



# NGS-BASED APPLICATIONS

Sequencing is enabling scientists to make rapid advances in epidemiology and surveillance, basic and clinical research, and diagnostics. A fast-growing number of methods are being developed to address whole genome, as well as targeted approaches. In all cases, streamlined workflows that result in high-quality, high yield libraries are critical towards optimizing your next generation sequencing (NGS) results. The table below summarizes some of the NGS products available for scientists who are working to develop diagnostics.

APPLICATION	PRODUCTS		NOTES
NGS-BASED APPLICATIONS	DNA Sequencing	DNA library preparation with enzymatic DNA fragmentation	<b>NEBNext UltraExpress® FS DNA Library Prep Kit</b> (NEB #E3340) <b>NEBNext Ultra™ II FS DNA Library Prep Kit for Illumina®</b> (NEB #E7805) <b>NEBNext Ultra II FS DNA PCR-free Library Prep Kit for Illumina</b> (NEB #E7730) <b>NEBNext Ultra II FS DNA Module</b> (NEB #E7810) <b>NEBNext UltraShear® FFPE DNA Library Prep</b> (NEB #E6655) <b>NEBNext Ultra II Q5® Master Mix</b> (NEB #M0544) <b>NEBNext® Adaptors and Primers</b> (www.neb.com/oligos)
		DNA library preparation for cfDNA or pre-sheared DNA	<b>NEBNext UltraExpress DNA Library Prep Kit</b> (NEB #E3325) <b>NEBNext Ultra II DNA Library Prep Kit for Illumina</b> (NEB #E7645) <b>NEBNext Ultra II DNA PCR-free Library Prep Kit for Illumina</b> (NEB #E7410) <b>NEBNext Ultra II End Repair/dA-Tailing Module</b> (NEB #E7546) <b>NEBNext Ultra II Ligation Module</b> (NEB # E7595) <b>NEBNext Ultra II Q5 Master Mix</b> (NEB #M0544) <b>NEBNext Adaptors and Primers</b> (www.neb.com/oligos)
		DNA methylation sequencing	<b>NEBNext Enzymatic Methyl-seq Kit</b> (NEB #E7120) <b>NEBNext Enzymatic 5hmC-seq Kit</b> (NEB #E3350)
	RNA Sequencing	Depletion of abundant RNAs and enrichment of poly(A)-tailed mRNA	<b>NEBNext Poly(A) mRNA Magnetic Isolation Module</b> (NEB #E7490) <b>NEBNext rRNA Depletion Kit v2 (Human/Mouse/Rat)</b> (NEB #E7400) <b>NEBNext Globin &amp; rRNA Depletion Kit (Human/Mouse/Rat)</b> (NEB #E7750) <b>NEBNext rRNA Depletion Kit (Bacteria)</b> (NEB #E7850) <b>NEBNext RNA Depletion Core Reagent Set (for customized depletion)</b> (NEB #E7865)
		RNA library preparation	<b>NEBNext UltraExpress™ RNA Library Prep Kit</b> (NEB #E3330) <b>NEBNext Ultra II Directional RNA Library Prep Kit for Illumina</b> (NEB #E7760) <b>NEBNext Ultra II RNA First Strand Synthesis Module</b> (NEB #E7771) <b>NEBNext Ultra II Directional RNA Second Strand Synthesis Module</b> (NEB #E7550) <b>NEBNext Ultra II End Repair/dA-Tailing Module</b> (NEB #E7546) <b>NEBNext Ultra II Ligation Module</b> (NEB #E7595) <b>NEBNext Ultra II Q5 Master Mix</b> (NEB #M0544) <b>NEBNext Adaptors and Primers</b> (www.neb.com/oligos) <b>NEBNext Immune Sequencing Kit (Human)</b> (NEB #E6320)
		Virus sequencing and detection	<b>NEBNext ARTIC SARS-CoV-2 FS Library Prep Kit (Illumina)</b> (NEB #E7658) <b>NEBNext ARTIC SARS-CoV-2 Library Prep Kit (Illumina)</b> (NEB #E7650) <b>NEBNext ARTIC SARS-CoV-2 Companion Kit (Oxford Nanopore Technologies)</b> (NEB #E7660) <b>NEBNext ARTIC SARS-CoV-2 RT-PCR Module</b> (NEB #E7626) <b>Q5 Hot Start High-Fidelity 2X Master Mix</b> (NEB #M0494) <b>NEBNext Ultra II End Repair/dA-Tailing Module</b> (NEB #E7546) <b>Blunt/TA Ligase Master Mix</b> (NEB #M0367) <b>NEBNext Quick Ligation Module</b> (NEB #E6056) <b>NEBNext Ultra II RNA Library Prep Kit for Illumina</b> (NEB #E7770) <b>NEBNext Adaptors and Primers</b> (www.neb.com/oligos)

- Range of packaging options including 96-well plates
- Component and kit customization
- Kitting
- Automation-compatible
- Streamlined workflows

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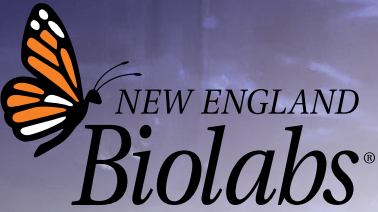
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# SUPPORTING SCIENTISTS DEVELOPING MOLECULAR DIAGNOSTICS

NGS- AND AMPLIFICATION-BASED SOLUTIONS





# IT'S TIME TO THINK DIFFERENTLY

The COVID-19 pandemic elevated many of the challenges faced by clinical labs, requiring new and innovative solutions to address them. Technology development is happening faster than ever before, increasing the need for innovation and thinking differently about how diagnostics should be developed, manufactured and deployed.

Many scientists know NEB as a trusted reagent provider to the life science community. What many do not know is that we also offer products and support for scientists who are working to develop diagnostics. Extensive molecular biology and enzymology experience enables us to help customers solve the challenges inherent in technology development and ultimately in scale-up and commercialization. For scientists looking for long term, ambient-stored products, NEB's diverse portfolio of lyophilized and lyo-compatible products, as well as custom lyophilization capabilities are also available.

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\*GMP-grade\* is a branding term NEB uses to describe reagents manufactured at NEB's Rowley facility. The Rowley facility was designed to manufacture reagents under more rigorous infrastructure and process controls to achieve more stringent product specifications and customer requirements. Reagents manufactured at NEB's Rowley facility are manufactured in compliance with ISO 9001 and ISO 13485 quality management system standards. However, at this time, NEB does not manufacture or sell products known as Active Pharmaceutical Ingredients (APIs), nor does NEB manufacture its products in compliance with all of the Current Good Manufacturing Practice regulations.



# AMPLIFICATION-BASED APPLICATIONS

As the first company to sell *Taq* DNA Polymerase, NEB has a long history in the development of reliable and convenient tools for amplification, and offers a large selection of products for PCR, qPCR, RT-qPCR and isothermal amplification. Our expertise in this area has allowed us to develop optimized enzymes for a variety of applications, that are available for scientists working to develop diagnostics. The table below summarizes some of the products available.

APPLICATION		PRODUCTS	PRODUCT NOTES	CUSTOM FORMULATIONS AVAILABLE
PCR APPLICATIONS	qPCR/ RT-qPCR	DNA, Dye <b>Luna® Universal qPCR Master Mix</b> (NEB #M3003) DNA, Probe <b>Luna Universal Probe qPCR Master Mix</b> (NEB #M3004)	<ul style="list-style-type: none"><li>Compatible with automation and reaction miniaturization</li><li>Room temperature stable for ≥ 24 hours</li></ul>	<ul style="list-style-type: none"><li>Blue-dye-free</li><li>Lyo-compatible</li></ul>
		RNA (1-step), Dye <b>Luna Universal One-Step RT-qPCR Kit</b> (NEB #E3005) RNA (1-step), Probe <b>Luna Probe One-Step RT-qPCR 4X Mix with UDG</b> (NEB #M3019) <b>Luna Probe One-Step RT-qPCR 4X Mix with UDG (No ROX)</b> (NEB #M3029) <b>Luna Universal Probe One-Step RT-qPCR Kit</b> (NEB #E3006) <b>Luna Probe One-Step RT-qPCR Kit (No ROX)</b> (NEB #E3007) <b>Luna SARS-CoV-2 RT-qPCR Multiplex Assay Kit</b> (NEB #E3019) <b>LyoPrime Luna™ Probe One-Step RT-qPCR Mix with UDG</b> (NEB #L4001)	<ul style="list-style-type: none"><li>Luna WarmStart RT paired with Hot Start <i>Taq</i> increases reaction specificity and robustness</li><li>Compatible with automation and reaction miniaturization</li><li>Room temperature stable for ≥ 24 hours</li><li>Lyophilized format (NEB #L4001)</li></ul>	<ul style="list-style-type: none"><li>Blue-dye-free</li><li>Lyo-compatible</li><li>Add primers and probes (NEB #L4001)</li></ul>
		RNA (2-step) <b>LunaScript® RT SuperMix Kit</b> (NEB #E3010/M3010)	<ul style="list-style-type: none"><li>Novel engineered RT</li><li>Single-tube format</li><li>13-minute cDNA synthesis protocol</li></ul>	<ul style="list-style-type: none"><li>Blue-dye-free</li><li>Primer-free</li></ul>
		Master Mixes <b>Q5® Hot Start High-Fidelity 2X Master Mix</b> (NEB #M0494) <b>Q5 High-Fidelity 2X Master Mix</b> (NEB #M0492) Standalone Enzyme & Buffer <b>Q5 Hot Start High-Fidelity DNA Polymerase</b> (NEB #M0493) <b>Q5 High-Fidelity DNA Polymerase</b> (NEB #M0491) <b>Q5 Blood Direct 2X Master Mix</b> (NEB #M0500)	<ul style="list-style-type: none"><li>~280X fidelity of <i>Taq</i></li><li>Consistent, fast, reliable performance</li><li>Compatible with automation and reaction miniaturization</li><li>Room temperature stable for ≥ 24 hours</li></ul>	<ul style="list-style-type: none"><li>High conc.</li><li>Glycerol-free</li><li>Custom mixes</li></ul>
	PCR/ RT-PCR	<b>Hot Start Taq DNA Polymerase</b> (NEB #M0495) <b>Hot Start Taq 2X Master Mix</b> (NEB #M0496)	<ul style="list-style-type: none"><li>Unique aptamer-based enzyme control supports fast protocols</li></ul>	<ul style="list-style-type: none"><li>High conc.</li><li>Glycerol-free</li></ul>
	ISOTHERMAL APPLICATIONS	<b>WarmStart® Colorimetric LAMP 2X Master Mix (DNA &amp; RNA)</b> (NEB #M1800) <b>WarmStart Colorimetric LAMP 2X Master Mix with UDG</b> (NEB #M1804)	<ul style="list-style-type: none"><li>Fast, clear pink-to-yellow visible detection of amplification</li><li>Results in approximately 30 minutes</li><li>Automation-compatible when coupled with absorbance plate reader</li></ul>	
		<b>SARS-CoV-2 Rapid Colorimetric LAMP Assay Kit</b> (NEB #E2019)	<ul style="list-style-type: none"><li>Simple, colorimetric detection of amplification of SARS-CoV-2 nucleic acid</li></ul>	
		<b>WarmStart LAMP Kit (DNA &amp; RNA)</b> (NEB #E1700) <b>WarmStart Multi-Purpose LAMP/RT-LAMP 2X Master Mix (with UDG)</b> (NEB #M1708) <b>WarmStart Fluorescent LAMP/RT-LAMP Kit (with UDG)</b> (NEB #E1708) <b>LyoPrime WarmStart Fluorescent LAMP/RT-LAMP Mix with UDG</b> (NEB #L4401)	<ul style="list-style-type: none"><li>Master mix for LAMP and RT-LAMP workflows</li><li>Supports multiple detection methods, including fluorescence and turbidity</li><li>Lyophilized format (NEB #L4401)</li></ul>	<ul style="list-style-type: none"><li>Lyo-compatible</li><li>High conc.</li><li>Add primers (NEB #L4401)</li></ul>
		<b>Tle UvrD Helicase</b> (NEB #M1202)	<ul style="list-style-type: none"><li>Improves specifically of fluorescent LAMP reactions</li></ul>	<ul style="list-style-type: none"><li>High conc.</li></ul>
		<b>Bst 2.0 WarmStart DNA Polymerase</b> (NEB #M0538) <b>Bst 2.0 WarmStart DNA Polymerase (Glycerol-free)</b> (NEB #M0402) <b>Bst 2.0 DNA Polymerase</b> (NEB #M0537)	<ul style="list-style-type: none"><li>Improved reaction properties compared to wild-type <i>Bst</i> DNA Polymerase</li><li>Increased dUTP tolerance enables carryover prevention</li></ul>	<ul style="list-style-type: none"><li>Glycerol-free (NEB #M0402)</li><li>High conc.</li></ul>



APPLICATION		PRODUCTS	PRODUCT NOTES	CUSTOM FORMULATIONS AVAILABLE
ISOTHERMAL APPLICATIONS	LAMP/ RT-LAMP	<b>Bst 3.0 DNA Polymerase</b> (NEB #M0374)	<ul style="list-style-type: none"><li>DNA binding domain fusion supports robust performance</li><li>Significantly increased RT activity up to 72°C enables single enzyme RT-LAMP</li></ul>	<ul style="list-style-type: none"><li>Glycerol-free</li><li>High conc.</li></ul>
		<b>WarmStart RTx Reverse Transcriptase</b> (NEB #M0380) <b>WarmStart RTx Reverse Transcriptase (Glycerol-free)</b> (NEB #M0439)	<ul style="list-style-type: none"><li><i>In-silico</i> designed RT for RT-LAMP with reversibly-bound aptamer that inhibits activity below 40°C</li></ul>	<ul style="list-style-type: none"><li>Glycerol-free (NEB #M0439)</li><li>High conc.</li></ul>
	Rolling Circle Amplification/ Whole Genome Amplification	<b>phi29-XT RCA Kit</b> (NEB #E1603) <b>phi29-XT WGA Kit</b> (NEB #E1604)	<ul style="list-style-type: none"><li>Includes phi29-XT DNA polymerase, an engineered polymerase that generates high product yield in a short time with improved thermostability and sensitivity</li></ul>	
	Strand Displacement	<b>Nt.BstNBI</b> (NEB #R0607) <b>WarmStart Nt. BstNBI</b> (NEB #R0725) <b>WarmStart Afu Uracil-DNA Glycosylase (UDG)</b> (NEB #M1282)	<ul style="list-style-type: none"><li>High purity, high quality nicking endonuclease</li><li>Warmstart <i>Afu</i> UDG digests uracil-containing amplification at temps over 40°C</li></ul>	<ul style="list-style-type: none"><li>Glycerol-free</li><li>High conc.</li></ul>
	Helicase-dependent Amplification	<b>IsoAmp® II Universal tHDA Kit</b> (NEB #H0110)	<ul style="list-style-type: none"><li>Requires only two primers</li><li>Produces short, discrete DNA products</li></ul>	
Other	Recombinase Polymerase Amplification	<b>T4 UvsX DNA Recombinase (Glycerol-free)</b> (NEB #M3081) <b>T4 UvsY Protein (Glycerol-free)</b> (NEB #M3082) <b>Bsu DNA Polymerase Large Fragment</b> (NEB #M0330) <b>T4 Gene 32 Protein</b> (NEB #M0300)	<ul style="list-style-type: none"><li>Core components of RPA reaction</li><li>Can increase yield and efficiency of amplification reactions</li></ul>	<ul style="list-style-type: none"><li>High conc.</li><li>Glycerol-free</li></ul>
		<b>Deoxynucleotide (dNTP) Solution Mix</b> (NEB #N0447)		<ul style="list-style-type: none"><li>Custom conc.</li></ul>
		<b>Nuclease-free water</b> (NEB #B1500)		
		<b>Antarctic Thermolabile UDG</b> (NEB #M0372)	<ul style="list-style-type: none"><li>Unique thermolabile version is completely inactivated in typical isothermal and RT-qPCR workflows</li></ul>	<ul style="list-style-type: none"><li>High conc.</li></ul>
		<b>Proteinase K, Molecular Biology Grade</b> (NEB #P8107)		
		<b>Thermolabile Proteinase K</b> (NEB #P8111)	<ul style="list-style-type: none"><li>Unique thermolabile version is completely inactivated in typical isothermal and RT-qPCR workflows</li></ul>	<ul style="list-style-type: none"><li>Custom conc.</li></ul>

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