



RNA SAMPLE PREPARATION

The New Standard in RNA Purification, Best-in-Class, Pure & Simple

Over 40 kits for the isolation of Total RNA including
microRNA from any specimen without phenol



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An ISO 13485:2003, ISO 9001:2008 & ISO 15189:2007 Certified Company

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Norgen Biotek is dedicated to providing our customers with first class sample preparation kits for RNA, microRNA, DNA and protein purification, clean-up and concentration for research and diagnostic applications; and to providing dedicated and expert support services to our customers and commercial partners worldwide.

Norgen is an **ISO 9001:2008**, **ISO 13485:2003** and **ISO 15189:2007** certified company, indicating our commitment to quality.



Ordering Information

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3. Billing Address
4. Shipping Address
5. Name of person to whose attention the order should be shipped
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7. Product catalogue number, description, size and quantity

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Technical Support

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Total RNA Extraction and Purification (including microRNA)

Total RNA Purification Kit

Cat. # 17200 & 37500

Total RNA Purification Kit Dx



Cat. # Dx17200

CE-certified kit for in-vitro diagnostic purposes - not available in all regions

Sample inputs:

- Cultured Cells (Growing in a monolayer or suspension)
- Animal Tissues (kidney, liver, lung, spleen, mouse tail)
- Blood/Plasma/Serum
- Viral RNA from Blood/Plasma/Serum
- Viral RNA from Nasal or Throat Swabs
- Bacteria (Gram-negative and Gram-positive)
- Yeast and Fungi
- Exosomes and microvesicles
- Body fluids (saliva, CSF, sperm)

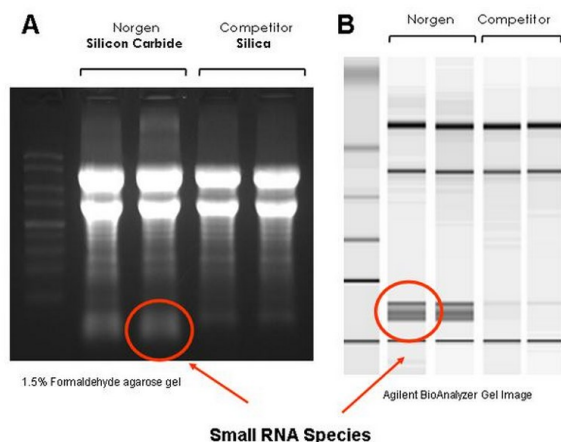


Figure 1. High Quality of Isolated RNA with Complete Size Range. Unlike most competitors' kits, Norgen's Total RNA Purification Kit allows for the isolation of all sizes of RNA, from the very large RNA down to the microRNA without the use of phenol. Total RNA was isolated from 1×10^9 *E. coli* cells using Norgen's Total RNA Purification Kit and a competitor's kit. **Panel A:** Five microliters of the 50 μ L isolated RNA was analyzed on an agarose gel. **Panel B:** One microliters of the 50 μ L isolated RNA was analyzed on the Agilent® 2100 BioAnalyzer RNA Nano 6000 chip. Note the presence of small RNA species (red circle) in the samples isolated via Norgen's kit and the absence of these RNA species in the competitor RNA preparation.

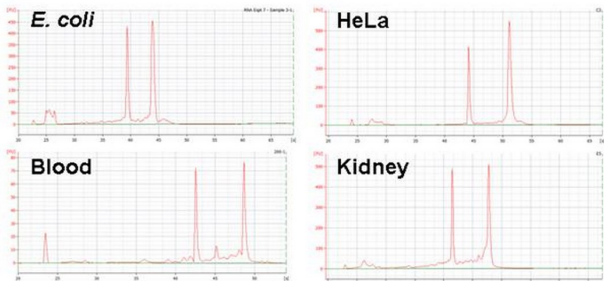


Figure 3. High Quality of RNA from a Diverse Range of Inputs. Norgen's Total RNA Purification Kit allows RNA isolation from a wide range of species or tissue types. Total RNA was isolated from 5×10^8 *E. coli* cells, 1×10^6 HeLa cells, 100 μ L rat blood and 10 mg hamster kidney using Norgen's Total RNA Purification Kit. One microliter of the 50 μ L isolated RNA was analyzed on the Agilent® 2100 BioAnalyzer using an RNA Nano 6000 chip. Note the integrity of RNA from all inputs with the presence of small RNA species. Norgen's Total RNA Purification Kit consistently isolates high quality RNA from various inputs that score a RIN value between 8 and 10.

Rapid preparation of total RNA - including microRNA - without phenol

Principle

Purification is based on spin column using Norgen's proprietary resin as the separation matrix. Briefly, the blood sample of interest is first lysed using the provided Lysis Solution, ethanol is added and the RNA is bound to Norgen's column. Under these conditions only the RNA will bind to Norgen's resin while most of the contaminating cellular proteins are removed in the flowthrough or retained on top of the resin. The bound RNA is then washed to remove any remaining impurities. Lastly, the purified total RNA is eluted into 50 μ L of the provided Elution Buffer.

Norgen's proprietary resin provides superior affinity to the full size range of RNA molecules, resulting in large and small RNA (miRNA) purification with better linearity and sensitivity. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time RT-PCR, RT-PCR, Northern blotting, RNase protection and primer extension, expression profiling, miRNA cloning and amplification and Next Generation Sequencing.

Performance

Norgen's Total RNA Purification Kit provides a rapid method for the isolation and purification of total RNA in as little as 20 minutes. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of phenol or chloroform. Norgen's kit is the only kit on the market that isolates true total RNA, as other kits must use phenol to recover all sizes of RNA. Therefore Norgen's kit offers significant advantages in functionality, savings on cost, ease-of-use, no hazardous organic waste, and no inhibitory effect on PCR amplifications as a result of residual phenol. With this kit both miRNA and mRNA can be studied from the same sample without further purifications, thus offering considerable advantages when comparing and relating expression of miRNA to other RNA. Furthermore, this is an excellent kit for the extraction of miRNA from all samples including plasma.

Applications

- Quantitative, real-time RT-PCR for both large mRNA and small RNA including miRNA
- RT-PCR for both large mRNA and small RNA including miRNA
- Expression profiling
- Next Generation Sequencing for RNA and miRNA
- miRNA from plasma for discovery
- microRNA cloning and amplification
- PCR-based virus detection
- PCR-based viable bacteria detection
- Northern blotting
- RNase protection
- Primer extension

Total RNA Extraction and Purification (including microRNA)

Total RNA Purification Kit

Cat. # 17200 & 37500

Total RNA Purification Kit Dx



Cat. # Dx17200

CE-certified kit for in-vitro diagnostic purposes - not available in all regions

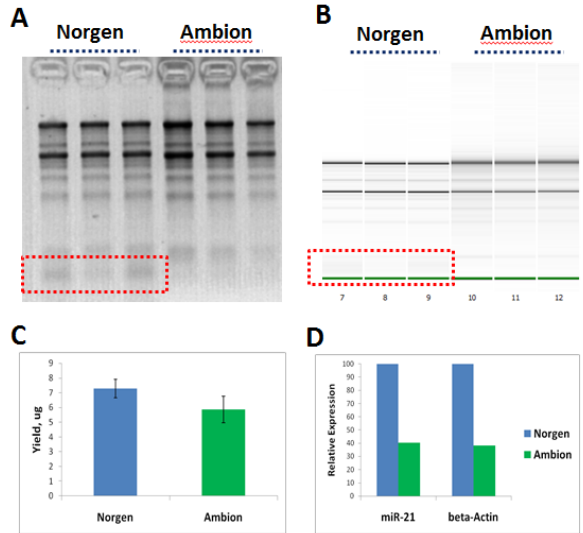


Figure 2. Recovery of True Total RNA including microRNA from 100 mL of Hamster Blood. Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 3 different samples of 100 μ L of Hamster blood using either Norgen's Total RNA Purification Kit or Ambion *RiboPure*TM-Blood Kit. Both kits isolated large RNA (represented by 28S and 18S rRNA) with high integrity but Norgen's Total RNA Purification Kit provided the added benefit of recovering small RNA without any additional protocol (highlighted). Panel B is a result from a bioanalyzer resolution of the eluted RNA. Similar to the agarose gel, Norgen's Total RNA Purification Kit showed the added benefit of recovering small RNA. Panel C showed that Norgen's Total RNA Purification Kit recovered higher RNA yield. Panel D showed Norgen's Total RNA Purification Kit recovered high quality RNA for sensitive downstream application. that One microgram of RNA was used in RT-qPCR reactions for beta-Actin (for Large RNA) and miR-21 (for microRNA) genes. The RNA isolated by Norgen's Total RNA Purification Kit showed much better relative expression of the genes studied.

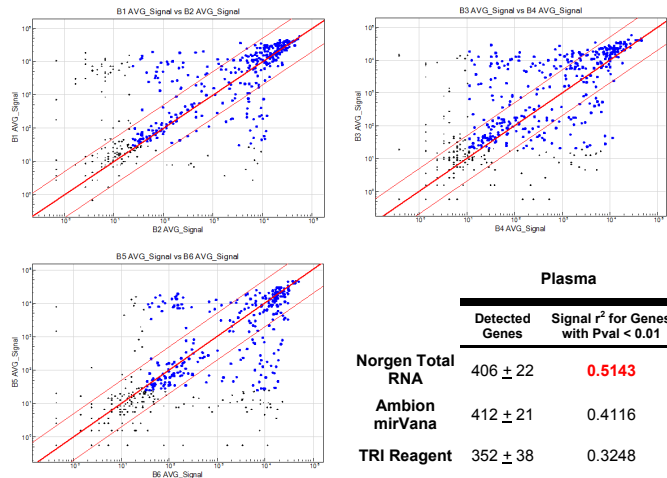


Figure 2. Recovering Diverse miRNA Species from Plasma with Better Consistency. Total RNA including miRNA was isolated from 100 μ L of mouse plasma using Norgen Total RNA Purification Kit, Ambion mirVana miRNA Kit or Sigma TRI Reagent and applied to Illumina microRNA expression profiling kit. Scatter plots displaying better consistency (better clustering) of Norgen replicate signal of Plasma RNA. Gene with Pval < 0.01 for both replicates were in blue. Norgen Protocol recovered same diversity of miRNA with better consistency (higher r^2 value).

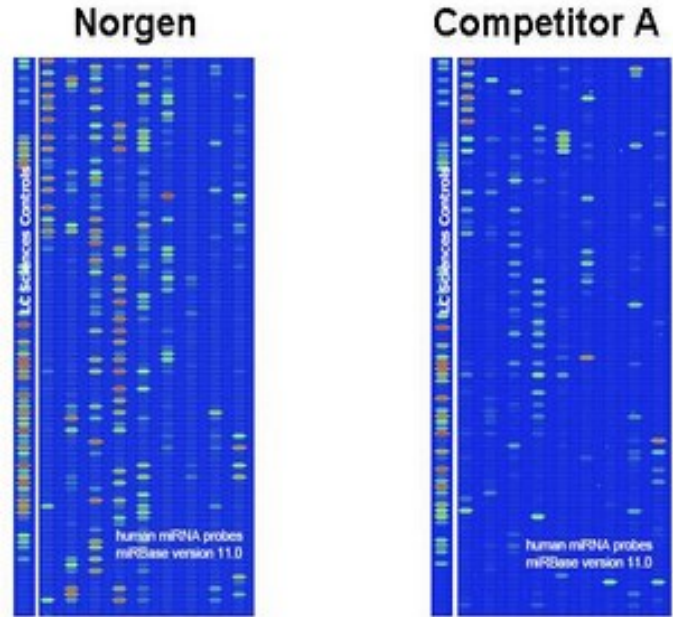


Figure 3: Better Diversity of miRNA Detected from Plasma. Norgen's Total RNA Purification Kit isolates miRNA from plasma with better diversity than a leading competitor. Total RNA including miRNA was isolated from 100 μ L of plasma using Norgen's Total RNA Purification Kit or 625 μ L of plasma using Competitor A's leading miRNA Kit, and was applied to an NCode expression profiling kit. Microarray images suggested that Norgen's Total RNA Purification Kit (left) isolates a better diversity of miRNA from a smaller input amount of plasma than the competitor's miRNA kit (right). Image courtesy of LC Sciences, Houston. (www.lcsciences.com).

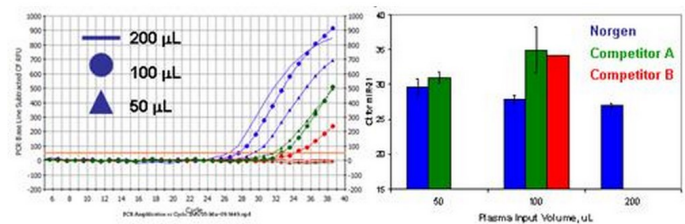


Figure 6. Effective and Consistent Detection of miRNA from Plasma. Norgen's Total RNA Purification Kit can effectively isolate miRNA from plasma. Total RNA was isolated from 50, 100 or 200 μ L of rat plasma in triplicates using Norgen's Total RNA Purification Kit (blue), a competitor's silica-based kit (green) and a phenol-based RNA extraction method (red). Stem loop RT-qPCR using primers specific to miR-21 was performed. In brief, two microliters of the 50 μ L isolated RNA was then subjected to a 20 μ L reverse transcription using miR-21 stem-loop reverse primer or oligo dT primer. Three microliters of the reverse transcription was used in a 20 μ L real-time PCR reaction with primers to detect the human miR-21. Norgen's Total RNA Purification Kit is the only product that showed (1) consistent detection of miR-21 transcripts across all input volumes, and (2) Ct values correlated to input volume (decrease Ct with increase input).

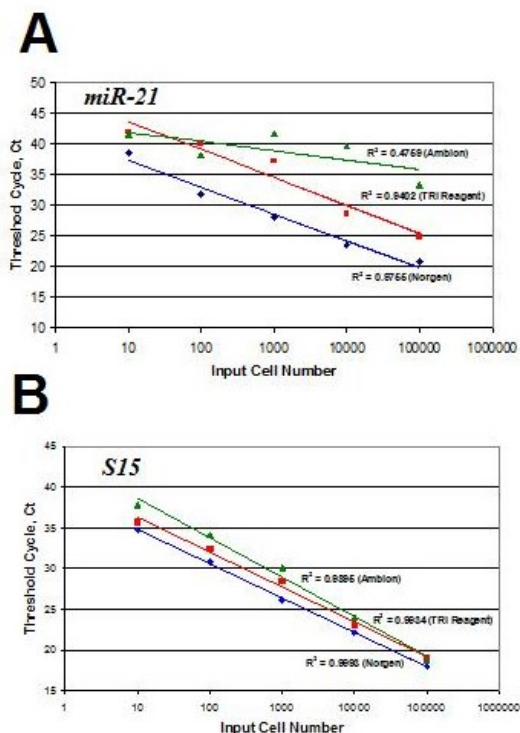


Figure 3. Linear and Sensitive Isolation of Both Large and Small RNA. Norgen's Total RNA Purification Kit allows consistent isolation of both large and small RNA from different input amounts. Total RNA was isolated from 10 to 100,000 HeLa cells using Norgen's Total RNA Purification Kit (blue), a competitor's silica-based kit (green) and a phenol-based RNA extraction method (red). **Panel A:** Relative expression of *miR-21* **Panel B:** Relative expression of *S15*. Both were determined by RT-qPCR of total RNA samples. In brief, 1 μ L of the 50 μ L isolated RNA was then subjected to a 20 μ L reverse transcription using *miR-21* stem-loop reverse primer or oligo dT primer. Two microliters of the reverse transcription was used in a 20 μ L real-time PCR reaction with primers to detect the human *miR-21* (Panel A) and the *S15* transcripts (Panel B). The resulting threshold cycle (Ct) values were plotted against input cell number. RNA isolated using Norgen's Total RNA Purification had the best linearity (higher R²) and sensitivity (lower Ct) for both large RNA (*S15*) and small RNA (*miR-21*).

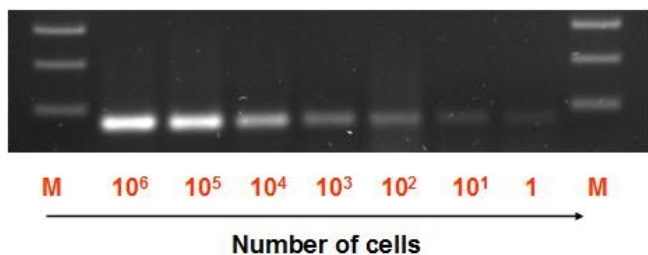


Figure 4. Great Isolation Sensitivity. Norgen's Total RNA Purification Kit allows sensitive RNA extraction from as little as a single cell. Total RNA was extracted from a decreasing number of 293 HEK cells from 1 million cells down to a single cell. Five microliters of the 50 μ L isolated RNA was then subjected to a 20 μ L reverse transcription using oligo dT primer. Three microliter of the reverse transcription was used in a 20 μ L PCR reaction with primers to detect the human beta-actin transcripts. PCR products of beta-actin were detected from as little as a single cell. M is the marker lane.

Features and Benefits

- **No phenol:chloroform extractions** - Total RNA is isolated from blood without the use of harmful chemicals such as phenol or chloroform
- **Isolate total RNA from very small samples** - Total RNA has been isolated and detected from as little as 10 μ L of blood
- **Extremely efficient isolation of low abundance microRNA** - Norgen's Total RNA Purification Kit has been shown to be extremely efficient at recovering low abundance microRNA from plasma samples
- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA)
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in 20 minutes
- **Isolate total RNA from a broad input source** - Total RNA has been isolated from cultured animal cells, small tissue samples, LCM samples, bacteria, yeast, fungi, plants, viruses and various bodily fluids including blood, plasma, serum, saliva, nasal or throat swabs
- **No need for carrier RNA** - Isolate all sizes of RNA without the use of carrier RNA
- **Multiple kit sizes available** - This kit is available in both 50 prep and 100 prep sizes

Feature	Specifications
Column binding capacity	Up to 50 μ g RNA
Maximum Loading Volume Per Spin Column	650 μ L
Size of RNA Purified	All sizes, including < 200 nt
Time to Complete 10 Purifications	20 minutes
RNA Yield	
Liver (10 mg)	30 μ g
Kidney (10 mg)	10 μ g
Human blood (100 μ L)	1 μ g
Hamster blood (100 μ L)	5 μ g
HeLa (1 x 10 ⁶)	15 μ g
CHO (1 x 10 ⁶)	11 μ g
Yeast (1 x 10 ⁸)	30 μ g
E coli (1 x 10 ⁹)	43 μ g
Format	Spin columns

Ordering information

Cat #	Quantity
17200	50 preps
Dx17200	50 preps
37500	100 preps

Total RNA Extraction and Purification (including microRNA)

Animal Tissue RNA Purification Kit

Cat. # 25700

Sample inputs:

Animal Tissues (kidney, liver, lung, spleen, mouse tail)
Fiber-Rich Tissues (muscle, heart)

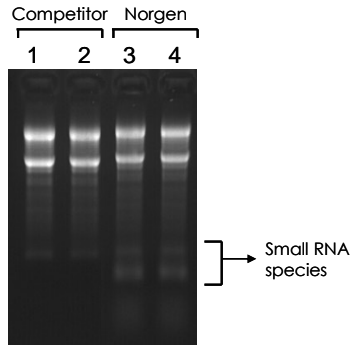


Figure 1. Isolate a Diversity of RNA Species

Total RNA was isolated from 25 mg samples of rat muscle using Norgen's Animal Tissue RNA Purification Kit and a leading competitors kit. The purified RNA was then resolved on a 1.2% formaldehyde-agarose gel. As it can be seen, only Norgen's kit was able to isolate the full diversity of RNA species, including microRNA.

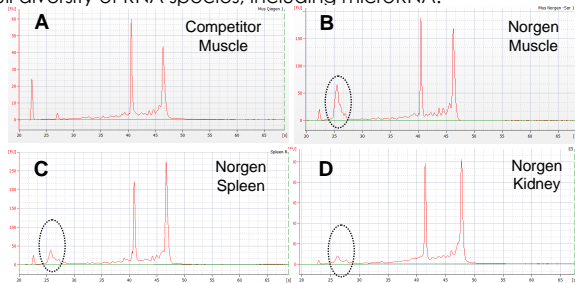


Figure 2. RNA Purification from a Diversity of Tissues

Total RNA was successfully isolated from various tissue samples including spleen (Panel C), kidney (Panel D) and fiber-rich muscle (Panel B) using Norgen's Animal Tissue RNA Purification Kit and a leading competitors kit (Panel A). The purified RNA was then analyzed using an Agilent BioAnalyzer. Small RNA could be observed in all the RNA samples isolated using Norgen's kit (Panels B-D, circled), whereas no small RNA was present in the samples isolated using a competitors kit (Panel A).

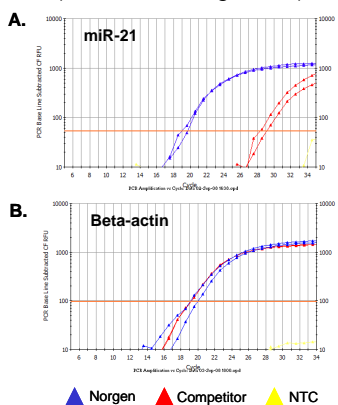


Figure 3. High Yield of microRNA Species

Total RNA was isolated from equal amounts of a rat muscle sample using Norgen's Animal Tissue RNA Purification Kit and a leading competitors kit. The purified RNA was then used as the template in RT-qPCR for detecting miR-21 (Panel A) and the beta-actin gene (Panel B). In both graphs the blue lines correspond to Norgen isolated-RNA and the red lines correspond to competitor-isolated RNA. As it can be seen, Norgen's kit isolated much higher yields of microRNA, as indicated by the lower CT value of the blue line in Panel A. The kits isolated similar yields of mRNA as seen by the similar CT values in Panel B. NTC corresponds to non-template control.

Rapid isolation and purification of total RNA including microRNA from all types of animal tissue samples without the use of Phenol

Norgen's Animal Tissue RNA Purification Kit provides a rapid method for the isolation and purification of total RNA from all types of animal tissue samples, including fiber-rich tissues such as muscle and heart. Norgen's Animal Tissue RNA Purification Kit is provided with Proteinase K, which aids in the removal of the various proteins present in fiber-rich tissues including collagen, contractile proteins and connective tissues. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of inhibitory phenol or chloroform. The purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate high quality total RNA from a variety of animal tissues** - Total RNA can be isolated and detected from high RNA content tissues such as liver and spleen, as well as fiber-rich tissues such as muscle and heart.
- **Compatible with RNA preservation reagents** - Total RNA can be isolated and detected from tissues stored in RNAlater®.
- **No phenol:chloroform extractions** - Total RNA is isolated without the use of harmful chemicals like phenol or chloroform.
- **Isolate a diversity of RNA species** - All sizes of RNA can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	50 minutes
Average Yield	
Rat Heart (10 mg)	10 mg
Rat Muscle (10 mg)	5 mg
Rat Kidney (10 mg)	25 mg

Ordering information

Cat #	Quantity
25700	50 preps

Total RNA Purification Plus Kit

Cat. # 48300 & 48400

Sample inputs:

- Cultured Cells (Growing in a monolayer or suspension)
- Animal Tissues (kidney, liver, lung, spleen, mouse tail)
- Blood/Plasma/Serum
- Viral RNA from Blood/Plasma/Serum
- Viral RNA from Nasal or Throat Swabs
- Bacteria (Gram-negative and Gram-positive)
- Yeast and Fungi
- Exosomes and microvesicles
- Body fluids (saliva, CSF, sperm)

Rapid isolation and purification of total RNA including microRNA with rapid gDNA removal

Norgen's Total RNA Purification Plus Kit provides a rapid method for the isolation and purification of total RNA from cultured animal cells, small tissue samples, blood, plasma, serum, bacteria, yeast, fungi, plants and viruses. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). Genomic DNA is rapidly removed from the sample using a Genomic DNA Removal Column, without the use of any enzymes or incubation. Purification is based on spin column chromatography, and the total RNA is preferentially purified from other cellular components such as proteins without the use of phenol or chloroform. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA)
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in 20 minutes.
- **No phenol:chloroform extractions**- Total RNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Rapid removal of genomic DNA** - Contaminating gDNA is rapidly removed without the use of enzymes via a Genomic DNA Eliminator Column
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

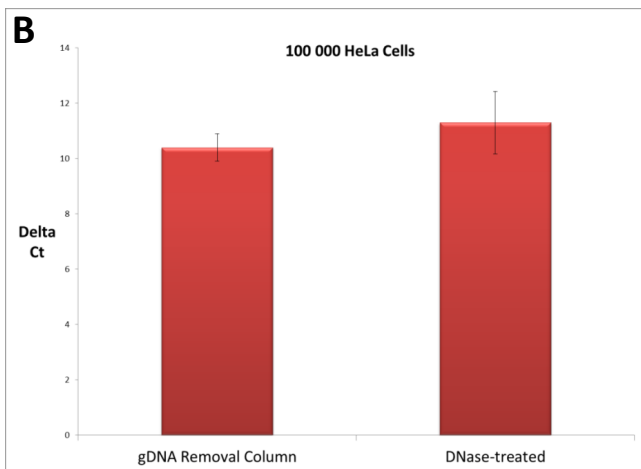
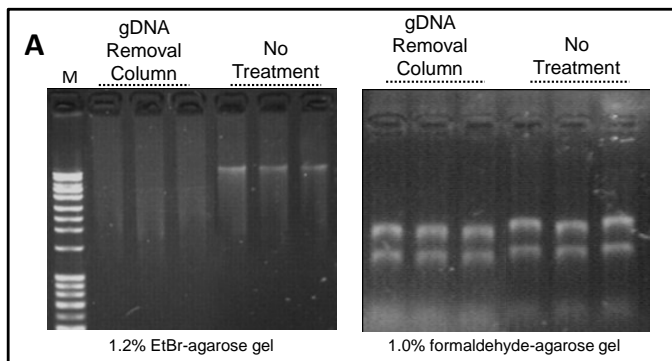


Figure 1. Genomic DNA Removal from HeLa Cells and Delta Ct Values Observed Between Different gDNA Removal Techniques.

To demonstrate gDNA removal using the RNA Purification Plus Kit, 100,000 HeLa cells were either passed through the gDNA Removal Column from the kit or received no gDNA removal treatment. The resulting RNA was then run on a 1.2% EtBr-agarose gel (Panel A, left gel). From observing the gel it can be seen that the gDNA Removal Column is removing all traces of the gDNA. The right gel in Panel A is a 1.0% formaldehyde-agarose gel showing the resulting RNA which was purified from the samples using the kit. To further test gDNA removal, 100,000 HeLa cells were either passed through the gDNA Removal Column or subjected to DNase-treatment using Norgen's RNase-Free DNase I (Cat# 25710). RT-qPCR was then performed with and without reverse transcription of the RNA sample in order to calculate the delta Ct and to determine the amount of genomic DNA contamination in RNA samples. From observing the graph in Panel B it can be seen that the gDNA Removal column eliminated gDNA to levels similar to that seen with DNase treatment.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
HeLa Cells (1 x 10 ⁶ cells)	15 mg
E. coli (1 x 10 ⁹ cells)	50 mg

Ordering information

Cat #	Quantity
48300	50 preps
48400	100 preps

Total RNA Extraction and Purification (including microRNA)

microRNA Purification Kit

Cat. # 21300

Sample inputs:

- Cultured Cells (Growing in a monolayer or suspension)
- Animal Tissues (kidney, liver, lung, spleen, mouse tail)
- Blood
- Bacteria (Gram-negative and Gram-positive)

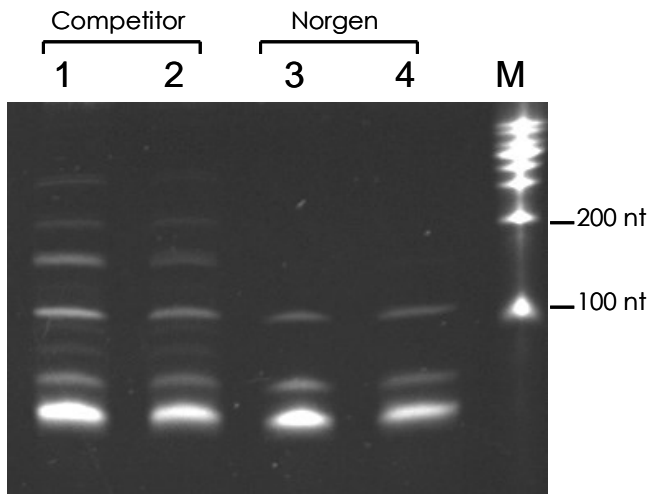


Figure 1. Isolate Only Small RNA Species Using Norgen's Kit

Small RNA was isolated from cultured HeLa cells using Norgen's microRNA Purification Kit (Lanes 3 and 4) and a competitor's kit (Lanes 1 and 2). Samples of the purified small RNA were run on an 8% urea-acrylamide gel. Lane M is Norgen's 100b RNA Ladder. Note that Norgen's kit is isolating only the small (<200 nt) RNA species, with no contaminating larger RNA fragments present.

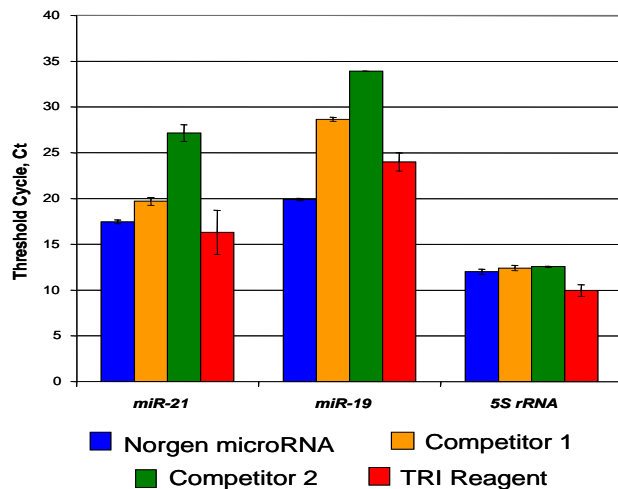


Figure 2. Better Recovery of miRNAs by Norgen's microRNA Purification Kit.

Small RNA was isolated from HeLa cells using Norgen's microRNA Purification Kit and a competitor's kits. Relative expression of (A) miR-21, (B) miR-19 and (C) 5S rRNA was determined by RT-qPCR of polyadenylated total RNA samples. The resulting threshold cycle (Ct) values were summarized in the graph. Blue = Norgen's microRNA Purification Kit; orange = Silica-based Competitor micro-RNA Kit; green = Silica-based Competitor Total RNA Kit; red = Phenol-based reagent protocol. Norgen's microRNA Purification Kit recovered more miRNAs (lower Ct) than competitor's microRNA-specific kit.

Rapid isolation and purification of microRNA from a variety of samples without the use of Phenol

Norgen's microRNA Purification Kit provides a rapid method for the isolation and purification of small RNA molecules (< 200 nt) from cultured animal cells, small tissue samples, bacterial cells, plants and blood. These small RNAs include regulatory RNA molecules such as microRNA (miRNA) and short interfering RNA (siRNA), as well as tRNA and 5S rRNA. Small RNA molecules are often studied due to their ability to regulate gene expression. For example, miRNAs and siRNAs, which are typically 20-25 nucleotides long, regulate gene expression by binding to mRNA molecules and affecting their stability or translation.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The process involves the use of two separate spin columns for the isolation of small RNA molecules. First, the large RNA molecules are removed through binding to the Large RNA Removal Column, while the smaller RNA molecules species will pass through into the flowthrough. Next, the small RNA species are isolated and purified through binding to the Small RNA Enrichment Column. If desired, the large RNA species can also be eluted and separately purified.

Features and Benefits

- **Isolate all small RNA molecules** - All small RNA species can be isolated including miRNA, siRNA, tRNA, and 5S rRNA.
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in under 25 minutes.
- **No phenol:chloroform extractions** - Norgen's microRNA Purification Kit isolates RNA without the use of harmful chemicals such as phenol or chloroform.
- **Minimal contamination from large RNA and genomic DNA** - Efficient isolation of small RNA with a 2 column process, resulting in minimal contamination of larger RNA and genomic DNA.
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications relating to gene regulation and functional analysis, including northern blotting and microarray analysis.

Feature	Specifications
Maximum Column Binding Capacity	35 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	<200 nt
Minimum Elution Volume	20 µL
Time to Complete 10 Purifications	25 minutes

Ordering information

Cat #	Quantity
21300	25 preps

Cytoplasmic & Nuclear RNA Purification Kit

Cat. # 21000 & 37400

Rapid fractionation and purification of cytoplasmic and nuclear RNA with complete size range including microRNA

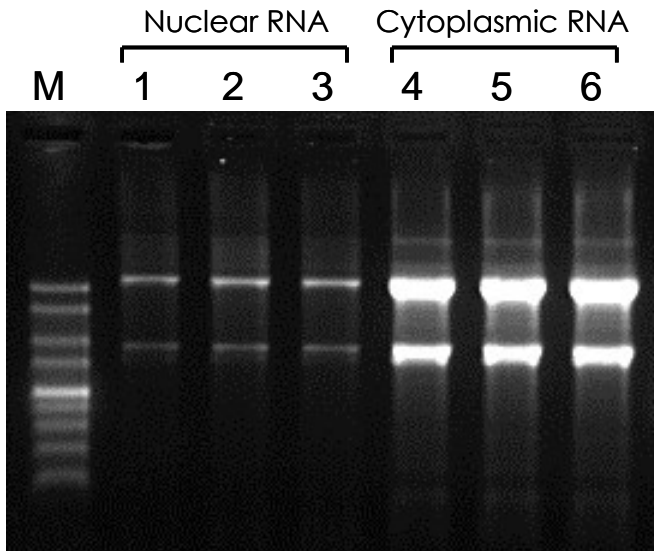


Figure 1. High Quality Cytoplasmic & Nuclear RNA
RNA isolated using Norgen's Cytoplasmic & Nuclear RNA Purification Kit is of the highest integrity and quality, with no degradation occurring. Both cytoplasmic and nuclear RNA was isolated from HeLa cells, and 10 mL of each elution was run on a 1.5% formaldehyde-agarose gel. Lane M is Norgen's 1 kb RNA Ladder, Lanes 1-3 contain nuclear RNA and Lanes 4-6 contain cytoplasmic RNA.

Norgen's Cytoplasmic & Nuclear RNA Purification Kit provides a rapid method for the isolation and purification of both cytoplasmic and nuclear RNA from cultured animal cells and small tissue samples. In certain circumstances it is desirable to isolate fractionated RNA as opposed to total RNA. For example, it may be preferable to isolate only mature, cytoplasmic RNA for some studies on expression profiling, or nuclear RNA in order to study pre-processed RNA. Furthermore, this kit can be used to isolate RNA for downstream applications where it is necessary to avoid DNA contamination, since the cytoplasmic fraction has been shown to be free of all traces of genomic DNA.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds RNA in a manner that depends on ionic concentrations. The cytoplasmic RNA is preferentially purified from the nuclear RNA and the other cellular components such as genomic DNA and proteins, without the use of phenol or chloroform. The purified RNA is of the highest quality and can be used in a number of downstream applications.

Features and Benefits

- **No genomic DNA contamination in cytoplasmic fraction** - Purified cytoplasmic RNA can be used directly in RT-PCR reactions with no DNase treatment required.
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in under 45 minutes.
- **No phenol:chloroform extractions** - Norgen's microRNA Purification Kit isolates RNA without the use of harmful chemicals such as phenol or chloroform.
- **Isolate a diversity of RNA species** - All nuclear and cytoplasmic RNA species can be isolated, from large mRNA species down to microRNA (miRNA) and small interfering RNA (siRNA).
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications relating to gene regulation and functional analysis, including northern blotting and microarray analysis.

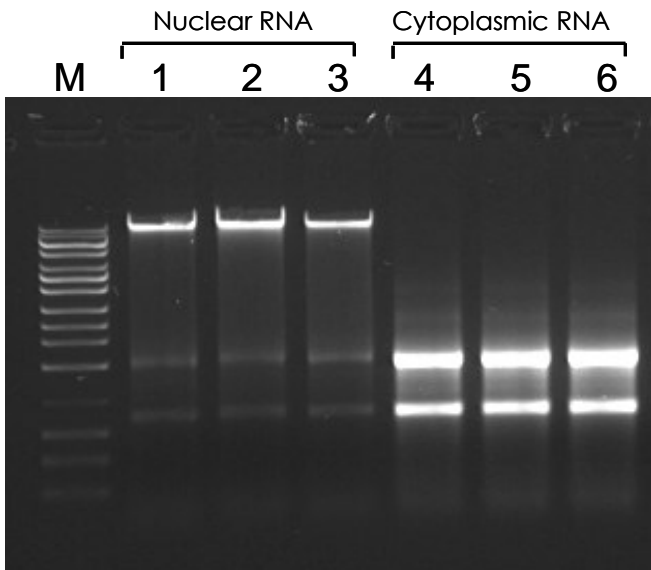


Figure 2. No Genomic DNA Contamination in Cytoplasmic Fraction
Cytoplasmic and nuclear RNA isolated from HeLa cells using Norgen's kit was run on a 1% agarose gel. Lane M is Norgen's HighRanger 1kb DNA Ladder. Genomic DNA is visible in the nuclear RNA fractions (Lanes 1-3), however no genomic DNA can be detected in the cytoplasmic RNA fractions (Lanes 4-6).

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	45 minutes
Average Yield	
HeLa (1 x 10 ⁶ cells) - Cytoplasmic	15 mg
HeLa (1 x 10 ⁶ cells) - Nuclear	3.5 mg

Ordering information

Cat #	Quantity
21000	50 preps
37400	100 preps

Single Preparation - RNA Isolation Kits

Leukocyte RNA Purification Kit

Cat. # 21200

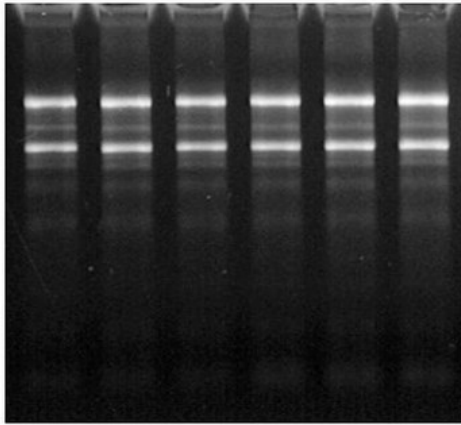


Figure 1. Consistent Isolation of High Quality Leukocyte RNA. Norgen's Leukocyte RNA Purification Kit isolates leukocyte RNA of high quality with great consistency. Total leukocyte RNA was isolated from 100 μ L of hamster blood using Norgen's Leukocyte RNA Purification Kit. A total of 6 replicates were performed, and 7 μ L of the 50 μ L purified RNA was then resolved on a 1.2% formaldehyde-agarose gel. As it can be seen, Norgen's kit not only isolated high and consistent yields of total RNA, but the RNA was also of high quality as evidenced by intactness of the major 28S and 18S rRNA.

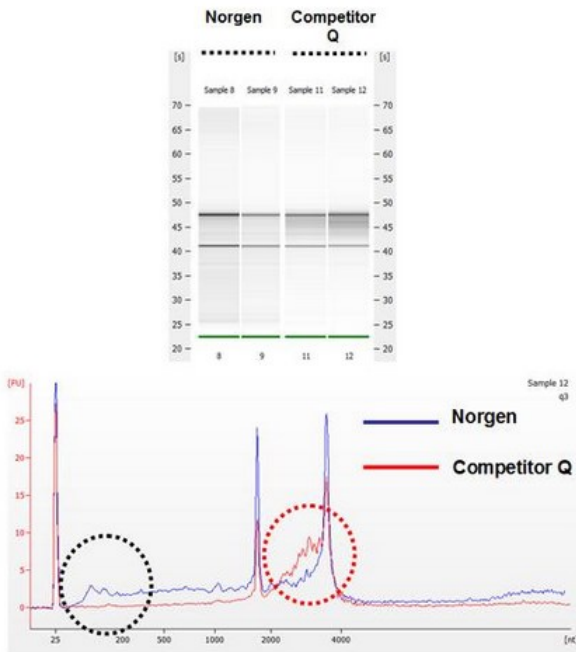


Figure 2. Higher Yield and Quality of Leukocyte RNA Isolated by Norgen's Leukocyte RNA Purification Kit. Norgen's Leukocyte RNA Purification Kit isolates Leukocyte RNA that exceeds the yield and quality of competitors. Total RNA was isolated from 200 μ L of hamster blood using Norgen's Leukocyte RNA Purification Kit and a leading competitor's kit. One microliter of the 50 μ L purified RNA was resolved on an Agilent RNA Nano 6000 chip. The gel diagram (Upper panel) and the electropherogram (Lower panel) showed better quality of RNA isolated by Norgen's kit. In particular, RNA isolated by Norgen's Leukocyte RNA Purification Kit did not have any evidence of the RNA degradation that was present in RNA isolated by the competitor's kit (Red Circle). In addition, Norgen's kit isolated higher amounts of RNA (Blue Line) with the additional recovery of small RNAs including miRNA (Black Circle) which were not present in RNA isolated by the competitor's kit.

Rapid extraction and purification of total RNA from leukocytes

Norgen's Leukocyte RNA Purification Kit provides a rapid method for the isolation and purification of total leukocyte RNA from mammalian blood samples in 40 minutes. Selective isolation of leukocyte RNA results in improved expression profiling and other downstream applications by removing the masking effects of some RNAs which are very abundant in whole blood, such as globin mRNAs. The kit is able to isolate total leukocyte RNA, including both large mRNA and all small RNA species containing microRNA (miRNA) and small silencing RNA (siRNA). The purified RNA is of the highest quality and can be used in a number of downstream applications.

Features and Benefits

- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in 40 minutes.
- **No phenol:chloroform extractions** - Norgen's Leukocyte RNA Purification Kit isolates RNA without the use of harmful chemicals such as phenol or chloroform.
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.
- **Isolate total leukocyte RNA** - All leukocyte RNA species are isolated, from large mRNA down to microRNA.
- **Fractionate leukocytes from whole blood in minutes** - Rapid removal of red blood cells from whole blood samples using differential red blood cell lysis.

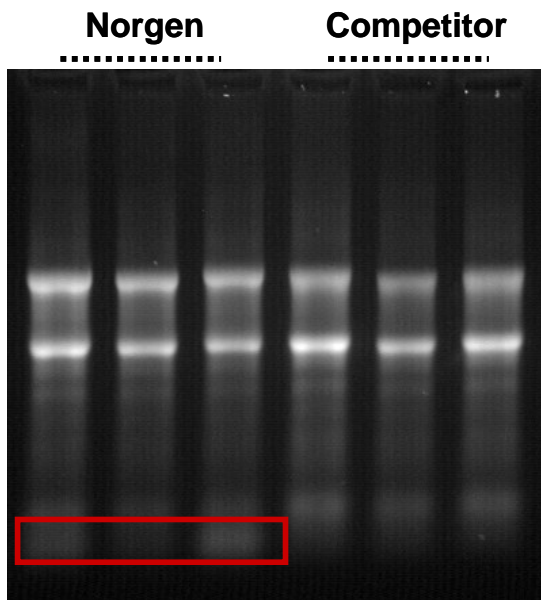
Feature	Specifications
Column binding capacity	Up to 50 μ g RNA
Maximum Loading Volume Per Spin Column	650 μ L
Size of RNA Purified	All sizes, including < 200 nt
Minimum Blood Input Volume	10 μ L
Maximum Blood Input Volume	2 mL or 3 x 10 ⁶ leukocytes
Time to Complete 10 Purifications	20 minutes
Input Type	Blood from Human, Hamster, Mouse, Rabbit and Rat
Yield from Human Blood (500 μ L)	1.5 μ g
Yield from Hamster Blood (100 μ L)	2.5 μ g
Format	Spin columns

Ordering information

Cat #	Quantity
21200	50 preps

Fatty Tissue RNA Purification Kit

Cat. # 36200



Rapid isolation and purification of total RNA including microRNA from fatty tissue samples without the use of Phenol

Norgen's Fatty Tissue RNA Purification Kit provides a rapid and optimized method for the isolation and purification of total RNA from animal tissues with high lipid content, including brain and adipose tissues. Norgen's Fatty Tissue RNA Purification Kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of inhibitory phenol or chloroform. The kit allows for convenient genomic DNA removal using a provided column. While the kit is optimized for fatty tissues, it can also be used for most mammalian tissue samples. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Figure 1. Isolate a Diversity of RNA Species

Total RNA was isolated from 25 mg samples of rat muscle using Norgen's Animal Tissue RNA Purification Kit and a leading competitor's kit. The purified RNA was then resolved on a 1.2% formaldehyde-agarose gel. As it can be seen, only Norgen's kit was able to isolate the full diversity of RNA species, including microRNA.

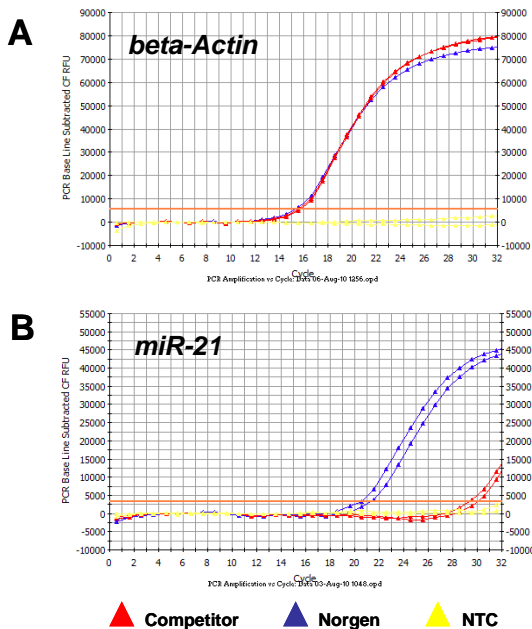


Figure 2. High Yield of a Diversity of RNA Species.

Total RNA was isolated from equal amounts of brain tissue using Norgen's Fatty Tissue RNA Purification Kit and a leading competitor's kit that involves a phenol:chloroform extraction step. The purified RNA was then used as the template in a RT-qPCR for detecting the beta-Actin gene (Panel A) and for detecting miR-21 (Panel B). In both graphs the blue lines correspond to Norgen isolated-RNA and the red lines correspond to competitor-isolated RNA. As it can be seen, Norgen's kit isolated higher yields of microRNA, as indicated by the lower Ct values of the blue lines. Also, Norgen's kit successfully isolated similar amount of large RNA to that of the competitor's kit indicating the full diversity of RNA species isolated.

Features and Benefits

- **Isolate total RNA from hard to extract fatty tissues** - Total RNA has been isolated and detected from animal tissues with high lipid content, including brain and adipose tissues.
- **Compatible with RNA preservation reagents** - Total RNA can be isolated and detected from tissues stored in RNAlater®.
- **No phenol:chloroform extractions** - Total RNA is isolated without the use of harmful chemicals like phenol or chloroform.
- **Isolate a diversity of RNA species** - All sizes of RNA can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	50 minutes
Average Yield Brain (15 mg)	15 mg

Ordering information

Cat #	Quantity
36200	25 preps

RNA, microRNA, DNA and Protein Isolation from the Same Sample

All-in-One Purification Kit (Total RNA, microRNA, total proteins and genomic DNA)

Cat. # 24200, 24210

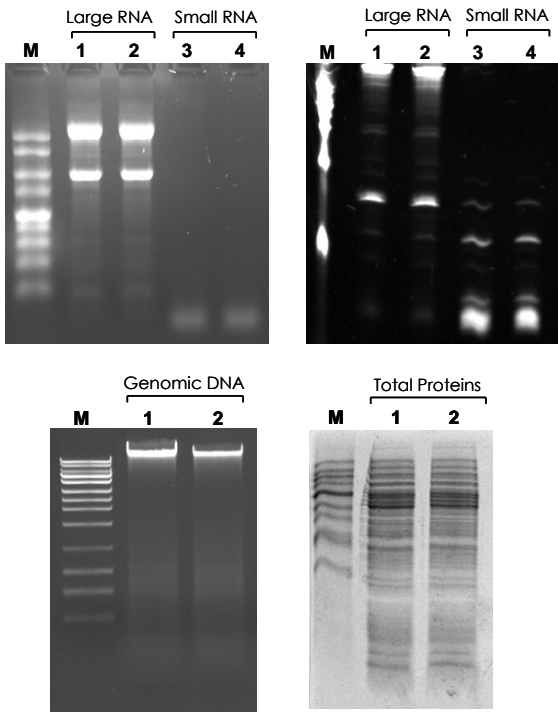


Figure 1. Sequential Isolation of microRNA, Large RNA, Genomic DNA and Proteins from 1×10^6 HeLa Cells.

Panels A and B show the separate isolation of large RNA and microRNA from 2 different samples of HeLa cells. Panel A is a 1X MOPS 1% agarose gel and Panel B is a 10% urea-PAGE gel. In both gels, Lane M is Norgen's 1Kb RNA Ladder, Lanes 1 and 2 contain 3 mL out of the 50 mL elutions of the large RNA fraction, and Lanes 3 and 4 contain 3 mL out of the 50 mL elutions of the microRNA fractions. Panel C is a 1% agarose gel showing the gDNA isolated from the same 2 HeLa cell samples. Lane M is Norgen's UltraRanger DNA Ladder and Lanes 1 and 2 contain 10 mL of each of the 100 mL elutions. Panel D is a 12% SDS-PAGE gel that contains the proteins that were isolated from the 2 HeLa cell samples. Lane M is a protein ladder and Lanes 1 and 2 contain 10 mL of the 100 mL elution of proteins that had been column purified. The large RNA, microRNA, gDNA and proteins are all intact and of the highest integrity and quality. Furthermore, the kit allows for the successful separate isolation of microRNA (<200 nt) and large RNA (>200nt).

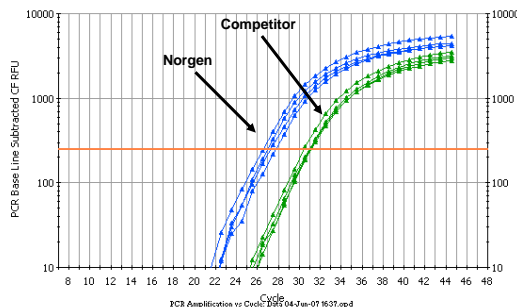


Figure 2. Isolate High Quality RNA

RNA was isolated from HeLa cells using Norgen's All-in-One Purification Kit and a leading market competitor for multiple analyte isolations. The purified RNA was used as the template in a qPCR reaction using GAPDH primers, and the results are shown in the PCR baseline graph to the left. The blue lines correspond to the PCR results when RNA isolated using Norgen's kit was used as the template, while the green lines correspond to the results when RNA isolated using the competitor's kit was used as the template. From the graph it can be seen that Norgen's kit isolated RNA with a greater sensitivity, and that more RNA was isolated from the same input as evidenced by the lower CT values for the Norgen-isolated RNA.

Sequential isolation of microRNA, large RNA, genomic DNA and proteins from the same sample

Norgen's All-in-One Purification Kit provides a rapid method for the purification of total RNA, including microRNA, genomic DNA and proteins sequentially from a single sample of cells, tissue, blood, bacteria, yeast, fungi or plants. In addition, a microRNA Enrichment Column is provided for the optional separate purification of small RNA (<200 nt), allowing for 4-in-1 purification (large RNA, genomic DNA, microRNA and proteins). This kit is an ideal all-in-one solution for researchers who are interested in the interactions of multiple disciplines including RNA interference, genomics, epigenomics, transcriptomics and proteomics. Norgen's All-in-One Purification Kit is especially useful for isolating macromolecules from precious, difficult to obtain or small samples such as needle biopsies and single foci from cell cultures, as well as for mutant analysis, RNA interference studies, cell differentiation studies and pathogen detection. Furthermore, analysis will be more reliable since the RNA, DNA and proteins are derived from the same sample without splitting, thereby eliminating inconsistent results.

Features and Benefits

- **Complete column purification** - RNA, DNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, genomic DNA and proteins from a single sample in < 40 minutes.
- **Isolate total or micro-enriched RNA** - Two different protocols are provided to isolate either total RNA, or separately isolate microRNA species (<200 nt) and large RNA species (>200 nt)
- **Process a wide range of sample types** - Isolate total RNA, genomic DNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, fungi and plants.
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 20 µg (DNA) 200 µg (Protein)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	40 minutes
Average Yield	
HeLa (1×10^6 cells) - RNA	15 mg
HeLa (1×10^6 cells) - DNA	8 mg
HeLa (1×10^6 cells) - Protein	150 mg

Ordering information

Cat #	Quantity
24200	20 preps
24210	100 preps

RNA/DNA/Protein Purification Kit

Cat. # 23500 & 24000

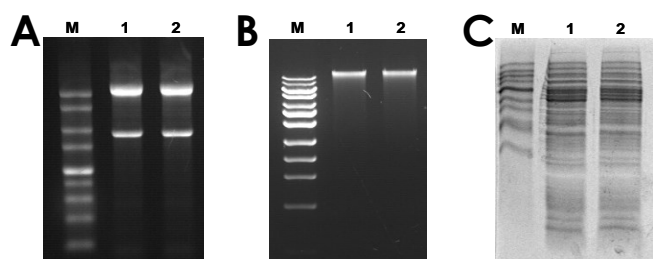


Figure 1. Sequential Isolation of Total RNA, Genomic DNA and Proteins from 5 x 10⁵ of HeLa Cells.

Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 2 different samples of HeLa cells. Lane M is Norgen's 1Kb RNA Ladder, and Lanes 1 and 2 contain 3 mL out of the 50 mL elutions. Panel B is a 1% agarose gel showing the gDNA isolated from the same 2 HeLa cell samples. Lane M is Norgen's UltraRanger DNA Ladder and Lanes 1 and 2 contain 10 mL of each of the 100 mL elutions. Panel C is a 12% SDS-PAGE gel that contains the proteins that were isolated from the 2 HeLa cell samples. Lane M is a protein ladder and Lanes 1 and 2 contain 10 mL of the 100 mL elution of proteins that had been column purified. The RNA, gDNA and proteins are all in tact and of the highest integrity and quality.

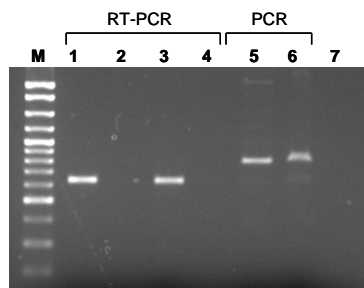


Figure 2. High Quality RNA and DNA

RNA isolated from HeLa cells was used as the template in an RT reaction with and without reverse transcriptase in the absence of DNase treatment. The RT reaction was then used in an RT-PCR to detect the GAPDH gene. There was no amplification in the absence of reverse transcriptase (Lanes 2 and 4), indicating that the RNA is free of genomic DNA. Lanes 1 and 3 contain the successful RT-PCR results when reverse transcriptase was used. Genomic DNA was also successfully used in a PCR reaction using the same set of primers to detect the GAPDH gene (Lanes 5 and 6), indicating the high quality of the isolated DNA. Lane M is Norgen's CloneSizer 100bp Ladder and Lane 7 is a control with no template. The larger PCR product in lanes 5 and 6 is due to the presence of an intron in the genomic DNA that was used as a template. Therefore RNA and DNA isolated using the kit are of a high quality and can be used in downstream applications.

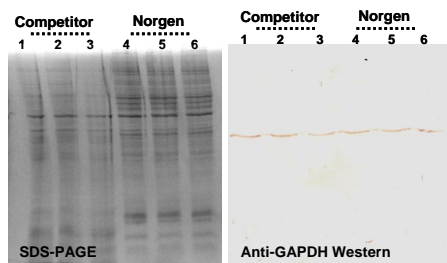


Figure 3. High Quality Total Proteins.

Proteins fraction isolated by Norgen's RNA/DNA/Protein Purification Kit and a competitor's kit were resolved on a 12% SDS-PAGE protein gel (Left). Similarly the same protein fraction was tested on a Western Immunoblotting probed with an anti-human GAPDH antibodies (Right). Proteins from both kits performed well as shown by good intense signals. However, proteins isolated with Norgen's kit showed better resolution on SDS-PAGE gel with sharper individual bands, suggesting a cleaner protein sample with less contaminants such as detergents or salts.

Sequential isolation of total RNA including microRNA, genomic DNA and proteins from the same sample

Norgen's RNA/DNA/Protein Purification Kit provides a rapid method for the isolation and purification of total RNA, genomic DNA and proteins sequentially from a single sample of cultured animal cells, tissues, blood, bacteria, yeast, fungi or plants. The total RNA, genomic DNA and proteins are all column purified in less than 30 minutes using a single column. This kit is ideal for researchers who are interested in studying the genome, proteome and transcriptome of a single sample, such as for studies of gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, studies in epigenetics, and for characterization of cultured cell lines. Norgen's RNA/DNA/Protein purification kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples, as it eliminates the need to fractionate the sample. Furthermore, analysis will be more reliable since the RNA, DNA and proteins are derived from the same sample, thereby eliminating inconsistent results.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds nucleic acids in a manner that depends on ionic concentrations, thus the RNA and DNA will bind to the column while the proteins are removed in the flowthrough. The RNA and DNA are then washed and eluted sequentially, and the column is then used to purify the proteins that are present in the flowthrough. The purified molecules are of the highest quality and are well suited for many downstream applications including PCR amplifications, RT-PCR and Real-Time PCR, as well as Southern blots, Northern blots, Western blots, cDNA synthesis, microarrays and mass spectrometry.

Features and Benefits

- **Complete column purification** - RNA, DNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, genomic DNA and proteins from a single sample in < 30 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Process a wide range of sample types** - Isolate total RNA, genomic DNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, fungi and plants.
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 20 µg (DNA) 200 µg (Protein)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
HeLa (1 x 10 ⁶ cells) - RNA	15 mg
HeLa (1 x 10 ⁶ cells) - DNA	8 mg
HeLa (1 x 10 ⁶ cells) - Protein	150 mg

Ordering information

Cat #	Quantity
24000	50 preps

RNA/DNA/Protein Purification Plus Kit

Cat. # 47800 & 47700

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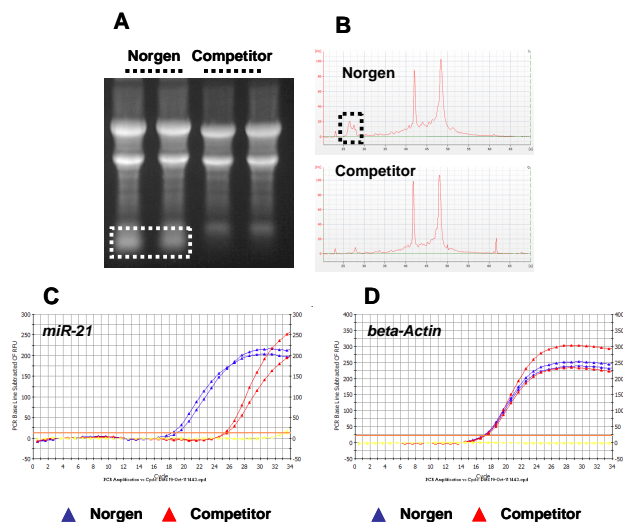


Figure 1. Recovery of True Total RNA including microRNA from Hamster Liver

Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 2 different samples of 15 mg hamster liver using either Norgen's RNA/DNA/Protein Purification Plus Kit or a competitor's multiple-analyte purification kit. Both kits isolated large RNA (represented by 28S and 18S rRNA) with high integrity but Norgen's RNA/DNA/Protein Purification Plus Kit provided the added benefit of recovering small RNA without any additional protocol. Panel B is a result from a bioanalyzer resolution of the eluted RNA. Similar to the agarose gel, Norgen's RNA/DNA/Protein Purification Plus Kit showed the added benefit of recovering small RNA. The difference in small RNA recovery was also demonstrated by gene-specific RT-qPCR. One microgram of RNA was used in RT-qPCR reactions for hamster beta-Actin (for Large RNA) and miR-21 (for microRNA) genes. The RNA isolated by Norgen's RNA/DNA/Protein Purification Plus Kit showed similar Ct value to RNA isolated by the competitor's kit for the large RNA (Panel D). However, Norgen's RNA/DNA/Protein Purification Plus Kit showed superior recovery of small RNA including microRNAs as depicted by the miR-21 RT-qPCR (Panel C)

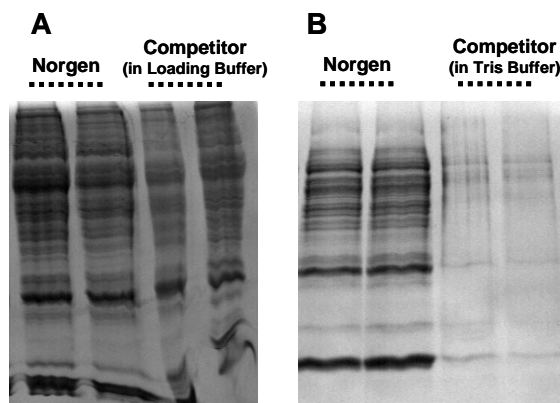


Figure 2. High Quality Total Proteins Eluted in Mass Spec-Compatible Buffer.

Protein fractions (from hamster liver) isolated by Norgen's RNA/DNA/Protein Purification Plus Kit and a competitor's kit were resolved on a 12% SDS-PAGE protein gel. Panel A showed that when the competitor's precipitated protein fraction was resuspended in a provided SDS-PAGE loading buffer, the protein recovery was similar among the two kits. Panel B showed that when the same precipitated protein fraction from the competitor's kit was resuspended in a Tris-based buffer containing no detergent or denaturant, the protein recovery became drastically reduced. In contrast, Norgen's RNA/DNA/Protein Purification Plus Kit purified proteins by column and the eluted proteins are already in a buffer compatible with most downstream applications including mass spectrophotometry as well as standard protein quantification methods (including Bradford assays).

Sequential isolation of total RNA including microRNA, genomic DNA and proteins from the same sample

Norgen's RNA/DNA/Protein Purification Plus Kit provides a rapid method for the isolation and purification of total RNA, genomic DNA and proteins sequentially from a single sample of cultured animal cells, tissues, blood, bacteria, yeast, fungi or plants. The total RNA, genomic DNA and proteins are all column purified in less than 30 minutes using a single column. This kit is ideal for researchers who are interested in studying the genome, proteome and transcriptome of a single sample, such as for studies of gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, studies in epigenetics, and for characterization of cultured cell lines. Norgen's RNA/DNA/Protein Purification Plus kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples, as it eliminates the need to fractionate the sample. Furthermore, analysis will be more reliable since the RNA, DNA and proteins are derived from the same sample, thereby eliminating inconsistent results.

Purification is based on spin column chromatography. The sample is first lysed, and the DNA is then captured and purified on a DNA Purification Column. The flowthrough of the DNA purification step is then loaded onto a RNA/Protein Purification Column. Total RNA, including microRNAs, will bind to the column while the proteins are removed in the flowthrough. The bound RNA is then washed and eluted from the column. The same RNA/Protein Purification Column is then used to purify the proteins that are present in the RNA binding flowthrough. The purified molecules are of the highest quality and are well suited for many downstream applications including PCR amplifications, RT-PCR and Real-Time PCR, as well as Southern blots, Northern blots, Western blots, cDNA synthesis, microarrays and mass spectrometry.

Features and Benefits

- **Complete column purification** - RNA, DNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, genomic DNA and proteins from a single sample in < 30 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Process a wide range of sample types** - Isolate total RNA, genomic DNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, fungi and plants.
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 20 µg (DNA) 200 µg (Protein)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
HeLa (1 x 10 ⁶ cells) - RNA	15 mg
HeLa (1 x 10 ⁶ cells) - DNA	8 mg
HeLa (1 x 10 ⁶ cells) - Protein	150 mg

Ordering information

Cat #	Quantity
47700	50 preps

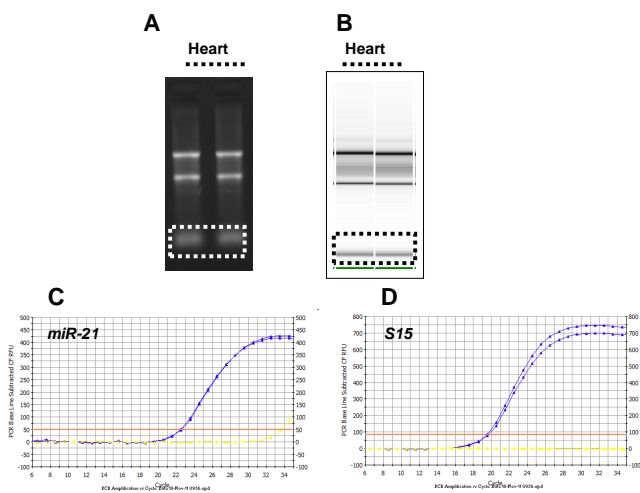


Figure 1. Recovery of True Total RNA including microRNA from Hamster Heart

Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 2 different samples of 10 mg hamster heart using Norgen's RNA/DNA Purification Kit. Norgen's RNA/DNA Purification kit isolated large RNA (represented by 28S and 18S rRNA) with high integrity. Moreover, it provided the added benefit of recovering small RNA without any additional protocol.

Panel B is a result from a bioanalyzer resolution of the eluted RNA. Similar to the agarose gel, Norgen's RNA/DNA Purification Kit showed the added benefit of recovering small RNA. The effectiveness in small RNA recovery was also demonstrated by gene-specific RT-qPCR. One microgram of RNA was used in RT-qPCR reactions for human *S15* (for Large RNA) and *miR-21* (for microRNA) genes. The RNA isolated by Norgen's RNA/DNA Purification Kit showed detection of both small RNA (**Panel C**) and the large RNA (**Panel D**).

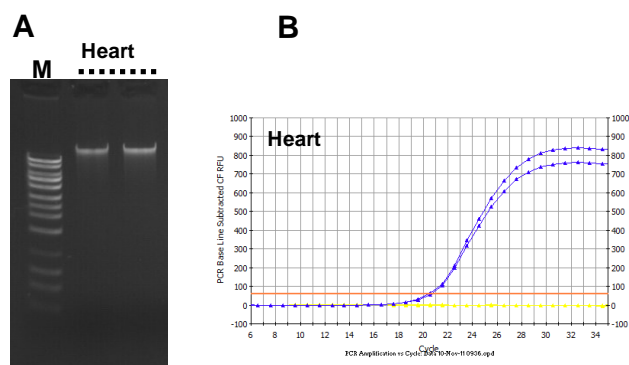


Figure 2. Recovery of Intact, High Quality Genomic DNA from Hamster Heart

Panel A is a 1% agarose gel showing the gDNA isolated from the same hamster heart samples using Norgen's RNA/DNA Purification Kit. Lane M is Norgen's HighRanger 1 kb DNA Ladder and the sample lanes contain 10 µL of each of the 100 µL elutions. The gel showed high quality, and intact genomic DNA. **Panel B** is the result of qPCR amplification of 25 ng of eluted genomic DNA using 5S rRNA-specific primers. Genomic DNA isolated using Norgen's RNA/DNA Purification Kit is of high quality with effective qPCR amplification.

Sequential isolation of total RNA including microRNA and genomic DNA from the same sample

Norgen's RNA/DNA Purification Kit provides a rapid method for the isolation and purification of total RNA and genomic DNA sequentially from a single sample of cultured animal cells, tissue samples (particularly hard-to-extract fibrous tissues), blood, bacteria, yeast, fungi or plants. The total RNA and genomic DNA are all column purified in less than 30 minutes. This kit is ideal for researchers who are interested in studying the genome and transcriptome of a single sample, such as for studies of microRNA profiling, gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, and for characterization of cultured cell lines. Norgen's RNA/DNA Purification Kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples such as biopsy materials or single foci from cell cultures, as it eliminates the need to fractionate the sample. Furthermore, analysis will be more reliable since the RNA and DNA are derived from the same sample, thereby eliminating inconsistent results. The purified macromolecules are of the highest purity and can be used in a number of different downstream applications

Purification is based on spin column chromatography. The process involves first lysing the cells or tissue of interest with the provided Lysis Solution. For hard-to-extract fibrous tissues (such as heart and muscle), an additional Proteinase K digestion step is provided for maximum recovery of the RNA and DNA. The DNA in the lysate is then captured and purified on a DNA Purification Column. Ethanol is then added to the flowthrough of the DNA purification step, and the solution is loaded onto a RNA Purification Column. The bound RNA is washed with the RNA Wash Solution and the purified RNA is eluted with the RNA Elution Solution. The kit purifies all sizes of RNA, including microRNA (miRNA) and small interfering RNA (siRNA). The purified RNA is of the highest integrity and can be used applications including reverse transcription PCR, Northern blotting and expression array assays. The genomic can be used in PCR reactions, sequencing, Southern blotting, methylation studies and SNP analysis.

Features and Benefits

- **Complete column purification** - RNA and DNA are all column purified without the use of phenol or chloroform.
- **Fast and easy processing** - Isolate microRNA, large RNA, genomic DNA and proteins from a single sample in < 30 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Isolate from hard-to-extract samples** - Proteinase K is provided for hard-to-extract fibrous tissue samples
- **Reduce variability** - RNA and DNA are isolated from a single sample with no splitting, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 20 µg (DNA)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
Liver (15 mg) - RNA	30 - 35 mg
Liver (15 mg) - DNA	4 - 6 mg

Ordering information

Cat #	Quantity
48700	50 preps

RNA, microRNA, DNA and Protein Isolation from the Same Sample

RNA/Protein Purification Kit

Cat. # 23000 & 24100

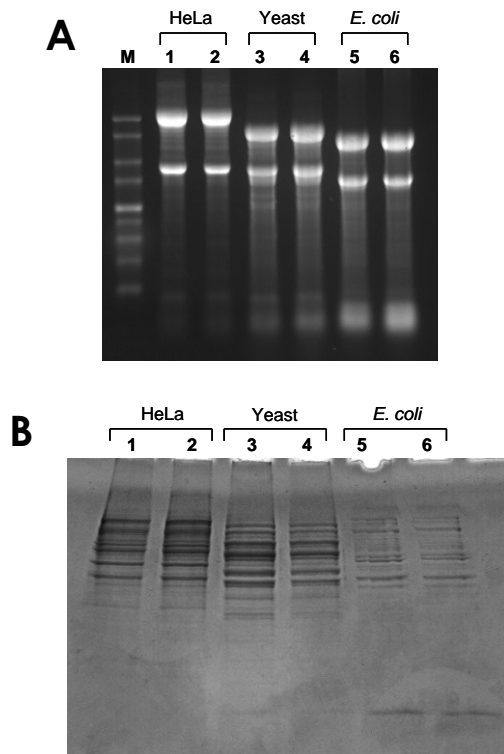


Figure 1. Simultaneous Isolation of RNA and Proteins from HeLa cells, yeast cells and E. coli

Total RNA and total proteins were isolated simultaneously from 10^6 HeLa cells, 5×10^6 yeast cells and 5×10^7 E coli cells using Norgen's kit. **Panel A** is a 1X MOPS 1.5% agarose gel showing the total RNA. Lane M is Norgen's 1 kb RNA Ladder, Lanes 1 and 2 contain 10 mL of the elution from the HeLa cells, Lanes 3 and 4 contain 3 mL of the elutions for the yeast cells, and Lanes 5 and 6 contain 3 mL of the elutions for the E. coli cells. **Panel B** is a 10% SDS-PAGE gel containing the total proteins that were isolated. In each case, 25 mL out of the elutions was loaded. Lanes 1 and 2 contain the HeLa proteins, Lanes 3 and 4 contain the yeast proteins and Lanes 5 and 6 contain the E. coli proteins. The RNA and proteins are intact and of the highest quality, and can be used in a number of different downstream applications.

Sequential isolation of total RNA including microRNA and proteins from the same sample

Norgen's RNA/Protein Purification Kit provides a rapid method for the isolation and purification of total RNA and total proteins simultaneously from a single sample of cultured animal cells, tissues, blood, bacteria, yeast or fungi. The total RNA and proteins are both column purified in less than 25 minutes using the same column. The simultaneous isolation of the RNA and proteins from the same sample not only saves time, but will also be of a great benefit when isolating RNA and proteins from precious, difficult to obtain or very small samples. Furthermore, gene expression analysis will be more reliable since the RNA and proteins are derived from the same sample, therefore eliminating inconsistent results and variability.

With Norgen's RNA/Protein Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds nucleic acids in a manner that depends on ionic concentrations, thus the RNA will bind to the column while the proteins are removed in the flowthrough. After the RNA is washed and eluted from the column, the column is then used to purify the proteins that are present in the flowthrough. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays. The purified proteins can also be used in a number of different downstream applications including SDS-PAGE analysis, Western blots and mass spectrometry.

Features and Benefits

- **Complete column purification** - RNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, and proteins from a single sample in < 25 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Process a wide range of sample types** - Isolate total RNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, plant and fungi.
- **Reduce variability** - RNA and proteins are isolated from a single sample with no splitting, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 200 µg (Protein)
Maximum Column Loading Volume	650 mL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	25 minutes
Average Yield	
HeLa (1×10^6 cells) - RNA	15 mg
HeLa (1×10^6 cells) - Protein	150 mg

Ordering information

Cat #	Quantity
24100	50 preps

RNA/Protein Purification Plus Kit

Cat. # 48100 & 48200

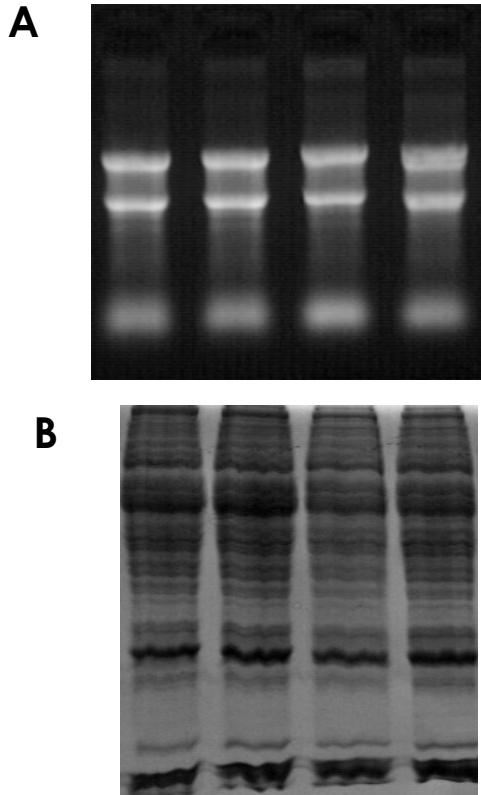


Figure 1. Recovery of True Total RNA and High Quality Proteins from Hamster Liver

Total RNA (Panel A) and proteins (Panel B) were isolated from 10 mg hamster liver samples using Norgen's RNA/Protein Purification Plus Kit. The kit isolated both large RNA (represented by the 28S and 18S rRNA) as well as many small RNA species with a high integrity, as can be seen in the 1X MOPS 1% agarose gel in Panel A. Panel B is a 12% SDS-PAGE gel showing the total proteins isolated from the liver samples. The proteins are eluted into a buffer which is compatible with many downstream applications including mass spectrometry as well as standard protein quantification methods (including Bradford assays). In contrast, most competing multiple analyte isolation products require protein precipitation and the precipitated proteins are required to be resuspended in buffer with high-detergent content (such as SDS-PAGE loading dye) for full recovery.

Sequential isolation of total RNA including microRNA and proteins from the same samples

Norgen's RNA/Protein Purification Plus Kit provides a rapid method for the isolation and purification of total RNA and proteins sequentially from a single sample of cultured animal cells, tissue samples, blood, bacteria, yeast, fungi or plants. The total RNA and proteins are all column purified in less than 30 minutes. This kit allows for rapid, efficient, non-enzymatic removal of contaminating DNA using the provided gDNA Removal Columns. The kit is ideal for researchers who are interested in studying the genome, proteome and transcriptome of a single sample, such as for studies of microRNA profiling, gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, and for characterization of cultured cell lines.

Purification is based on spin column chromatography. The sample is first lysed, and the DNA is then eliminated using a Genomic DNA Removal Column. The flowthrough of the DNA removal step is then loaded onto a RNA/Protein Purification Column. Total RNA, including microRNAs, will bind to the column while the proteins are removed in the flowthrough. The bound RNA is then washed and eluted from the column. The same RNA/Protein Purification Column is then used to purify the proteins that are present in the RNA binding flowthrough. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis. The purified proteins can also be used in a number of different downstream applications, such as SDS-PAGE analysis and Western blots.

Features and Benefits

- **Complete column purification** - RNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, and proteins from a single sample in < 25 minutes.
- **Efficient genomic DNA removal** - Non-enzymatic, rapid removal of genomic DNA using a gDNA Removal Column
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Process a wide range of sample types** - Isolate total RNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, plant and fungi.
- **Reduce variability** - RNA and proteins are isolated from a single sample with no splitting, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 200 µg (Protein)
Maximum Column Loading Volume	650 mL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	25 minutes
Average Yield	
Hamster Liver (15 mg) - RNA	30 - 35 mg
Hamster Liver (15 mg) - Protein	100 - 150 mg

Ordering information

Cat #	Quantity
48200	50 preps

FFPE RNA Purification Kit

Cat. # 25300

FFPE RNA Purification Kit Dx

Cat. # Dx25300

CE-certified kit for in-vitro diagnostic purposes - not available in all regions



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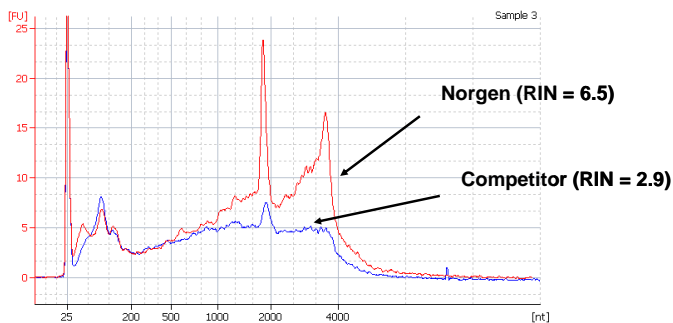


Figure 1. High Quality and Yield of Total RNA
Total RNA was isolated from equal amounts of an FFPE tissue sample using Norgen's FFPE RNA Purification Kit and a leading competitor's kit. The purified RNA was then resolved on an Agilent BioAnalyzer. As it can be seen, Norgen not only isolated higher yields of total RNA, but the RNA was also of a higher quality as evidenced by the higher RIN values obtained with Norgen's RNA.

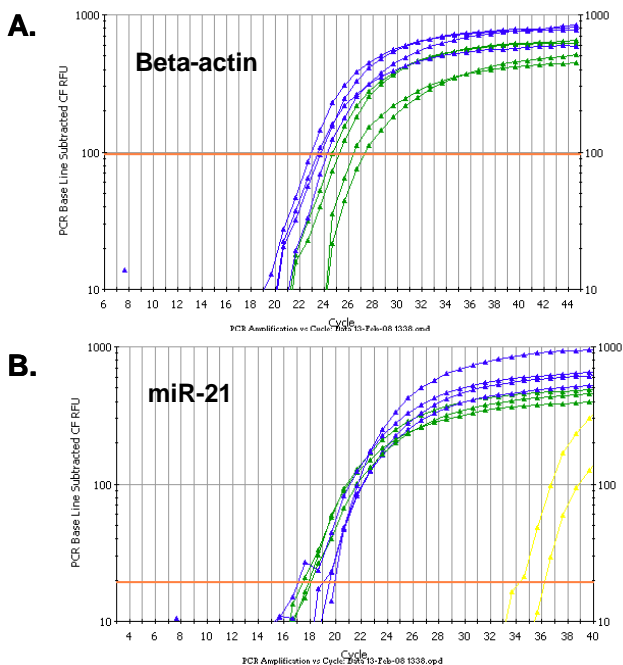


Figure 2. High Yield of a Diversity of RNA Species
Total RNA was isolated from equal amounts of an FFPE tissue sample using Norgen's FFPE RNA Purification Kit and a leading competitor's kit. The purified RNA was then used as the template in a RT-qPCR for detecting the beta-actin gene (Panel A) and for detecting miR-21 (Panel B). In both graphs the blue lines correspond to Norgen isolated-RNA and the green lines correspond to competitor-isolated RNA. As it can be seen, Norgen's kit isolated higher yields of RNA in both cases, as indicated by the lower C_t values of the blue lines. Also, Norgen's kit successfully isolated not only large RNA (Panel A) but also microRNA (Panel B), indicating the diversity of RNA species isolated.

Rapid isolation and purification of total RNA including microRNA from FFPE samples

Norgen's FFPE RNA Purification Kit provides a rapid method for the isolation and purification of total RNA (including microRNA) from formalin-fixed paraffin-embedded (FFPE) tissue samples. Using formalin to fix tissues leads to crosslinking of the RNA and proteins, and the process of embedding the tissue samples can also lead to fragmentation of the RNA over time. Norgen's FFPE RNA Purification Kit provides conditions that allow for the partial reversing of the formalin modifications, resulting in a high quality and yield of RNA. The kit is able to purify all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), depending on the age of the FFPE tissue as fragmentation of the RNA is known to occur over time.

With Norgen's FFPE RNA Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components without the use of phenol or chloroform. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including qRT-PCR, reverse transcription PCR, primer extension, expression array assays, and microarray analyses.

Features and Benefits

- **High quality and integrity of the isolated RNA** - The purified total RNA is of the highest quality and integrity, and can be used in any sensitive downstream applications.
- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **High yields** - Norgen's FFPE RNA Purification Kit allows for the purification of high yields of total RNA.
- **No phenol:chloroform extractions** - Total RNA is isolated from FFPE tissue samples without the use of harmful chemicals such as phenol or chloroform.
- **Rapid procedure** - Isolate total RNA from FFPE tissue sections using a rapid spin column or 96-well format.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	85 minutes
Maximum Amount of Starting Material	5 sections ≤20 mM thick 25 mg of unsectioned block

Ordering information

Cat #	Quantity
25300	50 preps
Dx25300	50 preps

Total RNA Extraction and Purification (including microRNA)

Total RNA Purification Micro Kit

Cat. # 35300

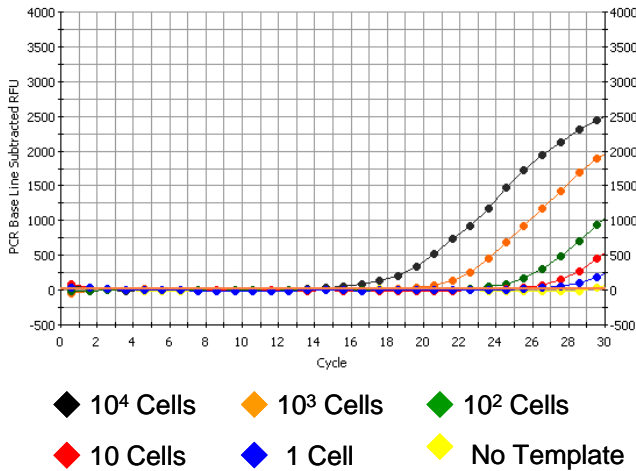


Figure 1. Great Isolation Sensitivity.

Norgen's Total RNA Purification Micro Kit allows sensitive RNA extraction from as little as a single cell. Total RNA was extracted from a decreasing number of HeLa cells. Five μ L of the eluted RNA was used as the template in a 20 μ L RT-qPCR reaction to detect the human S14 transcript. The S14 was detected from as little as a single cell.

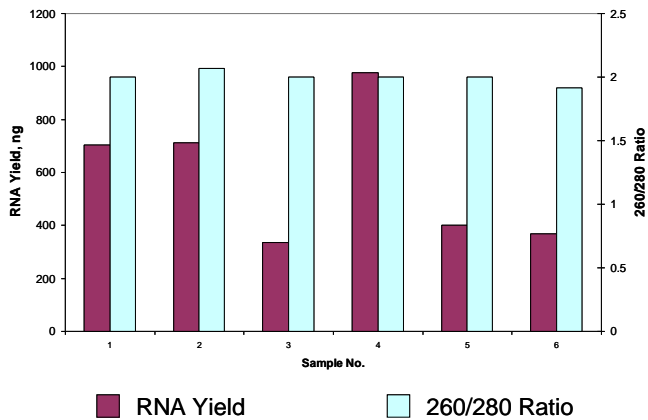


Figure 2. High Quality RNA Isolated from Laser-Captured Microdissection (LCM).

Norgen's Total RNA Purification Micro Kit allows sensitive but high quality RNA extraction from small inputs such as Laser-Captured Microdissection (LCM). Total RNA was isolated from 6 different LCM samples. RNA yield and quality (260/280 ratio) were assessed by NanoVue spectrophotometry. Norgen's Total RNA Purification Kit recovered good amounts of RNA with excellent 260/280 ratio.

Rapid isolation and purification of total RNA including microRNA from small samples without the use of Phenol

Norgen's Total RNA Purification Micro Kit provides a rapid method for the isolation and purification of total RNA from small input amounts of cultured animal cells, tissue samples, and microdissected samples including laser-capture microdissection (LCM). The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of phenol or chloroform.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components such as proteins. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA)
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in under 20 minutes.
- **No phenol:chloroform extractions** - Total RNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Ideal for small samples** - Isolate total RNA from small input amounts of cultured animal cells, tissue samples, and LCM samples. Total RNA has been isolated and detected from as little as a single animal cell.
- **Small elution volumes** - The special design of the micro spin-column allows a small elution volume of as little as 20 μ L.

Feature	Specifications
Maximum Column Binding Capacity	35 μ g
Maximum Column Loading Volume	650 μ L
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Minimum Elution Volume	20 μ L
Time to Complete 10 Purifications	20 minutes
Average Yield HeLa Cells (1 x 10 ⁵ cells)	1.5 mg

Ordering information

Cat #	Quantity
35300	50 preps

Total RNA Extraction and Purification (including microRNA)

Single Cell RNA Purification Kit

Cat. # 51800

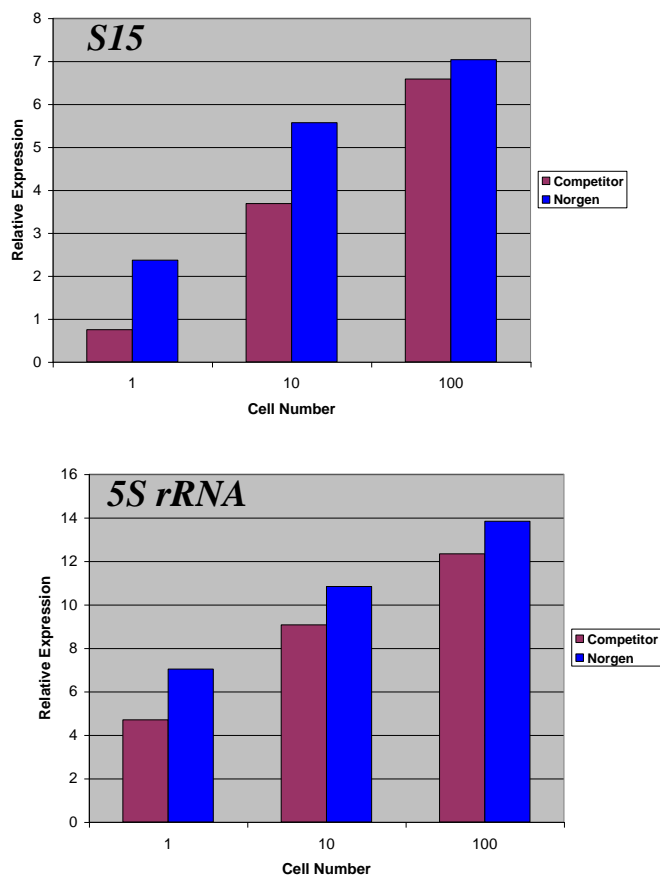


Figure 1. Better Efficiency of RNA Recovery at Single Cell Input.

Norgen's Single Cell RNA Purification Kit allows sensitive RNA extraction from as little as a single cell and outperforms competitor's kit that claim similar sensitivity. Total RNA was extracted from a decreasing number of HeLa cells using Norgen's Single Cell RNA Purification Kit and a competitor's spin column purification kit. The extracted RNA was subjected to RT-qPCR to detect the human S15 and 5S rRNA transcript in the isolated RNA. RNA isolated by Norgen's Single Cell RNA Purification Kit showed much higher relative expression of each RNA transcript tested at all cell input number down to single cell.

Rapid purification of total RNA including microRNA from as little as a single cell without the use of Phenol

Norgen's Single Cell RNA Purification Kit provides a rapid and sensitive method for the isolation and purification of total RNA from small input amounts of cultured animal cells, sorted cells, and microdissected samples including laser-capture microdissection (LCM). The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The RNA is preferentially purified from other cellular components such as proteins without the use of phenol or chloroform. The special design of the micro spin-column allows a small elution volume of as little as 10 μ L.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components such as proteins. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA)
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in under 20 minutes.
- **No phenol:chloroform extractions** - Total RNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Ideal for small samples** - Isolate total RNA from small input amounts of cultured animal cells, tissue samples, and LCM samples. Total RNA has been isolated and detected from as little as a single animal cell.
- **Small elution volumes** - The special design of the micro spin-column allows a small elution volume of as little as 10 μ L.

Feature	Specifications
Maximum Column Binding Capacity	35 μ g
Maximum Column Loading Volume	650 μ L
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Minimum Elution Volume	10 μ L
Time to Complete 10 Purifications	20 minutes
Average Yield HeLa Cells (1 x 10 ⁵ cells)	1.5 mg

Ordering information

Cat #	Quantity
51800	50 preps

RNA Clean-up and Concentration Kit

Cat. # 23600 & 43200

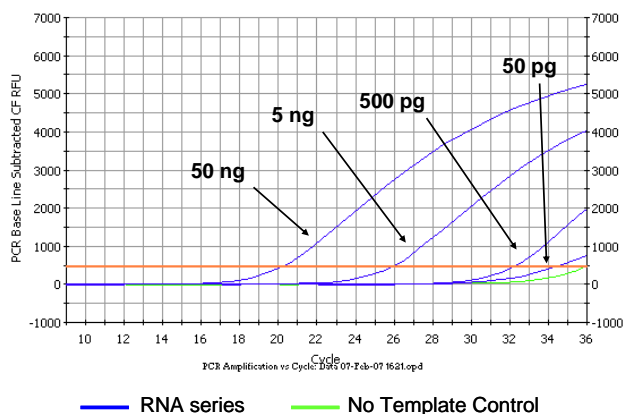


Figure 1. Concentration and Detection of Increasing Amounts of HeLa RNA

Increasing amounts of HeLa RNA in 50 µL input volumes were concentrated to 20 µL using Norgen's RNA Clean-Up and Concentration Micro Kit. A 10 µL aliquot of the purified RNA was then used as the template in a qRT-PCR reaction to detect the S14 gene. The amounts indicated on the graph correspond to the amount of RNA that was used as the input for the qRT-PCR reaction, demonstrating the consistent performance of the kit even in the picogram range.

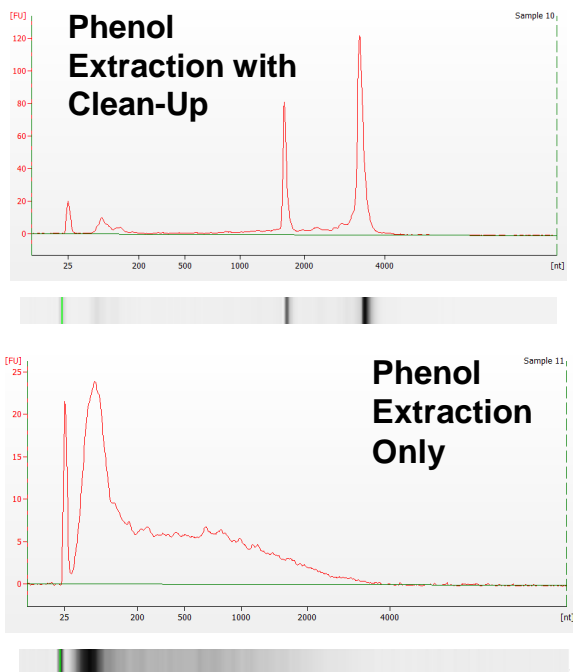


Figure 2. Effective Clean-Up to Produce High Quality Total RNA Compatible to Bioanalyzer Analysis.

Total RNA was isolated from HeLa cells using a competitor's phenol-based RNA extraction reagent. The resulting RNA was then purified using Norgen's RNA Clean-Up and Concentration Kit. Resolution of 1 µL of the 50 µL purified RNA on an Agilent RNA Nano 6000 Chip showed that without clean-up, the RNA sample isolated using the phenol-based RNA extraction reagent only resolved poorly on a bioanalyzer. In contrast, RNA extracted with the phenol-based RNA extraction reagent followed by clean-up by Norgen's RNA Clean-Up and Concentration Kit resolved properly on the bioanalyzer showing excellent quality.

Rapid clean-up and concentration of Total RNA including microRNA from different enzyme reactions or phenol:chloroform extraction

Norgen's RNA Clean-Up and Concentration Micro Kit provides a rapid method for the purification, cleanup and concentration of up to 35 mg of RNA isolated using various methods, including phenol/guanidine-based protocols, and from upstream enzymatic reactions such as DNase treatment, labeling and in vitro transcription. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other reaction components such as proteins, RNases and nucleotides, without the use of phenol or chloroform. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including end-point or quantitative reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Efficient clean-up from various enzymatic reactions** - RNA clean-up from upstream enzymatic applications such as labeling, DNase treatment and in vitro transcription. Remove proteins, RNases, DNases, nucleotides, etc.
- **Clean-up and concentration of RNA isolated by different methods** - RNA that has been isolated using various methods, including phenol-chloroform extractions or alcohol precipitations, can be processed with this kit.
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 10 samples in 20 minutes.
- **No phenol:chloroform extractions** - Norgen's RNA Clean-Up and Concentration Micro Kit purifies RNA without the use of harmful chemicals such as phenol or chloroform.
- **Isolate all small RNA molecules** - All small RNA species can be isolated including miRNA, siRNA, tRNA, and 5S rRNA.
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications relating to gene regulation and functional analysis, including northern blotting and microarray analysis.

Feature	Specifications
Maximum Column Binding Capacity	35 µg
Average Recovery	≥ 90%
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Minimum Elution Volume	20 µL
Time to Complete 10 Purifications	20 minutes

Ordering information

Cat #	Quantity
23600	50 preps
43200	100 preps

RNA, microRNA, DNA and Protein Isolation from the Same Sample

RNA/DNA Purification Micro Kit

Cat. # 50300

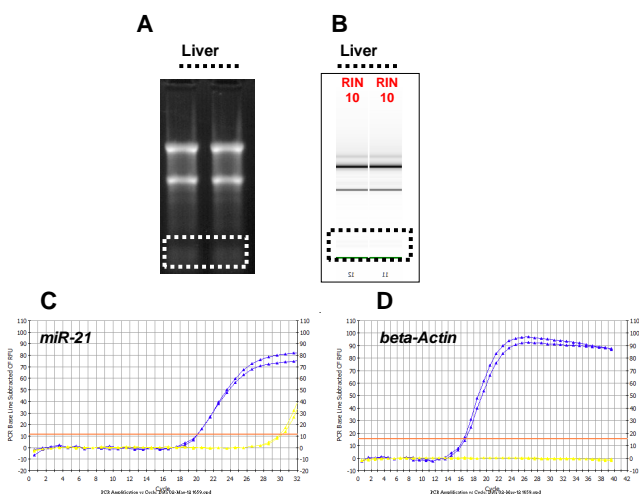


Figure 1. Recovery of True Total RNA including microRNA from Hamster Liver

Panel A is a 1X MOPS 1% agarose gel showing 3 mL of 20 mL eluted RNA that was isolated from 2 different samples of 5 mg hamster liver using Norgen's RNA/DNA Purification Micro Kit. Norgen's RNA/DNA Purification Micro Kit isolated large RNA (represented by 28S and 18S rRNA) with high integrity. Moreover, it provided the added benefit of recovering small RNA without any additional protocol. Panel B is a result from a bioanalyzer resolution of the eluted RNA. Similar to the agarose gel, Norgen's RNA/DNA Purification Micro Kit showed the added benefit of recovering small RNA while isolating very high quality RNA. The effectiveness in small RNA recovery was also demonstrated by gene-specific RT-qPCR. One microgram of RNA was used in RT-qPCR reactions for *beta-Actin* (for Large RNA) and *miR-21* (for microRNA) genes. The RNA isolated by Norgen's RNA/DNA Purification Micro Kit showed detection of both small RNA (Panel C) and the large RNA (Panel D).

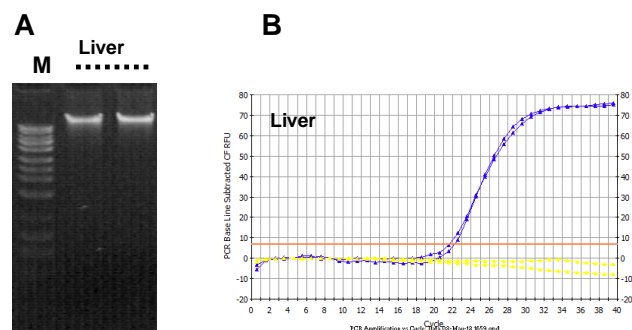


Figure 2. Recovery of Intact, High Quality Genomic DNA from Hamster Liver

Panel A is a 1% agarose gel showing the gDNA isolated from the same hamster liver samples using Norgen's RNA/DNA Purification Micro Kit. Lane M is Norgen's HighRanger 1 kb DNA Ladder and the sample lanes contain 3 µL of each of the 20 µL elutions. The gel showed high quality, and intact genomic DNA. Panel B is the result of qPCR amplification of 25 ng of eluted genomic DNA using 5S rRNA-specific primers. Genomic DNA isolated using Norgen's RNA/DNA Purification Micro Kit is of high quality with effective qPCR amplification.

Sequential isolation of total RNA including microRNA and genomic DNA from small, precious samples

Norgen's RNA/DNA Purification Micro Kit provides a rapid method for the isolation and purification of total RNA and genomic DNA sequentially from a single sample of cultured animal cells, tissue samples (particularly hard-to-extract fibrous tissues) or blood. The total RNA and genomic DNA are both column purified in less than 30 minutes. The purified RNA and DNA fractions can be eluted in as little as 20 µL. This kit is ideal for researchers who are interested in studying the genome and transcriptome of a single sample, such as for studies of microRNA profiling, gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, and for characterization of cultured cell lines. Norgen's RNA/DNA Purification Micro Kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples such as biopsy materials or single foci from cell cultures, as it eliminates the need to fractionate the sample. Furthermore, analysis will be more reliable since the RNA and DNA are derived from the same sample, thereby eliminating inconsistent results.

Purification is based on spin column chromatography. The sample is first lysed, and the DNA is then captured and purified on a gDNA Purification Micro Column. The flowthrough of the DNA purification step is then loaded onto a RNAPurification Micro Column. Total RNA, including microRNAs, will bind to the column while the proteins are removed in the flowthrough. The bound RNA is then washed and eluted from the column. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). Both RNA and DNA fractions can be eluted in as little as 20 µL, resulting in a higher concentration of nucleic acids. The purified RNA can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and expression array assays. The genomic DNA can be used in PCR reactions, sequencing, Southern blotting, methylation studies and SNP analysis

Features and Benefits

- **Complete column purification** - RNA and DNA are all column purified without the use of phenol or chloroform.
- **Fast and easy processing** - Isolate microRNA, large RNA and genomic DNA from a single sample in < 30 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Small elution volumes** - Small elution volume results in a higher concentration of eluted RNA/DNA/Protein
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	35 µg (RNA) 10 µg (DNA)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
Liver (5 mg) - RNA	10 - 12 mg
Liver (5 mg) - DNA	1 - 2 mg

Ordering information

Cat #	Quantity
50300	50 preps

RNA/DNA/Protein Purification Plus Micro Kit

Cat. # 51600

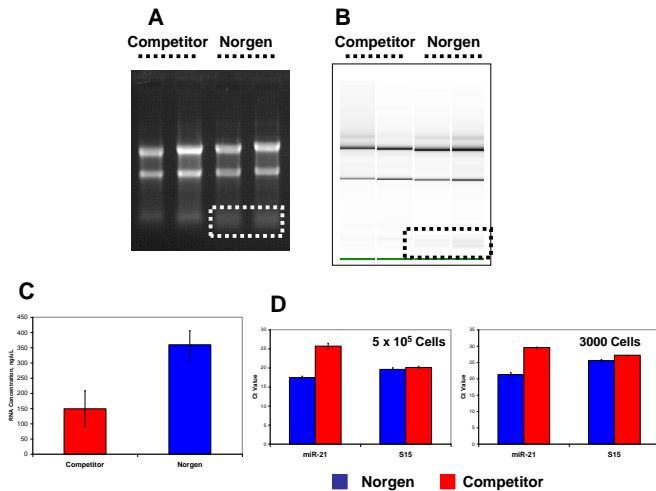


Figure 1. Recovery of True Total RNA including microRNA from HeLa Cells
 Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 2 different samples of ~500,000 HeLa cells using either Norgen's RNA/DNA/Protein Purification Plus Micro Kit or a competitor's multiple-analyte purification kit. Both kits isolated large RNA (represented by 28S and 18S rRNA) with high integrity but Norgen's RNA/DNA/Protein Purification Plus Micro Kit provided the added benefit of recovering small RNA without any additional protocols. Panel B is a result from a bioanalyzer resolution of the eluted RNA. Similar to the agarose gel, Norgen's RNA/DNA/Protein Purification Plus Micro Kit showed the added benefit of recovering small RNA as well as a much higher concentration of RNA (Panel C). The difference in small RNA recovery was also demonstrated by gene-specific RT-qPCR. Two microliters of RNA isolated from both 500,000 and 3,000 HeLa cells were used in RT-qPCR reactions for human S15 (for Large RNA) and miR-21 (for microRNA) genes. The RNA isolated by Norgen's RNA/DNA/Protein Purification Plus Micro Kit showed similar or better (lower) Ct value than RNA isolated by the competitor's kit for the large RNA. More importantly, Norgen's RNA/DNA/Protein Purification Plus Micro Kit showed superior recovery of small RNA including microRNAs as depicted by the miR-21 RT-qPCR (Panel D)

Sequential isolation of total RNA including microRNA, genomic DNA and proteins from small, precious samples

Norgen's RNA/DNA/Protein Purification Plus Micro Kit provides a rapid method for the isolation and purification of total RNA, genomic DNA and proteins sequentially from a single sample of cultured animal cells, small tissue samples, microdissected samples including laser-capture microdissection (LCM), blood, fungi or plants. The total RNA, genomic DNA and proteins are all column purified in less than 30 minutes. The RNA and DNA can be eluted in as little as 20 mL while the protein can be eluted in as little as 50 mL. This kit is ideal for researchers who are interested in studying the genome, proteome and transcriptome of a single sample, such as for studies of microRNA profiling, gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, and for characterization of cultured cell lines. This kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples as it eliminates the need to fractionate the sample. Analysis will be more reliable since the RNA, DNA and proteins are derived from the same sample, thereby eliminating inconsistent results. The purified macromolecules are of the highest purity and can be used in a number of different downstream applications.

Purification is based on spin column chromatography. The sample is first lysed, and the DNA is then captured and purified on a gDNA Purification Micro Column. The flowthrough of the DNA purification step is then loaded onto a RNA/Protein Purification Micro Column. Total RNA, including microRNAs, will bind to the column while the proteins are removed in the flowthrough. The bound RNA is then washed and eluted from the column. The same RNA/Protein Purification Micro Column is then used to purify the proteins that are present in the RNA binding flowthrough. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).

Features and Benefits

- **Complete column purification** - RNA, DNA and proteins are all column purified without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, genomic DNA and proteins from a single sample in < 30 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Small elution volumes** - Small elution volume results in a higher concentration of eluted RNA/DNA/Protein
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

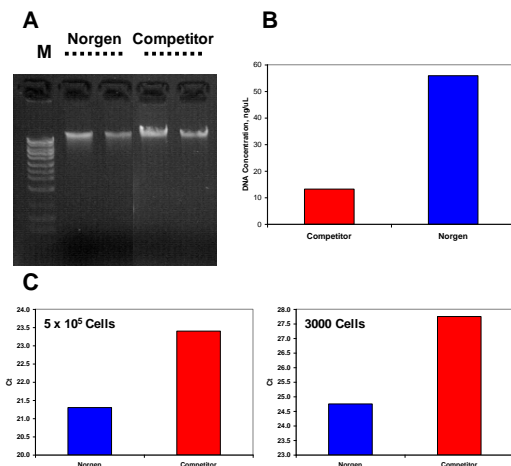


Figure 2. Recovery of Intact, High Quality Genomic DNA from HeLa Cells
 Panel A is a 1% agarose gel showing equal amount of gDNA isolated from the same HeLa cell using Norgen's RNA/DNA/Protein Purification Plus Micro Kit or competitor's multiple-analyte purification kit. Lane M is Norgen's HighRanger 1 kb DNA Ladder. The gel showed high quality, and intact genomic DNA, with a better DNA concentration using Norgen's RNA/DNA/Protein Purification Plus Micro Kit (Panel B). Panel C is the result of qPCR amplification of 2 mL of eluted genomic DNA using 5S rRNA-specific primers. Genomic DNA isolated using Norgen's RNA/DNA/Protein Purification Plus Micro Kit is of high quality and performed better than competitor's product.

Feature	Specifications
Maximum Column Binding Capacity	35 µg (RNA) 10 µg (DNA) 100 µg (Protein)
Size of DNA Purified	≥ 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	30 minutes
Average Yield	
HeLa (5 x 10 ⁵ cells) - RNA	7.5 mg
HeLa (5 x 10 ⁵ cells) - DNA	1-2 mg
HeLa (5 x 10 ⁵ cells) - Protein	70 mg

Ordering information

Cat #	Quantity
51600	50 preps

Total RNA Extraction and Purification (including microRNA)

Total RNA Purification Maxi Kit

Cat. # 26800

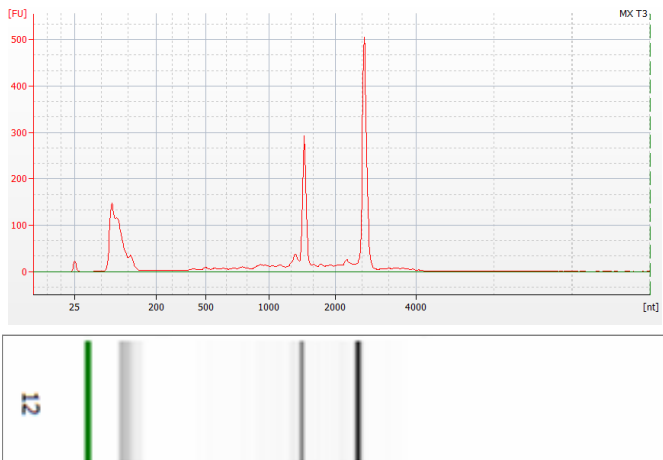


Figure 1. Isolate a Diversity of RNA Species

Total RNA was isolated from 10 mL of an overnight *E. coli* culture using Norgen's Total RNA Purification Maxi Kit. One microliter of the 2 mL elution was analyzed on an Agilent® 2100 BioAnalyzer RNA Nano 6000 chip. As it can be seen, high quality total RNA was isolated with minimal degradation. As well, a large amount of small RNA (<200 nt) was recovered, indicating that the kit is able to isolate a diversity of RNA species.

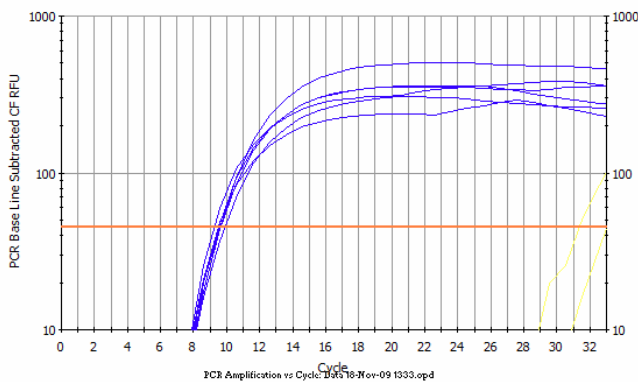


Figure 2. Good Amplification and Consistency of Isolation

Norgen's Total RNA Purification Maxi Kit was used to isolate total RNA from six different overnight samples of *E. coli* (10 mL samples). One microgram of each sample was then used as the template in an RT-qPCR reaction using 16s rRNA primers specific to *E. coli*. As it can be seen, the RNA was detected and successfully amplified in all cases. Furthermore, all samples showed a similar CT value, indicating consistent isolation.

Rapid isolation and purification of total RNA including microRNA without the use of Phenol

Norgen's Total RNA Purification Maxi Kit provides a rapid method for the isolation and purification of total RNA from cultured animal cells, tissue samples, blood, bacteria, yeast, fungi, plants and viruses. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of phenol or chloroform.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components such as proteins. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA)
- **Fast and easy processing** - Rapid spin-column format allows for the processing of 4 samples in under 40 minutes.
- **No phenol:chloroform extractions**- Total RNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Isolate total RNA from a wide variety of sources** - Isolate total RNA from cultured animal cells, tissue samples, blood, bacteria, yeast, fungi, plants and viruses.
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

Feature	Specifications
Maximum Column Binding Capacity	1.5 mg
Maximum Column Loading Volume	20 mL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 4 Purifications	40 minutes
Average Yield	
HeLa Cells (5 x 10 ⁷ cells)	750 mg
<i>E. coli</i> (2.5 x 10 ¹⁰ cells)	1.5 mg

Ordering information

Cat #	Quantity
26800	8 preps

Total RNA Purification 96-Well Kit

Cat. # 24300

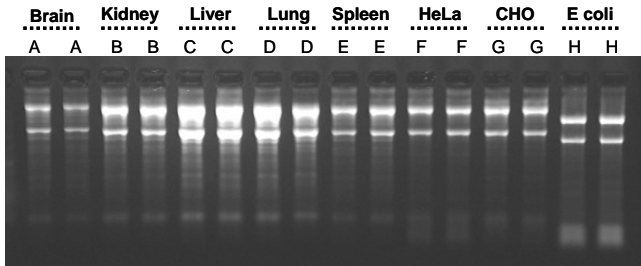


Figure 1. Isolate Total RNA from a Diversity of Species. Total RNA was isolated from 8 mg of brain (Lanes A), kidney (Lanes B), liver (Lanes C), lung (Lanes D) and spleen tissue (Lanes E), 7.5×10^5 HeLa (Lanes F) and CHO cells (Lanes G), and 5×10^8 bacteria (Lanes H) using Norgen's Total RNA Purification 96-Well Kit. From observing the formaldehyde-agarose gel, it can be seen that Norgen's kit can be used to successfully isolate total RNA, including small RNA species, from a broad range of sample types.

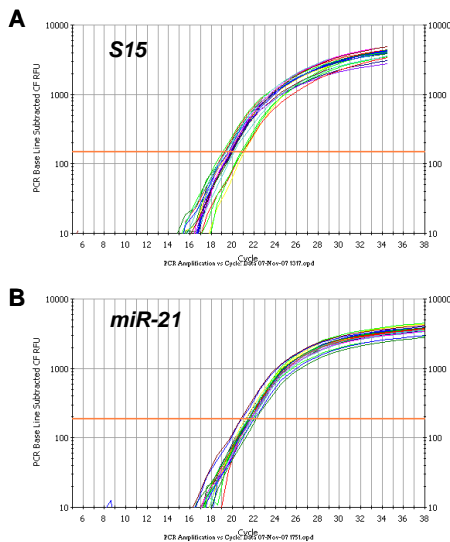


Figure 2. Consistent Isolation of Total RNA, Including microRNA Total RNA was isolated from samples of 5×10^5 HeLa cells using Norgen's Total RNA Purification 96-Well Kit. Aliquots of each total RNA sample were then used in 2 different RT-qPCR reaction. In the first RT-qPCR the S15 gene of mRNA was amplified (Panel A), and in the second RT-qPCR reaction the miR-21 microRNA was amplified (Panel B). Both the mRNA and microRNA were amplified in a consistent manner from all the samples, with low variability of the CT values. Thus both types of RNA are being consistently isolated using this kit.

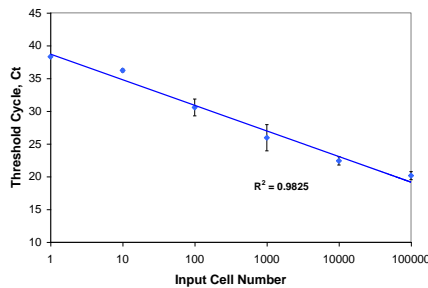


Figure 3. Sensitive RNA Isolation to <10 Cells RT-qPCR was used to detect mRNA isolated from various input amounts of HeLa cells using Norgen's Total RNA Purification 96-Well Kit. The primers used for the RT-qPCR detected the S15 gene. Total RNA was isolated and detected linearly from as little as a single HeLa cell.

Rapid 96-Well isolation and purification of total RNA including microRNA from different input

Norgen's Total RNA Purification 96-Well Kit provides a rapid method for the high-throughput isolation and purification of total RNA from cultured animal cells, small tissue samples, blood, plasma, serum, bacteria, yeast, fungi and plants. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of phenol or chloroform.

Purification is based on 96-well column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components such as proteins. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

Features and Benefits

- **Isolate total RNA from a diversity of species** - RNA can be isolated from cultured animal cells, small tissue samples, blood, plasma, serum, bacteria, yeast, fungi and plants.
- **Fast and easy processing** - 96-Well Plates can be rapidly processed in 30 minutes using either a vacuum manifold or centrifugation format.
- **No phenol:chloroform extractions**- Total RNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Isolate a diversity of RNA species** - All sizes of RNA can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **Recovered RNA is suitable for downstream applications** - Purified RNA can be used in a number of downstream applications including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	500 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 96 Purifications	30 minutes
Average Yield	
HeLa Cells (1×10^6 cells)	15 mg
<i>E. coli</i> (1×10^9 cells)	50 mg

Ordering information

Cat #	Quantity
24300	2 x 96-well plates

RNA, microRNA, DNA and Protein Isolation from the Same Sample

RNA/DNA/Protein Purification 96-Well Kit

Cat. # 51700

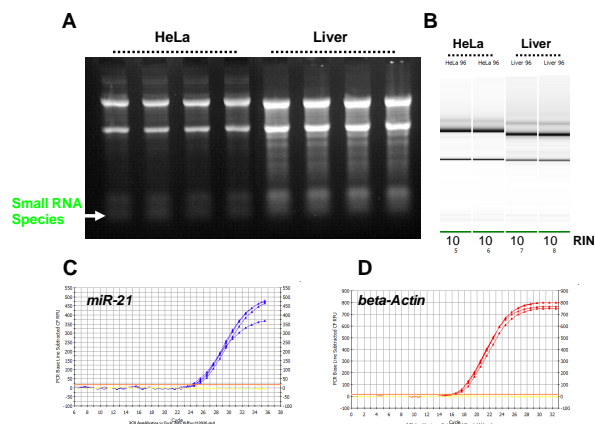


Figure 1. High Throughput Isolation of High Quality RNA with Complete Size Range without the Use of Phenol.

Norgen's RNA/DNA/Protein Purification 96-Well Kit allows for the consistent isolation of high quality RNA, with complete size range from the very large RNA down to small RNA without the use of phenol. HeLa RNA and Hamster Liver RNA was isolated using Norgen's RNA/DNA/Protein Purification 96-Well Kit in replicates. **(A)** The isolated RNA was resolved on a 1.2% formaldehyde agarose gel. All replicates showed both high yield and high quality. In addition, all replicates showed effective recovery of all sizes of RNA including the small RNA (arrow). **(B)** The isolated RNA was resolved on an Agilent RNA Nano 6000 Chip. All RNA achieved high RNA Integrity Number (RIN). The RNA isolated by Norgen's RNA/DNA/Protein Purification 96-Well Kit showed good recovery of both small RNA (**miR-21**, **(C)**) and large RNA (**beta-Actin**, **(D)**).

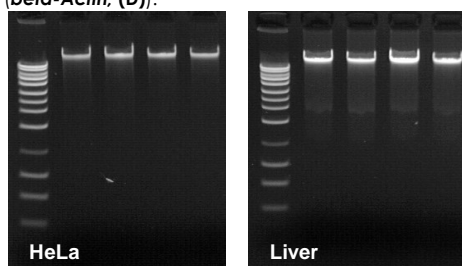


Figure 2 Recovery of Intact, High Quality Genomic DNA from HeLa cells and Hamster Liver

Panel **A** is a 1% agarose gel showing the gDNA isolated from the same HeLa cell or hamster liver samples using Norgen's RNA/DNA/Protein Purification 96-Well Kit with Norgen's HighRanger 1 kb DNA Ladder and the sample lanes contain 10 μ L of each of the 100 μ L elutions. The gel showed high quality, and intact genomic DNA. Panel **B** is the result of qPCR amplification of 25 ng of eluted genomic DNA using 5S rRNA-specific primers. Genomic DNA isolated using Norgen's RNA/DNA/Protein Purification 96-Well Kit is of high quality and is compatible to sensitive downstream applications.

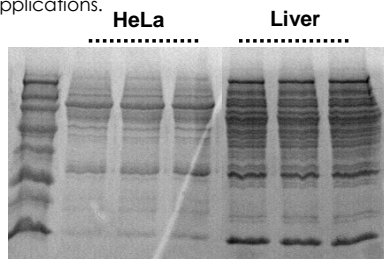


Figure 3. Consistent Isolation and Purification of Total Protein from the same sample used for RNA and DNA Isolation.

Norgen's RNA/DNA/Protein Purification 96-Well Kit allows concurrent isolation of RNA, DNA and protein from the same sample without splitting. The flowthrough samples from the RNA/DNA isolation in Figure 1 and Figure 2 were further purified using Norgen's RNA/DNA/Protein Purification 96-Well Kit. Ten microliters of the 100 μ L protein elutions were loaded on a 10% SDS-PAGE gel. The proteins are consistent in yield, intact and of the highest quality, and can be used in a number of different downstream applications.

Sequential 96-Well isolation of microRNA, large RNA, genomic DNA and proteins from the same sample

Norgen's RNA/DNA/Protein Purification 96-Well Kit provides a rapid method for the high throughput isolation and purification of total RNA, genomic DNA and proteins simultaneously from a single sample of cultured animal cells, small tissue samples, blood, bacteria, yeast, fungi or plants. This kit is ideal for researchers who are interested in studying the genome, proteome and transcriptome of a single sample, such as for studies of microRNA profiling, gene expression including gene silencing experiments or mRNA knockdowns, studies involving biomarker discovery, and for characterization of cultured cell lines.

Norgen's RNA/DNA/Protein Purification 96-Well Kit is especially useful for researchers who are isolating macromolecules from precious, difficult to obtain or small samples such as biopsy materials or single foci from cell cultures, as it eliminates the need to fractionate the sample. Furthermore, analysis will be more reliable since the RNA, DNA and proteins are derived from the same sample, thereby eliminating inconsistent results. The purified macromolecules are of the highest purity and can be used in a number of different downstream applications.

Features and Benefits

- **Complete column purification** - RNA, DNA and proteins are all column purified on 96-well plates without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate total RNA (including microRNA), genomic DNA and proteins from a single sample in 45 minutes.
- **High throughput processing** - Using either a vacuum manifold or centrifugation
- **Process a wide range of sample types** - Isolate total RNA, genomic DNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, fungi and plants.
- **Reduce variability** - RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 μ g (RNA) 20 μ g (DNA) 150 μ g (Protein)
Size of DNA Purified	\geq 30 kbp
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	45 minutes
Average Yield	
Liver (5 mg) - RNA	12.5 mg
Liver (5 mg) - DNA	2 mg
Liver (5 mg) - Protein	55 mg

Ordering information

Cat #	Quantity
51700	1 x 96-well plate

RNA/Protein Purification 96-Well Kit

Cat. # 37900

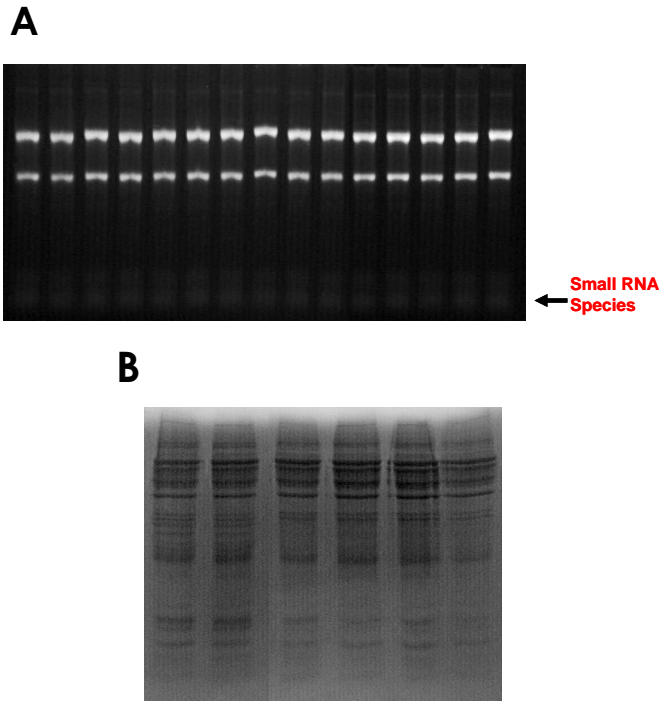


Figure 1. Simultaneous Isolation of RNA and Proteins from HeLa cells.

Total RNA and total proteins were isolated simultaneously from 5×10^5 HeLa cells using Norgen's kit. Panel A is a 1.2% formaldehyde agarose gel showing the total RNA. All 15 replicates showed both high yield and high quality, and all replicates showed effective recovery of all sizes of RNA including the small RNA (arrow). Panel B is a 10% SDS-PAGE gel containing the total proteins that were isolated from 6 of the flowthrough samples in Panel A. In each case, 10 mL out of the elutions was loaded. The proteins are consistent in yield, intact and of the highest quality, and can therefore be used in a number of different downstream applications.

Sequential and high throughput isolation of total RNA including microRNA and proteins from the same sample

Norgen's RNA/Protein Purification 96-Well Kit provides a rapid method for the high throughput isolation and purification of total RNA and total proteins simultaneously from a single sample of cultured animal cells, tissues, blood, bacteria, yeast or fungi. Purification is performed with 96-well plates using either a vacuum manifold or centrifugation. The simultaneous isolation of the RNA and proteins from the same sample not only saves time, but will also be of a great benefit when isolating RNA and proteins from precious, difficult to obtain or very small samples. Furthermore, gene expression analysis will be more reliable since the RNA and proteins are derived from the same sample, therefore eliminating inconsistent results and variability. In addition, the kit can also be used for the simultaneous isolation of genomic DNA and proteins from a single sample.

With Norgen's RNA/Protein Purification 96-Well Kit, the purification is based on 96-well column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds nucleic acids in a manner that depends on ionic concentrations, thus the RNA will bind to the resin while the proteins are removed in the flowthrough. After the RNA is washed and eluted from the plate, the plate is then used to purify the proteins that are present in the flowthrough. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The purified RNA is of the highest integrity, and can be used in a number of downstream applications. The purified proteins can also be used in a number of different downstream applications.

Features and Benefits

- **Complete column purification** - RNA and proteins are all column purified on the same 96-well plate without the use of phenol, chloroform or acetone.
- **Fast and easy processing** - Isolate microRNA, large RNA, and proteins from a single sample in < 25 minutes.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA
- **Process a wide range of sample types** - Isolate total RNA and proteins from cultured animal cells, tissue, blood, bacteria, yeast, plant and fungi.
- **Reduce variability** - RNA and proteins are isolated from a single sample with no splitting, thus reducing inconsistent results and variability.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 150 µg (Protein)
Maximum Column Loading Volume	500 mL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	25 minutes
Average Yield	
HeLa (1×10^6 cells) - RNA	15 mg
HeLa (1×10^6 cells) - Protein	150 mg

Ordering information

Cat #	Quantity
37900	2 x 96-well plates

FFPE RNA and microRNA Extraction and Purification

FFPE RNA Purification 96-Well Kit

Cat. # 25400

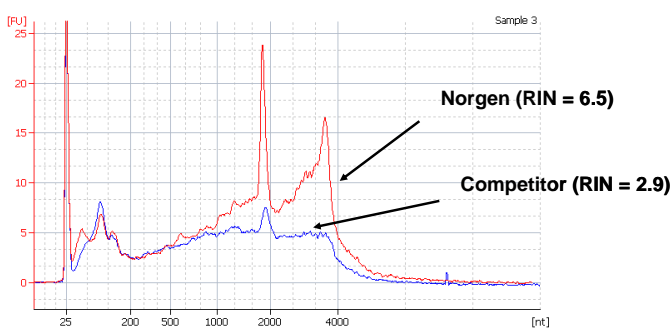


Figure 1. High Quality and Yield of Total RNA

Total RNA was isolated from equal amounts of an FFPE tissue sample using Norgen's FFPE RNA Purification Kit and a leading competitor's kit. The purified RNA was then resolved on an Agilent BioAnalyzer. As it can be seen, Norgen not only isolated higher yields of total RNA, but the RNA was also of a higher quality as evidenced by the higher RIN values obtained with Norgen's RNA.

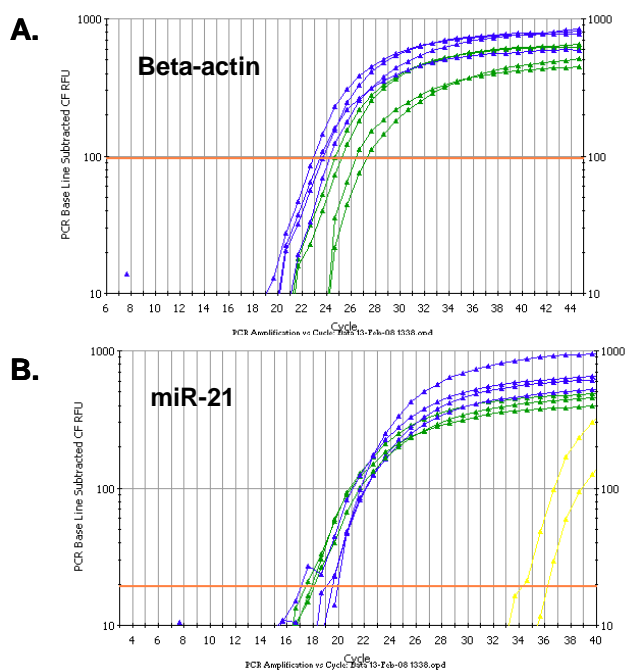


Figure 2. High Yield of a Diversity of RNA Species

Total RNA was isolated from equal amounts of an FFPE tissue sample using Norgen's FFPE RNA Purification Kit and a leading competitor's kit. The purified RNA was then used as the template in a RT-qPCR for detecting the beta-actin gene (Panel A) and for detecting miR-21 (Panel B). In both graphs the blue lines correspond to Norgen isolated-RNA and the green lines correspond to competitor-isolated RNA. As it can be seen, Norgen's kit isolated higher yields of RNA in both cases, as indicated by the lower C_T values of the blue lines. Also, Norgen's kit successfully isolated not only large RNA (Panel A) but also microRNA (Panel B), indicating the diversity of RNA species isolated.

Rapid isolation and purification of total RNA including microRNA from FFPE samples

Norgen's FFPE RNA Purification Kit provides a rapid method for the isolation and purification of total RNA (including microRNA) from formalin-fixed paraffin-embedded (FFPE) tissue samples. Using formalin to fix tissues leads to crosslinking of the RNA and proteins, and the process of embedding the tissue samples can also lead to fragmentation of the RNA over time. Norgen's FFPE RNA Purification Kit provides conditions that allow for the partial reversing of the formalin modifications, resulting in a high quality and yield of RNA. The kit is able to purify all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), depending on the age of the FFPE tissue as fragmentation of the RNA is known to occur over time.

With Norgen's FFPE RNA Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components without the use of phenol or chloroform. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including qRT-PCR, reverse transcription PCR, primer extension, expression array assays, and microarray analyses.

Features and Benefits

- **High quality and integrity of the isolated RNA** - The purified total RNA is of the highest quality and integrity, and can be used in any sensitive downstream applications.
- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **High yields** - Norgen's FFPE RNA Purification Kit allows for the purification of high yields of total RNA.
- **No phenol:chloroform extractions** - Total RNA is isolated from FFPE tissue samples without the use of harmful chemicals such as phenol or chloroform.
- **Rapid procedure** - Isolate total RNA from FFPE tissue sections using a rapid spin column or 96-well format.

Feature	Specifications
Maximum Column Binding Capacity	50 μ g
Maximum Column Loading Volume	650 μ L
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	85 minutes
Maximum Amount of Starting Material	5 sections \leq 20 mM thick 25 mg of unsectioned block

Ordering information

Cat #	Quantity
25400	2 x 96-well plates

FFPE RNA/DNA Purification 96-Well Kit

Cat. # 25500

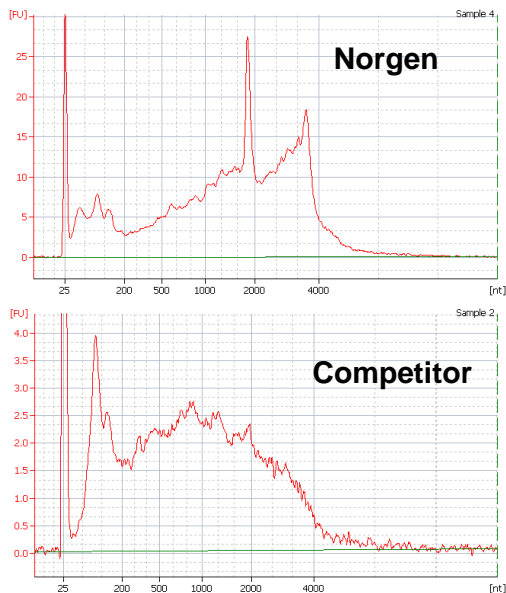


Figure 1. High Quality and Yield of Total RNA

Total RNA was isolated from equal amounts of an FFPE kidney sample using Norgen's FFPE RNA/DNA Purification Kit and a leading competitor's kit. The purified RNA was then resolved on an Agilent BioAnalyzer. As it can be seen, Norgen not only isolated higher yields of total RNA, but the RNA was also of a higher quality as evidenced by the higher RIN values obtained with Norgen's RNA.

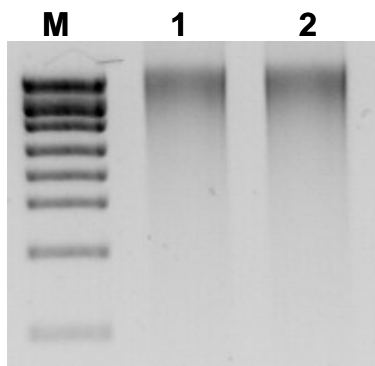


Figure 2. High Quality Genomic DNA

Genomic DNA was isolated from an FFPE kidney tissue sample using Norgen's FFPE RNA/DNA Purification Kit in duplicate and run on a 1.5% agarose gel. From observing the gel it can be seen that the kit isolates high yields of intact genomic DNA. Lane M is Norgen's HighRanger 1kb DNA Ladder, and Lanes 1 and 2 contain the purified DNA samples.

Rapid and high throughput purification of total RNA including microRNA or DNA from FFPE samples

Norgen's FFPE RNA/DNA Purification Kit provides a rapid method for the isolation and purification of total RNA (including microRNA) and genomic DNA from formalin-fixed paraffin-embedded (FFPE) tissue samples. Alternatively, the kit can be used to isolate total RNA alone or genomic DNA alone from FFPE tissue samples through varying the protease digestion time and performing optional RNase or DNase digestions. Using formalin to fix tissues leads to crosslinking of the nucleic acids and proteins, and the process of embedding the tissue samples can also lead to fragmentation of the nucleic acids over time. Norgen's FFPE RNA/DNA Purification Kit provides conditions that allow for the partial reversing of the formalin modifications, resulting in a high quality and yield of nucleic acids.

With Norgen's FFPE RNA/DNA Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The kit is able to purify all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), depending on the age of the FFPE tissue as fragmentation of the RNA is known to occur over time. The RNA is preferentially purified from other cellular components without the use of phenol or chloroform. The purified RNA and genomic DNA are of the highest integrity, and can be used in a number of downstream applications including qPCR, qRT-PCR, reverse transcription PCR, primer extension, mutation screening, expression array assays, microarray analyses, sequencing, Southern blotting and SNP analysis.

Features and Benefits

- **High quality and integrity of the isolated nucleic acid** - Both the purified total RNA and/or genomic DNA are of the highest quality and integrity, and can be used in any sensitive downstream application.
- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **High yields** - Norgen's FFPE RNA/DNA Purification Kit allows for the purification of high yields of total RNA or DNA.
- **Rapid procedure** - Isolate total RNA and/or genomic DNA from FFPE tissue sections using a rapid spin column or 96-well format.
- **Versatile procedure** - The kit allows for the purification of either pure total RNA, pure genomic DNA or both RNA and genomic DNA through the use of tailored protease digestion times.

Feature	Specifications
Maximum Column Binding Capacity	50 µg (RNA) 15 µg (DNA)
Maximum Column Loading Volume	650 µL
Size of RNA Purified	All sizes, including small RNA (<200 nt)
Time to Complete 10 Purifications	85 minutes
Maximum Amount of Starting Material	5 sections ≤20 mM thick 25 mg of unsectioned block

Ordering information

Cat #	Quantity
25500	2 x 96-well plates

Commitment to Quality



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