









Genomic DNA Purification

Promega has a variety of solutions for your genomic DNA (gDNA) purification needs. Promega has automated methods for blood, cultured cells, mammalian tissue and plant purifications. All systems produce high-quality DNA ready for amplification. Most automated systems use magnetic particle-based technologies. The Wizard® SV technologies introduce membrane-based purification for manual or automated purifications. The Wizard Genomic DNA Purification Kit is a truly versatile solution-based system to manually isolate high molecular weight gDNA from a variety of starting materials. This gentle solution-based method produces gDNA suitable for amplification, Southern blotting and genomic cloning.

Look for these symbols to find the system right for your application.

-  **Blood**
-  **Cultured Cells**
-  **Animal Tissue**
-  **Plant Tissue**
-  **Bacteria**
-  **Yeast**
-  **Fixed Tissue**  **NEW**

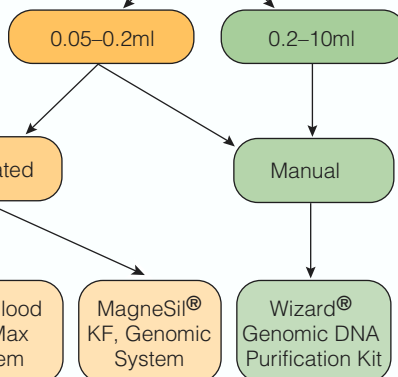
Please note, in the flow charts that follow, Promega systems are listed by which protocols come in the Technical Literature sent with the system. Other applications to other gDNA sources may exist (e.g., Blood protocols for the Wizard SV Genomic System).

Please contact Promega Technical Services if you have questions.
techserv@promega.com

Blood



Buffy coat or white blood cells?
Use cultured cells protocols.



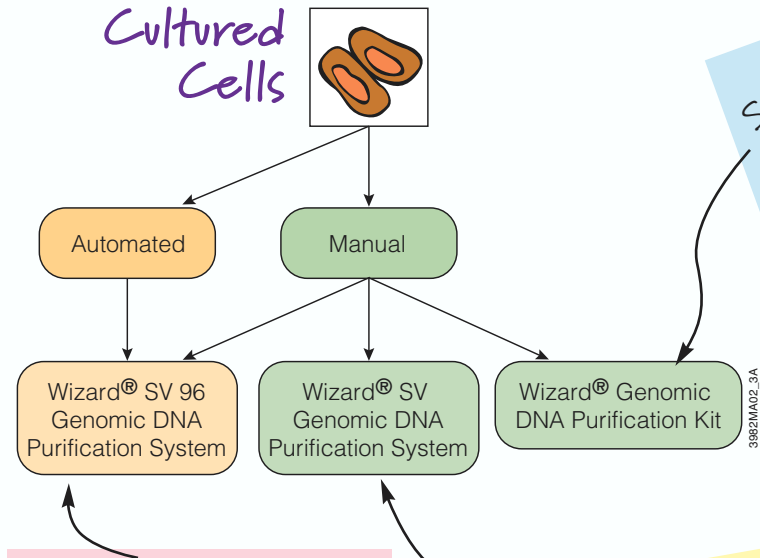
Requires automation, magnetics-based system. Specifically designed to capture just ~1µg gDNA from 50-60µl of blood. Eliminates need to quantitate after purification.

Requires automation, magnetics-based system. Will capture ≥11µg of gDNA from a 200µl blood sample.

Designed for automation on the KingFisher® mL. Handles up to 200µl of blood. Will purify 4-6µg of gDNA from 1-15 samples in 25 minutes.

Solution-based, totally scalable system. Uses centrifugation. Can handle any volume of blood. Specific protocols provided for 300µl, 3ml and 10ml of fresh whole blood.

Genomic DNA Purification

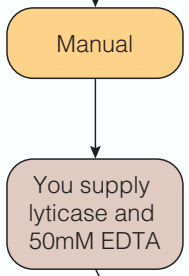
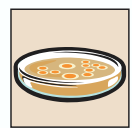


Solution-based, totally scalable system. Uses centrifugation. Produces high molecular weight (>50kb) gDNA suitable for any application, including PCR and Southern blotting.

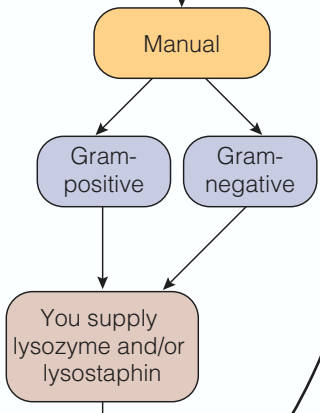
Perform 96 gDNA preps at once. Requires a vacuum manifold. Can be used on benchtop or automated. Comprised of SV membranes arrayed in a 96-well format. Can handle up to 5×10^6 cells/well.

Use with a microcentrifuge or vacuum manifold. Purify PCR-ready gDNA in 20 minutes after lysis. Can process up to 5×10^6 cells/prep.

Yeast



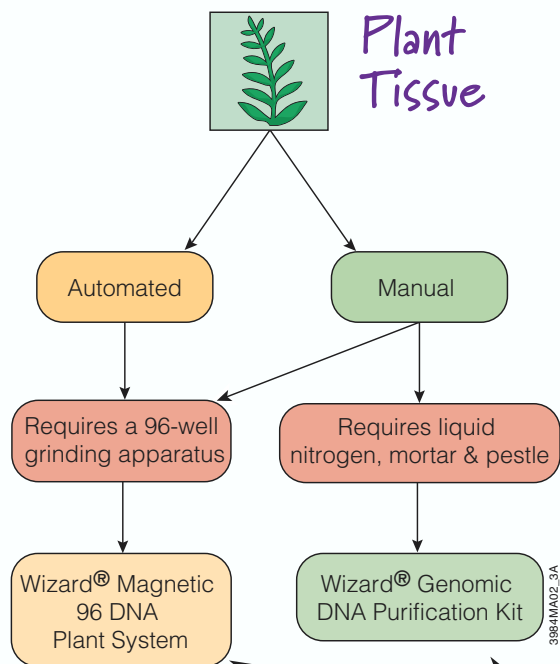
Bacteria



	Genome Size	Molecules/μg
Human	2.9Gb	3.13×10^5
Mouse	2.7Gb	3.35×10^5
Rat	2.8Gb	3.26×10^5
<i>Arabidopsis</i>	3.0Gb	3.04×10^5
Tobacco	4.4Gb	2.07×10^5
Corn	2.5Gb	3.65×10^5
Wheat	16.0Gb	5.70×10^4
Yeast (<i>S. cerevisiae</i>)	13.5Mb	6.75×10^7
Bacteria (<i>E. coli</i>)	4.7Mb	1.94×10^8

Gb = Gigabases (1×10^9). Mb = Megabases (1×10^6).

Genomic DNA Purification



Solution-based, totally scalable system for fresh plant leaf tissue. Uses centrifugation. Produces high molecular weight (>50kb) gDNA suitable for any application, including PCR and Southern blotting.

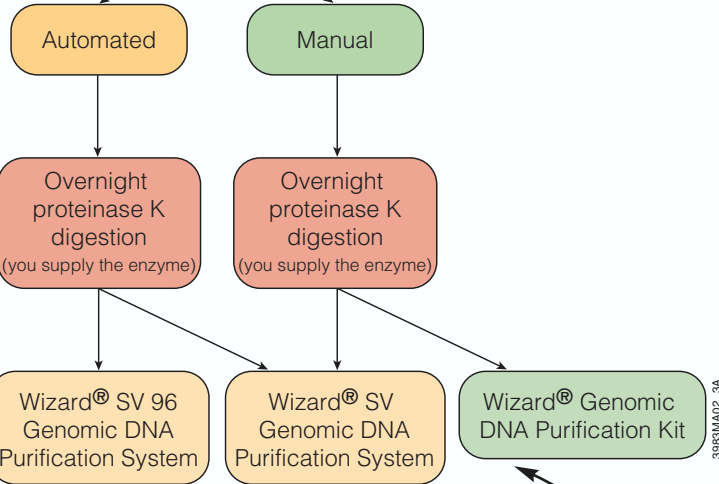
Magnetic-based system that can be used in manual or automated format. Purifies gDNA from seeds, leaf or tissues for PCR or other amplification based genotyping methods.

Don't see your DNA sample type in these flowcharts? Contact Promega Technical Services for advice at: techserve@promega.com

Genomic DNA Purification



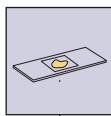
Animal Tissue



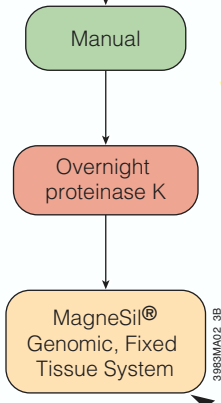
Performs 96 gDNA preps at once. Uses a vacuum manifold. Can be used on the benchtop or automated. Comprised of SV membranes arrayed in a 96-well format. Processes up to 20mg tissue/well.

Use with a microcentrifuge or vacuum manifold with vacuum adapters. Get PCR-ready gDNA in 20 minutes after lysis. Can process up to 20mg tissue/prep.

Solution-based, totally scalable system. Uses centrifugation. Produces high molecular weight (>50kb) gDNA suitable for any application, including PCR and Southern blotting.



Fixed Tissue



No Xylene required for deparaffinization!







Magnetics-based system works with 10µm thin sections. Purifies amplification-qualified gDNA allowing amplicons as large as 1.8kb. Works in multiplex amplifications.

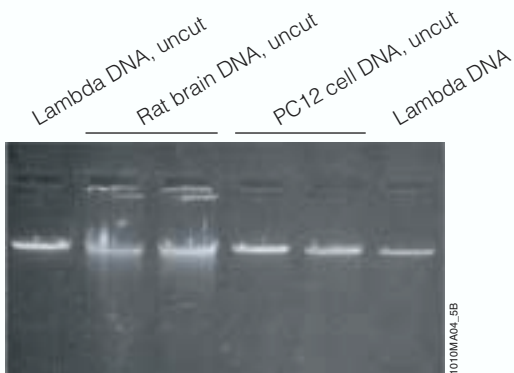
Genomic DNA Purification

Wizard® Genomic DNA Purification Kit

Need a versatile genomic DNA purification system? Get it all with the Wizard Genomic DNA Purification Kit. This solution-based system uses a simple, gentle “salting out” method to isolate genomic DNA from a wide variety of starting materials. The standard protocol allows isolation of gDNA from blood or cultured cells. Simple modifications to the protocol (involving the addition of reagents common to most molecular biology laboratories) allow you to isolate gDNA from bacteria, yeast, plant or animal tissues, including mouse tails. The system isolates high molecular weight DNA (>50kb) with an A_{260}/A_{280} greater than 1.7.

Protocols provided for:

-  Whole Blood (300µl, 3ml, 10ml, and 50µl × 96-wells)
-  Cultured Cells
-  Animal Tissue
-  Plant Tissue
-  Gram-Negative Bacteria
Gram-Positive Bacteria
-  Yeast



Genomic DNA isolated using the Wizard Genomic DNA Purification Kit. Genomic DNA was isolated from fresh rat brain or PC12 cells according to the protocol provided in the Wizard® Genomic DNA Purification Kit Technical Manual #TM050. DNA from the indicated sources (0.5µg/lane) was separated on a 0.7% agarose gel.

The Wizard Genomic DNA Purification Kit provides protocols for the easy, solution-based, manual purification of gDNA from many different sources.

Wizard® Genomic DNA Purification Kit

Cat.#: A1120 (100 isolations, 300µl blood)
A1125 (500 isolations, 300µl blood)
A1620 (100 isolations, 10ml blood)

Protocol:
www.promega.com/tbs/tm050/tm050.html

Customizable Protocol:
www.promega.com/tbscustom/tm050c/promega.asp

Citations detailing use of this kit:
www.promega.com/citations/



DNA Yields from Various Starting Materials.

Source	Amount of Starting Material	Typical DNA Yield
Whole Blood	300µl	5–15µg
	3ml	25–50µg
	10ml	250–500µg
	96-well plate, 50µl/well	0.2–0.7µg
Tissue Culture Cells	10 ⁶ –10 ⁷ cells	5–30µg
Animal Tissue		
Mouse Liver	11mg	15–20µg
Mouse Tail	0.5–1cm of tail	10–30µg
Insect Cells	5 × 10 ⁶ cells	16µg
Plant Leaf Tissue	40mg	7–12µg
Bacterial Culture*	10 ⁸ –10 ¹⁰ cells	5–20µg
Yeast*	1.9 × 10 ⁸ cells	4.5–6.5µg

*Overnight culture.

The Wizard Genomic DNA Purification Kit has been cited for purification of gDNA from the following bacterial sources:

Bordetella, Borrelia, Campylobacter, Desulfovibrio, Escherichia, Flavobacterium, Haemophilus, Helicobacter, Leptospira, Methanococcus, Mycobacterium, Mycoplasma, Paracoccus, Prevotella, Proteus, Rickettsia, Salmonella, Serratia, Sphingomonas, Staphylococcus, Streptococcus, Treponema and Vibrio.

Citations describing isolation from these and other sources, including yeast, fungi and virus-infected cells, are available online at:

www.promega.com/citations/

Genomic DNA Purification

Wizard® SV and SV 96 Genomic DNA Purification Systems

The Wizard SV and SV 96 Genomic DNA Purification Systems provide a fast, simple technique for the preparation of genomic DNA from cultured cells and tissue, including mouse tails. The SV system is designed for single-prep manual applications using either a microcentrifuge or vacuum manifold. Genomic DNA is obtained in 20 minutes after cell or tissue lysis. The SV 96 system was developed to meet high-throughput needs. You can use this system on the benchtop for manual 96-well purifications or automate on a liquid-handling platform like the Beckman Coulter Biomek® FX or Biomek® 2000 with a suitable vacuum manifold. Both systems provide similar yields of high quality, PCR-ready genomic DNA. Isolation of DNA from tissue requires the additional purchase of DNase-free Proteinase K (e.g., Promega Cat.# V3021).

Wizard® SV Genomic DNA Purification System

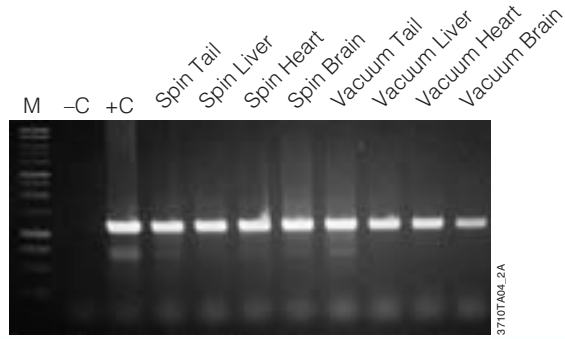
Cat.#: A2360 (50 preps)
A2361 (250 preps)

Protocol:

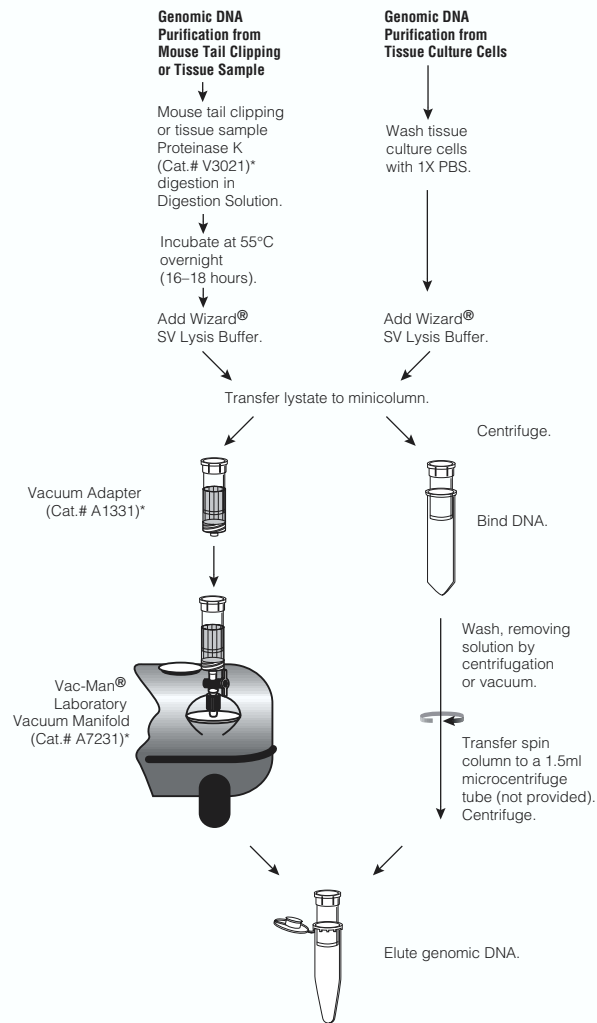
www.promega.com/tbs/tb302/tb302.html

Want to use the SV Genomic Systems for manual gDNA purification from blood?

Request *Genomic DNA Purification from Blood: Wizard® SV Genomic DNA Purification Systems*. Application Note #AN101:



Amplification of genomic DNA isolated from various mouse tissue sources using the Wizard SV Genomic DNA Purification System. Genomic DNA was isolated from the tissues listed using either the vacuum or spin protocols provided in the *Wizard SV Genomic DNA Purification System Technical Bulletin #TB302*. One microliter of the eluate from the column was amplified for a mouse IL-1 β (1.2kb) product. The positive control (+C) was Mouse Genomic DNA (Cat.# G3091) and the negative control (-C) contained no DNA. Further details are provided in Grunst, T. and Worzella, T. (2002) Introducing the Wizard SV and SV 96 Genomic DNA Purification Systems. *Promega Notes* 81, 9–13.



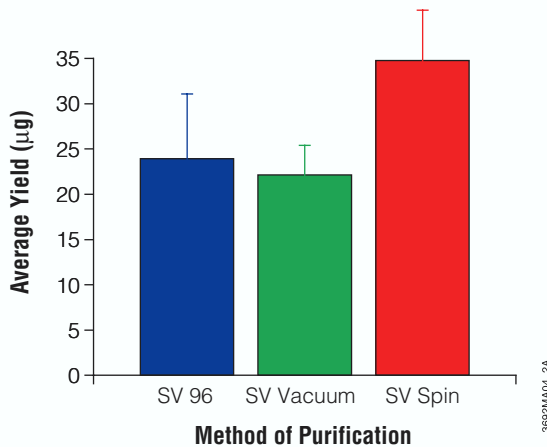
Overview of the Wizard SV Genomic DNA Purification System spin and vacuum protocols. *Vacuum Adaptor, Vacuum Manifold and Proteinase K must be purchased separately.

Genomic DNA Purification

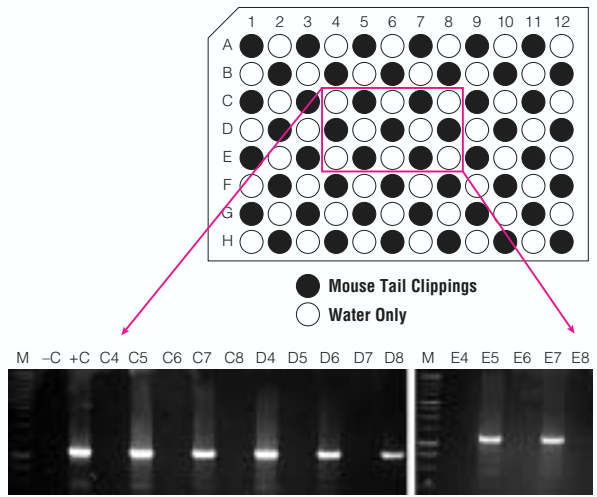
Average Yield of Genomic DNA Purified from Various Sources Using the Wizard® SV and SV 96 Genomic DNA Purification Systems.

Sample Type	Starting Amount	Average Yield
Mouse Tail Clipping	20mg	20µg
Mouse Liver	20mg	15µg
Mouse Heart	20mg	10µg
Mouse Brain	20mg	6µg
CHO Cells	1 × 10 ⁶ cells	5µg
NIH3T3 Cells	1 × 10 ⁶ cells	9µg
293 Cells	1 × 10 ⁶ cells	8µg

Work with the terminal 2cm of mouse tails. Any higher up on the tail and you'll get more connective tissue, cartilage and bone than nucleated cells. This material not only clogs columns, but fewer cells means less gDNA.

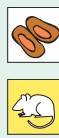


Comparison of DNA yields using the Wizard SV and SV 96 Genomic DNA Purification Systems. Average yield of genomic DNA (µg) purified from 20mg mouse tail clippings (1.2cm tail tip portions). Average A_{260}/A_{280} ratios are: SV 96, 1.7 ± 0.08 ; SV Vacuum, 1.7 ± 0.14 ; and SV Spin, 1.7 ± 0.14 .



Cross-contamination assay. Genomic DNA was purified from mouse tail clippings or water samples arrayed in adjacent wells of a 96-well plate using the Wizard SV 96 Genomic DNA Purification System. PCR products were amplified from 1µl of purified sample from each well for mouse IL-1β (1.2kb). No product is expected from wells containing water. For further details, see Grunst, T. and Worzella, T. (2002) Introducing the Wizard SV and SV 96 Genomic DNA Purification Systems. *Promega Notes* **81**, 9–13.

Wizard SV 96 Genomic DNA Purification System



Cat. #: A2370 (1 × 96 preps)
A2371 (4 × 96 preps)

Protocol:

www.promega.com/tbs/tb303/tb303.html

The Wizard SV 96 Genomic System is suitable for manual DNA purification at the benchtop or can be easily automated on liquid handlers such as the Biomek® FX, Biomek® 2000, or MultiPROBE® II HT/EX.

For more information visit:

www.promega.com/automethods/



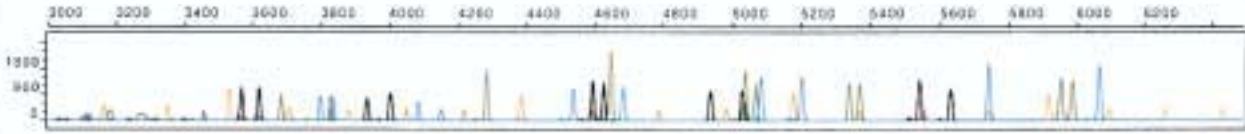
Robot turns into a genomic DNA purification machine!

Genomic DNA Purification

MagneSil® Blood Genomic, Max Yield & MagneSil ONE, Fixed Yield Blood Genomic

Promega has developed two genomic DNA isolation systems to streamline your blood-to-analysis pathway—MagneSil Blood Genomic, Max Yield^(a) and MagneSil ONE, Fixed Yield Blood Genomic^(a). Both systems are designed for automated gDNA purification on liquid-handling workstations such as the Beckman Coulter Biomek® FX. The Max Yield System purifies ≥4μg of gDNA from 200μl of whole blood. The MagneSil ONE System purifies 1μg gDNA (±50%) from 60μl whole blood. Both systems produce gDNA that is ready for use in monoplex or multiplex PCR amplification reactions.

Fixed Yield means no more quantitation or normalization! Optimize the volume of eluted DNA you need once—use that same amount each time.



Analysis of DNA isolated using the MagneSil Blood Genomic, Max Yield System. DNA isolated from whole blood using the MagneSil Blood Genomic, Max Yield System was used with the PowerPlex® 16 System (Cat.# DC6531), a multiplex STR amplification system for use in DNA typing. Results show successful coamplification and 3-color detection of the 16 loci (15 STR loci plus amelogenin) in the PowerPlex® 16 System^(b,c,d). Amplification products were separated on an ABI PRISM® 310 Genetic Analyzer, and analyzed using GeneScan® Software.

MagneSil® Blood Genomic, Max Yield System



Cat.#: MD1360 (1 × 96 preps)

Protocol:

www.promega.com/tbs/tb312/tb312.html

For more information on automated methods visit:

www.promega.com/automethods/

MagneSil® ONE, Fixed Yield Blood Genomic System



Cat.#: MD1370 (1 × 96 preps)

Protocol:

www.promega.com/tbs/tb313/tb313.html

For more information on automated methods visit:

www.promega.com/automethods/

Long-term storage of gDNA? Elute gDNA in a buffer solution like TE buffer or DNA Rehydration Solution (Cat.# A7963). Long-term storage in water can lead to autolytic degradation of the gDNA.

Purify up to ≥4μg gDNA from 200μl whole blood.

Purify ~1μg gDNA from 50-60μl whole blood.

DNA Yields (ng) From 60μl Whole Blood Samples Using the MagneSil ONE, Fixed Yield Blood Genomic System.

	Donor 1	Donor 2	Donor 3	Donor 4	Donor 5
Sample 1	1078	1078	1231	1451	1025
Sample 2	990	1092	1256	1078	998
Sample 3	970	1047	1315	990	994
Sample 4	1209	1294	1047	970	967
Sample 5	1105	1063	1388	1209	843
Sample 6	839	843	1296	1105	797
Mean	1032	1070	1256	1134	937
SD	128	143	116	178	94

Genomic DNA Purification

MagneSil® Genomic, Fixed Tissue System

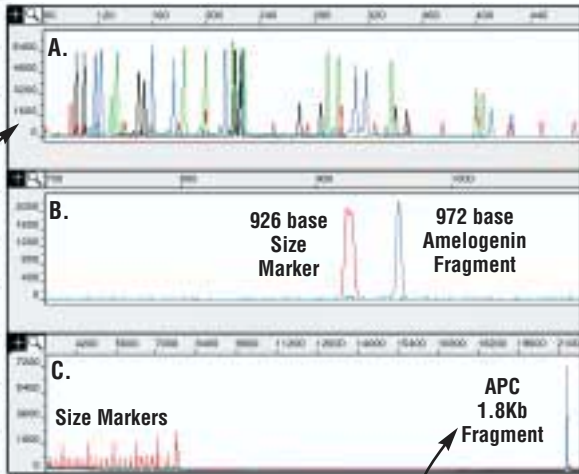
Do you have archived samples of formalin-fixed, paraffin-embedded tissues that you'd like to genotype? We have developed a system that extracts amplifiable gDNA from 10µm sections without xylene extraction. The new MagneSil Genomic, Fixed Tissue System uses proteinase K digestion followed by a rapid one hour processing step to prepare samples for amplification. The purification process removes amplification inhibitors such as small DNAs, and isolates gDNA fragments large enough to allow amplification targets up to 1.8kb. The highly pure gDNA can be used in monoplex or multiplex amplification reactions.

MagneSil® Genomic, Fixed Tissue System

Cat.#: MD1490 (100 samples)

Protocol:

www.promega.com/tbs/tb319/tb319.html



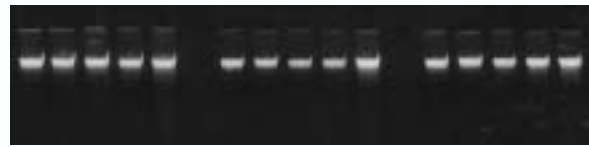
Multiplex-quality gDNA from fixed tissue

Amplify targets as large as 1.8Kb!

MagneSil® KF, Genomic System

Use your Thermo Electron KingFisher® mL to the fullest with the MagneSil KF, Genomic System. With this system, we provide optimized lysis and wash buffers to allow purification of high quality genomic DNA in the fixed number of steps required on the KingFisher® instrument. The MagneSil KF, Genomic System purifies 2–6µg DNA from 200µl blood. The isolated DNA is ready for monoplex and multiplex analysis, STR analysis and SNP genotyping.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17



Yield gel of gDNA isolated from 200µl of liquid blood. A single run of 15 samples purified on the KingFisher® mL using the MagneSil KF, Genomic System. The microliters of each eluate were loaded on the gel and visualized by ethidium bromide staining. Lanes 6 and 12 intentionally left blank.

MagneSil® KF, Genomic System

Cat.#: MD1460 (200 preps)

Protocol:

www.promega.com/tbs/tb322/tb322.html



Thermo Electron KingFisher® mL tube strips

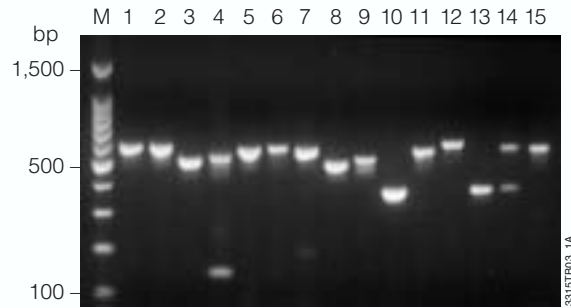
200µl sample	1,000µl Salt Wash, Blood	1,000µl Alcohol Wash, Blood	1,000µl Alcohol Wash, Blood	200µl Nuclease-Free Water
200µl MagneSil® KF PMPs				
800µl Lysis Buffer, KF				

25 minutes from start to finish for 1–15 samples

Genomic DNA Purification

Wizard® Magnetic 96 DNA Plant System

The Wizard Magnetic 96 DNA Plant System^(a) is designed for manual or automated 96-well purification of genomic DNA from plant leaf and seed tissue. The system was initially validated with corn and tomato leaf as well as with canola and sunflower seeds. The DNA purified from these samples can be used in PCR as well as more demanding applications such as Rapid Amplification of Polymorphic DNA (RAPD) analysis. The Wizard Magnetic 96 DNA Plant System uses MagneSil® Paramagnetic Particles^(a) (PMPs), considered a “mobile solid phase”. The binding of nucleic acids to magnetic particles occurs in solution, resulting in increased binding kinetics and binding efficiency. Contact with the wash buffer is also enhanced, facilitating removal of contaminants and increasing nucleic acid purity. Automated methods for the Beckman Coulter Biomek® 2000, Biomek® FX and other robots are available.



- | | |
|---------------------------|----------------------------|
| 1 Tobacco seedling | 9 Prairie grass, seed head |
| 2 Soybean | 10 Chives |
| 3 Lettuce leaf | 11 Tomato leaf |
| 4 Corn leaf | 12 Rice |
| 5 Potato | 13 Canola seed |
| 6 <i>Arabidopsis</i> leaf | 14 Sunflower seed |
| 7 Cabbage seed | 15 Carrot seed |
| 8 Green pepper seed | |

The Wizard Magnetic 96 DNA Plant System produces PCR-quality DNA from a variety of plant species. One microliter of gDNA purified from the indicated materials was used as template in PCR using a universal primer pair specific for the intron of the *TinL* chloroplast gene. One or more bands are produced depending on the plant species. For more information, please see Koller, S. *et al.* (2001) Automated genomic DNA purification using the Wizard Magnetic 96 DNA Plant System. *Promega Notes* 79, 25–28.

Plant Sample Types Processed Using the Wizard Magnetic 96 DNA Plant System.

<i>Arabidopsis</i>	Cotton seed	Soybean
Cabbage seed	Grass seed	Squash
Canola leaf	Green pepper seed	Squash seed
Canola seed	Lettuce	Strawberry leaf*
Carrot seed	Milkweed leaf	Sunflower seed
Chicory leaf	Potato tuber	Tobacco seedling
Chives	Radish leaf	Tomato leaf
Corn leaf	Rice leaf	Tomato seed
Cotton leaf*	Sorghum	Watermelon seed

*These samples require addition of polyvinylpyrrolidone (PVPP) to the lysis buffer to remove phenolic compounds that inhibit PCR.

Typical DNA Yield from Plant Species Using the Wizard Magnetic 96 DNA Plant System.

<i>Arabidopsis</i> tissue	10ng/mg
Canola leaf punches* (12)	26ng/leaf punch
Canola seeds (5)	343ng/seed
Corn leaf punches* (12)	98ng/leaf punch
Cotton seed (1)	29ng/seed
Lettuce leaf punches* (8)	13ng/leaf punch
Melon seed (1)	166ng/seed
Radish leaf punches* (12)	89ng/leaf punch
Soybean (10mg)	10ng/mg bean
Squash seed (1)	279ng/seed
Sunflower seed (1)	405ng/seed
Tomato leaf punches* (12)	111ng/leaf punch

*Leaf punches 6mm in diameter.

Wizard® Magnetic 96 DNA Plant System



Cat.#: FF3760 (2 × 96 preps)
FF3761 (4 × 96 preps)

Protocol:

www.promega.com/tbs/tb289/tb289.html

For more information on automated methods visit:

www.promega.com/automethods/

Want to use the Wizard Magnetic 96 DNA Plant System for high yield or fixed yield gDNA purification from plant tissue?

Request *Application Note* #AN105



Genomic DNA Purification

Genomic DNA Purification Systems and Accessories

Product	Size	Cat.#
Wizard® Genomic DNA Purification Kit	100 isolations (300µl blood per isolation)	A1120
	500 isolations (300µl blood per isolation)	A1125
	100 isolations (10ml blood per isolation)	A1620

For Laboratory Use. Cat.# A1120 will give ~40 animal tissue preps, ~80 mouse tail preps, ~80 plant tissue preps, and ~80 cultured cell preps. Please see the *Wizard® Genomic DNA Purification Kit Technical Manual #TM050* for more details and additional supplies necessary for the various preps.

Product	Size	Cat.#
Wizard® SV Genomic DNA Purification System	50 preps (20mg tissue per prep)	A2360
	250 preps (20mg tissue per prep)	A2361
Vac-Man® Laboratory Vacuum Manifold, 20-sample capacity	1 each	A7231
Vacuum Adapters	20 each	A1331

The Wizard® SV Genomic DNA Purification System can be used in spin or vacuum format. The Vac-Man® Laboratory Vacuum Manifold can be used to process up to 20 samples at once. The Vacuum Adapters are required when using the the Vac-Man® Laboratory Vacuum Manifold with the Wizard® SV Genomic DNA Purification System.

Product	Size	Cat.#
Wizard® SV 96 Genomic DNA Purification System	1 × 96 preps (20mg tissue per prep)	A2370
	4 × 96 preps (20mg tissue per prep)	A2371
Vac-Man® 96 Vacuum Manifold	1 each	A2291

The Vac-Man® 96 Vacuum Manifold is required for use with the Wizard® SV 96 Genomic DNA Purification System.

Product	Size	Cat.#
MagneSil® ONE, Fixed Yield Blood Genomic System ^{(a)*}	1 × 96 preps (50–60µl blood per prep)	MD1370
MagneSil® Blood Genomic, Max Yield System ^{(a)*}	1 × 96 preps (200µl blood per prep)	MD1360
Deep Well MagnaBot® 96 Magnetic Separation Device*	1 each	V3031
MagnaBot® Spacer, 1/8 inch	1 each	V8581

* For Laboratory Use. Both MagneSil® Blood Genomic Systems require use of an automated liquid handler such as the Beckman Coulter Biomek® FX. The Deep Well MagnaBot® 96 Magnetic Separation Device and the MagnaBot® Spacer, 1/8 inch, are also required for use with these systems.

Product	Size	Cat.#
MagneSil® Genomic, Fixed Tissue System	100 samples	MD1490
MagneSphere® Technology Magnetic Separation Stands	1.5ml (2 position)	Z5332
	1.5ml (12 position)	Z5342

One time purchase of a magnetic stand required to use product.

Product	Size	Cat.#
MagneSil® KF, Genomic System	200 preps	MD1460

Designed for use with the Thermo Electron KingFisher® mL Instrument.

Product	Size	Cat.#
Wizard® Magnetic 96 DNA Plant System ^(a)	2 × 96 preps	FF3760
	4 × 96 preps	FF3761
MagnaBot® 96 Magnetic Separation Device	1 each	V8151
MagnaBot® Spacer	1 each	V8381

The Wizard® Magnetic DNA Plant System requires use of the MagnaBot® 96 Magnetic Separation Device and the MagnaBot® Spacer for manual or automated DNA purification.

Related Products

Product	Size	Cat.#
Proteinase K	100mg	V3021
RNase A Solution, 4mg/ml	1ml	A7973

For Laboratory Use. Proteinase K is required for tissue preparations. RNase A is certified DNase-free and is used to remove RNA from gDNA preps.