

# RNA/DNA/Protein Purification Kit

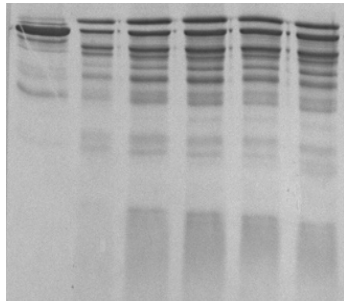
## “The 3-in-1 Kit”



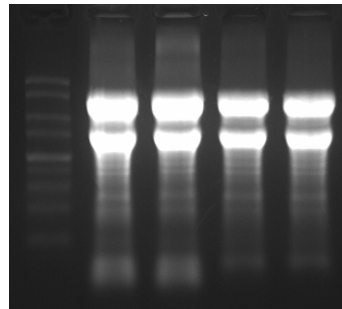
# Norgen's RNA/DNA/Protein Purification Kit

Sequentially purify total RNA, genomic DNA and proteins from a single sample of cultured animal cells, animal & plant tissue, blood, bacteria, yeast or fungi.

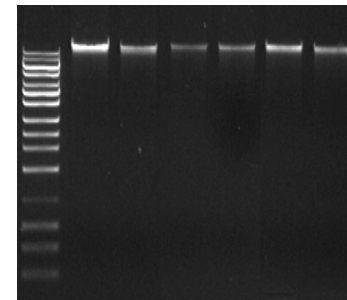
1. Proteome  
*Total Proteins*



2. Transcriptome  
*Total RNA*



3. Genome  
*Genomic DNA*

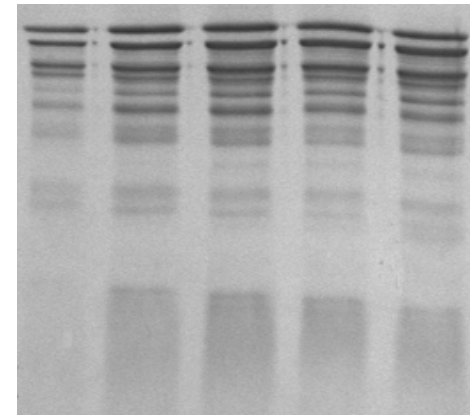
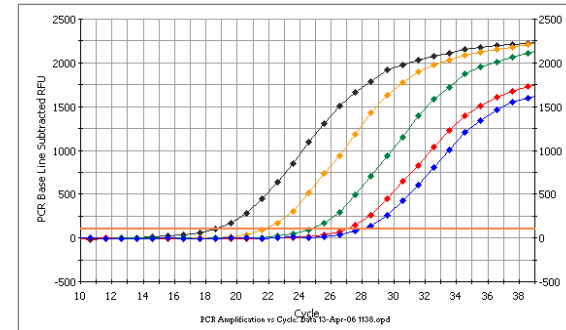


# How is this Traditionally Done?

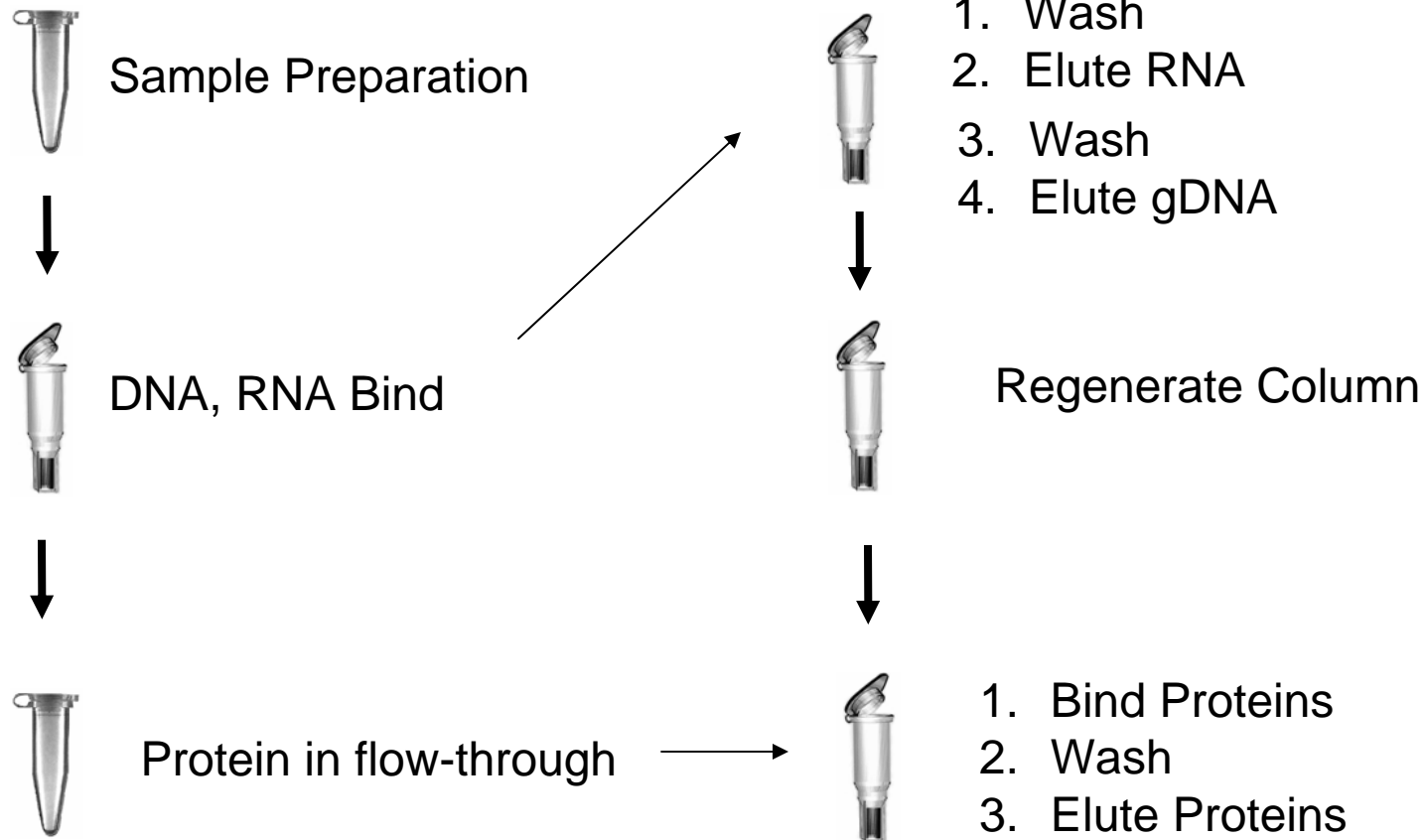
- Researches will divide a sample into 3 separate fractions and perform 3 different isolations
  1. gDNA
  2. RNA
  3. Protein
- Disadvantages:
  - Time consuming
  - Often not enough sample is available to perform 3 separate procedures
  - Inconsistent results: RNA and proteins not being isolated from the same sample, variability is introduced

# Downstream Applications

- RNA
  - Reverse-transcription PCR
  - *In vitro* transcription
  - Real-time PCR
  - Northern blotting
  - Expression array assays
- gDNA
  - PCR
  - Sequencing
  - Southern blotting
  - SNP analysis
- Proteins
  - SDS-PAGE
  - Western blotting
  - Protein arrays
  - Mass Spectrometry



# 3-in-1 Isolation Kit Protocol



Time: < 20 minutes for 1 sample

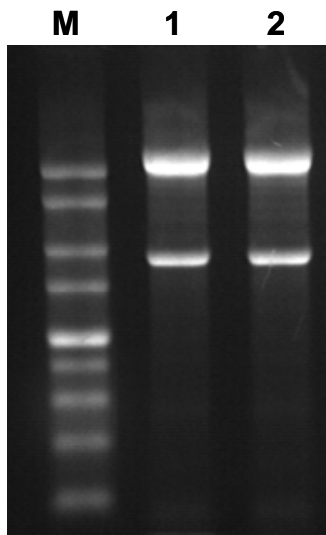
# Features & Benefits

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 all isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.
Isolate from small samples	Simultaneous 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 < 20 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	Process cultured animal cells, tissue, blood, bacteria, yeast, fungi and plants.

# 1. Reduce Variability

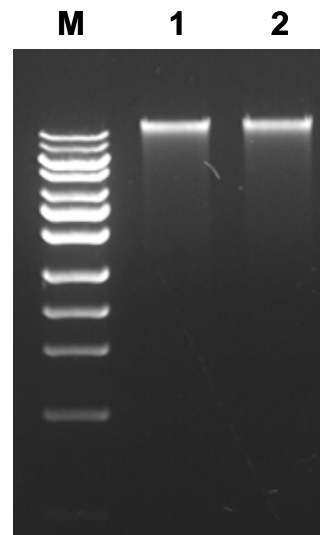
Simultaneous isolation of total RNA, gDNA and proteins from a single sample of  $5 \times 10^5$  HeLa cells

## Total RNA



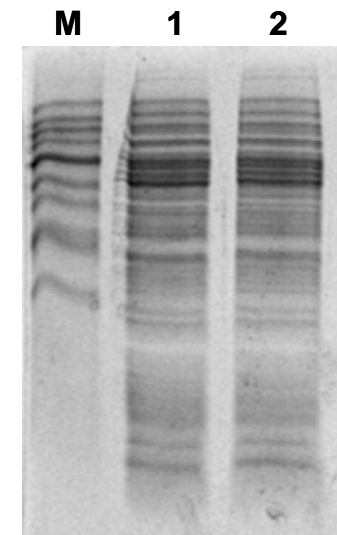
1X MOPS 1% agarose gel

## Genomic DNA



1% agarose gel

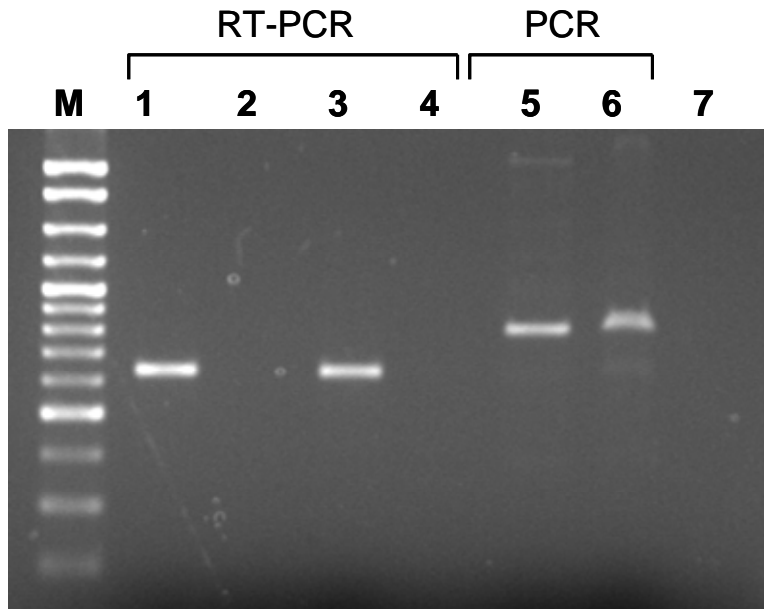
## Proteins



12% SDS-PAGE gel

## 2. Isolate High Quality RNA and DNA

RNA fraction is free of gDNA contamination



RT-PCR and PCR to detect GAPDH gene in RNA and gDNA isolated from HeLa cells

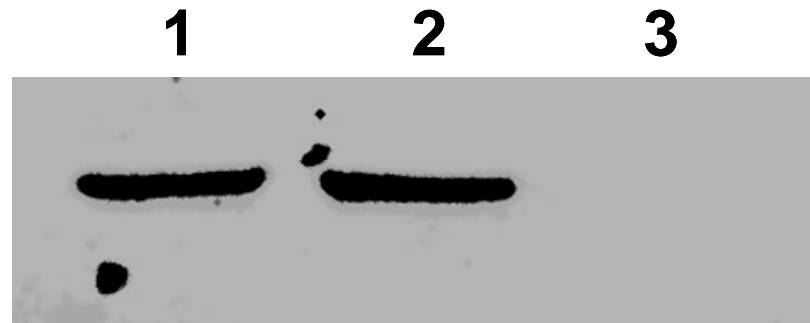
Lanes 1 and 3 – successful RT-PCR using RNA

Lanes 2 and 4 – No amplification in the absence of reverse transcriptase, thus no gDNA in RNA fraction

Lanes 5 and 6 – successful PCR using gDNA as template – larger size due to intron

Lane 7 – No template control

# 3. Isolate High Quality Total Proteins



Western blot analysis was performed on proteins isolated from HeLa cells using antibodies against GAPDH. Lanes 1 and 2 contain duplicate samples, and Lane 3 is a negative control.

# Who May Benefit?

- Researches who are interested in studying the genome, proteome and transcriptome of a single sample
- Total RNA and Proteins – *Studies of gene expression*
  - Gene silencing experiments
  - mRNA knockdowns
  - Analyzing a regulatory pathway
  - Correlating RNA and protein expression levels
- Genomic DNA and Proteins
  - Biomarker discovery
  - Test effects of different mutations on protein levels in cultured cell lines
- RNA and DNA - *Epigenetics*
  - Studying the degree of methylation of a particular region of DNA and how it effects transcription of a particular gene
  - Proteins also isolated in some cases for further expression analysis

# Who May Benefit? continued

- Researches who are isolating macromolecules from precious, difficult to obtain or very small samples, as it eliminates the need to fractionate the sample
  - Exfoliated cells from bodily fluids
    - Urine
    - Cerebral spinal
  - Diagnostics
    - Viral
    - Bacterial
    - Fungal
  - Biopsy materials
  - Single foci; cell culture characterization

# Comparison with Traditional Methods

Criteria	Traditional Methods	Norgen's Kit
Cost	Expensive, need to purchase 3 different kits	Reduced cost, purchase of a single kit
Speed	Time consuming – need to perform 3 separate procedures, could take hours	Time savings – obtain all 3 molecules in <20 minutes
Sample Variation	Introduces sample variation as DNA, RNA and proteins not isolated from the same sample/lysate	No sample variation. RNA, DNA and proteins isolated from the same sample/lysate.
Sample Size	Requires larger sample size – samples must be separated into 3 fractions. Could pose a problem for rare, difficult to obtain or small samples	Can isolate all 3 molecules sequentially from a single small sample

# Highlights

- Novel
  - The only complete, ready-to-use kit available on the market capable of separating and column-purifying DNA, RNA and protein from the same sample
  - No additional protocols or reagents required
- Fast
  - Sample isolation completed in less than 20 minutes