Results You Can Rely On

Gene Detection Systems

Gene Detection Systems

Genetic Tools & Reagents

Gene Link™

Quality • Consistency • Confidence

For over a decade Gene Link has been providing researchers with the finest critical genetic research tools. Consistently maintaining our reputation and responsibility to supply quality products, we present our entire line with unrivaled confidence. Our products and services are supported and ensured by our commitment to premium quality and our constant efforts to introduce innovative products and cutting-edge technology to the research community worldwide.

Gene Link fosters customer satisfaction and loyalty by stressing personal relationships with our customers. Our dedicated and expertly trained customer service and technical support teams are motivated to serve our customers in any way possible. Routinely assisting our customers in the design of their experiments and other technical inquiries, we stay committed and connected to our customers who have entrusted us with supplying the tools they need in furthering their exciting and groundbreaking research. Gene Link has developed, and will continue to preserve, a reputation for "Quality, Consistency and Confidence."

A leading supplier of premium custom oligonucleotides, researchers turn to Gene Link for demanding applications and consistent results. Gene Link services include genotyping, sequencing and gene construction; as well as a wide variety of other molecular biology products such as siRNA, fluorescent probes, genetic tools and reagents, and non-radioactive gene detection systems for human genetic disorders.

Specializing in Long Oligos up to 250 mer

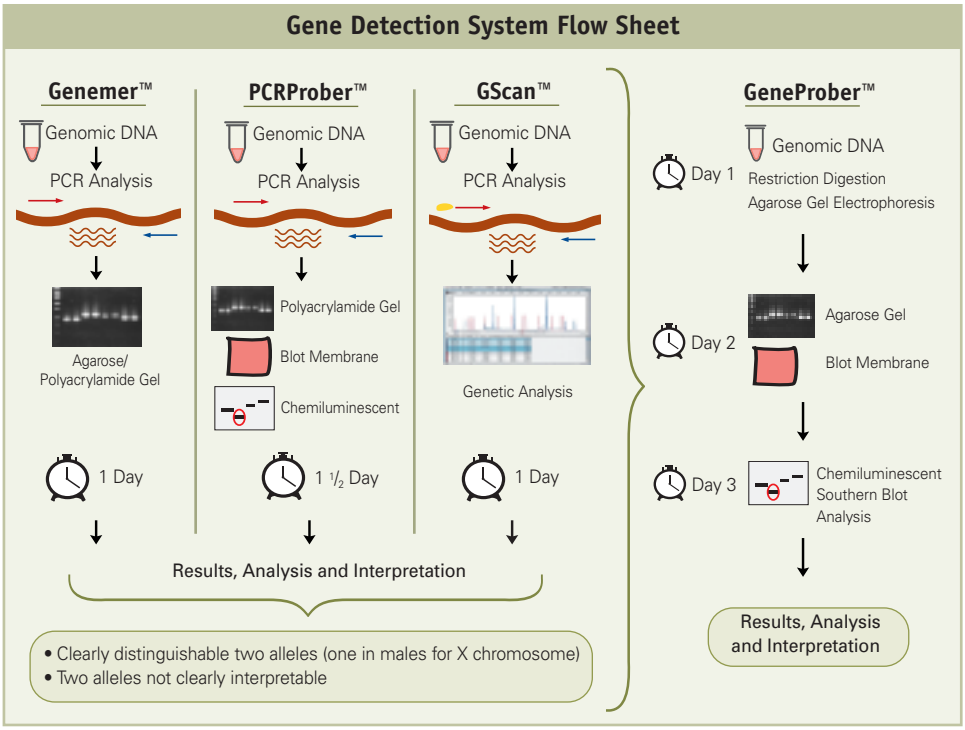
Gene Link | 1-800-GENE LINK | www.genelink.com

Gene Detection Systems

Gene Link is the leader in triple repeat disorder genotyping using non-radioactive based methods. We have more than a decade of expertise and have developed facile non-radioactive detection methods for safe, sensitive and reliable genotyping of human genetic disorders. Take a look at the simple agarose and polyacrylamide gel based systems, the chemiluminescent Southern blot detection methods and the fluorescent systems for genotyping of triple repeat disorders.

The molecular basis of genetic disorders is as varied as clinical genetics itself. The molecular etiology of disorders may be fundamentally straightforward, such as in Sickle cell disease, as compared to a whole new class of diseases where anticipation is involved with apparently increasing disease severity in successive generations. Addressing the etiology and molecular diagnosis of the more complex disorders that involve anticipation (i.e., Fragile X syndrome, Myotonic dystrophy, and Huntington's disease) is often challenging.

This product profile of Gene Link's current gene detection product line spotlights non-radioactive detection products as well as conventional radioactive based methods for genotyping the challenging triple repeat disorders as well as single base mutations and various pathogens. Control DNA fragments with varying number of triple repeats, single base mutations and pathogen control DNA fragments are also available.

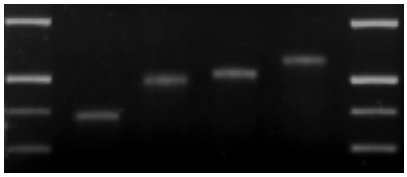


Genemer™

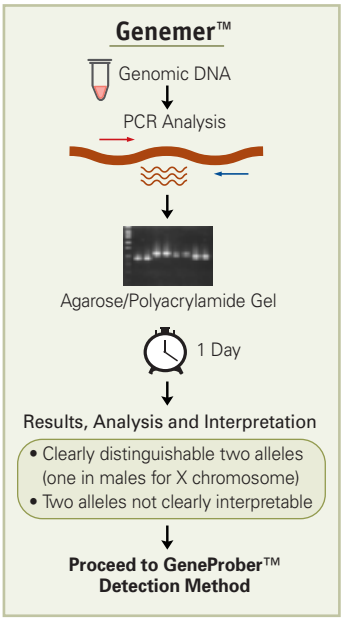
Genemer™ are optimized primer pairs for amplification of the gene fragment of interest, particularly those spanning a mutation. A wide range is available from single base pair mutation sites, the complex triple repeat disorders and various pathogens. Genemer™ kits are complete, easy-to-use systems for reliable genotyping of large repeats in certain triple repeat disorder.

Gene Link has developed a wide array of specific amplification primers and optimized conditions for gene fragments and specifically for the triple repeat disorders. For example, the Huntington Genemer™ kit is capable of routinely amplifying greater than 150 CAG repeats. Other detection systems available are for single base mutations and various pathogens.

The Genemer™ product contains 10 nmols of the primer pair that is sufficient for 400 regular 50 µl amplifications. The Genemer™ Kit contains reagents as well as control DNA sufficient for 100 amplifications.



Friedreich's ataxia GAA repeat genotyping was performed using FRDA Genemer™ (Catalog No. 40- 2027-10) and various FRDA Genemer™ Control DNAs (Catalog No. 40-2027-XX). Optimized reagents from the FRDA Genemer™ Kit were used to amplify long repeats. Lanes 1 & 6 are molecular weight markers; lanes 2–5 are 64, 102, 110 and 125 GAA repeat amplification products.



Genemer™

Product	Size	Catalog No.	Price ($)
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia, Kennedy Disease, Sickle Cell, Rh, Sry, and other Genemer™ Kits available.	1 Kit	40-20XX-11	250.00
HIV, HCV, HBV, MTB and MTB Genemer™ Kit.	1 Kit	60-20XX-11	250.00
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia, Kennedy Disease, Sickle Cell, Rh, Sry, and other Genemer™ primer pairs available.	10 nmols	40-20XX-10	100.00

Visit www.genelink.com for complete listing of Gene Detection Systems product line.

The Gene Link Advantage

- No More Hazardous Radioactive Exposure
- No More Decayed Probes
- Safe, Sensitive and Reliable Genotyping
- Optimized Kits for Reproducible Results
- Triple Repeat Disorder Genotyping
- Wide Array of Detection Methods
- Chemiluminescent Detection
- Fluorescent Based Genetic Analysis
- Control DNA Standards for Varying Triple Repeat Lengths
- Wide Selection of Disease Genotyping
- Knowledgeable Technical Support

GOLD STANDARD

First Round Genotyping

The Genemer™ and GScan™ products are for initial screening. All samples yielding disease causing triple repeats should be confirmed by Southern blot analysis using the GeneProber™ product line to confirm genotype.

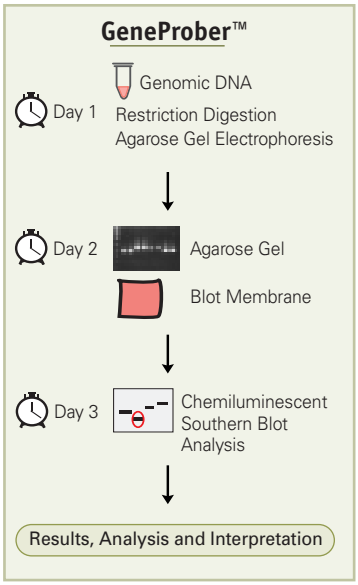
A specific gene fragment probe for Southern blot based hybridization of genomic DNA. The GeneProber™ is available unlabeled for radioactive based methods and labeled with digoxigenin for chemiluminescent detection. One tube is supplied containing 500 ng of the lyophilized unlabeled GeneProber™ probe.

The quantity supplied is sufficient for at least 5 random prime labeling reactions using 100 ng for each reaction. Gene Link recommends using 25 ng of probe for each labeling reaction. The digoxigenin labeled probe supplied is sufficient for five 20 x 20 blots.

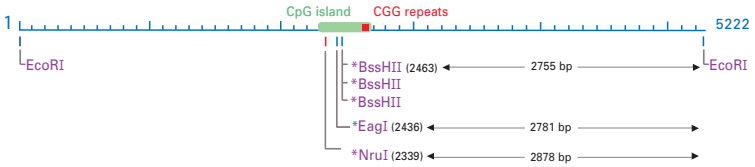
The GeneProber™ product line is based on the chemiluminescent Southern blot detection method. These probes are specially developed to detect the triple repeat amplifications. Fragile X, Huntington disease, Myotonic dystrophy, Friedreich's ataxia and Kennedy disease GeneProber™ unlabeled and digoxigenin labeled are available.

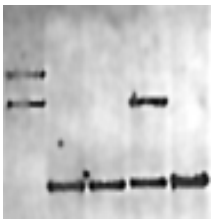
Gene Link's non-radioactive detection systems for genotyping of triple repeat disorders are rapid, reliable and as sensitive as the ^{32}P labeled southern blots. No more decayed probes and radioactive exposure.

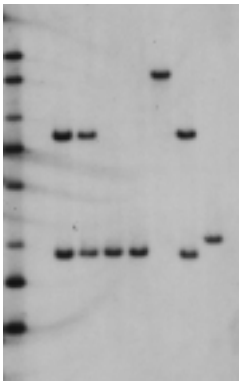
A detailed manual accompanies the product giving a step by step protocol, results and interpretation guidelines.



Fragile X Southern Blot Analysis







Fragile X CGG repeats genotyping results using Gene Link's GeneProber™ products. Fragile X GeneProber™ GLFXDig1 Digoxigenin-labeled Probe (Catalog No. 40-2004-41) and GeneProber™ GLFX1 Unlabeled Probe (Catalog No. 40-2004-40) were used to probe human blood genomic DNA digested with Eco RI and Eag I. Left blot was hybridized with digoxigenin labeled probe and processed for chemiluminescent detection. The blot on the right was hybridized with ^{32}P labeled GLFX1 and processed for radioactive Southern blot detection. Both blots were exposed overnight to X-ray films. Normal fragment sizes for females are between 2.8 kb and 5.2 kb, and a single fragment of 2.8 kb in males. The blot shows samples with CGG repeats in the affected range.

GeneProber™

Product	Size	Catalog No.	Price ($)
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease GeneProber™ unlabeled probe.	500 ng	40-20XX-40	350.00
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease GeneProber™ digoxigenin labeled probe.	110 µl	40-20XX-41	400.00

Visit www.genelink.com for complete listing of Gene Detection Systems product line.

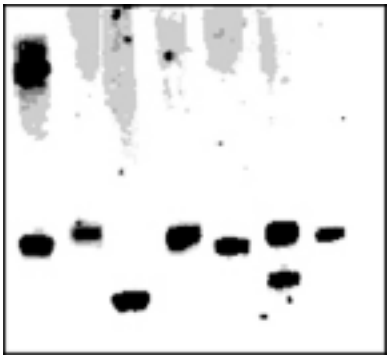
PCRProber™ Gene Detection Kits

PCRProber™ alkaline phosphatase labeled probe is for amplification and non-radioactive detection of a trinucleotide repeat region amplified PCR product. The PCRProber™ Kit comprises of a primer pair for PCR amplification followed by gel blot and chemiluminescent detection using the alkaline phosphatase oligonucleotide probe. Quantity supplied is sufficient for 100 amplifications.

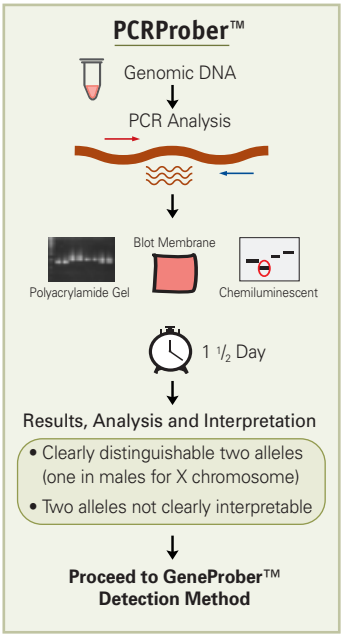
Gene Link's PCRProber™ Kit is based on PCR amplification followed by Southern blot chemiluminescent detection using an alkaline phosphatase labeled oligonucleotide probe. This kit is a safe and sensitive alternate to radioactive-based detection methods. The amplified products are resolved on a sequencing polyacrylamide gel, and then blotted and processed for chemiluminescent detection.

The PCRProber™ Kit is simple and robust for routine triple repeat detection of greater than 100 repeats of all triple repeat disorders listed, except Fragile X. The CGG repeat in Fragile X can be detected up to ~50 repeats.

It is strongly recommended that the genotyping be followed up by using GeneProber™ Southern blot detection methods when two alleles are not clearly discernable.



Fragile X CGG repeats genotyping results using Gene Link's PCRProber™. Various human genomic DNA samples were amplified using the reagents supplied in the PCRProber™ Kit (Catalog No. 40-2004-32) and processed for chemiluminescent detection following the protocol in the manual provided. Fragile X CGG repeat genotyping as an initial screening using the PCRProber™ is rapid as it amplifies CGG repeat sizes up to ~50 repeats. Lane 1 in the blot shows a female sample containing 29 and ~60 CGG repeats respectively.



PCRProber™ Kits

Product	Size	Catalog No.	Price ($)
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease PCRProber™ Kits available.	1 kit	40-20XX-32	650.00
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease PCRProber™ available.	12 µl	40-20XX-31	400.00

Visit www.genelink.com for complete listing of Gene Detection Systems product line.

GScan™ Gene Detection Kits

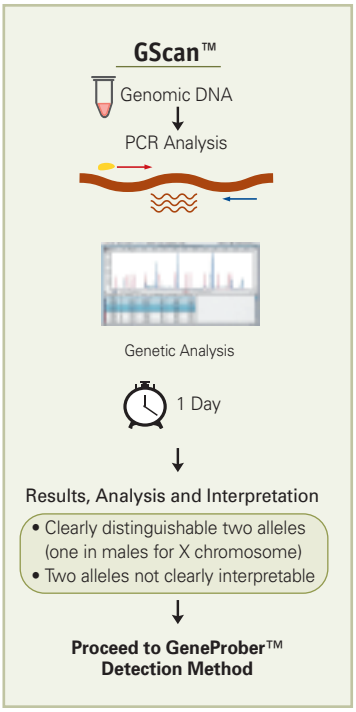
GScan™ Kits contain optimized PCR amplification reagents and a wide selection of fluorescent-labeled primers for genotyping after PCR using fluorescent genetic analyzer instrument(s). Kit includes sufficient reagents for 100 detections.

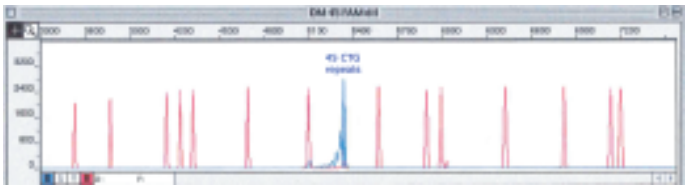
Genotyping using this kit requires use of the appropriate fluorescent genetic analyzer instrument(s) and software capable of detection of fluorescently labeled fragments of varying lengths. These kits have been optimized for an ABI310 genetic analyzer.

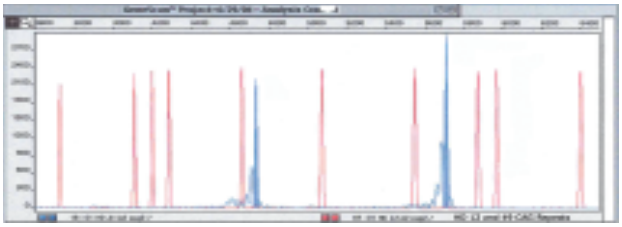
Gene Link's GScan™ gene detection kits are safe, convenient and sensitive, and afford automated compilation of data. The kits contain optimized PCR amplification reagents and a wide array of fluorescent-labeled primers for genotyping after PCR using fluorescent genetic analyzer instrument(s). Included in these kits are ready-to-run control samples of various repeats of the triple repeat disorder. These control samples are for calibration with the molecular weight markers for accurate size determination of the amplified fragments.

The GScan™ Kits are simple and robust for routine triple-repeat detection of greater than 100 repeats of all triple repeat disorders listed, except Fragile X. The CGG repeat in Fragile X can be detected up to ~50 repeats.

It is strongly recommended that the genotyping be followed up by using Southern blot detection methods when two alleles are not clearly discernable.







Above:Myotonic Dystophy CTG genotyping
Right: Huntington Disease CAG genotyping

GScan™ Gene Detection Kits

Product	Size	Catalog No.	Price ($)
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease GScan™ Kits available.	1 Kit	40-20XX-15	650.00

Visit www.genelink.com for complete listing of Gene Detection Systems product line.

GScan™ Dye Labeled Markers

Product	Catalog No.	Size	Price ($)
GScan™ Marker Tamra labeled 50 bp - 600 bp	40-3061-01	100 µl	75.00
GScan™ Marker Tamra labeled 50 bp - 600 bp	40-3061-05	500 µl	325.00
GScan™ Marker Hex labeled 50 bp - 600 bp	40-3081-01	100 µl	75.00
GScan™ Marker Hex labeled 50 bp - 600 bp	40-3081-05	500 µl	325.00

*A loading of 0.5 µl is suggested.

Genemer™ Control DNA

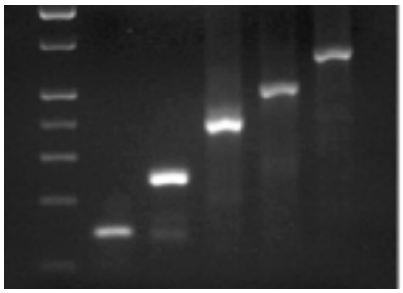
Genemer™ Control DNA are cloned fragments of a particular gene for use with gene or mutation specific Genemer™ and GScan™ products. These control DNAs are ideal genotyping templates for optimizing and performing control amplification with unknown DNA. One tube is supplied containing 500 ng of lyophilized DNA segment of the specified fragment spanning the mutation region. The quantity supplied is sufficient for 1000 regular 50 µl PCR reactions.

The control DNAs were developed to complement Gene Link's gene detection system product line. The control DNAs for a single base mutation are helpful to optimize the protocol and in setting up positive control standards.

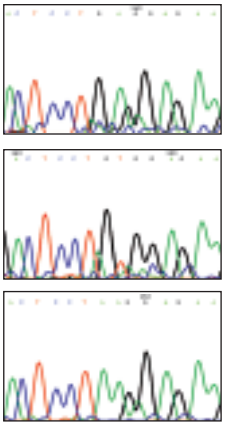
The control DNA series for various triple repeat disorders were generated by amplification. These serve as controls for the amplification of various triple repeats and to run as positive controls. The size of the triple repeats has been determined by sequencing and gel electrophoresis.

The stability of size repeats upon cloning and amplification has not been determined. Thus, the size should be considered approximate and there is no claim for each fragment to contain the exact number of triple repeats.

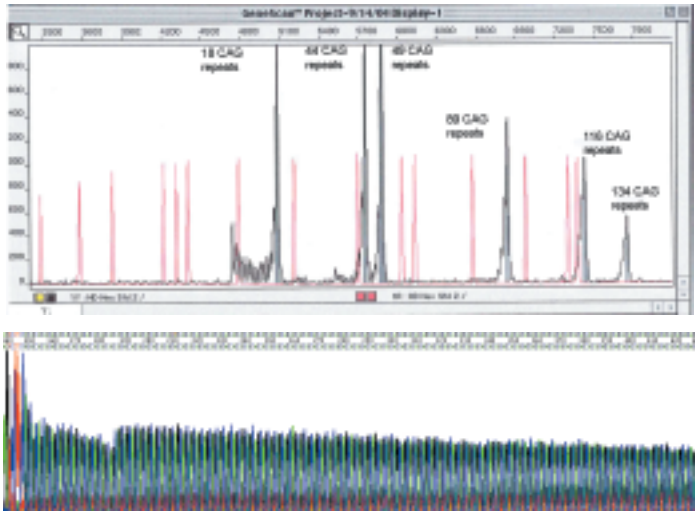
These control DNAs are sold with the expressed condition that these not be used for exact triple repeat size determination of DNA of unknown genotype. The control DNA should be used for determining the performance of specific Genemer™, GScan™ and PCRProber™ Gene Link products.



Lane 1 is molecular weight markers. Lanes 2-6 represent PCR products from DM genomic clones that contain 12, 45, 93, 129, and 182 CTG repeats respectively.



Sickle Cell Genemer™ control DNA for Hb-A, Hb-S and Hb-C.



Huntington's Disease Genemer™ control DNA of various CAG repeats shown here used for GScan™ analysis.

Genemer™ Control DNA Kits

Product	Size	Catalog No.	Price ($)
Fragile X, Huntington Disease, Myotonic Dystrophy, Friedreich's Ataxia and Kennedy Disease control DNA available with varying number of triple repeats. Control DNA also available for single base mutation disorders.	500 ng	40-20XX-XX	175.00
HIV, HBV, HCV, MTB, and WNV pathogen control Genemer™ DNA.	500 ng	60-20XX-06	175.00

Please visit www.genelink.com for other Genemer™ Control DNA not listed here.

FACILE AND RAPID PURIFICATION AND CONCENTRATION OF DNA

Gene Link offers a variety of DNA and RNA purification and concentration systems. Each system has been optimized for reproducible and consistent results, yielding ultra high quality DNA and RNA suitable for all molecular biology applications.

The Omni-Clean™ System

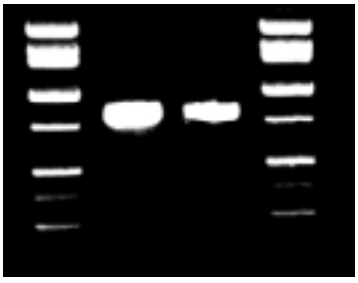
Purification of DNA from agarose gels and concentration of DNA by ethanol precipitation are routine protocols used in all molecular biology laboratories. The Omni-Clean™ system provides optimized reagents for rapid extraction of DNA from agarose gels, and for routine concentration of DNA. The DNA is concentrated, purified and completely salt-free.

APPLICATION

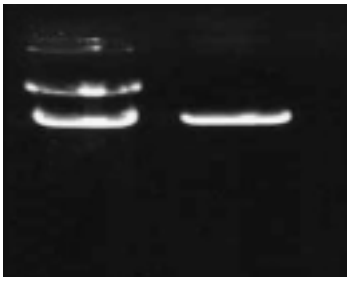
Purification of DNA fragments excised from agarose gels

Omni-Clean™ DNA Purification System

The Omni-Clean™ DNA Purification System takes advantage of the principle that DNA binds to powdered flint glass in the presence of chaotropic salts. This technique provides a rapid and efficient method for the purification of high quality DNA from solutions or agarose gel slices, and is suitable for cloning, sequencing, isotope labeling, and a host of other procedures.



Lanes 2 and 3 are fragments excised from agarose gel and purified using the Omni-Clean™ column based purification system.



Lane 1 is plasmid extracted using Omni-Pure™ plasmid purification system. Lane 2 is the lower fragment gel purified using the Omni-Clean™ gel glass bead based purification system.

Omni-Clean™ Gel DNA Purification Systems

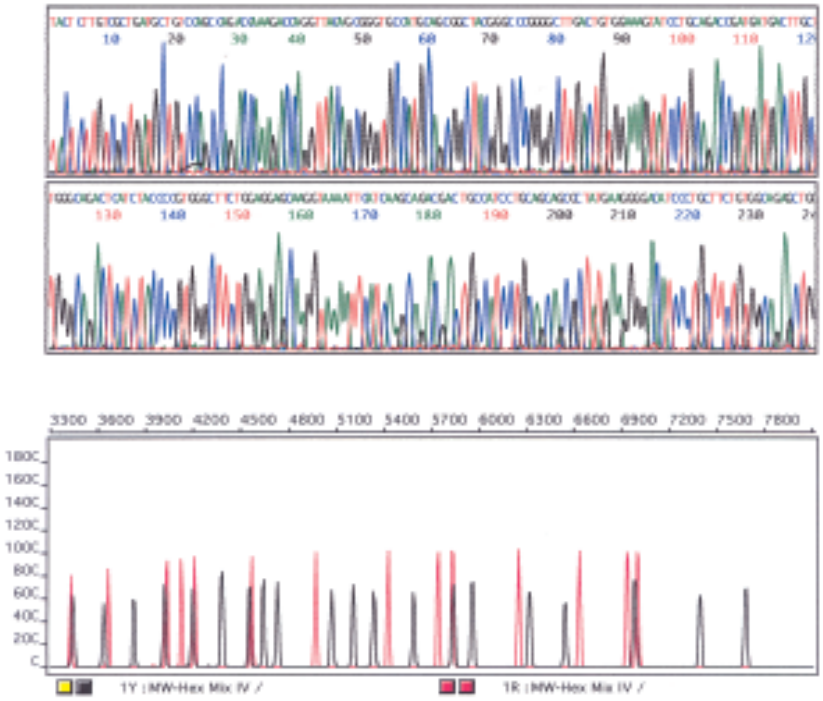
Product	Catalog No.	Size*	Price ($)
Omni-Clean™ Gel DNA Beads Purification System	40-4110-10	100	95.00
Omni-Clean™ Gel DNA Beads Purification System	40-4110-50	500	380.00
Omni-Clean™ Gel DNA Spin Column Purification System	40-4120-10	100	110.00
Omni-Clean™ Gel DNA Spin Column Purification System	40-4120-50	500	440.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.

APPLICATION:

Concentration and Cleanup of DNA in solution

The Omni-Clean™ DNA Concentration System yields higher quality DNA than with conventional ethanol precipitation. The samples are completely desalted, purified and concentrated. It is ideal for sequencing and genotyping samples with stringent purity requirements. The electropherogram shows samples purified using the Omni-Clean™ system.



Omni-Clean™ Gel DNA Concentration Systems

Product	Catalog No.	Size*	Price ($)
Omni-Clean™ DNA Beads Concentration System	40-4130-10	100	95.00
Omni-Clean™ DNA Beads Concentration System	40-4130-50	500	380.00
Omni-Clean™ DNA Spin Column Concentration System	40-4140-10	100	110.00
Omni-Clean™ DNA Spin Column Concentration System	40-4140-50	500	440.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.

Omni-Clean™ System

- Ultra Purified DNA in Less Than 20 minutes
- No Hazardous Reagents
- Suitable for All Molecular Biology Applications
- No More Ethanol Precipitations
- DNA Purification, Concentration and Desalting from Agarose Gel Slices Using Beads or Spin Columns

GOLD STANDARD

Ultra Pure Templates

Automated sequencing and genotyping requires high quality template DNA. The Omni-Clean™ system is the method of choice to reproducibly yield ultra high quality DNA.

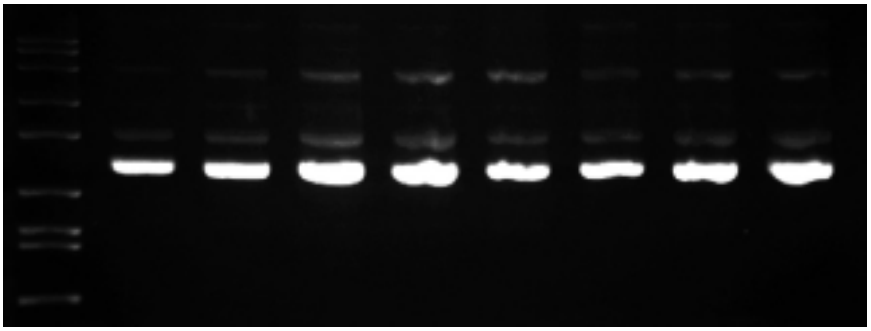
Facile and Rapid Extraction and Purification of DNA

Facile and rapid purification of DNA from varied sources can be performed using the Omni-Pure™ series of DNA, RNA and plasmid purification systems. Each purification system has been formulated, optimized and designed to yield the highest purity available with the starting sample volume specially geared towards the desired downstream application.

APPLICATION:

Mini-Prep Plasmid DNA Purification

Routine mini-preps of plasmid extraction are made even easier with consistent performance. Purification can be performed with a maximum of 3 ml of cells yielding up to 20 µg of purified DNA. The convenient spin column method can be scaled up by using multiple columns and processed in less than 30 minutes. The purified DNA is of high quality suitable for all molecular biology applications including direct use in fluorescent automated sequencing methods.

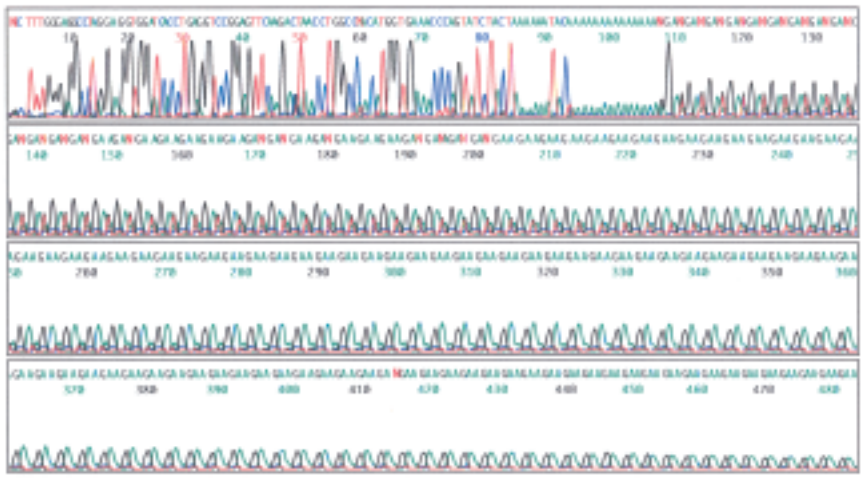


Replicates of plasmid purification using the Omni-Pure™ Plasmid DNA Purification System.

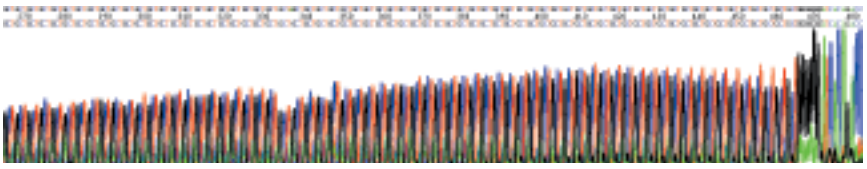
Omni-Pure™ Plasmid DNA Purification Systems

Product	Catalog No.	Size*	Price ($)
Omni-Pure™ Plasmid DNA Purification System	40-4020-01	100	95.00
Omni-Pure™ Plasmid DNA Purification System	40-4020-05	500	380.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.



Friedreich's Ataxia Control DNA with 110 GAA repeats (top) and Myotonic Dystrophy Control DNA with 129 CTG repeats (bottom) sequencing electropherograms. These triple repeat sequencing requires ultra clean DNA.



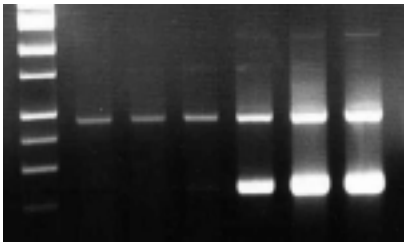
Plasmids were purified using the Omni-Pure™ system and processed for automated sequencing.

APPLICATION:

Viral DNA & RNA Purification

Gene Link provides a rapid purification system for extraction of viral DNA or RNA from human bodily fluids including blood. Viral DNA or RNA is captured on a special membrane and then eluted in a low volume for direct use in qualitative and quantitative amplification protocols for detection of a pathogen.

The Viral RNA purification system is ideal for small volumes of human bodily fluid samples, i.e., serum, plasma and CSF. Using the easy spin column format, purification of HIV, HCV and other RNA viruses is easily accomplished in less than 30 minutes and ready for RT-PCR amplification.



Viral DNA purification and amplification using zero, 1, 10 & 100 ng of template DNA. The top fragment is an internal control from human genomic DNA.

Omni-Pure™ Viral DNA & RNA Purification Systems

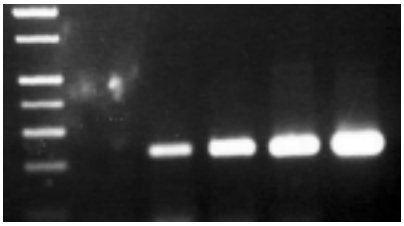
Product	Catalog No.	Size*	Price ($)
Omni-Pure™ Viral DNA Purification System	40-3720-01	100	175.00
Omni-Pure™ Viral DNA Purification System	40-3720-05	500	700.00
Omni-Pure™ Viral RNA Purification System	40-3650-01	100	175.00
Omni-Pure™ Viral RNA Purification System	40-3650-05	500	700.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.

APPLICATION:

Microbial DNA Purification

The microbial DNA purification system is ideal for DNA purification of pathogen DNA in the easy spin column format. Purification from sputum and other bodily fluids is rapidly performed using this system. The pathogen DNA can be directly used in qualitative and quantitative amplification protocols for detection of a pathogen.



Microbial DNA purification followed by amplification of a specific fragment using zero, 10, 20, 50 & 100 ng of template DNA.

Omni-Pure™ Microbial DNA Purification Systems

Product	Catalog No.	Size*	Price ($)
Omni-Pure™ Microbial DNA Purification System	40-3700-01	100	175.00
Omni-Pure™ Microbial DNA Purification System	40-3700-05	500	700.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.

Omni-Pure™ System

- Ultra Purified High Yield Plasmid DNA
- No Toxic Reagents
- Rapid Purification Protocols
- Suitable for All Molecular Biology Applications
- Convenient Optimized Reagents
- Easy Spin Column Format
- Genomic DNA Purification
- Viral DNA & RNA Purification
- Microbial DNA Purification

GOLD STANDARD

Pathogen Detection Made Easy

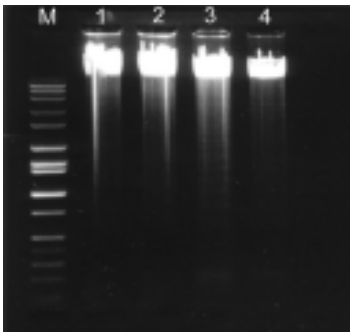
Purification of pathogen DNA or RNA is performed conveniently using the Omni-Pure™ system. The purified DNA or RNA can immediately be used for qualitative or quantitative detection.

See Gene Link's product line of Gene Detection Systems.

Facile and Rapid Extraction and Purification of Genomic DNA

The Omni-Pure™ Genomic DNA purification system is designed for a convenient volume of 300 µl whole blood (lower volumes can also be used) to yield an average of ~10 µg ultra pure DNA. This quantity is sufficient for restriction-based Southern blot analysis and hundreds of PCR-based analyses.

The Omni-Pure™ Genomic DNA purification system is designed for convenience and consistency. It is a universal genomic DNA purification system. Ultra pure genomic DNA can be purified from small amounts of almost all known sample types and sources. Samples from human blood, bodily fluids, animal and plant tissue and microbial and viral sources have been purified using the Omni-Pure™ Genomic DNA purification system. One purification is usually sufficient to yield enough DNA for all molecular biology applications.



Purified genomic DNA (~200 ng) was electrophoresed on a 0.8% agarose gel and stained with ethidium bromide. Observe high quality genomic DNA that ranges from ~30 to 50 kb in size. Lane M contains molecular weight markers from 10 kb to 50 bp in length. Lanes 1-4 are genomic DNA samples obtained from blood samples of 4 different individuals using the Omni-Pure™ system.

APPLICATION:

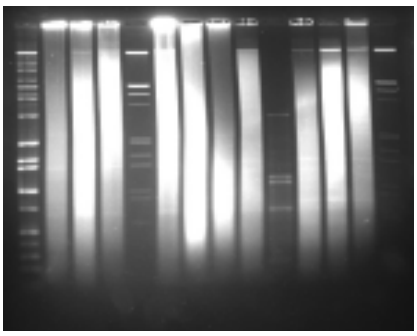
Tissue DNA Purification

An accompanying product manual contains a detailed protocol for the purification of genomic DNA from animal tissue. The protocol has been tested and yields high quality DNA. The gel picture shows genomic DNA extracted from mouse and rat skeletal muscle and liver. This system is geared towards minute tissue samples. From 2 mg of tissue an average yield of 2-10 µg is expected. The DNA is suitable for all molecular biology applications.

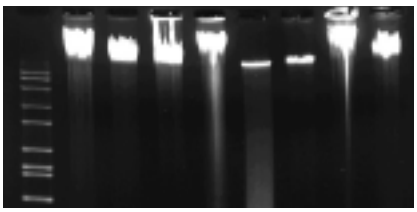
APPLICATION:

Blood DNA Purification

Each purification sample volume is specially geared towards the desired downstream application. A sample volume of 300 µl is recommended for human blood samples yielding on average from 5–15 µg of high molecular weight and high quality genomic DNA for two restriction digestions for Southern blot analysis. The yield is sufficient for hundreds of PCR amplification reactions. An accompanying product manual contains a detailed protocol for the extraction of genomic DNA from tissues and bodily fluids.



Human blood genomic DNA from different individuals purified using the Omni-Pure™ Genomic DNA Purification System. Approximately 5 µg were digested with different restriction enzymes and the samples were electrophoresed on a 0.7% agarose gel. Note the high molecular weight DNA and the consistency between different samples. The gel was processed for Southern blot analysis and chemiluminescent detection.

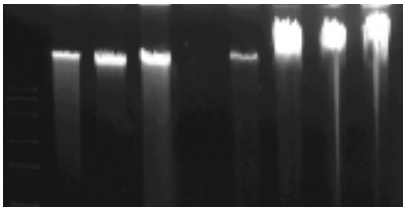


Samples from various animals were processed for DNA purification using the Omni-Pure™ Genomic DNA Purification System. Purified genomic DNA (~200 ng) was electrophoresed on a 0.7% agarose gel and stained with ethidium bromide. Observe high quality genomic DNA that ranges from ~30 to 50 kb in size. Lane 1 contains molecular weight markers followed by samples from human, rabbit, cat, mouse, guinea pig, sheep, pig and hamster.

APPLICATION:

Plant DNA Purification

An accompanying product manual contains a detailed protocol for the purification of genomic DNA from plant tissue. The protocol has been tested and yields high quality DNA. The gel picture shows genomic DNA extracted from plants such as ginger, green pepper, cilantro and carrot. This system is geared towards minute tissue samples. From 2 mg of tissue an average yield of 2-10 µg is expected. The DNA is suitable for all molecular biology applications.



Samples from various plant tissues were processed for DNA purification using the Omni-Pure™ Plant DNA Purification System. Purified genomic DNA (~200 ng) was electrophoresed on a 0.7% agarose gel and stained with ethidium bromide. Observe high quality genomic DNA that ranges from ~30 to 50 kb in size. Lane 1 contains molecular weight markers followed by plant samples from ginger, green pepper, cilantro, blank lane, carrot and animal genomic DNA comparison samples from human, mouse and pig.

Omni-Pure™ Genomic DNA Purification Systems

Product	Catalog No.	Size*	Price ($)
Omni-Pure™ Blood DNA Purification System	40-4010-01	100	80.00
Omni-Pure™ Blood DNA Purification System	40-4010-05	500	320.00
Omni-Pure™ Blood DNA Purification System	40-4010-10	1000	495.00
Omni-Pure™ Tissue DNA Purification System	40-4050-01	100	85.00
Omni-Pure™ Tissue DNA Purification System	40-4050-05	500	340.00
Omni-Pure™ Tissue DNA Purification System	40-4050-10	1000	510.00
Omni-Pure™ Plant DNA Purification System	40-4060-01	100	85.00
Omni-Pure™ Plant DNA Purification System	40-4060-05	500	340.00
Omni-Pure™ Plant DNA Purification System	40-4060-10	1000	510.00
Omni-Pure™ Universal DNA Purification System	40-4070-01	100	110.00
Omni-Pure™ Universal DNA Purification System	40-4070-05	500	440.00
Omni-Pure™ Universal DNA Purification System	40-4070-10	1000	660.00

*Sample volume for each purification system varies. Each purification yields sufficient quantity for desired applications.

Are You Genotyping?

Consider using Gene Link's comprehensive line of non-radioactive gene detection systems. We have genotyping solutions for triple repeat disorders, single base mutations and various pathogens.

The Omni-Pure™ Genomic DNA Purification System

- Ultra Purified Genomic DNA
- No Toxic Reagents
- ~30 Minute Protocols
- Blood & Bodily Fluid Genomic DNA
- Animal Tissue Genomic DNA
- Plant Tissue Purification
- Yeast DNA Purification
- Gram Positive & Negative Bacterial DNA
- Suitable for All Molecular Biology Applications
- Convenient Optimized Systems
- Detailed Manual Provided with Product

GOLD STANDARD

Convenience Perfected

All of the reagents, a simple 30 minute protocol and ultra pure genomic DNA for all your gene detection applications. Get one today!

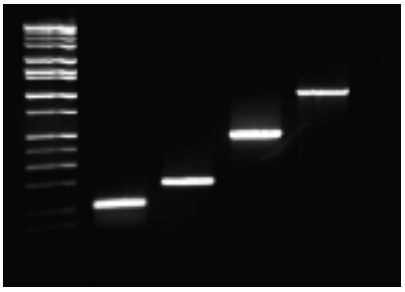
Omni-cDNA™ First Strand cDNA

First strand cDNA is useful for amplifying a particular cDNA using PCR. Gene Link provides a convenient source of high quality first strand cDNA prepared from freshly obtained tissue and appropriately frozen during transportation.

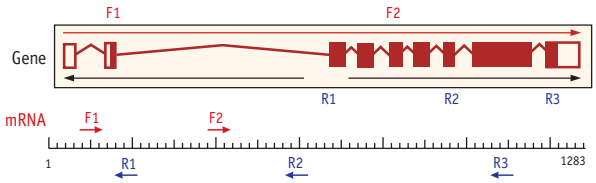
APPLICATION:

RT-PCR , cDNA amplification, cloning, tissue-specific gene expression, etc.

Tissue-specific individual first strand cDNA is available from Gene Link. These are of high quality and lot tested for amplification of ß -actin and/or GAPDH cDNA fragments up to 1.1 kb in length.



Amplification was performed using 50 ng of Omni-cDNA™ Human Pooled First Strand cDNA (Catalog No. 10-0100-05) as the template. A 10 µl aliquot of the amplified fragment was loaded on a 1% agarose gel. The amplified fragment sizes obtained with the RT-PCRmer™ primer pair used are as follows:
lane 2, F1/R1 = 109 bp;
lane 3, F2/R2 = 208 bp;
lane 4, F1/R2 = 505 bp and
lane 5, F1/R3 = 1009 bp.



GAPDH gene and mRNA sequences showing the position of different primers. The primers (RT-PCRmer™) were constructed to assess the quality of Gene Link Omni-cDNA™ first strand cDNA. Full length and near full length cDNA will amplify the 1.1 kb cDNA fragment signifying high quality. All Omni-cDNA™ lots undergo this qualification.

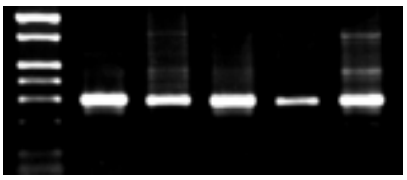
APPLICATION:

RT-PCR, cDNA cloning, etc.

The first strand cDNA has been prepared from pooled and or amplified mRNA obtained from different tissues. These are not from cultured cell lines. The assortment of tissues vary, including lung, heart, brain, spleen, skeletal muscle, smooth muscle, ovaries, pancreas, liver and kidney. The amount supplied is sufficient for at least 50 amplifications. Each lot is tested for amplification of ß -actin cDNA.

Omni-cDNA™ pooled first strand size distribution is from ~5 kb to 200 bp. These can also be used for cloning mRNA of interest by RT-PCR. A 1.3 kb and a ~500 bp amplified cDNA fragment of p53 is shown in the figure.

ß -actin amplified fragment of 289 bp. Lane 1 is molecular weight markers. Lanes 2-5 are ß -actin control PCR product from guinea pig, human, mouse and rat pooled first strand Omni-cDNA™.



An amplified fragment of 289 bp. Lane 1 is molecular weight markers. Lanes 2-6 are ß -actin control PCR products from brain, liver, intestine, skeletal muscle and spleen.

First Strand Pooled cDNA

Product	Catalog No.	Size	Price ($)
Omni-cDNA™ Human First Strand Pooled cDNA	10-0100-05	5 µg	425.00
Omni-cDNA™ Mouse First Strand Pooled cDNA	10-0200-05	5 µg	425.00
Omni-cDNA™ Rat First Strand Pooled cDNA	10-0300-05	5 µg	425.00
Omni-cDNA™ Guinea Pig First Strand Pooled cDNA	10-2100-05	5 µg	425.00

First Strand cDNA

Product	Catalog No.	Size	Price ($)
Guinea pig first strand cDNA; Various tissues; Brain, Heart,Liver, Kidney, etc.	10-21XX-05	5 µg	425.00

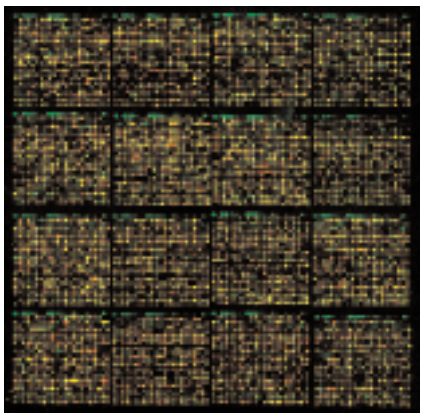
Various animal and plant tissue first strand cDNAs available.
Visit www.genelink.com for complete listing.

Omni-mRNA™ Pooled Reference mRNA

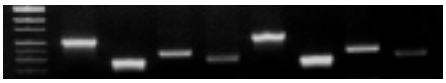
APPLICATION:

Microarray reference mRNA, RT-PCR, cloning, cDNA amplification

Omni-mRNA™ pooled reference mRNA is compatible with all commercially available labeling systems. Other applications of pooled reference mRNA include RNA ELISA, Quantigene, HPSA, and a number of other RNA amplification/detection systems.



Omni-mRNA™ pooled reference mRNA size distribution is from ~5 kb to 200 bp. These can also be used for cloning mRNA of interest by RT-PCR. A 1.3 kb and a ~500 bp amplified cDNA fragment of p53 are shown in the figure.



Human and Mouse Omni-mRNA™ Amplified Pooled Reference mRNA (Catalog No. 08-0100-50 and 08-0200- 50) was used for synthesis of First Strand cDNA (Catalog No. 10-0100-05 and 10-0300-05) and used as a template for amplification of rare and abundant messages. PCR products generated from Human Omni-cDNA™ (lanes 2-5) and Mouse Omni-cDNA™ (lanes 6-9). Individual lanes correspond to the following products; lanes 2 & 6 = GAPDH (~500 bp); lanes 3 & 4 = granulocyte-macrophage colony stimulating factor (GMCSF) (~250 bp); lanes 4 & 7 = tumor necrosis factor alpha (TNF-α) (~325 bp); lanes 5 & 8 = Interleukin-1 receptor alpha (IL-1R α) (~300 bp). Lane 1 = molecular weight markers (200 bp-1500 bp).

Omni-mRNA™ Amplified Pooled Reference mRNA

Product	Catalog No.	Size*	Price ($)
Human Omni-mRNA™ Amplified Pooled Reference mRNA	08-0100-25	25 µg	395.00
Mouse Omni-mRNA™ Amplified Pooled Reference mRNA	08-0200-25	25 µg	395.00
Rat Omni-mRNA™ Amplified Pooled Reference mRNA	08-0300-25	25 µg	395.00
Guinea Pig Omni-mRNA™ Amplified Pooled Reference mRNA	08-2100-25	25 µg	395.00

*Quantity supplied is sufficient for direct hybridization of 20 microarrays.

Omni-cDNA™ First Strand cDNA

- Near Full-length First Strand cDNA
- Average Size 500 bp to 5 kb
- Convenient Amplification Source of a cDNA Fragment
- Each Lot Tested for ß -actin cDNA and Primer Set Provided
- Tissue-specific Expression Studies

Omni-mRNA™ Pooled Reference mRNA

- Full-length and Near Full-length
- Reference Source of mRNA for Microarray
- Compatible with Other Labeling Systems
- Reference mRNA Among Different Research Groups

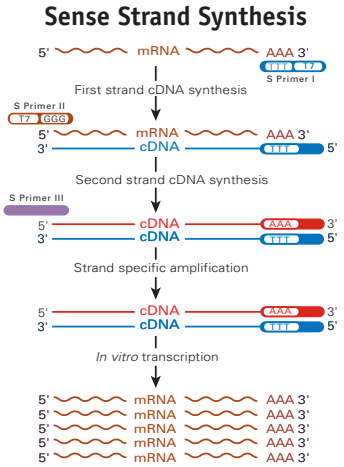
GOLD STANDARD

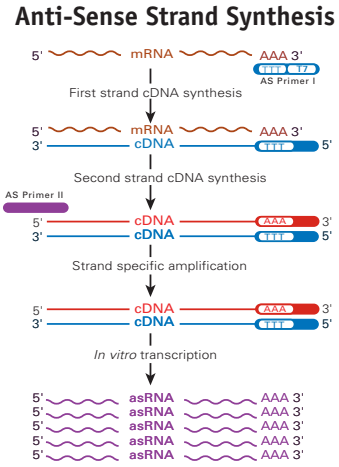
Get the Complete Message and More

We got it, so you can get it. Gene Link's Omni-cDNA™ and Omni-mRNA™ are your sources for high quality mRNA and cDNA for all your needs.

Omni-Array™ mRNA Amplification System

A universal method that performs global mRNA amplification, while maintaining the relative proportions comparable to the original sample is the Omni-Array™ mRNA amplification system. This system is compatible with all labeling and detection systems. Samples which were previously thought to be too small for microarray or other genome wide study can now be amplified using the Omni-Array™ mRNA amplification system.





APPLICATION:

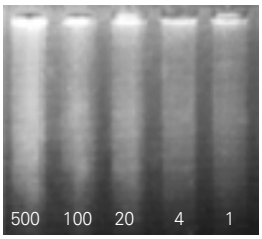
Microarray labeling, global mRNA amplification, cDNA synthesis, RT-PCR, cloning etc.

Omni-Array™ mRNA Amplification system

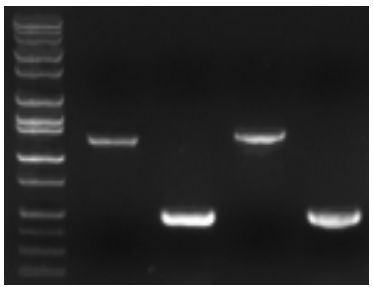
The Omni-Array™ mRNA amplification system provides a rapid and simple procedure for the generation of sufficient amounts of high quality sense or antisense strand RNA using nanogram quantities of starting RNA. The Omni-Array™ Amplification System is especially suited when the availability of total RNA becomes the limiting factor in performing certain experimental procedures.

System Format

The system contains enough reagents for 5 two round or 10 single round amplifications. Consistent results are obtained with 100 ng total RNA for single round amplification and with 2 ng total RNA for two round amplification. The final yield of mRNA is enough for labeling at least 2 microarrays. A single round of amplification results in 100-1000-fold amplification of the entire mRNA population from the sample.



One Round Amplification;
2 ng total RNA amplified



p53 cDNA amplification from human Omni-mRNA™ pooled reference mRNA. Lane 1, mw markers; lanes 2 and 4, ~1.3 kb 5' end fragment of p53; lanes 3 and 5, ~500 bp of middle portion of p53. Lanes 2-3 and 4-5 represent reproducible different preps.

Omni-Array™ mRNA Amplification Systems

Product	Catalog No.	Size	Price ($)
Omni-Array™ Sense strand mRNA Amplification System, 2 ng Version	08-0011-02	10 rxns	495.00
Omni-Array™ Antisense strand mRNA Amplification System, 2 ng Version	08-0021-02	10 rxns	495.00

Omni-Marker™ Unlabeled DNA Molecular Weight Markers

Omni-Marker™

Universal and Low unlabeled DNA markers contain a blend of fragments ranging from 50 base pairs to 10 kb. The universal contains fragments of the following sizes; 10 kb, 8 kb, 6 kb, 4 kb, 3 kb, 2 kb, 1.55 kb, 1.4 kb, 1 kb, 750 bp, 500 bp, and 400 bp. The "low" version contains fragments from 50 bp to 2 kb. The low Omni-Marker™ is ideal for routine PCR gels. A loading of 5 µl is sufficient per lane.

Molecular Weight Markers

Product	Catalog No.	Size	Price ($)
Omni-Marker™ Universal unlabeled	40-3005-01	100 µl	15.00
Omni-Marker™ Universal unlabeled	40-3005-05	500 µl	50.00
Omni-Marker™ Universal unlabeled	40-3005-10	1 ml	90.00
Omni-Marker™ Low unlabeled	40-3006-01	100 µl	15.00
Omni-Marker™ Low unlabeled	40-3006-05	500 µl	50.00
Omni-Marker™ Low unlabeled	40-3006-10	1 ml	90.00

*Shipped at room temperature. Store at –20°C. ** Normal recommended loading per lane is 5 µl.

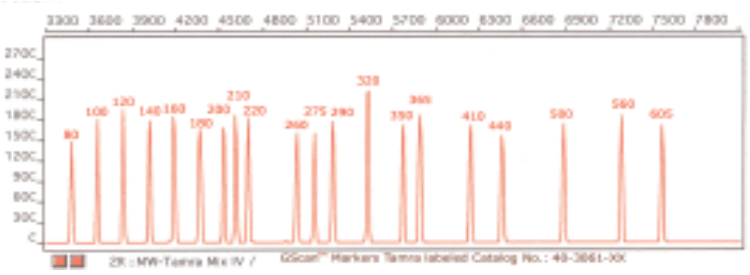
GScan™ Fluorescent Dye-labeled Molecular Weight Markers

APPLICATION:

Genetic Analyzer Fluorescent Polymorphism Studies

Genetic analysis of microsatellites, SNP, allelic discrimination, polymorphic fragment analysis and triple repeat amplification with fluorescent dyes require the parallel co-migration of appropriate molecular weight markers for accurate determination of fragment size.

GScan markers have been especially developed for the above applications. These are supplied ready to load and provide highly consistent fragment sizing.



GScan™ Dye-labeled Markers

Product	Catalog No.	Size	Price ($)
GScan™ Marker Tamra labeled 50 bp - 600 bp	40-3061-01	100 µl	75.00
GScan™ Marker Tamra labeled 50 bp - 600 bp	40-3061-05	500 µl	325.00
GScan™ Marker Hex labeled 50 bp - 600 bp	40-3081-01	100 µl	75.00
GScan™ Marker Hex labeled 50 bp - 600 bp	40-3081-05	500 µl	325.00

*A loading of 0.5 µl is suggested.

Omni-Array™ mRNA Amplification System

- As Low as 2 ng Amplification
- Amplified mRNA Suitable for Microarray, cDNA Synthesis, RT-PCR, Cloning, etc.
- Two Round Amplification From 2 ng Generates More Than 10 µg RNA
- Full-Length and Near Full-length Amplification

GScan™ Markers

- Precise & High Resolution Fragment Sizing
- Consistent and Reproducible
- Sharp Sensitive Peaks
- Available with Tamra and Hex Dyes
- Ready to Load

GOLD STANDARD

Not Enough mRNA?

There is no barrier, as low as 2 ng, repeat, two nanograms; is sufficient to amplify and yield 10 micrograms of mRNA. Advance to the Omni-Array™ Amplification System.

Appendix

PCR Components and Analysis

PCR buffer conditions vary and it is imperative to optimize buffer conditions for each amplification reaction. At Gene Link most amplification reactions have been optimized to work with the following standard buffer condition, unless otherwise indicated.

Recipe

Standard Gene Link PCR Buffer Composition

10 X PCR buffer	1 X PCR buffer
100 mM Tris-HCl pH 8.3	10 mM
500 mM KCl	50 mM
15 mM $MgCl_2$	1.5 mM
0.01% Gelatin	0.001%

dNTP Concentration

Standard dNTP concentration of 0.2 mM of each base is used. See section on PCR additives when dNTP concentration is changed.

Recipe

2.0 mM dNTP Stock Solution Preparation*

Component	Volume
100 mM dGTP	100 µl
100 mM dATP	100 µl
100 mM dTTP	100 µl
100 mM dCTP	100 µl
Water	4.6 ml
Total Volume	5 ml

*Aliquot and freeze.

$MgCl_2$ Concentration

The concentration of Mg^{2+} will vary from 1-5 mM, depending upon primers and substrate. Since Mg^{2+} ions form complexes with dNTPs, primers and DNA templates, the optimal concentration of $MgCl_2$ has to be selected for each experiment. Low Mg^{2+} ion concentration results in a low yield of PCR product, and high concentrations increase the yield of non-specific products and promote mis-incorporation. Lower Mg^{2+} concentrations are desirable when fidelity of DNA synthesis is critical. The recommended range of $MgCl_2$ concentration is 1-4 mM, under the standard reaction conditions specified. At Gene Link, using the standard PCR buffer with KCl, and a final dNTP concentration of 0.2 mM, a $MgCl_2$ concentration of 1.5 mM is used in most cases. If the DNA samples contain EDTA or other chelators, the $MgCl_2$ concentration in the reaction mixture should be raised proportionally. Given below is a $MgCl_2$ concentration calculation and addition table using a stock solution of 25 mM $MgCl_2$.

Primer Concentration

The final concentration of primers in a PCR reaction is usually 0.5 to 1 µM (micromolar). This is equivalent to 0.5 to 1 pmol/µl. For a 100 µl reaction, add 50 to 100 pmols. At Gene Link we use 0.5 pmol/µl in the final reaction.

⚠ Always use filter barrier pipette tips to prevent cross contamination.

Primer Reconstitution

Stock Primer Mix: Prepare a primer stock solution of 100 µM, i.e., 100 pmols/µl in sterile TE.

Primer Mix: Prepare a 10 pmols/µl Primer Mix solution by a ten fold dilution of the stock primer mix.

Example: Add 160 µl sterile TE to a new tube, and to this tube add 20 µl of each primer stock solution. Label this tube as Primer Mix 10 pmols/µl.

Recipe

TE Buffer pH 7.5 Composition

1 X TE Buffer pH 7.5
10 mM Tris-HCl pH 7.5
1 mM EDTA

PCR Additives

DNA polymerases need to elongate rapidly and accurately to function effectively *in vivo* and *in vitro*, yet certain DNA regions appear to interfere with their progress. One common problem are pause sites, at which DNA polymerase molecules cease elongation for varying lengths of time. Many strong DNA polymerase pauses are at the beginnings of regions of strong secondary structure such as template hairpins (1). Taq polymerase used in PCR suffers the same fate and GC-rich DNA sequences often require laborious work to optimize the amplification assay. The GC-rich sequences possess high thermal and structural stability, presumably because the high duplex melting temperature permits stable secondary structures to form, thus preventing completion of a faithful replication (2).

Nucleotide analog 7-deaza dGTP is effective in reducing the secondary structure associated with the GC rich region by reducing the duplex stability (4). Betaine, DMSO and formamide reduce the T_m and the complex secondary structure, thus the duplex stability (1-5). Tetramethyl ammonium chloride (TMAC) actually increases the speci-

$MgCl_2$ Concentration & Addition Table

Final concentration of $MgCl_2$ in 50 µl reaction mix, (mM)	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0
Volume of 25 mM $MgCl_2$, (µl)	2	2.5	3	3.5	4	5	6	8

ficity of hybridization and increases the T_m. The use of TMAC is recommended in PCR conditions using degenerate primers.

These PCR additives and enhancing agents have been used to increase the yield, specificity and consistency of PCR reactions. These additives may have beneficial effects on some amplification and it is impossible to predict which agents will be useful in a particular context. Therefore, they must be empirically tested for each combination of template and primers.

PCR Additives

Additive	Purpose & Function	Concentration
7-deaza-2'-deoxyguanosine; 7-deaza dGTP	GC rich region amplification. Reduces the stability of duplex DNA.	Totally replace dGTP with 7-deaza dGTP; or use 7-deaza dGTP: dGTP at 3:1.
Betaine (N,N,N-trimethylglycine = [carboxymethyl]trimethylammonium)	Reduces T_m facilitating GC rich region amplification. Reduces duplex stability.	Use 3.5 M to 0.1 M Betaine. Be sure to use Betaine or Betaine (mono)hydrate and not Betaine HCl.
BSA (bovine serum albumin)	Proven particularly useful when attempting to amplify ancient DNA or templates, which contain PCR inhibitors such as melanin.	BSA concentration of 0.01 µg/µl to 0.1 µg/ µl can be used.
DMSO (dimethyl sulfoxide)	Reduces secondary structure and is particularly useful for GC rich templates.	DMSO at 2-10% may be necessary for amplification of some templates, however 10% DMSO can reduce Taq polymerase activity by up to 50% so it should not be used routinely.
Formamide	Reduces secondary structure and is particularly useful for GC rich templates.	Formamide is generally used at 1-5%. Do not exceed 10%.
Non-ionic detergents e.g. Triton X-100, Tween 20 or Nonidet P-40 (NP-40)	Stabilizes Taq polymerase and may also suppress the formation of secondary structure.	0.1-1% Triton X-100, Tween 20 or NP-40 may increase yield but may also increase non-specific amplification. As little as 0.01% SDS contamination of the template DNA (left- over from the extraction procedure) can inhibit PCR by reducing Taq polymerase activity to as low as 10%, however, inclusion of 0.5% Tween-20 or -40 will effectively neutralize this effect.
TMAC (tetramethyl ammonium chloride)	Reduces potential DNA-RNA mismatch and improves the stringency of hybridization reactions. It increases T_m and minimizes mis-pairing.	TMAC is generally used at a final concentration of 15-100 mM to eliminate non-specific priming.

References

1. Kovarova, M. and Draber, P. (2000) New Specificity and yield enhancer for polymerase chain reactions (2000) Nucl. Acids. Res. 28: e70.
2. Henke, W., Herdel, K., Jung, K., Schnorr, D. and Loening, S. (1997) Betaine improves the PCR amplification of GC-rich DNA sequences. Nucl. Acids Res. 25: 3957-3958.
3. Daniel S. Mytelka, D.S., and Chamberlin, M.J.,(1996) Analysis and suppression of DNA polymerase pauses associated with a trinucleotide consensus. Nuc. Acids Res., 24:2774–278.
4. Keith, J. M., Cochran, D.A.E., Lala, G.H., Adams, P., Bryant, D.and Mitchelson, K.R. (2004) Unlocking hidden genomic sequence. Nucl. Acids Res. 32: e35.
5. Owczarzy, R., Dunietz, I., Behlke, M.A., Klotz, I.M. and Walder, J.A.. (2003) Thermodynamic treatment of oligonucleotide duplex–simplex equilibria. PNAS, 100:14840-14845.

Formulas

%GC= (G+C)/length

MW = (A x 313.2) + (C x 289.19) + (G x 329.21) + (T x 304.2) + (I x 314.2) + (N x 308.95) + (R x 321.21) + (Y x 296.69) + (M x 301.2) + (K x 316.7) + (S x 309.2) + (W x 308.71) + (H x 302.2) + (B x 307.53) + (D x 315.54) + (V x 310.53) + (P x 79.98) + (U x 290.17) – 62

T_m for oligos shorter than 25 bp = 2(A+T) + 4(C+G)

For longer oligos:
T_m = 81.5 – 16.6 + (0.41 x %GC)) – 600/size
(Reference Bolton, E.T and McCarthy, B.J. (1962) PNAS 48: 139-1397)

Formula for T_m Calculation

T_m = 81.5 + 16.6 x Log10[Na^+] + 0.41 (%GC) – 600/size
[Na^+] is set to 100 mM

Example: 5'-ATGCATGCATGCATGCATGC-3' 20 mer; GC=50%; AT= 50%

T_m = 81.5 + 16.6 x Log10[0.100] + 0.41 x 50 – 600/20

T_m = 81.5 - 16.6 + 0.41 x 50 – 600/20

T_m = 81.5 - 16.6 + 20.5 – 30

T_m = 64.9 + 20.5 – 30

T_m = 85.40 – 30

T_m = 55.4°C

T_m for same oligo using 2(A+T) + 4(C+G)

= 2(5+5) + 4(5+5)

= 2(10) + 4(10)

= 20 + 40

= 60°C

Degenerate Bases in Sequence

International union of biochemistry (IUB) recommends the use of single letter nomenclature for degenerate/mixed bases. The use of inosine is recommended to reduce the number of degeneracies. For degenerate (mixed bases) positions use the following IUB codes:

R = A+G	H = A+T+C
Y = C+T	B = G+T+C
M = A+C	D = G+A+T
K = G+T	V = G+A+C
S = G+C	N = A+C+G+T
W = A+T	I = Inosine

MW and Extinction Coefficient

Base	MW	EC
deoxy adenosine	313.21	15.40
deoxy cytosine	289.19	7.40
deoxy guanosine	329.21	11.50
thymidine	304.2	8.70
deoxy inosine	314.2	7.20
A+G+T+C	308.95	10.70
A+G	321.21	13.45
C+T	296.69	8.05
A+C	301.2	11.40
G+T	316.7	10.10
G+C	309.2	9.45
A+T	308.71	12.05
A+T+C	302.2	10.50
G+T+C	307.53	9.20
G+A+T	315.54	11.86
G+A+C	310.53	11.43
phosphate	79.98	0.00
deoxy uridine	290.17	9.90

International System of Unit Prefixes

Prefix	Symbol	Multiple
exa	(E)	10^{18}
peta	(P)	10^{15}
tera	(T)	10^{12}
giga	(G)	10^{9}
mega	(M)	10^{6}
kilo	(k)	10^{3}
hecto	(h)	10^{2}
deka	(da)	10^{1}
deci	(d)	10^{-1}
centi	(c)	10^{-2}
milli	(m)	10^{-3}
micro	(μ)	10^{-6}
nano	(n)	10^{-9}
pico	(p)	10^{-12}
femto	(f)	10^{-15}
atto	(a)	10^{-18}

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