

## RNA/DNA/Protein Purification Kit

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.



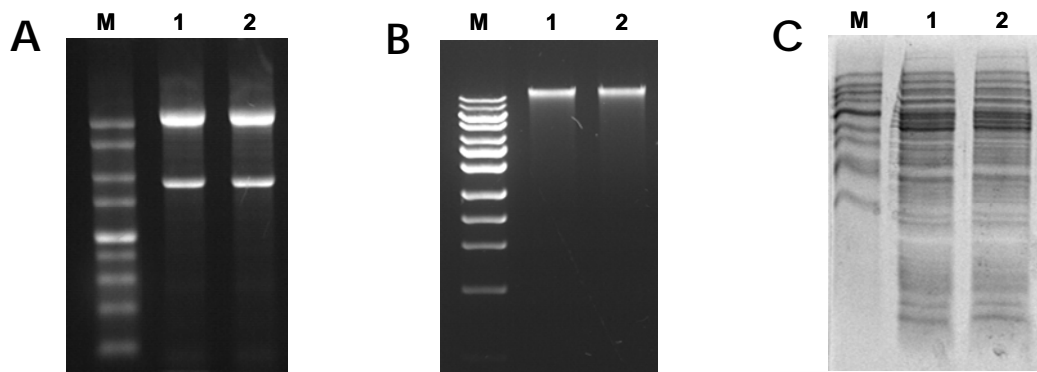
Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds nucleic acids in a manner that depends on ionic concentrations, thus the RNA and DNA will bind to the column while the proteins are removed in the flowthrough. The RNA and DNA are then washed and eluted sequentially, and the column is then used to purify the proteins that are present in the flowthrough. Alternatively, the kit is provided with a specially formulated loading dye that allows the proteins present in the flowthrough to be loaded directly onto an SDS-PAGE gel. 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 genomic DNA is also of the highest quality, and can be used in various applications including PCR reactions, sequencing, Southern blotting and SNP analysis. The purified proteins can also be used in a number of different downstream applications, such as SDS-PAGE analysis and Western blots.

### RNA/DNA/Protein Purification Kit Benefits

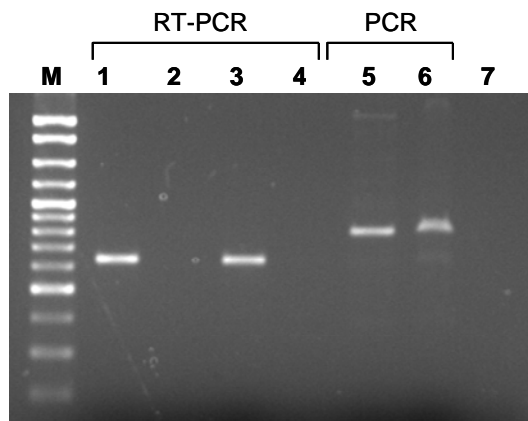
Complete column purification	The RNA, DNA and proteins are all column purified using the same column.
Reduce variability	RNA, DNA and proteins are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.
Isolate from small samples	Sequential isolation of RNA, DNA and protein from a single sample. Ideal for precious, difficult to obtain or small samples such as biopsy material or single foci from cell cultures.
Rapid procedure	Isolate total RNA, genomic DNA and total 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.

## RNA/DNA/Protein Purification Kit

Kit Specifications			
Column Binding Capacity (RNA)	50 µg	Average Yield:	
Column Binding Capacity (DNA)	20 µg	HeLa Cells (1 x 10 <sup>6</sup> cells)	15 µg RNA
Column Binding Capacity (Protein)	200 µg	HeLa Cells (1 x 10 <sup>6</sup> cells)	8 µg DNA
Size of RNA Purified	All sizes	HeLa Cells (1 x 10 <sup>6</sup> cells)	150 µg protein
Size of DNA Purified	> 30 kbp	Time to Complete 10 Purifications	30 minutes



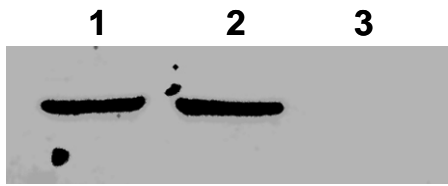
**Figure 1. Sequential Isolation of Total RNA, Genomic DNA and Proteins from 5 x 10<sup>5</sup> of HeLa Cells.** Panel A is a 1X MOPS 1% agarose gel showing the RNA that was isolated from 2 different samples of HeLa cells. Lane M is Norgen's 1Kb RNA Ladder, and Lanes 1 and 2 contain 3 µL out of the 50 µL elutions. Panel B is a 1% agarose gel showing the gDNA isolated from the same 2 HeLa cell samples. Lane M is Norgen's Ultra-Ranger DNA Ladder and Lanes 1 and 2 contain 10 µL of each of the 100 µL 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 µL of the 100 µL 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

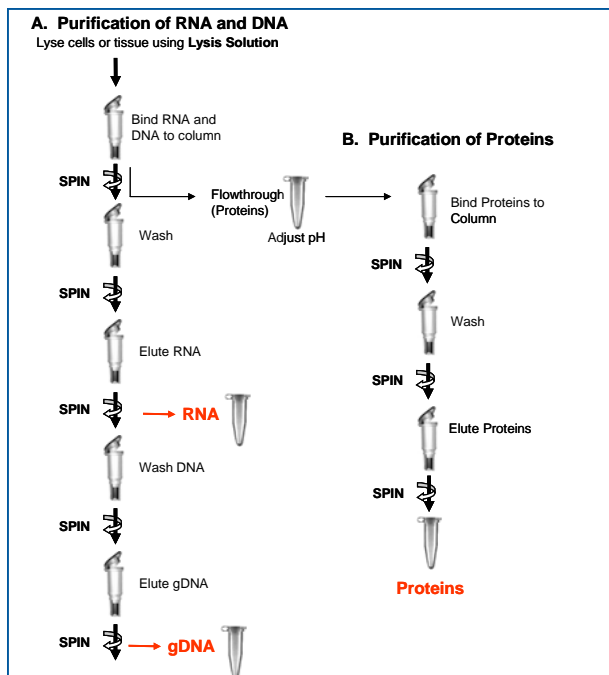
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**Figure 3. High Quality Total Proteins**

Total proteins were isolated and column purified from HeLa cells using Norgen's RNA/DNA/Protein Purification Kit, and Western blot analysis of duplicate samples with antibodies against GAPDH was performed. Lanes 1 and 2 contain the expected signal from the GAPDH, while Lane 3 was a negative control using *E. coli* lysate. The presence of strong signals in Lanes 1 and 2 indicates that the isolated proteins are of a high quality and can be used in common downstream applications

### RNA/DNA/Protein Purification Kit Procedure



### Customer-Supplied Reagents and Equipment

- Benchtop microcentrifuge
- 95% ethanol
- Isopropanol
- $\beta$ -mercaptoethanol
- RNase-free DNase I (optional)
- TE Buffer and lysozyme (Bacteria)
- Resuspension buffer with lyticase (Yeast)
- Liquid nitrogen, mortar and pestle (Tissue, Fungi, Plant)
- 70% ethanol (Tissue and Plant)

### Storage Conditions

All solutions should be kept tightly sealed and stored at room temperature. All the reagents should remain stable for at least 1 year in their unopened containers.

### Shipping Conditions

The RNA/DNA/Protein Purification Kit is shipped at room temperature.

Cat #	Description	Quantity
23500	RNA/DNA/Protein Purification Kit	20 preps

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