

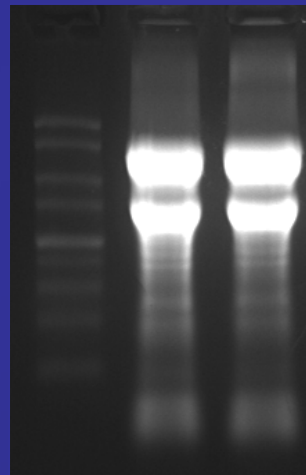
RNA Purification Product Portfolio



RNA Purification Kits

Norgen Biotek offers excellent RNA purification products

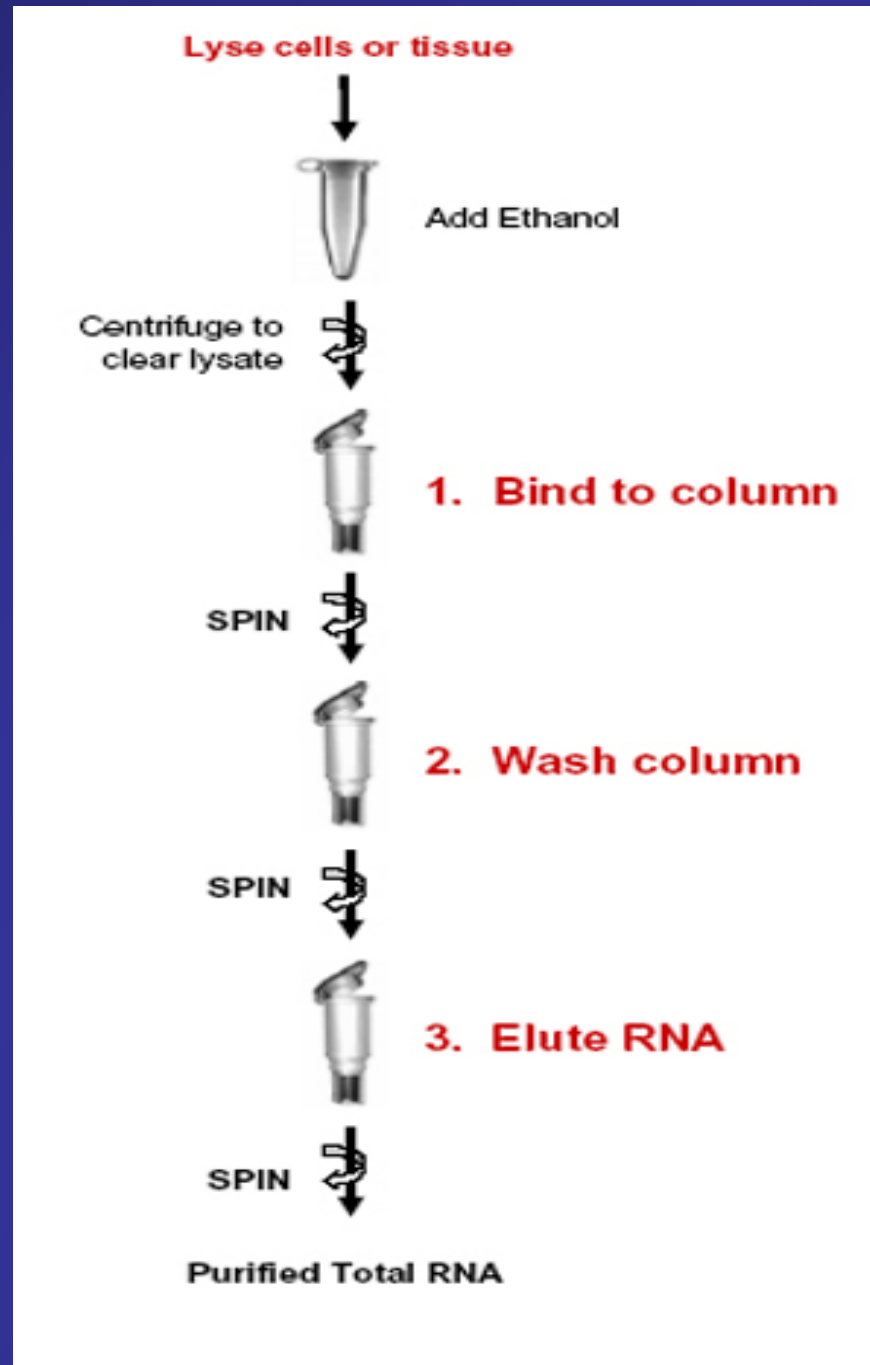
- No phenol extraction step
- Very sensitive - RT-PCR from 1 cell
- No sample degradation - robust protocol
- High quality & yield
- Diverse RNA species



In 20 min



Isolate high quality RNA without phenol in three simple steps



Range of applications

Norgen Biotek Current RNA Products:

1. Total RNA kit (Cat# 17200)

RNA from mammalian cells, bacteria, yeast, blood, etc.

2. Cytoplasmic & Nuclear RNA Purification Kit (Cat# 21000)

Cytoplasmic RNA without genomic DNA contamination

3. Leukocyte RNA Purification kit (Cat# 21200)

Total, cytoplasmic or nuclear RNA without globin mRNA

4. microRNA Purification Kit (Cat# 21300)

Enrich & purify small RNA (<200 nucleotides)



1. Total RNA Purification Kit

Cat# 17200

Kit Specifications			
Column Binding Capacity	50 µg	Maximum Amount of Starting Material:	
Maximum Column Loading Volume	700 µL	Animal Cells	1 x 10 ⁶ cells
Size of RNA Purified	All sizes	Animal Tissues	2 mg
Time to Complete 10 Purifications	30 minutes	Blood	50 µL
Average Yield:		Bacteria	1 x 10 ⁹ cells
HeLa Cells (5 x 10 ⁵ cells)	15 µg	Yeast	1 x 10 ⁸ cells
<i>E. coli</i> (1 x 10 ⁹ cells)	50 µg	Fungi	50 mg

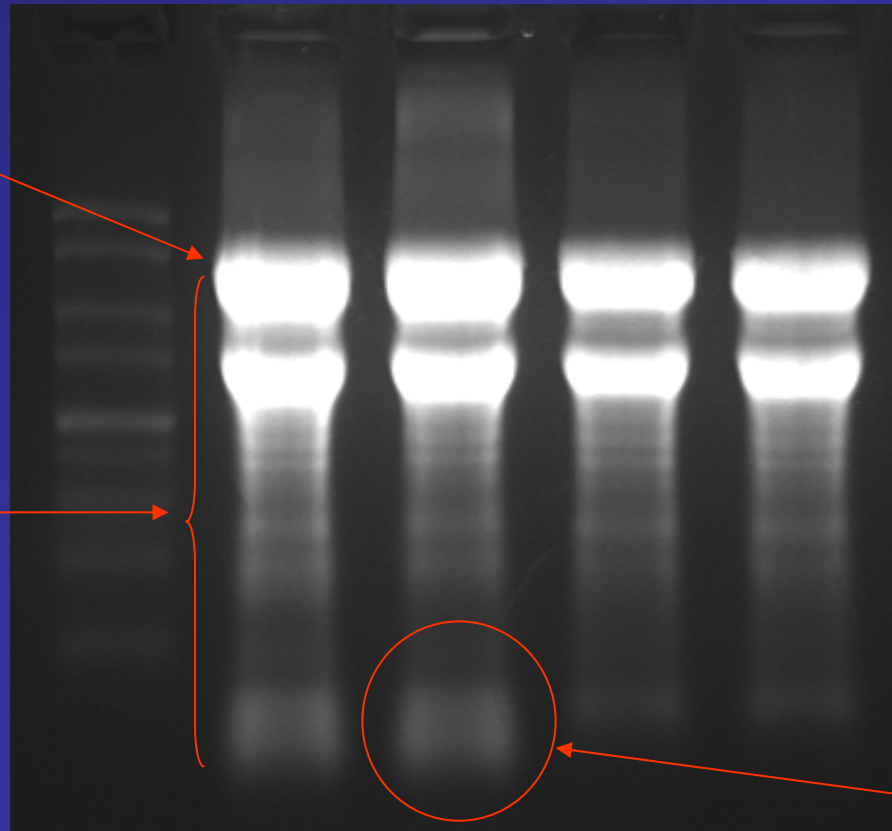
Total RNA Purification Kit Benefits

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 30 minutes.
No phenol:chloroform extractions	Total RNA is isolated 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 a single animal cell.
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.

Quality, Quantity and Diversity

Norgen

Competitor



23S

16S

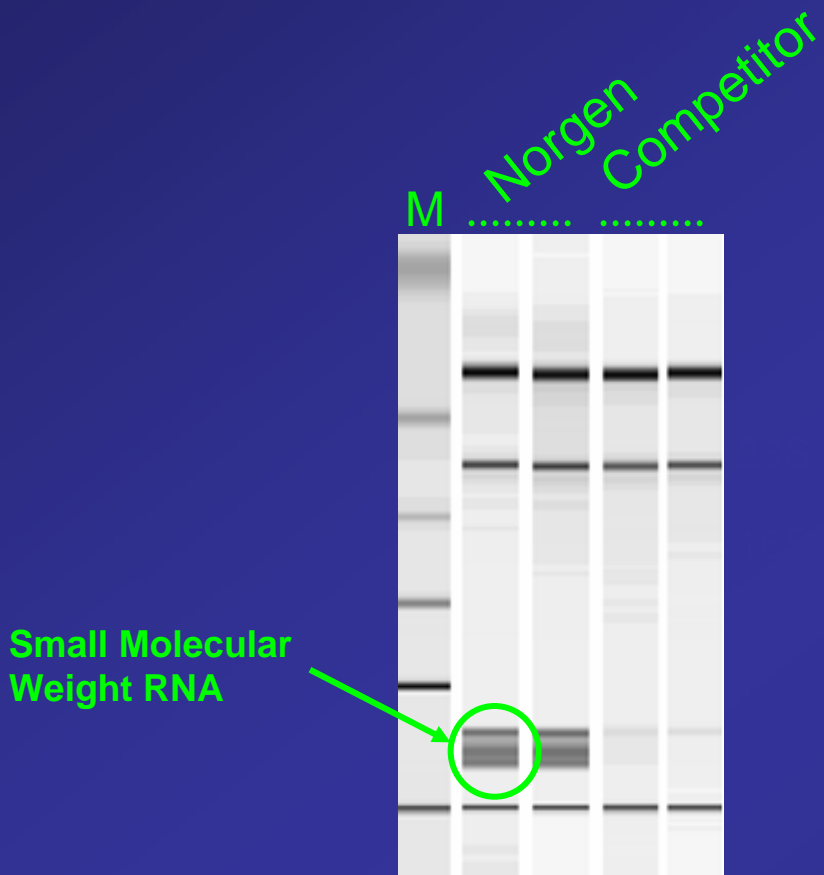
Small molecular weight
RNA

Total RNA isolated from *E. coli* using Norgen and Competitor Total RNA Isolation Kit resolved on 1.5% formaldehyde-agarose gel

- ❖ Each protocol in duplicates
- ❖ RNA isolated from 1×10^9 *E. coli* DH5 α
- ❖ 5 μ L of 100 μ L elution of each protocol loaded
- ❖ Marker = Norgen 1kb RNA marker (#15003)

Resolution of *E coli* Total RNA on Bioanalyzer

Note the small molecular weight RNA

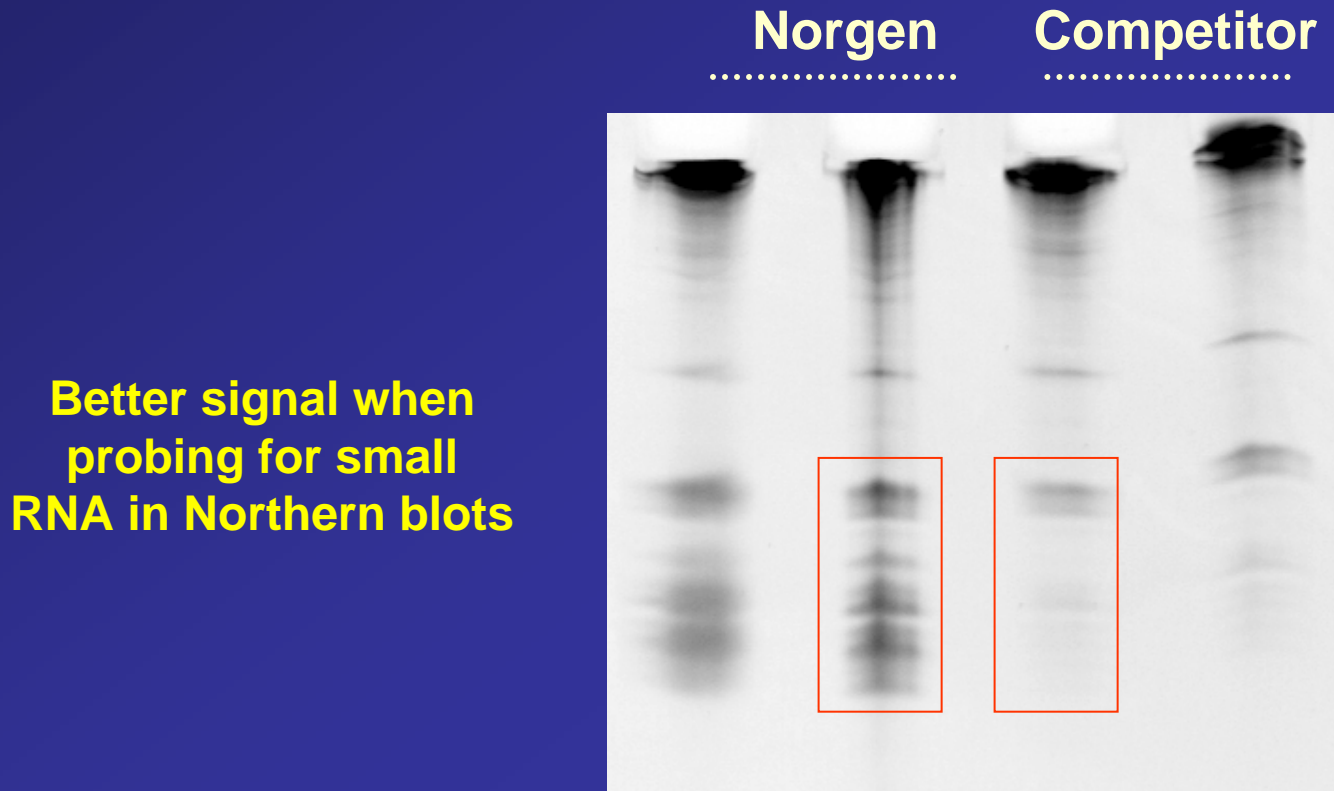


- ❖ 1 uL of each sample was loaded onto an Agilent RNA 6000 Nano Chip and resolved on an Agilent 2100 Bioanalyzer
- ❖ Total RNA yield and 23S/16S ratios were determined using supplied software

	RNA Yield, μg	23S/16S Ratio
Norgen	101.5	1.57
Competitor	60.5	1.57

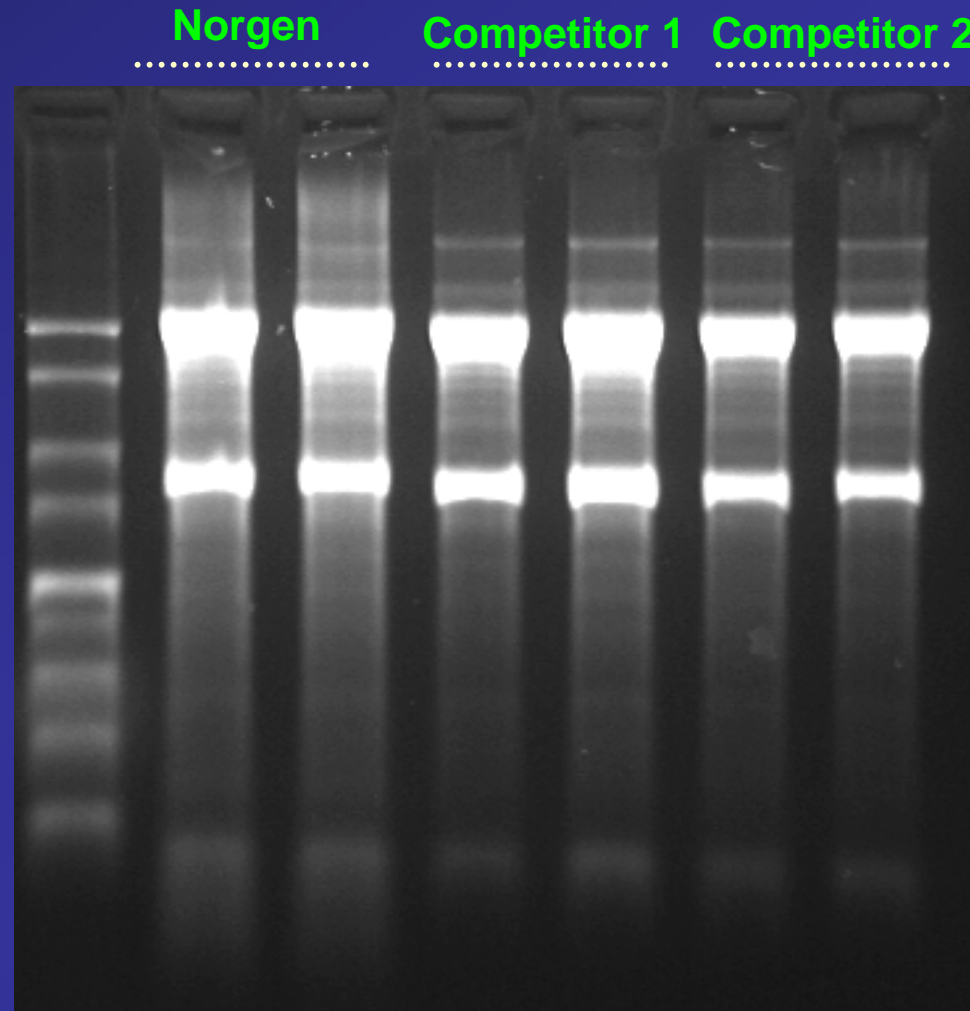
Resolution of *E coli* small RNAs on denaturing PAGE gels

Note the small molecular weight RNA



- ❖ Equal amounts of RNA isolated using Norgen or Competitor's kits were treated with formamide RNA loading buffer (80°C for 5 min)
- ❖ Loaded onto a 5% urea-PAGE gel
- ❖ Electrophoresis at 150V (with a 10 min pre-run)

Resolution of Mammalian Total RNAs Isolated using Norgen and Competitors Total RNA Isolation Kit on Formaldehyde-agarose Gel

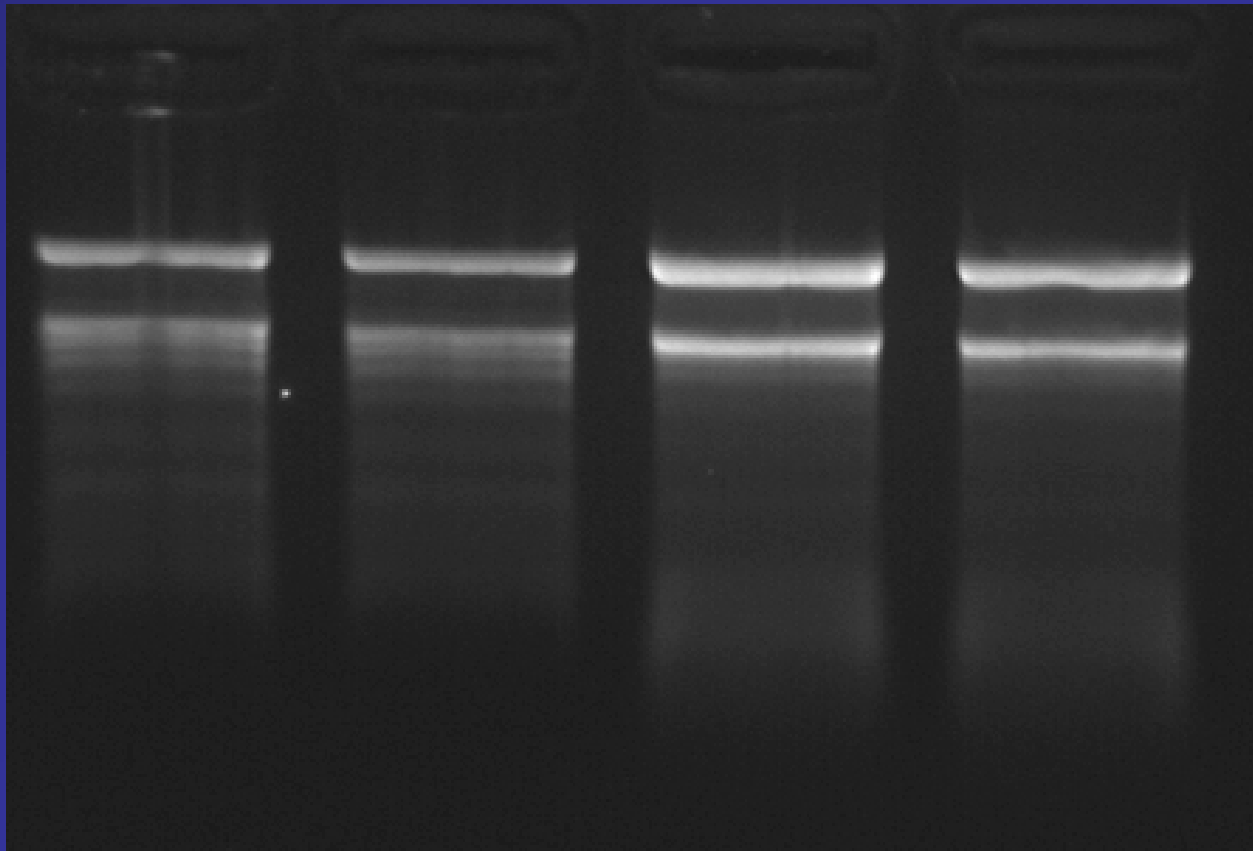


- ❖ Each protocol in duplicates
- ❖ RNA isolated from 5×10^5 HeLa monolayer cells
- ❖ 5 μ L of 100 μ L elutions of each protocol loaded
- ❖ Marker = Norgen 1kb RNA marker (#15003)

Total RNA from *Agaricus bisporus* (Fungus)

Norgen Total RNA Purification Kit vs Competitor RNA Kit

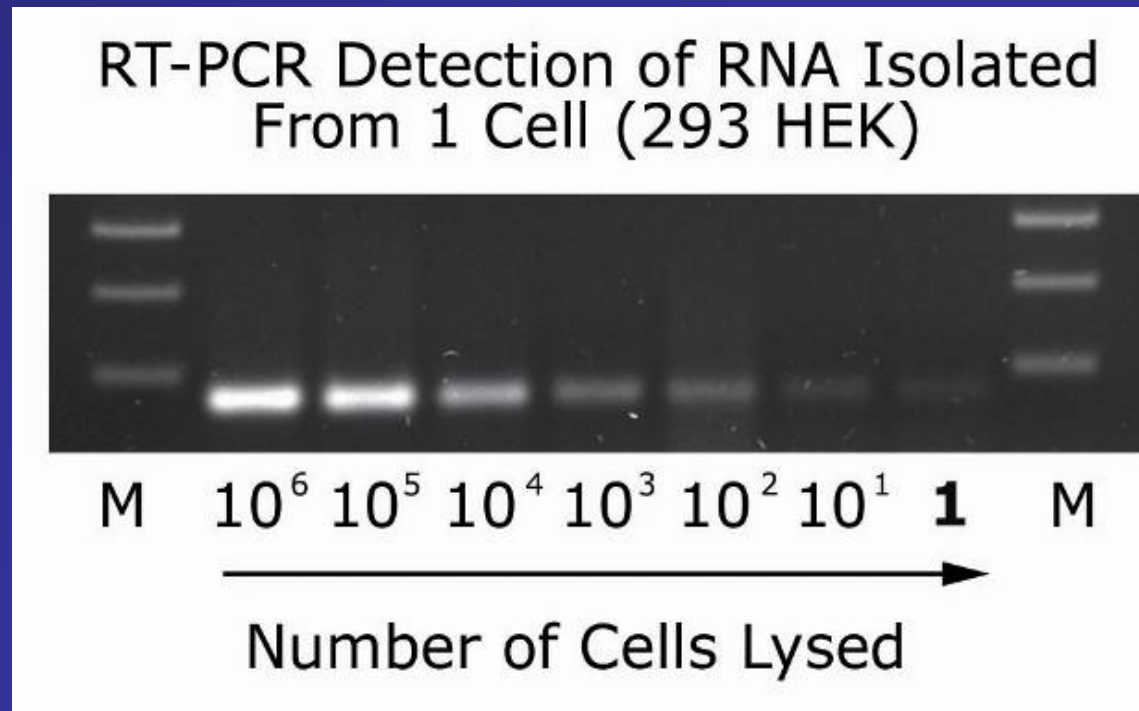
Competitor 1 Competitor 1 Norgen Norgen



- ❖ RNA yield From Norgen Kit is 30 to 40% higher
- ❖ Norgen protocol isolated small RNA as well
- ❖ 12 uL of 50 uL elutions of each protocol loaded

Total RNA Purification Kit

Excellent Sensitivity



❖ Very Sensitive - Amplification from as low as one cell

2. Cytoplasmic/Nuclear RNA Purification Kit

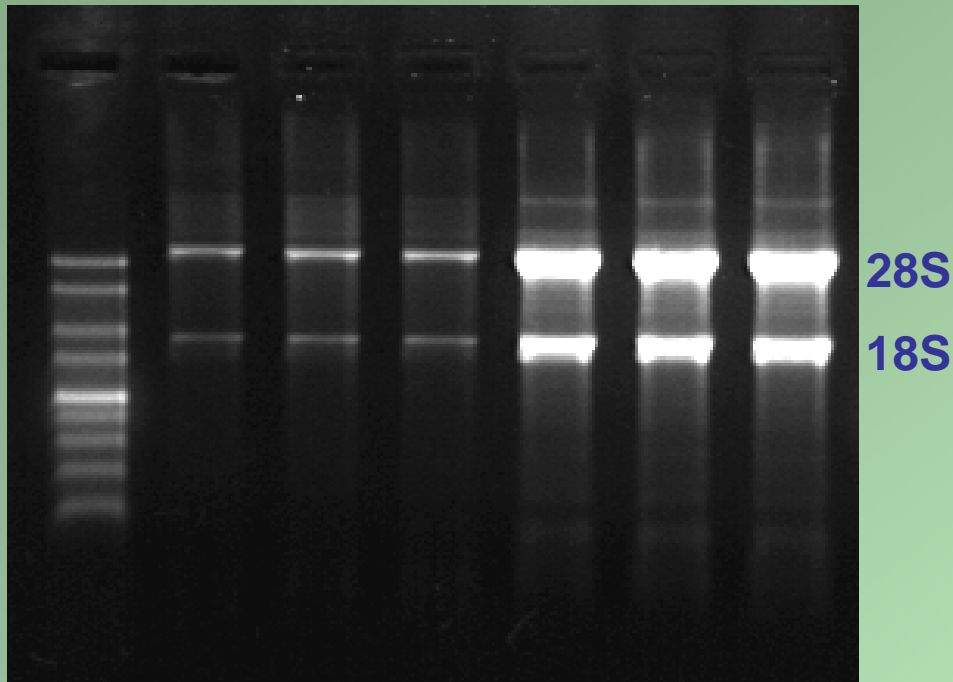
Cat# 21000

Kit Specifications			
Column Binding Capacity	50 µg	Size of RNA Purified	All sizes
Maximum Column Loading Volume	700 µL	Time to Complete 10 Purifications	45 minutes
Maximum Amount of Starting Material:		Average Yield:	
Animal Cells	1 x 10 ⁶ cells	HeLa Cells (5 x 10 ⁵ cells) - nuclear	15 µg
Animal Tissues	2 mg	HeLa Cells (5 x 10 ⁵ cells) - cytoplasmic	≤ 3.5 µg

Cytoplasmic and Nuclear RNA Purification Kit Benefits	
Fast and easy processing	Rapid spin-column format allows for the processing of 10 samples in 45 minutes.
No genomic DNA contamination in cytoplasmic fraction	Purified cytoplasmic RNA can be used directly in RT-PCR reactions with no DNase treatment required (Figure 2)
No phenol:chloroform extractions	Cytoplasmic and nuclear RNA is isolated 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 including real-time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array analysis requiring the use of intact RNA.

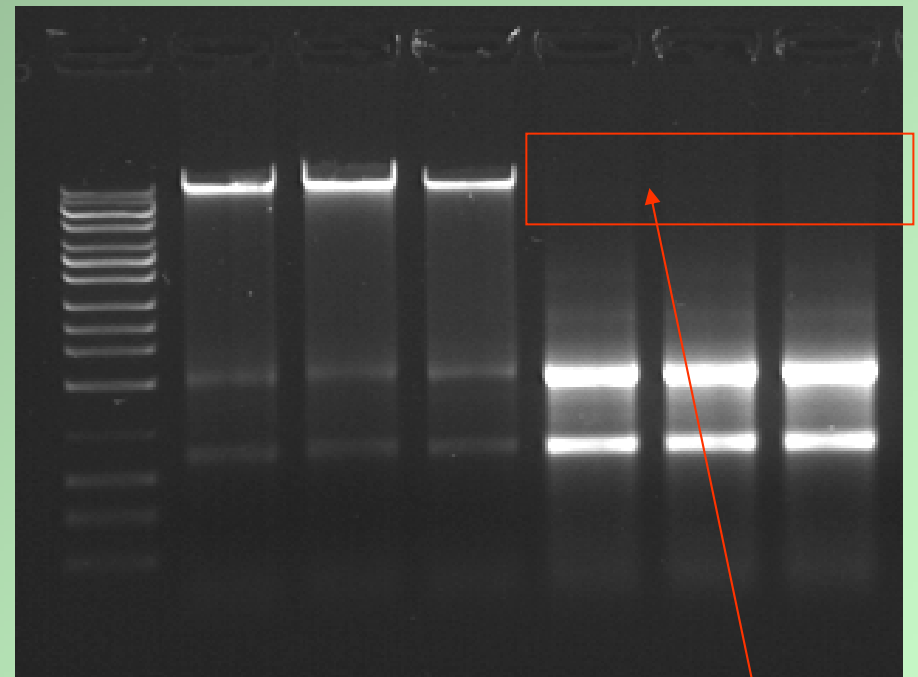
Cytoplasmic RNA without Genomic DNA

Nuclear
.....
Cytoplasmic
.....



1.6 % Formaldehyde-agarose gel

Nuclear
.....
Cytoplasmic
.....

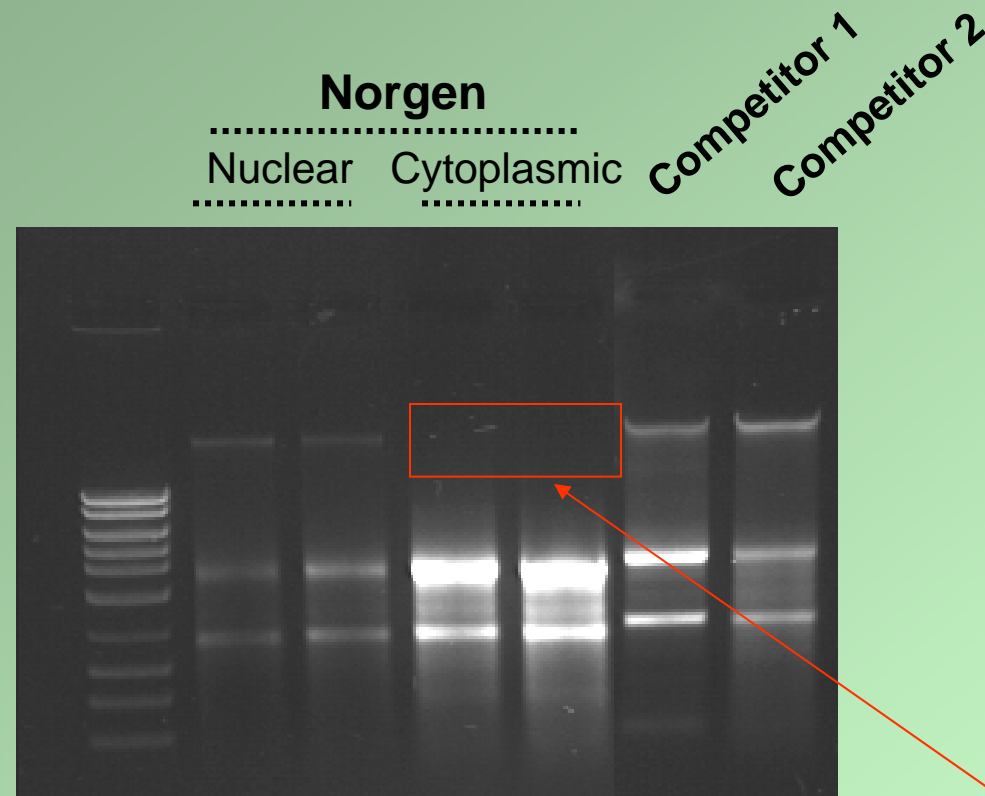


0.9 % Agarose gel

No genomic DNA contamination

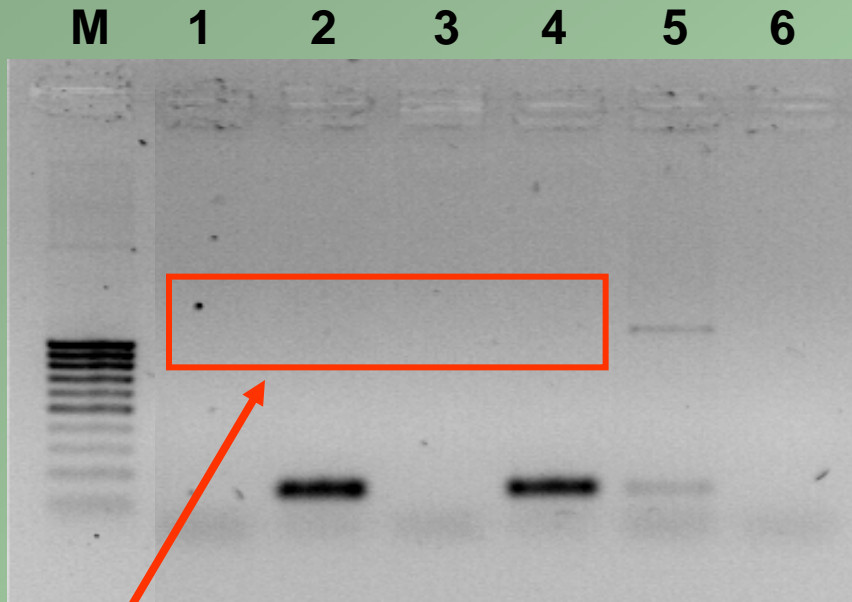
- ❖ Each protocol in triplicates
- ❖ RNA isolated from 5×10^5 HeLa monolayer cells
- ❖ 5 μ L of 100 μ L elution of each protocol loaded
- ❖ Marker = Norgen 1kb RNA marker (#15003) (Left)
= Norgen UltraRanger DNA marker (#12100) (Right)

Cytoplasmic & Nuclear RNA Isolation Kit Norgen's Kit vs Competitor's Kit



- ❖ RNA isolated from 5×10^5 HeLa monolayer cells
- ❖ 5 μ L of 100 μ L elutions of each protocol loaded
- ❖ Resolved on 0.9% agarose gel
- ❖ Marker = Norgen Midranger DNA marker (#11700)

Direct RT-PCR Application of Cytoplasmic RNA Isolated using Norgen's Cytoplasmic & Nuclear RNA Isolation Kit



No genomic DNA contamination

- RNA isolated from 5×10^5 HeLa monolayer cells
- **No DNase treatment**
- cDNA generated using Invitrogen's Superscript II
- PCR product amplified using S14 primers (cDNA transcript = 143 bp, genomic copy = 1.2 kb)
- Resolved on 1.2 % agarose gel

- 1 and 3 = RT-PCR of cytoplasmic RNA **without reverse transcriptase**
- 2 and 4 = RT-PCR of cytoplasmic RNA **with reverse transcriptase**
- 5 = PCR of nuclear RNA
- 6 = PCR negative control (no template)
- M = Norgen PCRSizer DNA marker (#11400)

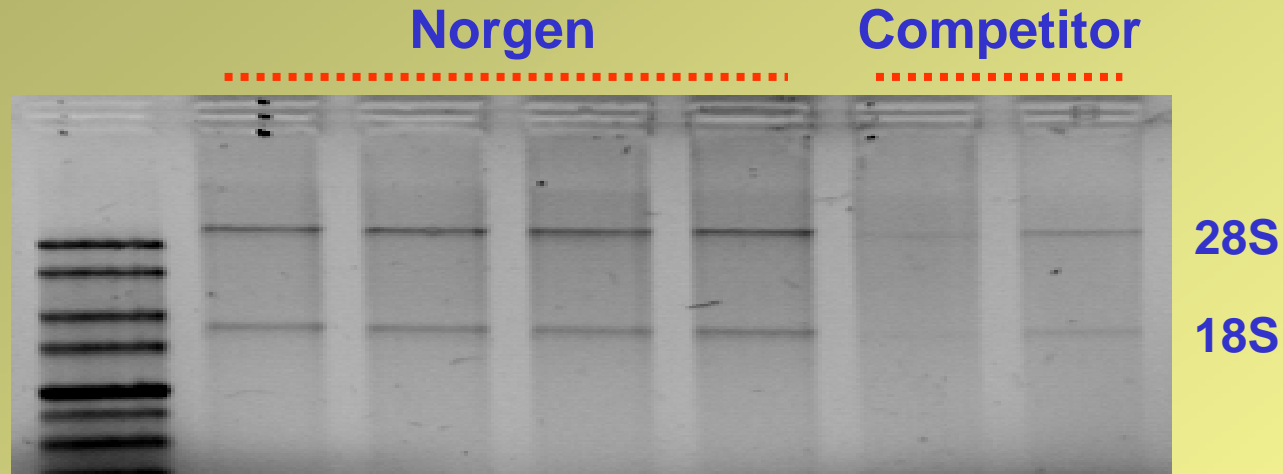
3. Leukocyte RNA Purification Kit

Cat# 21200

Kit Specifications			
Column Binding Capacity	50 µg	Size of RNA Purified	All sizes
Maximum Column Loading Volume	700 µL	Time to Complete 10 Purifications	45 minutes
Maximum Blood Input	500 µL	Average Yield:	
Time to Complete 10 Purifications	10 µL	500 µL Human Blood	1.5 µg

Leukocyte RNA Purification Kit Benefits	
Fast and easy processing	Rapid spin-column format allows for the processing of 10 samples in 45 minutes.
No phenol:chloroform extractions	Norgen's Leukocyte RNA Purification Kit isolates RNA without the use of harmful chemicals such as phenol or chloroform.
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.
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.

Leukocyte RNA Purification Kit vs Competitor



1.6% formaldehyde-agarose gel

- ❖ RNA isolated from 50 μ L of human blood
- ❖ 20 μ L of 50 μ L elutions of each protocol loaded
- ❖ Marker = Norgen 1kb RNA marker (#15003)

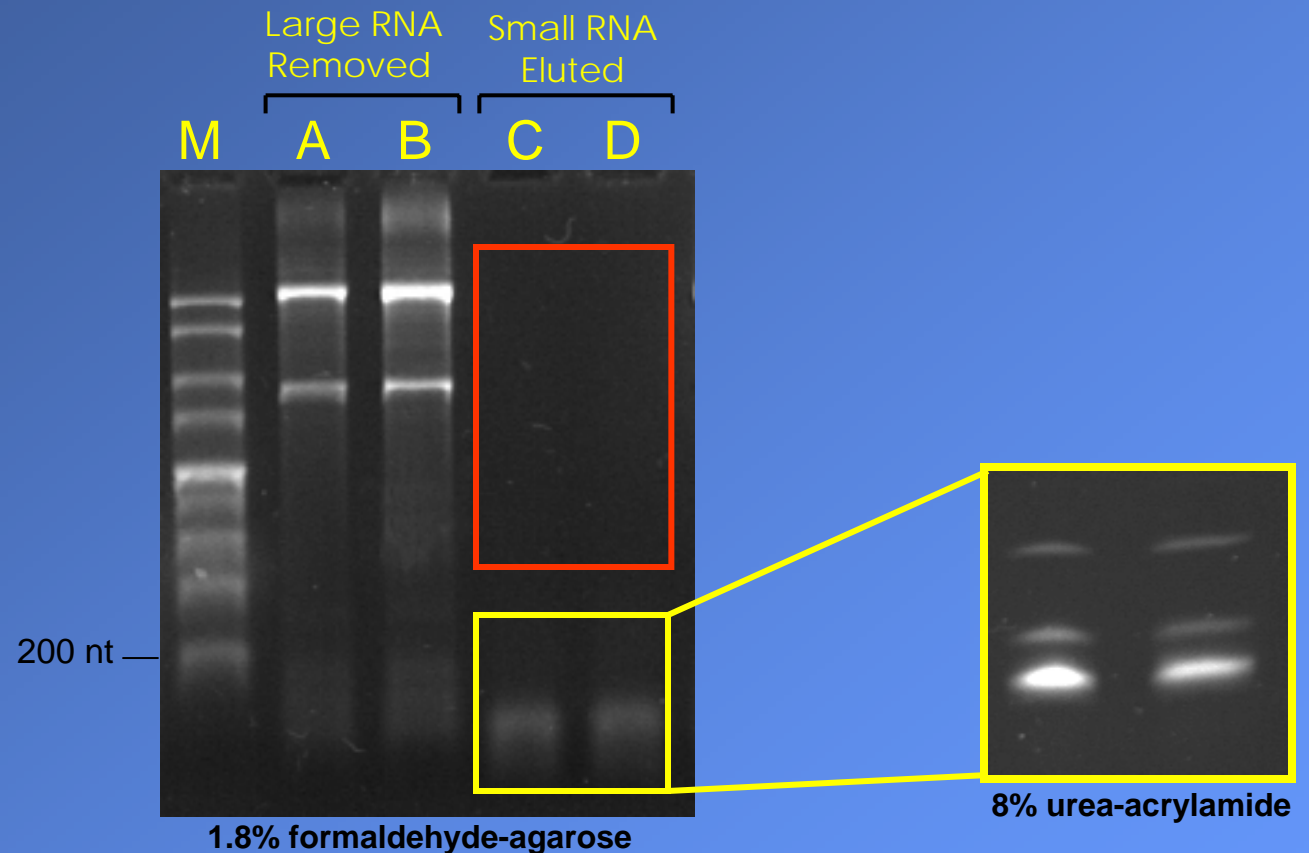
4. microRNA Purification Kit

Cat# 21200

Kit Specifications			
Column Binding Capacity	50 µg	Maximum Amount of Starting Material:	
Maximum Column Loading Volume	700 µL	Animal Cells	1 x 10 ⁶ cells
Size of RNA Purified	<200 nt	Animal Tissues	2 mg
Time to Complete 10 Purifications	45 minutes	Bacteria	1 X 10 ⁹ cells

microRNA Purification Kit Benefits	
Fast and easy processing	Rapid spin-column format allows for the processing of 10 samples in 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 all small RNA molecules	All small RNA species can be isolated including miRNA, siRNA, tRNA, and 5S rRNA (Figure 1).
Minimal contamination from large RNA molecules and genomic DNA	Efficient isolation of small RNA species using a 2 column process, resulting in minimal contamination of larger RNA and genomic DNA (Figure 2).
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.

Efficient Removal of Large RNA Species



- ❖ Isolate small RNA species from HeLa cells.
- ❖ Eluted RNA resolved on a formaldehyde-agarose gel.
- ❖ Lanes A and B contain the large RNA that is removed using the first spin column
- ❖ Lanes C and D contain the small RNA species recovered in the elution from the second column. All traces of the large RNA are clearly removed using the first column



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