) StellarScript, StellarScript HT, and StellarScript HT+ were evaluated with varying concentrations of heparin to assess impact on yield. **(B)** Watchmaker's StellarScript HT+ and ThermoFsiher Scientific's SuperScript IV and Maxima H minus were assessed using varying reverse transcription temperatures to measure impact on yield. Yield was assessed via qPCR. In both cases, StellarScript HT+ delivered improved yields (indicated by lower ΔCq* and Cq values) with higher heparin concentrations and higher reaction temperatures.

* ΔCq = Cq (with inhibitor) - Cq (without inhibitor).

CUSTOMIZATION MADE EASY

We aim to make the customization process as painless as possible for our OEM partners. We view ourselves as an extension of your team and offer a variety of tailored services.

Custom fills and formats minimize waste and maximize your efficiency

Tailored packaging and labeling — including private label — designed to your unique specifications

White glove support and a dedicated project manager make customization seamless

Streamlined processes and flexible terms enable fast turnaround times and serve organizations of all sizes

STELLARTAQ SPECIFICATIONS

- Protein Purity Assay: ≥97%
- dsDNA Exonuclease Assay*: <1% released
- ssDNA Exonuclease Assay*: <1% released
- DNA Contamination Assay (*E. coli*, mammalian, library): <10 copies
- Phosphatase Contamination Assay*: <1% released

*As assessed using 50 U of protein input per assay

ALSO AVAILABLE:

High-purity **RNase Inhibitor**

Protect what's precious for your single cell, single nuclei, and RT-qPCR assays.

PRODUCT	0.25 kU[1]	1 kU[1]	1.5 kU[1]	7 kU[1]
StellarTaq Hot Start DNA Polymerase (5 U/µL)	7K0117-50UL	7K0117-200UL		
StellarTaq Hot Start DNA Polymerase – Glycerol-Free (30 U/µL)			7K0121-50UL	
StellarTaq Hot Start DNA Polymerase – Glycerol-Free (140 U/µL)				7K0120-50UL
StellarTaq DNA Polymerase (5 U/µL)	7K0116-50UL	7K0116-200UL		
StellarTaq DNA Polymerase – Glycerol-Free (140 U/µL)				7K0118-50UL

[1]One unit of StellarTaq DNA Polymerase incorporates 16 nmol of dNTPs into a DNA template in 30 minutes at 72°C.

Contact sales@watchmakergenomics.com
or visit watchmakergenomics.com/StellarTaq to learn more.

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