NEB expressions

a scientific update

50th Anniversary Golden Jubilee Edition II (Fall/Winter 2024)

NEW ENGLAND Biolabs®

IN THIS ISSUE

Congratulations to the winners of the 2024 Passion in Science Awards

For NEB, great science is not only analytical, but also creative and artistic - it changes the way we see and understand our world. With the Passion in Science Awards, we recognize scientists for their innovative work that goes beyond the pure science. These awards give us the opportunity to honor the "unsung heroes" of the laboratory, who are dedicated to their cause. Our motivation is based on foundational values that are still as true today as they were when we founded the company over 50 years ago. We are excited to be offering the awards again in NEB's anniversary year.

The Passion in Science categories reflect NEB's core values: the knowledge that there is overlap between art and science, that we all have a duty to help fellow humans, as well as to care for and protect our environment, and finally to inspire people by making scientific ideas and concepts accessible to everyone, not just our fellow scientists.

Scientific Mentorship

Humanitarian Duty

Environmental Stewardship

Arts and Creativity

We invite the winners be our guests at a celebration on October 9-10, 2024, at our headquarters in Ipswich, MA, USA. The NEB campus includes a 140,00 square foot research and production facility, renovated historic buildings and a unique wastewater treatment plant, among other things, surrounded by more than 160 acres of nature. The winners can explore the modern and historic buildings on campus, learn more about NEB's sustainability efforts, and discover the art that can be found throughout the campus and they are involved in presentations and discussions related to their inspiring work. In addition the winners receive $1,000 to donate to a charity of their choice. We will also spread the word about the great work the winners are doing through our website, social media, and our catalog.

We thank all applicants and wish every "unsung hero" continued success with their projects!

Information about the award winners
www.NEB.com/PassionInScience

PASSION IN SCIENCE AWARDS®

Celebrating 50 Years of Passion for Science

50 Years New England Biolabs

Created by scientists for scientists, NEB prioritizes the advancement of science, stewardship of the environment, and giving back to the world around us in everything we do. Since our establishment in 1974, we have remained committed to developing high quality and innovative products that not only empower your research but also our own. Our profits have always funded an extensive research program, which we believe is critical for staying connected to our customers and helping to drive scientific breakthroughs. From our founding principles to our unique corporate culture, NEB's philosophy can be distilled down to three core values: passion, humility and being genuine.

As we reflect on the last 50 years and look toward the future, we are excited to support your research and help you address the complex challenges the world is facing today. We hope that by working together we can shape the science of tomorrow.

Celebrate with us 50 Years of Passion for Science!

Throughout the year, we are hosting a series of events to celebrate with you.
Check back to find out what we are up to!

Visit **NEB.com/nebturns50** to learn more.

The Golden Butterflies have been caught

We celebrated our golden jubilee with a big raffle. You have enthusiastically searched for the golden butterflies and scanned the raffle tickets eagerly. The cuddly plush, NEB Lego sets and goodies packs are now with the lucky winners.

We wish all winners lots of fun with their anniversary prizes!

Many thanks to everyone who took part and made this anniversary raffle unforgettable!

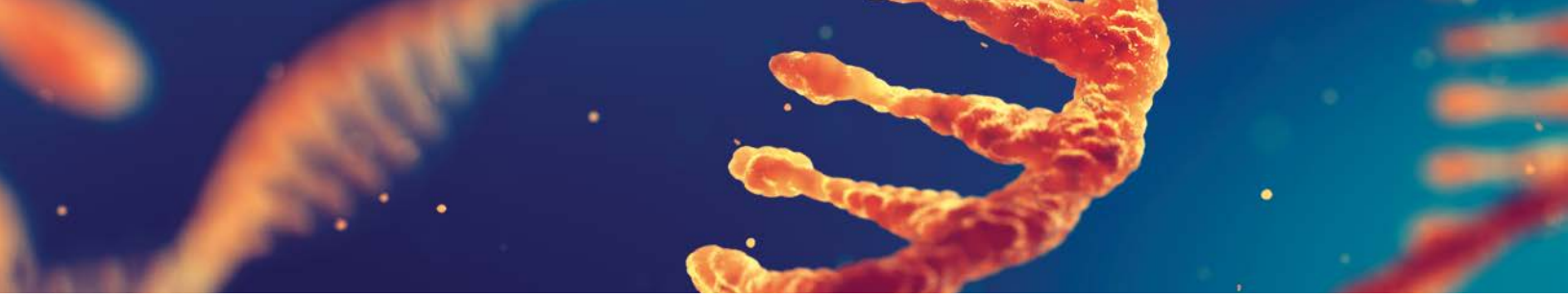
NEB 50-Stop World Tour

Visit our scientists and staff at our booths, tabletops and events to learn about new products, pick up samples and literature, and provide your feedback on how we are doing.
We are looking forward to seeing you!

Visit **NEB.com/worldtour** to see the full list of events for our 50-Stop World Tour.

NEW ENGLAND BIOLABS

50 STOP World Tour 2024



Afrigen's Mission to Empower Developing Countries with mRNA Vaccine Production

Addressing Global and Regional Health Inequalities through Local Manufacturing Initiatives

Joanne Gibson, Ph.D., New England Biolabs.

The global disparity in vaccine distribution was brought into sharp focus by the COVID-19 pandemic. While affluent nations quickly secured and distributed life-saving vaccines, lower-income countries faced severe shortages, exacerbating health inequities and prolonging the crisis. To address this issue, Afrigen Biologics & Vaccines (www.afrigen.co.za), supported by the World Health Organization (WHO; www.who.int), was given a bold mission to bridge the vaccine gap and empower regions traditionally left behind by global healthcare advancements.

Afrigen, founded in 2014 and operational since mid-2016, is at the forefront of advancing vaccine innovation and manufacturing in Africa – a continent that uses 25-30% of global vaccine supplies but is only able to produce 1% of its needs. Initially focused on in-licensing a TB vaccine from the Infectious Disease Research Institute (IDRI) in Seattle (now known as AAHI), Afrigen now sits at the center of a program born from the COVAX initiative (www.who.int/initiatives/act-accelerator/covax) and jointly run by the WHO and the Medicines Patent Pool (MMP) (medicinespatentpool.org). The program aims to address vaccine inequity by creating a hub for technology transfer and training that could be passed to lower-middle-income countries, which in turn would become regional manufacturers of mRNA vaccines.

Overcoming Initial Obstacles and Long-Term Vision

The WHO/MPP program envisioned Afrigen as a central hub for mRNA vaccine production technology, aiming to transfer this technology to 15 global partners in low-middle-income countries across four continents. However, initial expectations of a technology transfer during the recent COVID-19 pandemic from major manufacturers fell through. By September 2021, Afrigen realized they would need to develop the mRNA technology from scratch. With a team of only 20 people, none of whom had prior mRNA experience, Afrigen embarked on a journey to learn, innovate, and collaborate. They partnered with universities in South Africa, expert advisors, and suppliers, including New England Biolabs, to gain the necessary knowledge and resources. Over nearly three years, Afrigen has grown its staff by 150 people, built an end-to-end research, development and GMP manufacturing facility, and developed the technology to a point where it is ready for phase 1-2 clinical trials.

[...]

While these collaborations allowed Afrigen to fast-track the development of mRNA vaccines, it was also realized that in terms of the timeline, they would not be able to participate in the manufacture of the COVID-19 vaccine. However, the program included medium- to long-term sustainability goals, with each partner using the technology to address specific regional health needs while also contributing to global health security. For example, in South Africa, Afrigen is prioritizing vaccines relevant to the burden of disease in Africa in a quest to address unmet needs. The current product development pipeline includes HIV, TB, Rift Valley Fever virus, gonorrhea, and RSV.

[...]

Afrigen's story is one of determination and ingenuity. From its inception as a small adjuvant formulation vaccine development company, it is now poised to significantly impact global health using mRNA technology addressing immediate health needs as well as building a foundation for sustainable vaccine manufacturing in Africa and beyond.

[...]

> *"The essential ingredients of Afrigen's progress and success are diverse partnerships, suppliers such as NEB who walked the extra mile for us, innovative collaborations, a dedicated 'can do' attitude team, and society believing in us – all inspired by the vision of equitable health for all universe. Afrigen says: Thank you."*
>
> – Dr. Caryn Fenner, Executive Director: mRNA Hub, Afrigen Biologics

To read the full article, please use the following link:
neb-online.fr/AfrigensMission

Covering your NGS library prep needs for MGI sequencing

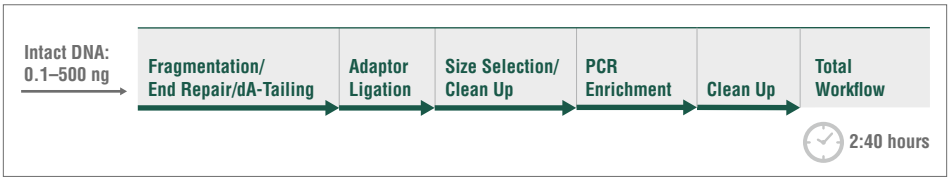
From the beginning of the NGS era, NEBNext stands for innovation and advancement in sample preparation for Next Generation Sequencing (NGS) applications. All NEBNext products are available in a convenient kit format or as separate modules and offer flexible library prep workflows that can be easily scaled and automated. As a platform-independent reagent supplier, NEB is your ideal library prep partner - whether for single experiments, high-throughput in the core facility or with customized solutions for large-scale industrial applications.

Introducing NEBNext for MGI sequencing

With the NEBNext Library Prep Kits for MGI, you can now prepare high-quality libraries from DNA or RNA for subsequent sequencing using MGI DNA nanoball technology. The NEBNext Library Prep Kits for MGI are used in conjunction with NEBNext Multiplex Oligos for MGI and libraries are circularized using the NEBNext Circularization Module for MGI before sequencing.

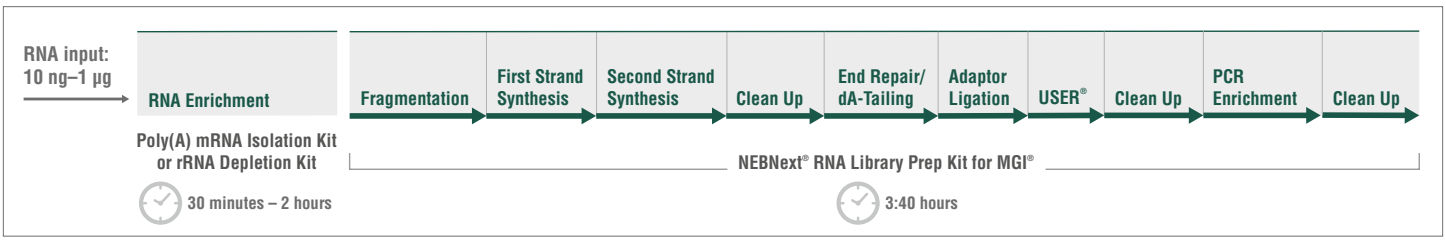
NEBNext FS DNA Library Prep Kit for MGI

- Streamlined workflow including enzymatic DNA fragmentation
- Enables production of high-quality libraries from 0.1-500 ng input DNA
- Excellent sequencing metrics across the input range



NEBNext RNA Library Prep Kit for MGI

- Compatible with rRNA depletion or poly(A) enrichment protocols
- High-quality directional RNA libraries from 10 ng-1 µg total RNA
- Provides excellent transcript correlation between inputs and replicates



Ordering Information

PRODUCT	NEB #	SIZE
NEBNext FS DNA Library Prep Kit for MGI	E9705S/L	24/96 rxns
NEBNext RNA Library Prep Kit for MGI	E9710S/L	24/96 rxns
NEBNext Multiplex Oligos for MGI (Dual Index Primer Pairs Set 1)	E9725S/L	24/96 rxns
NEBNext Circularization Module for MGI	E9720S	24 rxns

- Fast workflows
- High library yields
- Broad input ranges
- Uniform transcript & GC coverage
- Minimized adaptor-dimers

"We have been using MGI sequencing systems since 2020 and we observed a significant improvement with NEB´s NEBNext solutions for MGI in both library prep performances and sequencing quality metrics reaching impressive Q40 results."

– Davide Cacchiarelli, PhD
University of Naples, Italy

Interested in giving NEBNext a try? Learn more and request a sample at **NEB.com/NEBNextMGI**.

Monarch Nucleic Acid Purification Kits are Evolving!

Make the better choice and migrate to Monarch

Monarch Nucleic Acid Purification Kits are the perfect complement to many molecular biology workflows. Recover pure, intact DNA and RNA in minutes with our fast, user-friendly protocols and optimized buffer systems, and focus your time on the experiments that will drive your research forward. Isolate nucleic acids from biological samples, clean up DNA and RNA from enzymatic reactions, extract DNA fragments from gels, or purify plasmids.

The Monarch nucleic acid purification kits are evolving, with new updates that deliver significant improvements to performance, sustainability and value. The next generation of upgraded kits are now being released:

Monarch Spin Plasmid Miniprep Kit | Monarch Spin PCR & DNA Cleanup Kit | Monarch Spin DNA Gel Extraction Kit

Improved performance by design

NEB Monarch's spin column is precision-engineered for high performance with upgraded column design and membrane assembly allowing high-quality, highly-concentrated nucleic acid purification with low elution volume, for downstream applications. The column is designed and made with significantly less plastic for a reduced environmental impact.

Better performance

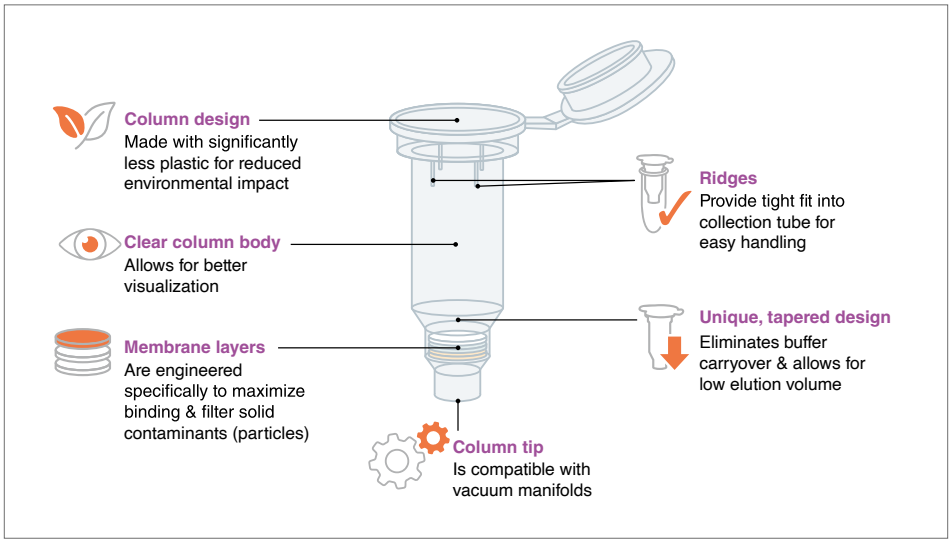
Redesigned column delivers higher purity and yield.

Better for the environment

Streamlined packaging and significantly less plastic.

Better for your budget

Attractive list price due to cost savings from the improvements.



For more information visit **NEBMonarch.com**.

Interested in giving Monarch a try? Request a free sample at **NEBMonarch.com**.

Ordering Information

PRODUCT	NEB #	SIZE
Monarch Spin Plasmid Miniprep Kit	T1110S/L	50/250 preps
Monarch Spin DNA Gel Extraction Kit	T1120S/L	50/250 preps
Monarch Spin PCR & DNA Cleanup Kit (5ug)	T1130S/L	50/250 preps
Monarch Spin Columns S2D and Tubes	T1117L	100 preps
Monarch Spin Collection Tubes	T2118L	100 preps

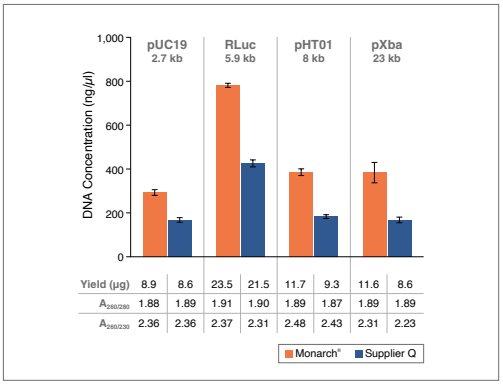
In order to provide you with the most advanced products, the following **Monarch kits will be replaced by new, optimized versions**.

PRODUCT – To be discontinued	NEB #
Monarch Plasmid Miniprep Kit	T1010S/L
Monarch DNA Gel Extraction Kit	T1020S/L
Monarch PCR & DNA Cleanup Kit (5ug)	T1030S/L

Experience Superior Results with the new Monarch Kits

Monarch Spin Plasmid Miniprep Kit (#T1110)

- Elute in as little as 30 µl for highly concentrated DNA, with yields up to 20 µg
- Easy to follow workflow with colored buffer system to indicate completion of key steps
- Reduce *hands-on* time with faster protocols and less spin time



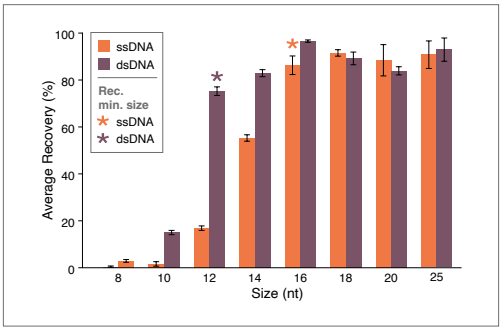
	pUC19		RLuc		pHT01		pXba	
Yield (µg)	8.9	8.6	23.5	21.5	11.7	9.3	11.6	8.6
$A_{260/280}$	1.88	1.89	1.91	1.90	1.89	1.87	1.89	1.89
$A_{260/230}$	2.36	2.36	2.37	2.31	2.48	2.43	2.31	2.23

Monarch Spin Plasmid Miniprep Kit consistently produces more concentrated plasmid DNA with equivalent or better yield and purity compared to other supplier.

Preps were performed according to recommended protocols using ~1 ml (OD600 = 3) aliquot for pUC19 and pHT01 and ~2 ml (OD600 = 6) aliquot for Rluc and pXba of the same overnight cultures.

Monarch Spin PCR & DNA Cleanup Kit (#T1130)

- Elute in as little as 5 µl for highly concentrated DNA, with yields up to 5 µg
- No need to monitor buffer pH
- Protocol modification for oligonucleotide cleanup is provided, allowing purification of ssDNA, oligonucleotide and other small DNA fragments

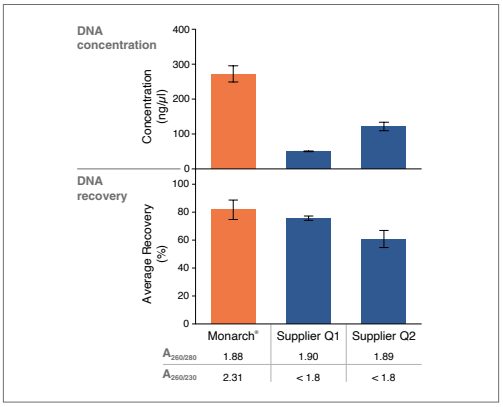


Monarch Spin PCR & DNA Cleanup Kit (5 µg) effectively cleans up ssDNA (≥ 16 nt) and dsDNA (≥12 bp) oligonucleotides.

The provided oligonucleotide cleanup protocol was followed using 1 µg of oligonucleotides of varying lengths (8-25 nt/bp) as an input. DNA was eluted in 20 µl of Monarch Buffer EY. Concentrations of DNA were measured and percent recovery calculations are based on the eluted DNA concentration and elution volume used. The minimum sized ss- and ds- oligonucleotides that can be used are marked with a star (*).

Monarch Spin DNA Gel Extraction Kit (#T1120)

- Elute in as little as 5 µl for highly concentrated DNA, with yields up to 5 µg
- Prevent buffer retention and salt carryover with a unique, optimized column design
- No need to monitor pH or add isopropanol



	Monarch®	Supplier Q1	Supplier Q2
$A_{260/280}$	1.88	1.90	1.89
$A_{260/230}$	2.31	< 1.8	< 1.8

The Monarch Spin DNA Gel Extraction Kit consistently recovers DNA as well as or better than the leading supplier, and is more concentrated for greater downstream utility.

Using the Monarch Spin DNA Gel Extraction Kit, DNA concentrations and recovery are equal to or higher than other suppliers' kits. 2 µg of 3 kb fragment were resolved on a 1.2 % w/v TBE agarose gel, excised and processed with recommended protocols and elution volumes. Concentrations of DNA were measured and percent recovery.

Expert Tips & Tricks for Plasmid DNA Purification Using Miniprep Kits

Purifying DNA plasmids using a miniprep kit may seem like a straightforward task, but what happens when things don't go according to plan? Unexpected issues can arise, from low yields to impure samples. We've asked our scientists what some of the most essential tips and tricks are to help you face any plasmid purification challenges that can occur. By troubleshooting common problems, you can ensure your plasmid purification process is as efficient and reliable as possible. Read on for expert insights and practical advice for mastering DNA plasmid purification with miniprep kits.

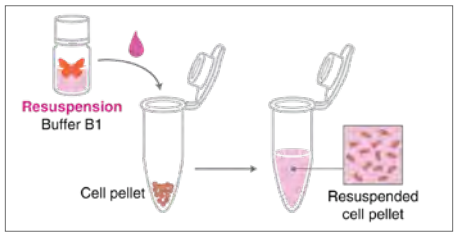
A miniprep kit (such as the Monarch Spin Plasmid Miniprep Kit) generally follows a similar set of steps, so we're dividing this article into tips and tricks for each step: Sample Preparation (Growing bacterial culture), Resuspend, Lyse, Neutralize, Bind, Wash, and Elute.

Sample Preparation (Growing bacterial culture)

Grow your bacterial culture overnight to obtain a sufficient quantity of cells containing the plasmid DNA.

- ✓ Use a fresh growth media plate and antibiotic when growing colonies.
- ✓ Inoculate growth media from a single colony.
- ✓ Ensure you use the proper antibiotic at the correct concentration.
- ✓ Harvest the culture during the transition from logarithmic growth to stationary phase (typically 12–16 hours for growth in LB medium) to ensure the greatest quantity of plasmid DNA, and little cell lysis.
- ✗ Don't select satellite colonies, as these may not contain the desired plasmid.
- ✗ Don't use *E. coli* strains like HB101 and the JM series if you can avoid them, as they have high levels of endogenous endonuclease that can degrade plasmid DNA.

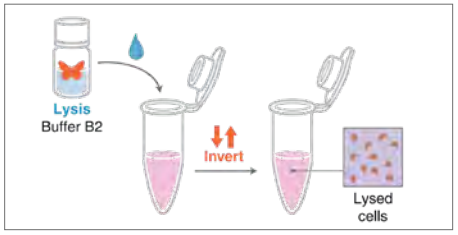
Resuspend



Resuspend the bacterial pellet thoroughly in a buffer solution to prepare the cells for the lysis step.

- ✓ If you are working with a low-copy plasmid, increase the number of cells processed and scale up the buffers accordingly to accommodate the increased number of cells.
- ✓ Ensure the cell pellet is completely resuspended before adding the Lysis Buffer.
- ✗ Don't use more cells than recommended.

Lyse



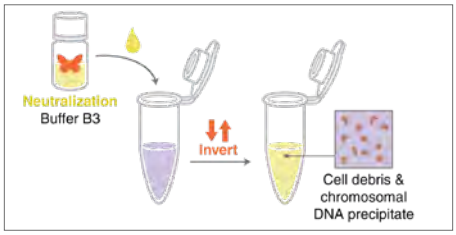
Lyse the bacterial cells by adding a lysis buffer, which releases the plasmid DNA into the solution.

- ✓ Confirm the color change from light pink to dark pink and transparent during the lysis process.
- ✓ Promptly move on to the neutralization step after the lysis step to prevent plasmid denaturation.
- ✗ Don't extend the incubation time during the lysis step, as this can separate the DNA strands and irreversibly denature the plasmid.
- ✗ Don't mix vigorously or vortex after cell lysis and before pelleting cell debris.

Neutralize

Neutralize the lysate with a neutralization buffer, allowing gDNA, proteins and other cellular debris to precipitate out, while the plasmid remains in the solution.

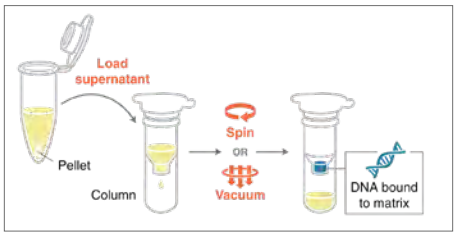
- ✓ If RNase A was added to the buffer in the Resuspension step, ensure the sample is well mixed and allow it to incubate for the recommended time to allow for RNA degradation.
- ✓ Gently invert the sample tube enough times to ensure a complete and uniform color change.
- ✓ Make sure cell debris is fully compacted into the pellet after centrifugation.



Bind

Bind the plasmid DNA to a silica column by passing the lysate through it, allowing the plasmid DNA to adhere to the column.

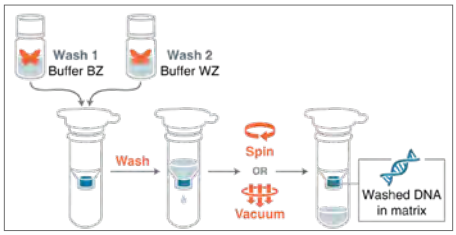
- ✓ Make sure the lysate is free of cellular debris before applying it to the column.
- ✗ Do not overload the column.
- ✗ Don't hurry the binding step; insufficient contact time can lead to poor DNA recovery.



Wash

Wash the bound DNA on the column with a wash buffer to remove any remaining contaminants and impurities.

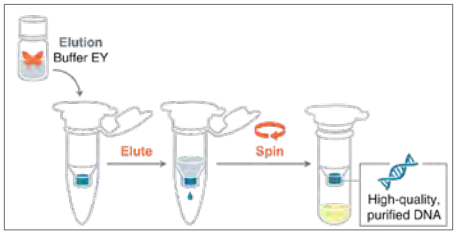
- ✗ Don't skip any wash steps to help remove any residual RNA, protein and other contaminants.



Elute

Elute the purified plasmid DNA from the column by adding an elution buffer and collecting the eluate.

- ✓ Use the recommended elution volumes and incubation times.
- ✓ To improve the yield for larger plasmids, incubate the column at room temperature for 5 minutes or heat the elution buffer to 50°C before adding to the column.
- ✗ Don't use smaller elution volumes or shorter incubation times than recommended.
- ✗ Don't store DNA in a solution containing magnesium, as this can degrade the DNA.
- ✗ Don't let the column tip contact the flow-through during the transfer to a new tube.



If you're having any problems with your DNA plasmid purifications, our technical support team is always available to help.

NEBinspired is a science blog designed to share inspirational stories about trends in the life sciences, lab tips to help you save time, and life lessons to reflect on. Browse our collection of science stories, or filter to find a topic that you are passionate about. From groundbreaking discoveries to sustainable lab techniques and helpful online tools that will aid your experimental design, we have something for everyone. And if you can't find what you're looking for, not to worry – simply send us a message about topics you would like to see covered.

This Article is a shortened version of the NEB inspired blog post. You can find the full article and an audio version at **NEB.com/NEBInspired-Blog**.

The finest in fidelity

Q5 High-Fidelity DNA Polymerase

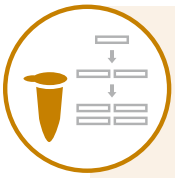
NEB's best and most accurate PCR polymerase

Q5 High-Fidelity DNA Polymerase sets the standard for both fidelity and robust performance. With fidelity >280 times higher than *Taq*, Q5 results in ultra-low error rates. Q5 is a designed polymerase that is fused to the processivity-enhancing Sso7d DNA binding domain, improving speed, fidelity and reliability of performance.

Q5 is also available in a hot start format. In contrast to chemically modified or antibody-based hot start polymerases, Q5 Hot Start High-Fidelity DNA Polymerase utilizes engineered oligonucleotides known as aptamers. The aptamer binds to the polymerase through non-covalent interactions, blocking enzyme activity during the reaction setup, and is dissociated during normal cycling conditions. Reactions can be set up at room temperature and a separate high temperature activation step is not required, shortening reaction times.

Trust Q5 DNA Polymerase

for all your high-fidelity PCR needs



PCR AT HIGHEST FIDELITY

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 High-Fidelity 2X PCR Master Mix** (NEB #M0541) | **NEBNext Q5 Hot Start HiFi PCR Master Mix** (NEB #M0543) | **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)

Five Quality features of Q5 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.

3. Superior coverage, 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. Amplify 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.

Learn more about Q5 and request a free sample at
Q5PCR.com

A free Q5 sample is included in the Starter Pack 2024!
Details on page 16

Fast and easy 2-step PCR

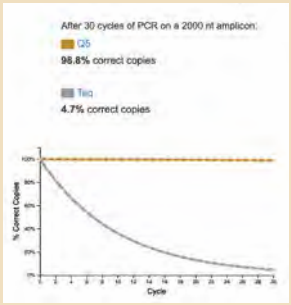
Optimal annealing temperatures for Q5 High- Fidelity DNA Polymerase tend to be higher than for other PCR polymerases. When primers with annealing temperatures ≥ 72°C are used, a 2-step thermocycling protocol without a separate annealing step (combining annealing and extension into one step) is possible.

Thermocycling conditions for 2-step PCR:

STEP	TEMP	TIME
Initial Duration	98°C	30 seconds
25-35 Cycles	98°C 72°C	5-10 seconde 10-30 seconds/kb
Final Extension	72°C	2 min
Hold	4-10°C	

Q5 fun fact

In 2016, the first successful PCR experiment in space was performed aboard the International Space Station (ISS) using a modified Q5 master mix. The experiment, designed by high school student Anna-Sophia Boguraev, aimed to study epigenetic changes in DNA during spaceflight as part of her winning Genes in Space proposal. The reactions were launched on the SpaceX CRS-8 mission and later analyzed at New England Biolabs, confirming the success of PCR in microgravity.



PCR Fidelity Estimator!

Estimate the percentage of correct DNA copies (those without base substitution errors) per cycle of PCR for selected DNA polymerases and see why Q5 DNA Polymerase is your preferred high-fidelity polymerase.

Try out the free PCR Fidelity Estimator
PCRFidelityEstimator.neb.com

Give NEB amplification products a try with a free product sample

Try an NEB amplification product in your lab and compare it to your current product to experience NEB's exceptional performance and reliability firsthand.

Request a free sample of your preferred **DNA Polymerase** at info.fr@neb.com

NEB has the right DNA polymerase for your application

Real-Time PCR:

Luna Universal (RT)-qPCR Mixes
Excellent performance and reliability based on unique enzyme technology.

Proof-reading PCR:

Q5 High Fidelity DNA Polymerases and Kits
NEB's best and most accurate PCR polymerase.

Standard-PCR:

One*Taq* DNA Polymerases and Kits
For exceptional reliability on any sample.

Learn more about NEBs amplification products **NEB.com/DNAAmplification**.

Amplification Online Resources

Empowering your research

NEB offers you a selection of useful tools and guidelines to help you planning your PCR and achieving optimal results. Try them out!

Tm Calculator

Use this tool when designing PCR reaction protocols to help determine the optimal annealing temperature for your amplicon. Simply input your DNA polymerase, primer concentration and your primer sequence and the Tm Calculator will guide you to successful reaction conditions.

NEBioCalculator

Use this tool for your scientific calculations and conversions for DNA and RNA. Options include conversion of mass to moles, ligation amounts, conversion of OD to concentration, dilution and molarity. Additional features include sgRNA Template Oligo Design and qPCR library quantification.

NEBaseChanger

NEBaseChanger can be used to design primers specific to the mutagenesis experiment you are performing using the Q5 Site-Directed Mutagenesis Kit. This tool will also calculate a recommended custom annealing temperature based on the sequence of the primers by taking into account any mismatches.

PCR Selector

Use this tool to help select the right DNA polymerase for your PCR setup. Whether your amplicon is long, complex, GC-rich or present in a single copy, the PCR selection tool will identify the perfect DNA polymerase for your reaction.

PCR Fidelity Estimator

Estimate the percentage of correct DNA copies (those without base substitution errors) per cycle of PCR for selected DNA polymerases.

DNA Polymerase Selection Chart

This table lists properties that should be considered when choosing a polymerase. Since these properties can depend on reaction conditions, the primary references should be consulted prior to use in a given application.

For an overview of all NEB online resources to support your research like literature, troubleshooting guides or webinars visit **www.NEB.com/tools-and-resources**.

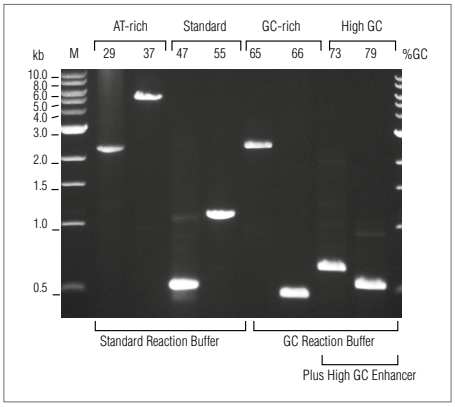
One*Taq* DNA Polymerase

For exceptional reliability on any sample

One*Taq* and One*Taq* Hot Start DNA Polymerases offer robust amplification across a wide range of templates. One*Taq* is an optimized blend of *Taq* and Deep Vent DNA polymerases. The 3–5 exonuclease activity of Deep Vent DNA Polymerase increases the fidelity and robustness of *Taq*, and the hot start formulation combines convenience with decreased interference from primer dimers and secondary products.

Additionally, One*Taq* Reaction Buffers and High GC Enhancer have been formulated for robust yields with minimal optimization, regardless of a template's GC content. Both polymerases are available in master mix and Quick-Load master mix formats.

Achieve robust amplification for standard, AT- and GC-rich templates with One*Taq* DNA Polymerase



Amplification of a selection of sequences with varying AT and GC content from human and C. elegans genomic DNA using OneTaq DNA Polymerase. GC content is indicated above gel. Marker M is the 1 kb DNA Ladder.

Advantages

- Ideal for routine, AT- and GC-rich PCR Applications

Applications

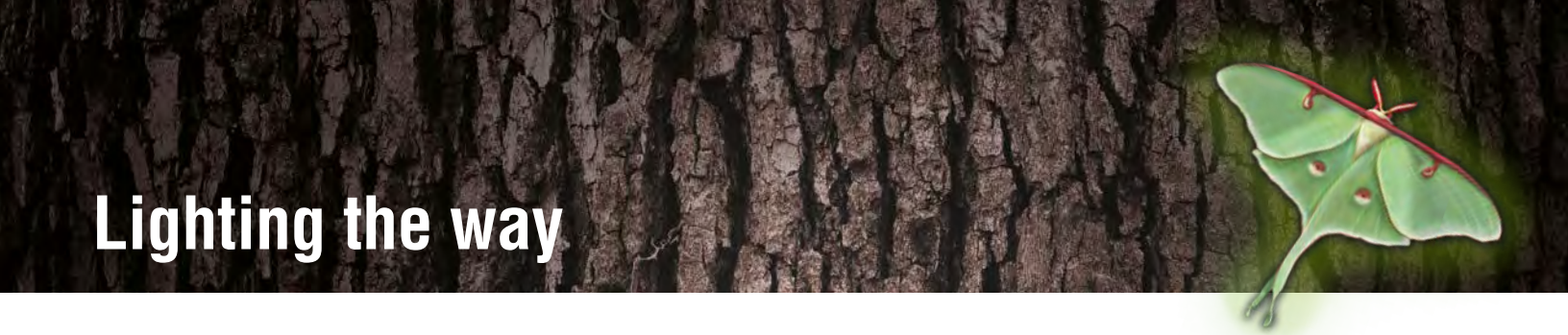
- High Sensitivity PCR
- High Throughput PCR
- Routine PCR
- GC-rich PCR
- AT-rich PCR
- Colony PCR
- Long PCR (up to ~6 kb genomic)

Ordering Information

PRODUCT	NEB #	SIZE
One*Taq* DNA Polymerase	M0480S/L/X	200 units/1.000 units/5 x 1.000 units
One*Taq* Hot Start DNA Polymerase	M0481S/L/X	200 units/1.000 units/5 x 1.000 units
One*Taq* 2X Master Mix with Standard Buffer	M0482S/L	100 rxns/500 rxns
One*Taq* Hot Start 2X Master Mix with Standard Buffer	M0484S/L	100 rxns (50 µl vol)/500 rxns
One*Taq* Hot Start 2X Master Mix with GC Buffer	M0485S/L	100 rxns/500 rxns
One*Taq* Quick-Load 2X Master Mix with Standard Buffer	M0486S/L/X	100 rxns/500 rxns/5 X 500 rxns
One*Taq* Hot Start Quick-Load 2X Master Mix, Standard Buffer	M0488S/L	100 rxns (50 µl vol)/500 rxns (50 µl vol)
One*Taq* Hot Start Quick-Load 2X Master Mix with GC Buffer	M0489S/L	100 rxns (50 µl vol)/500 rxns (50 µl vol)
One*Taq* RT-PCR Kit	E5310S	30 reactions
One*Taq* One-Step RT-PCR Kit	E5315S	30 reactions
One*Taq* Quick-Load DNA Polymerase	M0509L/X	500 units/2.500 units

Learn more about One*Taq* and request a free sample at

NEB.com/OneTaq



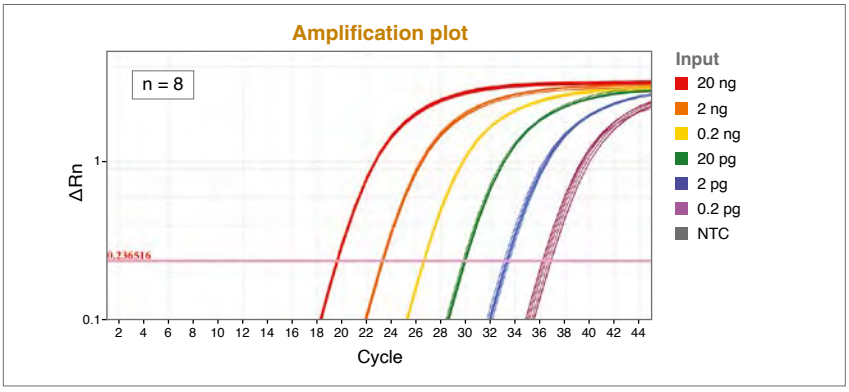
Luna Universal (RT)-qPCR products: unrivaled performance for all your (RT)-qPCR needs!

Luna (RT-)qPCR products offer best-in-class performance and robustness, and are available for intercalating dye or probe-based detection methods. They are compatible with all leading qPCR cyclers incl. ROX/dye-dependent machines. Luna Universal qPCR mixes contain dUTP, enabling carryover prevention when reactions are treated with Antarctic Thermolabile UDG.

LunaScript RTase is a unique designer enzyme and allows for a fast (13 min) and robust performance in RT-qPCR settings. It is available as LunaScript Super Mix or Super Mix Kit – your preferred choice in two-step workflows – or readily "built-in" as part of the Luna One-Step RT-qPCRs Kits.

In addition, the "Luna Cell Ready" products and kits are designed for direct RNA quantification from cell lysate, bypassing traditional RNA extraction and purification steps.

Luna products offer exceptional sensitivity, reproducibility and qPCR performance



qPCR targeting human GAPDH was performed using the Luna Universal Probe qPCR Master Mix over a 6-log range of input template concentrations (20ng – 0.2pg Jurkat-derived cDNA) with 8 replicates at each concentration. cDNA was generated from Jurkat total RNA using the NEB Protoscript II First Strand cDNA Synthesis Kit. NTC=non-template control.

Ordering Information

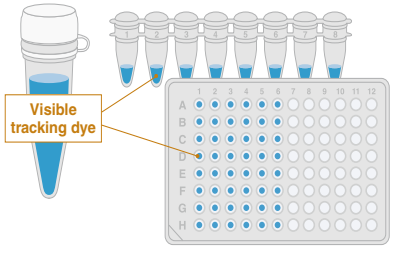
PRODUCT	NEB #	SIZE
Luna Universal qPCR Master Mix	M3003S/L/X/E	200/500/1,000/2,500 rxns
Luna Universal Probe qPCR Master Mix	M3004S/L/X/E	200/500/1,000/2,500 rxns
Luna Universal One-Step RT-qPCR Kit	E3005S/L/X/E	200/500/1,000/2,500 rxns
Luna Universal Probe One-Step RT-qPCR Kit	E3006S/L/X/E	200/500/1,000/2,500 rxns
Luna Probe One-Step RT-qPCR Kit (No ROX)	E3007E	2,500 rxns
Luna Probe One-Step RT-qPCR 4X Mix with UDG	M3019S/L/X/E	200/500/1,000/2,000 rxns
Luna Probe One-Step RT-qPCR 4X Mix with UDG (No ROX)	M3029S/L/E	200/500/2,000 rxns
Luna SARS-CoV-2 RT-qPCR Multiplex Assay Kit	E3019S/L	96/480 rxns
LunaScript RT Master Mix Kit (Primer-free)	E3025S/L	25/100 rxns
LunaScript RT SuperMix Kit	E3010S/L	25/100 rxns
LunaScript RT SuperMix	M3010L/X/E	100/500/2,500 rxns
LunaScript Multiplex One-Step RT-PCR Kit	E1555S/L	50/250 rxns
Luna Cell Ready One-Step RT-qPCR Kit	E3030S	100 + 500 rxns
Luna Cell Ready Probe One-Step RT-qPCR Kit	E3031S	100 +500 rxns
Luna Cell Ready Lysis Module	E3032S	100 rxns

Advantages

- Increasing reaction specificity, sensitivity, accuracy, reproducibility and robustness
- Products perform consistently across a wide variety of sample sources
- Convenient master mix formats with user-friendly protocols allow for UDG-dependent carry-over-prevention and simplify reaction setup
- Non-interfering, visible tracking dye helps to eliminate pipetting errors
- Skip RNA purification and go direct from cells to RT-qPCR analysis with Luna Cell Ready Module and Kits
- Readily available as lyophilized kit – more lyophilization options available as part of our customized solutions offering
- Excellent value

> *"The choice of One-step kit is critical for sensitivity and at the same time a major cost factor. We recommend the NEB Luna Universal Probe One-Step RT-qPCR Kit (E3006), which is attractively priced and performs among the most sensitive One-step kits we tested."*
>
> – VIENNA COVID-19 Detection Initiative (VCDI)

Luna products feature a blue tracking dye eliminating pipetting errors



Find the right Luna product for your application:

	Dye-based	Probe-based
Genomic DNA or cDNA	Luna® Universal qPCR Master Mix (NEB #M3003)	Luna Universal Probe qPCR Master Mix (NEB #M3004)
Purified RNA One-Step RT-qPCR	Luna Universal One-Step RT-qPCR Kit (NEB #E3005)	Luna Universal Probe One-Step RT-qPCR: • Kit (NEB #E3006) • Kit (no ROX) (NEB #E3007) • 4X Mix with UDG (NEB #M3019)
Two-Step RT-qPCR	LunaScript® RT SuperMix Kit (NEB #E3010) + Luna Universal qPCR Master Mix (NEB #M3003)	LunaScript RT SuperMix Kit (NEB #E3010) + Luna Universal Probe qPCR Master Mix (NEB #M3004)
RNA from cell lysate	Luna Cell Ready One-Step RT-qPCR Kit (NEB #E3030)	Luna Cell Ready Probe One-Step RT-qPCR Kit (NEB #E3031)

A free Luna Universal qPCR Master Mix sample included in the Starter Pack 2024!

Details on page 16

Learn more about Luna and request a free sample at

www.LUNAqPCR.com

Also available:

LyoPrime Luna Probe One-Step RT-qPCR Mix with UDG – lyophilized, storage at room temperature

Bringing together expertise in enzyme development, manufacturing and lyophilization, NEB Lyophilization Sciences™ – a new NEB subsidiary – has created shelf-stable, lyophilized products that do not sacrifice the high-performance qualities of their liquid counterparts.

PRODUCT	NEB #	SIZE
LyoPrime Luna Probe One-Step RT-qPCR Mix with UDG	L4001S/P	120 rxns/ 1 x 96 wells

Learn more about lyophilization and access our on-demand webinar discussing considerations for lyophilizing reagents at

www.NEB.com/LyoPrime

Advantages

- Simply add nuclease-free water for rapid rehydration
- Store at room temperature for up to 2 years prior to rehydration
- Eliminate cold chain shipping requirements
- Same product performance as liquid format (#M3019)

Nouveau doctorant ou post-doctorant ?

Équipez-vous pour vos projets en biologie moléculaire !

Le Starter Pack NEB France est de retour pour les nouveaux doctorants ou post-doctorants qui viennent d'arriver dans un laboratoire de biologie moléculaire.

Cette année, le Starter Pack se revêt de doré pour fêter nos 50 ans ! À cette occasion, il contient trois échantillons pour tester nos produits, des goodies exclusifs ainsi que des brochures et posters pour bien commencer votre nouveau projet !

**Offre valable jusqu'au 15/12/24, limitée à un par personne, uniquement vers les adresses professionnelles en France métropolitaine et dans la limite des stocks disponibles. NEB France se réserve le droit de refuser l'envoi d'un Starter Pack.*

Demandez-le vôtre :
www.neb-online.fr/starterpack

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