

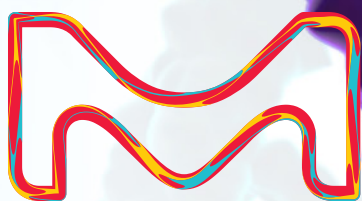


MERCK

Bind. Wash. Elute.

Easier nucleic acid preparation
with fewer impurities using

GenElute™-E Single Spin DNA and RNA Purification Kits



The life science
business of Merck
operates as
MilliporeSigma in
the U.S. and Canada.

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Is there a better way?

Traditional DNA and RNA preparation techniques use silica to bind nucleic acid from samples, followed by ethanol washing steps prior to the elution of purified DNA or RNA. At the time, these bind-wash-elute methods offered DNA and RNA purification adaptable to the development of pre-packaged purification kits, providing a significant improvement over phenol chloroform extraction methods that were previously used.

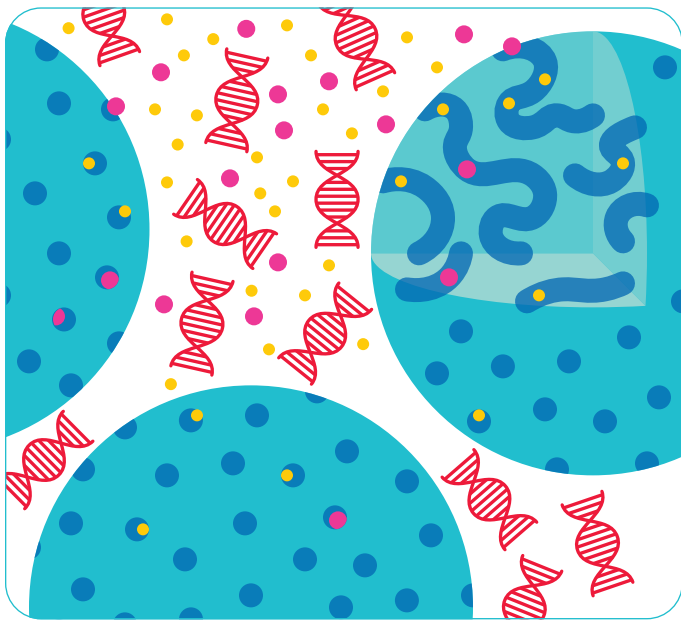
But is silica still the best way to purify?

Silica-based purification protocols aren't perfect – they require multiple, tedious wash and spin steps, with lots of hands-on tube manipulation and little downtime. Additionally, binding of DNA and RNA to silica necessitates the use of chaotropic salts, which can falsely elevate nucleic acid concentration estimates and interfere with downstream enzymatic processes such as qPCR.

Your nucleic acid preparation might not be as pure as you think it is...

Introducing GenElute™-E Single Spin DNA and RNA Purification Kits

We introduce the GenElute™-E Single Spin nucleic acid purification system that eliminates the need for high salt binding and ethanol wash steps, yielding DNA and RNA preparations with fewer impurities for more robust results. GenElute™-E DNA and RNA purification kits employ a negative chromatography method dependent on size exclusion to separate large DNA and RNA nucleic acid molecules from smaller protein, lipid, and ionic components in cell, tissue, blood, and other samples.



3 key advantages over silica:

- Simplified workflow**
- Superior performance**
- Reduced waste**

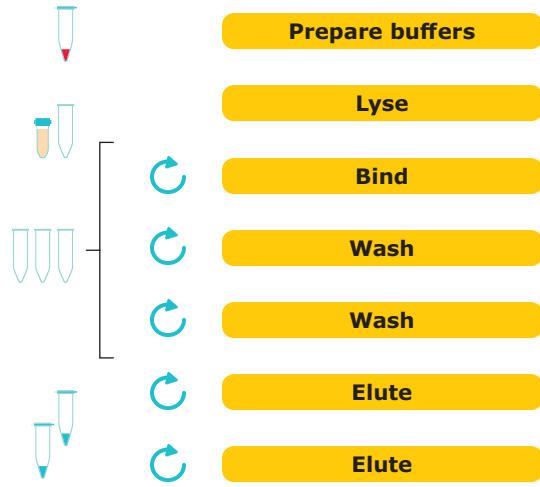

Using negative chromatography, GenElute™-E Single Spin columns efficiently absorb and retain sample contaminants while allowing nucleic acids to flow through the column, reducing the number of steps and plastic materials required for purification. Based on a novel lysis method, innovative SmartLyse™ proteases act as sample-specific enzymes, resulting in an optimized procedure and eliminating the need for an overnight step.

A simplified workflow

Purification in one spin, eliminating all wash steps and reducing tube handling for more efficient, safer sample processing.

The improved workflow of GenElute™-E DNA and RNA purification kits significantly simplifies DNA and RNA preparation. Isolate nucleic acid in a fraction of time compared to traditional silica bind-wash-elute procedures. The negative chromatography principle permits the flow of large nucleic acid molecules directly through the column in a single spin, while impurities are retained on the column.

Silica Procedure



- Prepare buffers
- Lyse
- Bind
- Wash
- Wash
- Elute
- Elute

Multiple spins & tube transfers

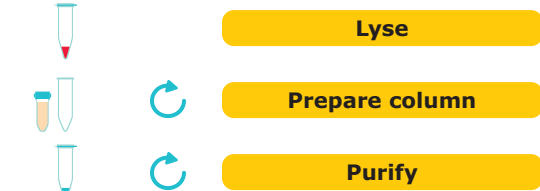

Lysis

- 45 minutes to overnight

Purification

- 45 minutes hands-on time
- 6 centrifugation steps

GenElute™-E Single Spin Technology



- Lyse
- Prepare column
- Purify

- ✓ **Reduced time**
- ✓ **Reduced handling**
- ✓ **Reduced waste**

Lysis

- 10 to 40 minutes

Purification

- 3 minutes hands-on time
- 1 centrifugation step

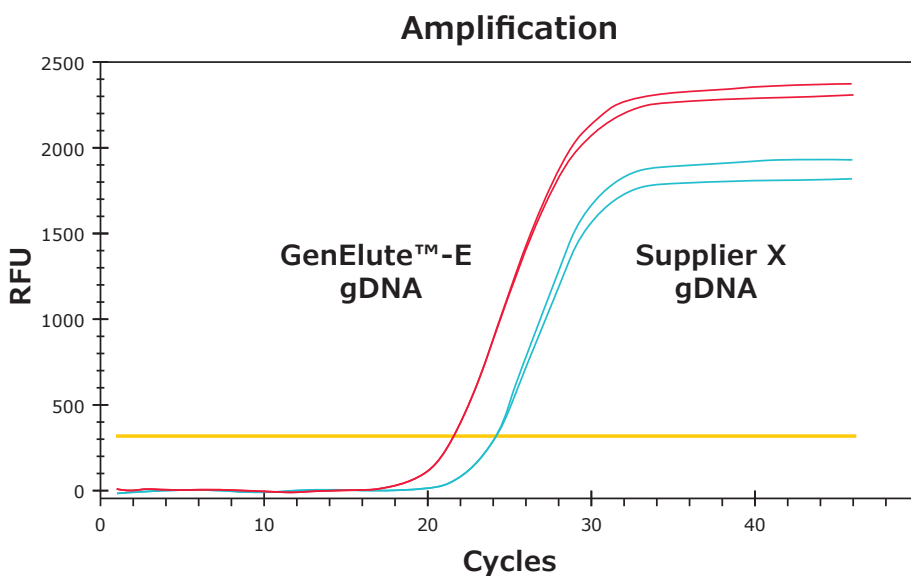
Fewer impurities for better performance

Less shearing and fewer chemical contaminants that can lead to overestimation of nucleic acid concentration and inhibit enzyme activity in PCR and other downstream processes.

Silica-based DNA and RNA preparation methods introduce denaturing salts and organic solvents such as ethanol to the sample during purification. These contaminants can be carried over into downstream applications, leading to inhibition of enzymatic reactions. Removal of these contaminants can render enzymatic methods such as qPCR more sensitive and robust.

Binding salts and buffer components can also affect ultraviolet (UV) measurements used in nucleic acid quantitation. Tris, EDTA, and guanidinium absorb strongly at 230 nm and can bleed into the 260 nm absorbance range used to calculate DNA and RNA concentration, falsely elevating estimated concentrations and yield. GenElute™-E purification kits eliminate impurities from the preparation process for results you can trust.

Higher quality preps



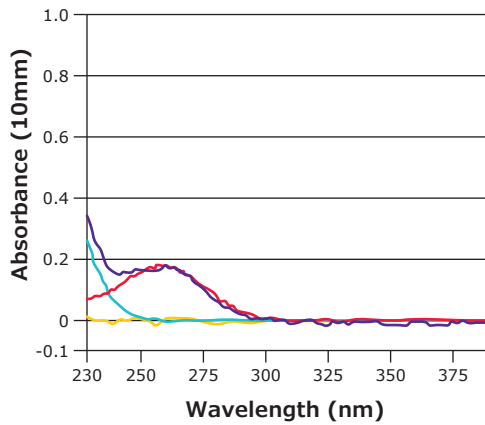
GenElute™-E Single Spin Purification provides:

- Maximum nucleic acid purity and quality for minimal interference in enzymatic processes
- More robust performance in downstream applications such as qPCR

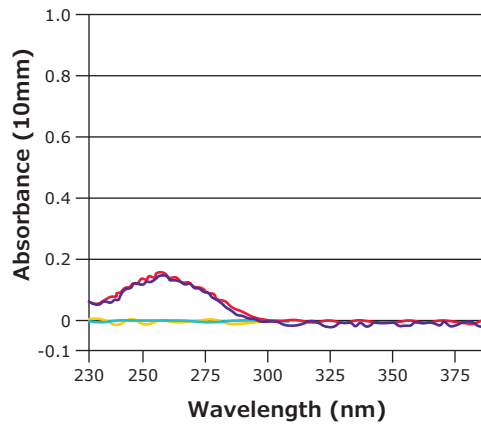
Results from qPCR analysis adding equivalent calculated amounts of genomic DNA from mouse kidney tissue. Amplification curves were generated using samples prepared with silica-based spin prep kits from Supplier X (blue curves) and GenElute™-E Single Spin negative chromatography purification kits (red curves). Curves for the silica-purified samples are right-shifted compared to samples purified using GenElute™-E negative chromatography, suggesting the presence of interfering contaminants or overestimated concentration in the silica-purified samples.

Fewer contaminants

A Silica kit from Supplier X



B GenElute™-E negative chromatography



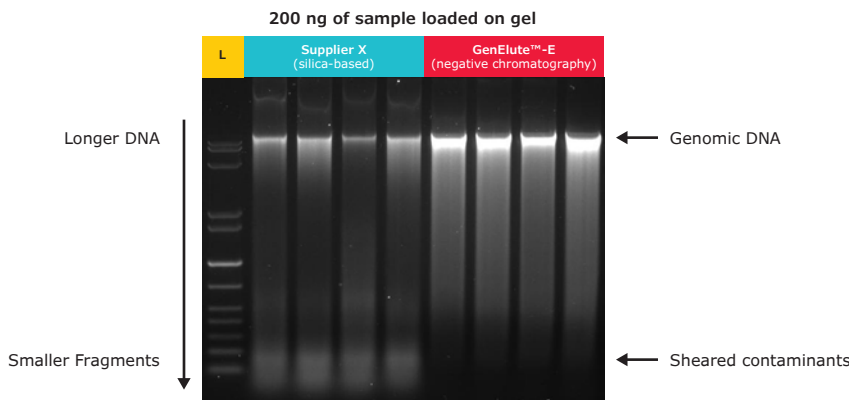
GenElute™-E Single Spin Purification provides:

- High final concentration and yield
- Fewer chemical contaminants, as indicated by $A_{260/230}$ ratio
- Less chemical interference in optical density measurements, resulting in more accurate quantitation
- Greater agreement between calculated concentrations and yields across different methods

Sample type	Purification method	$A_{260/280}$ (optimal range 1.8-2.0)	$A_{260/230}$ (optimal range 2.0-2.2)
Human blood	Silica-based spin prep kit (Supplier X)	2.45	0.57
	GenElute™-E negative chromatography (size exclusion)	1.83	2.2

UV absorption spectra of genomic DNA prepared from blood using A) silica-based DNA purification spin prep kit from Supplier X or B) GenElute™-E Single Spin negative chromatography DNA purification kits. Purple lines: sample purified using indicated method. Red lines: purified sample without process contaminants, used as baseline controls. Blue lines: purification method without using an actual sample (process contaminant impact on the spectrophotometric reading). Table shows calculated $A_{260/280}$ and $A_{260/230}$ ratios for DNA purified using both purification techniques. Data suggest that preparation using GenElute™-E Single Spin Purification Kits yielded better purity, with fewer chemical contaminants in the final prep.

Less shearing



GenElute™-E Single Spin Purification provides:

- High molecular weight genomic DNA
- Fewer low molecular weight nucleic acid byproducts
- More full-length gDNA with less sheared nucleic acid impurities

High molecular weight genomic DNA is critical for certain downstream applications, such as next generation sequencing (NGS). Silica-based spin prep purification methods rely on multiple spins that can shear nucleic acid. Genomic DNA from tissue samples was purified using silica-based spin prep kits from Supplier X or GenElute™-E Single Spin negative chromatography purification kits. Purified product was resolved by agarose gel electrophoresis. Data confirm that extraction using GenElute™-E Single Spin Purification kits results in more full-length product, with less shearing of genomic DNA.

Reduced waste for a better environment

With fewer plastic consumables and no hazardous bind and wash buffers, GenElute™-E DNA and RNA purification kits provide an eco-friendly alternative to silica-based purification.

GenElute™-E purification kits greatly reduce the amounts of plastic-based components packaged with each kit and consumed while executing protocols in the lab. All tedious binding and washing steps associated with silica-based procedures are omitted, with no use of chaotropic salts or organic solvents that require special disposal. For example, plastic waste can be reduced by 55% compared to common silica workflows, resulting in disposal cost savings and reduced environmental impact.

GenElute™-E kits



Supplier X



GenElute™-E Single Spin Purification supports:

- Significantly reduced plastic waste
- No hazardous bind and wash steps
- Responsible and sustainable nucleic acid purification
- Disposal cost savings

GenElute™-E Single Spin Nucleic Acid Purification Kits provide easier workflows for DNA and RNA isolation, better nucleic acid quality with fewer impurities as well as reduced plastic and hazardous waste disposal compared to silica bind-wash-elute spin prep kits.

With all these advantages, why purify DNA and RNA any other way?

Key applications

Preparation of genomic DNA:

- Whole blood gDNA
- Cell culture gDNA
- Tissue gDNA
- Plant gDNA

Cleanup:

Selection by Impurity

	Organic solvents				DNA		Salts			Dyes		
	Phenol	TRIzol™ reagent	Chloroform	Ethanol	Primer	dNTPs	Chaotrophs ¹	Salts	SDS	NaAzide	Indigo	Gel loading
GenElute™-E Single Spin DNA CleanUp Kit				✓	✓	✓	✓	✓	✓	✓	✓	✓
GenElute™-E Organic Solvent DNA CleanUp Kit	✓	✓	✓	✓				✓				
GenElute™-E Single Spin RNA CleanUp Kit ²	✓	✓	✓	✓			✓	✓				

Supporting products

- Cap puncher
- FFPE deparaffination solution
- Tissue stabilizer
- RNA Gel Loading Buffer

Selection by Application

	Post Phenol-based Extraction ³	Desalting of Nucleic Acids	Post Bind-Wash-Elute Extraction	PCR Cleanup	Enzymatic Reaction CleanUp	Buffer Exchange ⁴
GenElute™-E Organic Solvent DNA CleanUp Kit	✓	✓				✓
GenElute™-E Single Spin RNA CleanUp Kit ²	✓	✓	✓			✓

1. Gu HCl; GTC

2. Does not recover miRNAs, tRNAs, small RNA molecules

3. TRIzol™ reagents; Phenol/Chloroform based extractions

4. Buffering to low mM Tris, pH 8.2

Ordering Information

Description	Catalog No.
GenElute™-E Single Spin Blood DNA Kit	EC100-10RXN
GenElute™-E Single Spin Blood DNA Kit	EC100-50RXN
GenElute™-E Single Spin Blood DNA Kit	EC100-250RXN
GenElute™-E Single Spin Blood DNA High Yield Kit	EC200-10RXN
GenElute™-E Single Spin Blood DNA High Yield Kit	EC200-50RXN
GenElute™-E Single Spin Blood DNA High Yield Kit	EC200-250RXN
GenElute™-E Single Spin Tissue DNA Kit	EC300-10RXN
GenElute™-E Single Spin Tissue DNA Kit	EC300-50RXN
GenElute™-E Single Spin Tissue DNA Kit	EC300-250RXN
GenElute™-E Single Spin Cell Culture DNA Kit	EC400-10RXN
GenElute™-E Single Spin Cell Culture DNA Kit	EC400-50RXN
GenElute™-E Single Spin Cell Culture DNA Kit	EC400-250RXN
GenElute™-E Single Spin Plant DNA Kit	EC500-10RXN
GenElute™-E Single Spin Plant DNA Kit	EC500-50RXN
GenElute™-E Single Spin Plant DNA Kit	EC500-250RXN
GenElute™-E Single Spin DNA Cleanup Kit	EC600-10RXN
GenElute™-E Single Spin DNA Cleanup Kit	EC600-50RXN
GenElute™-E Single Spin DNA Cleanup Kit	EC600-250RXN
GenElute™-E Organic Solvent DNA Cleanup Kit	EC700-10RXN

Description	Catalog No.
GenElute™-E Organic Solvent DNA Cleanup Kit	EC700-50RXN
GenElute™-E Organic Solvent DNA Cleanup Kit	EC700-250RXN
GenElute™-E Single Spin RNA Cleanup Kit	EC800-10RXN
GenElute™-E Single Spin RNA Cleanup Kit	EC800-50RXN
GenElute™-E Single Spin RNA Cleanup Kit	EC800-250RXN
GenElute™-E FFPE Deparaffinization Solution	EC900-10ML
GenElute™-E FFPE Deparaffinization Solution	EC900-100ML
GenElute™-E Tissue Stabilizer	EC111-100ML
GenElute™-E Tissue Stabilizer	EC111-500ML
GenElute™-E RNA Gel Loading Buffer	EC222-1EA
GenElute™-E RNA Gel Loading Buffer	EC222-5EA
GenElute™-E Single Spin Tissue DNA 96 Kit	EC396-2EA
GenElute™-E Single Spin Tissue DNA 96 Kit	EC396-8EA
GenElute™-E Single Spin Plant DNA 96 Kit	EC596-2EA
GenElute™-E Single Spin Plant DNA 96 Kit	EC596-8EA
GenElute™-E Single Spin Blood DNA 96 Kit	EC196-2EA
GenElute™-E Single Spin Blood DNA 96 Kit	EC196-8EA
GenElute™-E Single Spin Cap Puncher	EC9999-1EA

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