Ver 1.0

Cat.No. 305-101

Hybrid-R™

For total RNA isolation from tissues and cultured cells

RNA PURIFICATION HANDBOOK

GeneAll

Customer & Technical Support

Do not hesitate to ask us any question.

We thank you for any comment or advice.

Contact us at

www.geneall.com

Tel : 82-2-407-0096

Fax : 82-2-407-0779

E-mail(Order/Sales) : sales@geneall.com

E-mail(Tech. Info.) : tech@geneall.com

Visit GeneAll® Community

www.geneall.com

www.geneall.co.kr

Trademarks

AmpONE™, Exfection™, Exgene™, Expin™, Exprep™, EzClear™, EzSep™, *GenEx*™, Hybrid-Q™, Hybrid-R™, RiboEx™, Riboclear™, Ribospin™ are trademarks of GeneAll Biotechnology co., ltd.

This protocol handbook is included in :

GeneAll® Hybrid-R™ (305-101) total RNA purification kit

Visit www.geneall.com or www.geneall.co.kr for FAQ, QnA and more information.

Brief protocol

GeneAll

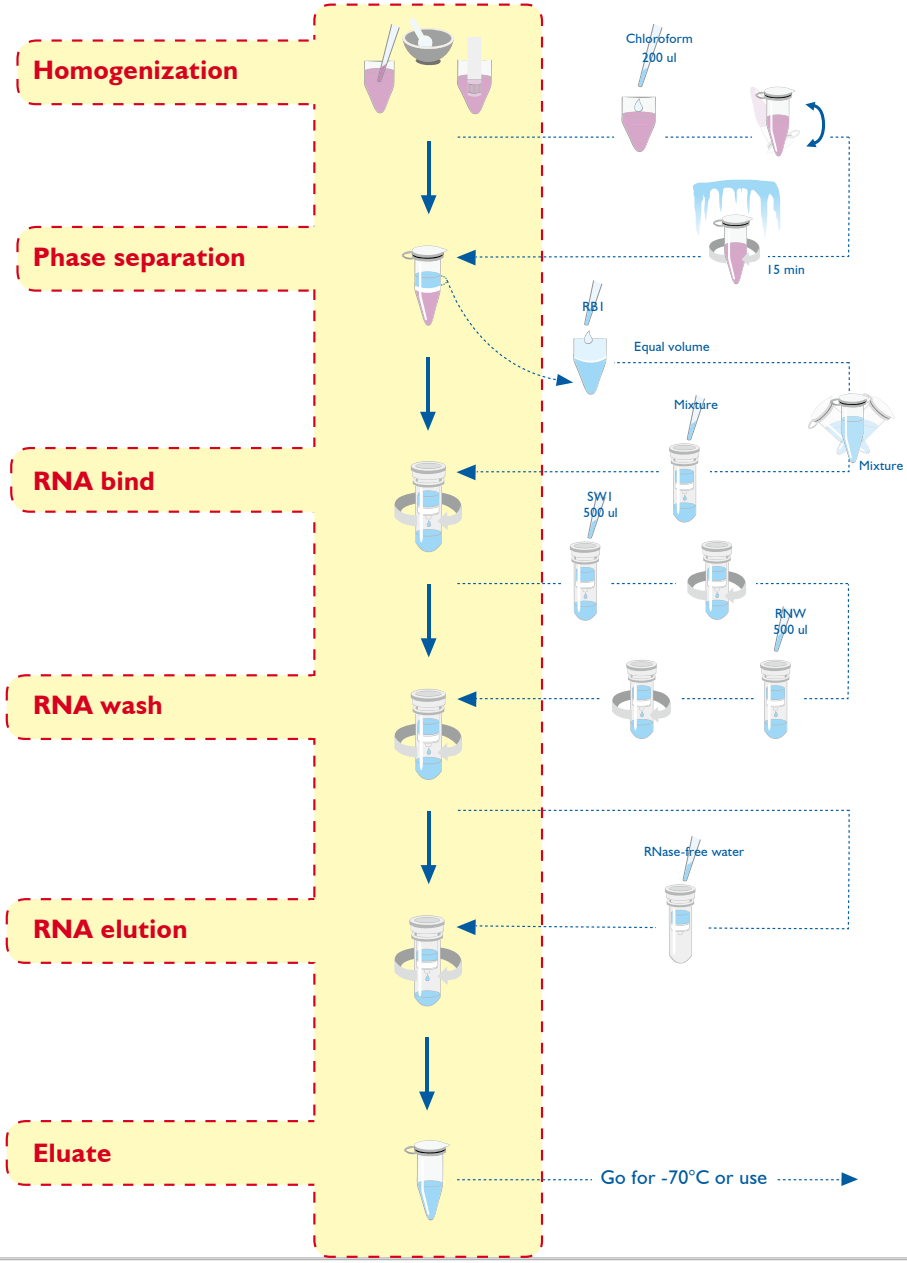
GENEALL BIOTECHNOLOGY CO., LTD

Homogenization	Homogenize ~ 100 mg / ml tissue samples or ~ 1 x 10^7 cells. Incubate the homogenate for 5 minutes at RT
Phase separation	Add 200 ul chloroform Incubate the mixture for 2 minutes at RT Centrifuge at 12,000 x g for 15 minutes at 4°C, then transfer the aqueous phase to a fresh tube.
RNA bind	Add 1 volume of buffer RB1 to the sample and mix thoroughly by inverting. Transfer (up to 700 ul) the mixture to a mini spin column and centrifuge at ≥ 10,000 x g for 30 seconds.
RNA wash	Add 500 ul of buffer SW1 to the mini spin column and centrifuge at ≥ 10,000 x g for 30 seconds. Add 500 ul of buffer RNW to the mini spin column and centrifuge at ≥ 10,000 x g for 30 seconds. Centrifuge at ≥ 10,000 x g for an additional 1 minute.
RNA elution	Add 50 ~ 100 ul of free-water to the center of the membrane in the mini spin column. Let it stand for 1 minute. Centrifuge at ≥ 10,000 x g for 1 minute.

Brief protocol

GeneAll

GENEALL BIOTECHNOLOGY CO., LTD



INDEX

Hybrid-R™ Kit Contents

100 preps
Cat.No. 305-101

Components	Quantity	Storage
RiboEx™	100 ml	4°C
Buffer RB1	70 ml	Room temperature
Buffer SW1	55 ml	
Buffer RNW	55 ml	
RNase-free water	20 ml	
GeneAll Column type B	100	
2 ml collection tube	100	
1.5 ml collection tube	100	

Materials **Not Provided**

Reagent

* Chloroform or 1-bromo-3-chloropropane(BCP)
* Tissue storage buffer to protect RNA from RNase

Disposable material

* RNase-free pipet tips
* Disposable gloves

Equipment

* Equipment for homogenizing solid tissue
* Microcentrifuge for centrifugation at 4°C and at room temperature
* Suitable protector (ex; lab coat, disposable gloves, goggles, etc)

Quality Control

Hybrid-R™ is manufactured in strictly clean condition, and its degree of cleanness is monitored periodically. For consistency of product, the quality certification process is carried out from lot to lot thoroughly and only the qualified is approved to be delivered.

Storage Conditions

Hybrid-R™ kit except RiboEx™ solution should be stored at room temperature. All components are stable for 1 year.
RiboEx™ solution should be stored at 2 to 8°C for optimal performance.

User Precautions

RiboEx™ contains phenol which is poisonous and guanidine salt which is an irritant. When working with Hybrid-R™, use gloves and eye protector to avoid contact with skin or clothing and inhalation of vapor. In case of contact, wash immediately with plenty of water and seek medical advice.

Product Disclaimer

GeneAll® Hybrid-R™ kit is for research use only, not for use in diagnostic procedure.

Product Specifications

Specification	Hybrid-R™
Type	Spin
Maximum amount of starting samples	~ 100 mg or ~ 1 x 10^7 cells
Maximum loading volume	~ 700 ul
Minimum elution volume	~ 30 ul
Maximum binding capacity	~ 500 ug

Preventing RNase Contamination

RNase can be introduced accidentally into a RNA preparation. Wear disposable gloves always, because skin often contains bacteria that can be a source of RNase. Use sterile, disposable plasticwares and automatic pipettes reserved for RNA work to prevent cross-contamination with RNase on shared equipment.

Product Description

Hybrid-R™ is a complete kit with ready-to-use reagent for the isolation of total RNA from tissue samples or cultured cells.

This kit utilizes the lysis method of RiboEx™ which has a powerful ability of lysis and the purification method based on glassfiber membrane technology. Fast and convenient procedure of Hybrid-R™ takes only 30 minutes for complete preparations of pure RNA.

Samples are homogenized in RiboEx™, a monophasic solution containing phenol and guanidine salt, which rapidly lyse cells and inactivates nucleases. Addition of chloroform brings about a separation of the homogenate into aqueous and organic phases. RNA locates in the aqueous phase while DNA and protein remain in the interphase and organic phase. The aqueous phase including RNA is mixed with buffer RB1, RNA binding buffer, and then bind to a spin column. After washing with buffer SW1 and RNW, RNA is eluted by RNase-free water.

Hybrid-R™ is suitable for RNA preparation from up to 100 mg tissues or 1×10^7 cultured cells. The maximum yield reaches 500 ug per 100 mg tissues. The purified RNA is suitable for the isolation of Poly A RNA, Northern blotting, Dot blotting, in vitro Translation, cloning, RT-PCR, RNase protection assays, and other analytical procedures.

Hybrid-R™

PROTOCOL
for total RNA isolation

1. Homogenize ~ 100 mg tissue samples in 1 ml RiboEx™.
Homogenize ~ 1 x 10^7 cells in 1 ml RiboEx™.

Tissue samples

Homogenize ~ 100 mg of tissue samples in 1 ml RiboEx™ using homogenizer. The sample volume should not exceed 10% (w/v) of the volume of RiboEx™ used for homogenization.

Handling fresh tissue

Immediately after dissection, inactivate RNases by any one of the following treatments.

* Homogenize in RiboEx™ immediately.
* Freeze rapidly in liquid nitrogen.
* Submerge in a tissue storage buffer to protect RNA from RNases.

Cell samples

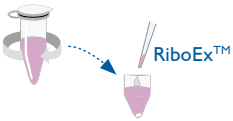
<u>*Cells grown in Monolayer*</u>

Pour off media, add 1 ml of RiboEx™ per 10 cm^2 of culture dish area. Pass the cell lysate several times through a pipette. An insufficient amount of RiboEx™ may result in contamination of the isolated RNA with DNA.

Cells grown in suspension

Pellet cells by centrifugation, then lyse in 1 ml of RiboEx™ per ~ 1 x 10^7 animal cells, or 10^7 bacterial cells, by repetitive pipetting or vortexing.

* Do not wash cells before lysing with RiboEx™ as this may contribute to mRNA degradation.



2. Incubate the homogenate for 5 minutes at room temperature.

This step allows nucleoprotein complexes to completely dissociate.

Homogenized samples can be stored at -70°C for at least one month.

3. *(optional :)* Centrifuge at 12,000 x g for 10 minutes at 4°C and transfer the supernatant to a fresh tube.

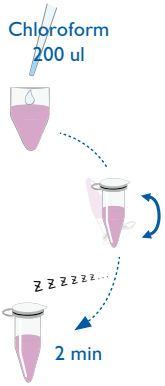
This optional step is only required for homogenate with high contents of proteins, fats, polysaccharides or extracellular materials such as muscles, fat, tissue, and tuberous parts of plants.

The resulting pellet contains extracellular membranes, polysaccharides, and high molecular weight DNA, while the supernatant contains RNA.

Fat tissue samples will form a layer on top of the aqueous phase, therefore, remove and discard this layer.

4. Add 0.2 ml of chloroform per 1 ml of RiboEx™. Shake vigorously for 15 seconds and store for 2 minutes at room temperature.

Alternatively, 0.1 ml of BCP (1-bromo-3-chloropropane) can be used in place of chloroform.



5. Centrifuge at 12,000 x g for 15 minutes at 4°C and transfer the aqueous phase to a fresh tube.

The mixture will be separated into three phases; a lower layer, an interphase, and a colorless upper aqueous layer. The upper aqueous layer is about 50% of the volume of RiboEx™ used for homogenization.

Centrifugation at temperatures >8°C may cause some DNA to partition in the aqueous phase.

6. Add 1 volume of buffer RB1 to the sample and mix thoroughly by inverting.
Do not centrifuge.

7. Transfer upto 700 ul of the mixture to a mini spin column.

8. Centrifuge at ≥ 10,000 x g for 30 seconds at room temperature.

Discard the pass-through and reinsert the mini spin column back into the same tube.

9. Repeat step 7 ~ 8 using the remainder of the sample.

Discard the pass-through and reinsert the mini spin column back into the same tube.

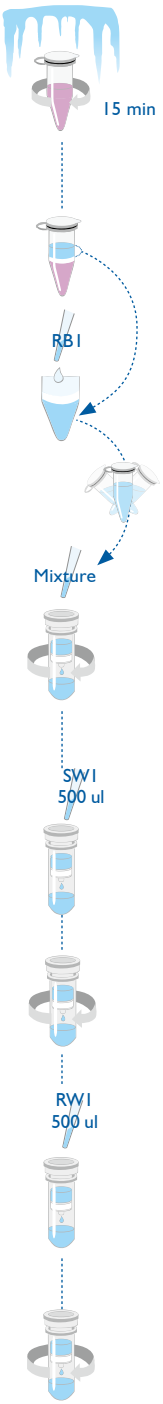
10. Add 500 ul of buffer SW1 to the mini spin column.

11. Centrifuge at ≥ 10,000 x g for 30 seconds at room temperature.

12. Add 500 ul of buffer RNW to the mini spin column.

13. Centrifuge at ≥ 10,000 x g for 30 seconds at room temperature.

Discard the pass-through and reinsert the mini spin column back into the same tube.



14. Centrifuge at ≥ 10,000 x g for an additional 1 minute at room temperature to remove residual wash buffer. Transfer the mini spin column to a new 1.5 ml tube (provided).

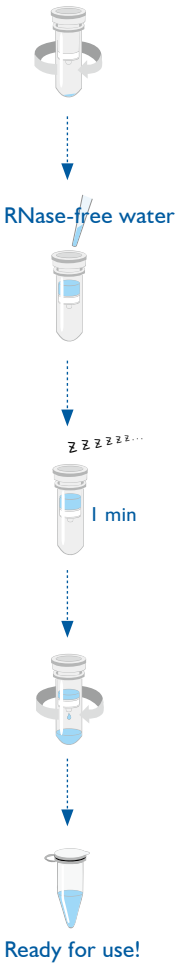
Residual ethanol may interfere with downstream reactions. Care must be taken at this step for eliminating the carryover of buffer RNW.

15. Add 50 ~ 100 ul of RNase-free water to the center of the membrane in the mini spin column. Let it stand for 1 minute.

16. Centrifuge at ≥ 10,000 x g for 1 minute at room temperature.

Purified RNA can be stored at 4°C for immediate analysis and can be stored at -70°C for long term storage.

The purified RNA is free of DNA and proteins, and A_{260}/A_{280} will be between 1.8 and 2.1.



Troubleshooting Guide

Facts	Possible Causes	Suggestions
Low or no yield	**Poor quality of starting material**	Process the sample immediately after harvest from animal. Thaw the frozen sample directly in RiboEx™.
	Sample not homogenized completely	Make sure no particulate matter remains. Be sure to incubate for 5 minutes at room temperature after homogenization.
	Some aqueous phase left	Perform second extraction with the remaining aqueous phase.
	Incorrect elution conditions	Add RNase-free water to the center of the mini spin column membrane and perform incubation for 1 minute before centrifugation.
Degradation of RNA	**Sample manipulated too much before the addition of RiboEx™**	Process the sample immediately after harvest from animal. For cultured cell, minimize washing steps. Add RiboEx™ directly to plates. Do not trypsinize cells.
	Improper storage of RNA	Store isolated RNA at -70°C, Do not store at -20°C.
	Reagent or disposable is not RNase-free	Make sure to use RNase free products only.
Low A_{260}/A_{280} (<1.6)	**Aqueous phase was contaminated with the phenol phase**	Avoid carryover when transferring the aqueous phase to a fresh tube.

Facts	Possible Causes	Suggestions
Low A_{260}/A_{280} (<1.6)	**Sample not completely homogenized with RiboEx™**	Use 1 ml RiboEx™ for up to 100 mg tissue or upto 10^7 cells. Be sure to incubate sample for 5 minutes at room temperature after homogenization.
Contamination of DNA	**The interphase was co-transfered by mistake**	Be sure not to transfer any of the interphase (containing DNA) to the aqueous phase.
	Insufficient RiboEx™ used	Use 1 ml RiboEx™ for 100 mg tissue or 10^7 cells.
	Temperature was too high during centrifugation	The phase separation should be performed at 4°C to allow optimal phase separation and removal of genomic DNA from the aqueous phase.
Cells not detached completely from flask after addition of RiboEx™	**This can be seen with some strongly adherent cells**	After addition of RiboEx™, let cells sit 2 to 3 minutes. Scrape cells with a scraper. Incubate for several minutes. Collect and repeatedly pipette cells over flask surface. Then transfer homogenate to a tube.
RNA does not perform well in downstream application	**Residual ethanol remains in eluate**	To remove any residual ethanol included in buffer RNW from mini spin column membrane, Centrifuge again (step 14).

APPENDIX I. Total RNA purification method using RiboEx™ solution only (Manual method)

Hybrid-R™ is simplified method of RiboEx™, manual method, using mini spin column. Therefore, RiboEx™, lysis buffer of Hybrid-R™, can be used for total RNA purification, independently. This method gives an improved yield up to 30% but the purity will be reduced slightly. Moreover, the whole experimental time will be extended over 1 hour because of the prolonged precipitation and washing steps.

As your experimental purpose, you can use the appropriate method.

The procedure of total RNA purification using RiboEx™ is shown below.

Materials Not Provided

For RNA isolation

* Nuclease-free Water
* Equipment for homogenizing solid tissue
* RNase-free centrifuge tubes
* Chloroform or 1-bromo-3-chloropropane(BCP)
* 100% isopropanol, ACS grade or better
* 100% ethanol, ACS grade or better
* High salt precipitation solution for plant (0.8 M sodium citrate and 1.2 M NaCl)

Protocol for RNA isolation

1. **Homogenize 50 ~ 100 mg tissue samples in 1 ml RiboEx™.**
   Homogenize 5 ~ 10 x 10^6 cells in 1 ml RiboEx™.

   Tissue samples

   Homogenize tissue samples in 1 ml RiboEx™ per 50 ~ 100 mg of tissue using homogenizer. The sample volume should not exceed 10% of the volume of RiboEx™ used for homogenization.

   Handling fresh tissue

   Immediately after dissection, inactivate RNases by any one of the following treatments.

   * Homogenize in RiboEx™ immediately.
   * Freeze rapidly in liquid nitrogen.
   * Submerge in a tissue storage buffer to protect RNA from RNase.

Cell samples

Cells grown in Monolayer

Pour off media, add 1 ml of RiboEx™ per 10 cm^2 of culture dish area. Pass the cell lysate several times through a pipette. An insufficient amount of RiboEx™ may result in contamination of the isolated RNA with DNA.

Cells grown in suspension

Pellet cells by centrifugation, then lyse in 1 ml of RiboEx™ per 5 ~ 10 x 10^6 animal, plant, or yeast cells, or per 10^7 bacterial cells, by repetitive pipetting or vortexing.

* Do not wash cells before lysing with RiboEx™ as this may contribute to mRNA degradation.

2. **Incubate the homogenate for 5 minutes at room temperature.**
   This step allows nucleoprotein complexes to completely dissociate.
   Homogenized samples can be stored at -70°C for at least one month.

3. ***(Optional :)* Centrifuge at 12,000 x g for 10 minutes at 4°C and transfer the supernatant to a fresh tube.**
   This optional step is only required for homogenate with high contents of proteins, fats, polysaccharides or extracellular materials such as muscles, fat, tissue, and tuberous parts of plants. The resulting pellet contains extracellular membranes, polysaccharides, and high molecular weight DNA, while the supernatant contains RNA.
   Fat tissue samples will form a layer on top of the aqueous phase, therefore, remove and discard this layer.

4. **Add 0.2 ml of chloroform per 1 ml of RiboEx™. Shake vigorously for 15 seconds, store for 2 minutes at room temperature.**
   Alternatively, 0.1 ml of BCP (1-bromo-3-chloropropane) can be used in place of chloroform.

5. **Centrifuge at 12,000 x g for 15 minutes at 4°C, then transfer the aqueous phase to a fresh tube.**
   The mixture separates into a lower layer, an interphase, and a colorless upper aqueous layer. The upper aqueous layer is about 50% of the volume of RiboEx™ used for homogenization. Centrifugation at above 8°C may cause some DNA to partition in the aqueous phase.

6. **Add 0.5 ml of isopropyl alcohol per 1 ml of RiboEx™ used for the initial homogenization and gently mix the solution by inverting, 5 ~ 10 times.**
   Proteoglycan and polysaccharide contamination
   To RNA precipitate from tissue with high content of proteoglycans and/or polysaccharides

(after step 5), these contaminating compounds from the isolated RNA are removed by the modified method.
Add to the aqueous phase 0.4 ml of isopropyl alcohol and 0.1 ml of a high salt precipitation solution (0.8 M sodium citrate and 1.2 M NaCl) per 1 ml RiboEx™. After mixing this solution, proceed with the step 7.

This modified precipitation effectively precipitates RNA and maintains proteoglycans and polysaccharides in a soluble form. This procedure should only be used if the sample is known to have a high content of proteoglycans and polysaccharides. To isolate pure RNA from plant material containing a very high level of polysaccharides, the modified precipitation should be combined with an additional centrifugation of the initial homogenate.

7. **Incubate samples for 10 minutes at room temperature.**

8. **Centrifuge at 12,000 x g for 10 minutes at 4°C, and discard the supernatant.**
   Carefully remove the supernatant without disturbing the pellet.
   Precipitated RNA forms a gel-like or white pellet on the side and bottom of the tube.
   To increase yield, store sample for 30 minutes ~ overnight at -20°C.

9. **Add 1ml of 75% ethanol per 1ml RiboEx™ to wash the RNA pellet.**
   The RNA precipitate can be stored in 75% ethanol at 4°C for one week, or at -20°C for at least one year.

10. **Centrifuge at 7,500 x g for 5 minutes. Carefully discard the supernatant, ethanol, and air-dry the RNA pellet for 5 minutes.**
    The RNA pellet is very loose at this point and care must be taken to avoid missing the pellet.
    Do not completely dry the RNA pellet as this will greatly decrease its solubility.
    Ethanol should be completely removed to perform perfect downstream application.

11. **Dissolve RNA in DEPC-treated water or in 0.5% SDS solution by incubating for 10 ~15 minutes at 56°C.**
    The resuspension volume is applied to samples. For example, enough resolution volume is 50 ~ 100 ul per 1 ml reaction for E. coli, cultured cell, or plant, or 300 ~ 500 ul per 1 ml reaction for tissue. For immediate analysis, store at 4°C and for long term storage, store at -70°C.
    For best results in RT-PCR, dissolve the RNA in DEPC-treated water not included EDTA.
    The final precipitation of total RNA will be free of DNA and proteins, and will have a $_{260/280}$ O.D. ratio of 1.8 to 2.2.

APPENDIX 2. Confirmation of RNA yield and purity by UV absorbance

Concentration of RNA

The concentration of RNA can be determined by using the absorbance of spectrophotometer at 260nm. For the convenient measurement, we recommend using the NanoDrop which can also reduce your RNA sample and time. If not, you need to dilute the RNA samples to measure the concentration through traditional spectrophotometer. The value of A_{260} should be between 0.15 and 1.00. Be sure to calibrate the spectrophotometer with the same solution used for dilution. An absorbance of 1 at 260nm is about 40 ug RNA / ml at a neutral pH. Therefore, the concentration of RNA was calculated by the formula shown below.

A_{260} X dilution factor X 40 = RNA ug / ml

Purity of RNA

To confirm the RNA purity, you should read the ratio of A_{260}/A_{280}. Pure RNA is in the range of 1.8~2.2.

APPENDIX 3. Formaldehyde agarose gel electrophoresis (Denaturing gel method)

A denaturing agarose gel is routinely used for the assessment of the quality of an RNA preparation. After preparation, RNA forms secondary structure via intramolecular base pairing. Therefore, it is very difficult to get the exact result of electrophoresis because of migrating inaccuracy. However, the denaturing gel denatures the secondary structure of RNA and makes an accurate migration.

To confirm the RNA band, the gel should be transferred to a UV transilluminator after electrophoresis. Mainly, two RNA bands are shown. In case of animal sample, the 28S and 18S rRNA bands are confirmed on the gel. If they are intact, the RNA bands should be sharp and the intensity of upper band should be about twice that of the lower band.

Prepare the denaturing gel

1. Put 1g agarose in 72 ml water and heat to dissolve thoroughly.
2. Cool to 60°C.
3. Add 10 ml of 10 X MOPS buffer, 18 ml of 37% formaldehyde, and 1 ul of a 10 mg/ml ethidium bromide (EtBr).
4. Mix well then pour the gel into the gel tray and cool to solidify it.
5. Transfer the solidified gel from tray to tank, and add enough 1 X MOPS running buffer to cover the gel.

Prepare the RNA sample

1. Make the mixture.
   ? ul RNA (up to 20 ug)
   2 ul 10 X MOPS electrophoresis buffer
   4 ul formaldehyde
   10 ul formamide
2. Incubate the mixture for 15 minutes at 65°C.
3. Chill the sample for 5 minutes in ice.
4. Add 2 ul of 10 X formaldehyde gel-loading dye to the mixture.
5. Load the mixture in a denaturing gel which is covered with a sufficient 1 X MOPS electrophoresis buffer.
6. Run the gel and confirm the RNA band on transilluminator.
   Occasionally, gel destaining may be needed to increase the visibility of the bands of RNA in dH_2O for several hours.

Composition of buffers

- 10 X MOPS buffer
  0.2 M MOPS
  20 mM sodium acetate
  10 mM EDTA
  pH to 7.0 with NaOH

- 10 X formaldehyde gel-loading dye
  50% glycerol
  10 mM EDTA
  0.25% (w/v) bromophenol blue
  0.25% (w/v) xylene cyanol FF

*** Caution**

When working with these chemicals, always use gloves and eye protector to avoid contact with skin and cloth. Especially, formaldehyde and ethidium bromide (EtBr) should be handled in a fume hood.

Ordering Information

Products	Size	Type	Cat. No.
GeneAll® *Hybrid-Q™* *for rapid preparation of plasmid DNA*			
Plasmid Rapidprep	50 200	mini / spin	100-150 100-102
GeneAll® *Exprep™* *for preparation of plasmid DNA*			
Plasmid SV mini	50 200 1,000	spin / vacuum	101-150 101-102 101-111
Plasmid SV Midi**	26 50 100	spin / vacuum	101-226 101-250 101-201
Plasmid SV Quick	50 200 1,000	mini / spin	101-050 101-002 101-011
GeneAll® *Exfection™* *for preparation of highly pure plasmid DNA*			
Plasmid LE mini *(Low Endotoxin)*	50 200	spin / vacuum	111-150 111-102
Plasmid LE Midi* *(Low Endotoxin)*	26 100	spin / vacuum	111-226 111-201
Plasmid EF Midi* *(Endotoxin Free)*	20 100	spin	121-220 121-201
GeneAll® *Expin™* *for purification of fragment DNA*			
Gel SV	50 200	mini / spin / vacuum	102-150 102-102
PCR SV	50 200	mini / spin / vacuum	103-150 103-102
CleanUp SV	50 200	mini / spin / vacuum	113-150 113-102
Combo GP	50 200	mini / spin / vacuum	112-150 112-102
GeneAll® *Exgene™* *for isolation of total DNA*			
Tissue SV mini (*plus!*)*	100 250	spin / vacuum	104(9)-101 104(9)-152
Tissue SV Midi (*plus!*)**	26 100	spin / vacuum	104(9)-226 104(9)-201
Tissue SV MAXI (*plus!*)**	10 26	spin / vacuum	104(9)-310 104(9)-326
Blood SV mini	100 250	spin / vacuum	105-101 105-152
Blood SV Midi**	26 100	spin / vacuum	105-226 105-201

Products	Size	Type	Cat. No.
GeneAll® *Exgene™* *for isolation of total DNA*			
Blood SV MAXI**	10 26	spin / vacuum	105-310 105-326
Cell SV mini	100 250	spin / vacuum	106-101 106-152
Cell SV MAXI**	10 26	spin / vacuum	106-310 106-326
Clinic SV mini	100 250	spin / vacuum	108-101 108-152
Clinic SV Midi	26 100	spin / vacuum	108-226 108-201
Clinic SV MAXI**	10 26	spin / vacuum	108-310 108-326
Plant SV mini	100 250	spin / vacuum	117-101 117-152
Plant SV Midi**	26 100	spin / vacuum	117-226 117-201
Plant SV MAXI**	10 26	spin / vacuum	117-310 117-326
GMO SV mini	50 200	spin / vacuum	107-150 107-102
GeneAll® *GenEx™* *for isolation of total DNA*			
GenEx™ B	100† 500† 100††	mini / solution mini / solution MAXI / solution	220-101 220-105 220-301
GenEx™ C	100† 500† 100††	mini / solution mini / solution MAXI / solution	221-101 221-105 221-301
GenEx™ T	100† 500† 100††	mini / solution mini / solution MAXI / solution	222-101 222-105 222-301
GeneAll® *RiboEx™* *for preparation of total RNA*			
RiboEx™	100 200	solution	301-001 301-002
Hybrid-R™	50	spin	305-101
RiboEx™ LS	100 200	spin / vacuum	302-001 302-002
Riboclear™	50	spin	303-150
Ribospin ™	50	spin	304-150
Ribospin vRD™	50	spin	302-150

Ordering Information

Products	Size	Type	Cat. No.
GeneAll® *AmpONE™* *for PCR amplification*			
Taq DNA polymerase	250 U 500 U 1,000 U	(2.5 U/μℓ)	501-025 501-050 501-100
α-Taq DNA polymerase	250 U 500 U 1,000 U	(2.5 U/μℓ)	502-025 502-050 502-100
Pfu DNA polymerase	250 U 500 U 1,000 U	(2.5 U/μℓ)	503-025 503-050 503-100
Taq Master mix	2x	0.5 ml x 2 tubes	511-010
α-Taq Master mix	2x	0.5 ml x 2 tubes	512-010
Taq Premix	20 μℓ 50 μℓ	96 tubes	521-200 521-500
α-Taq Premix	20 μℓ 50 μℓ	96 tubes	522-200 522-500
dNTP mix	500 μℓ	2.5 mM each	509-020
dNTP set (set of dATP, dCTP, dGTP and dTTP)	1 ml x 4 tubes	100 mM	509-040

* Each dNTP is available

** GeneAll® Tissue SV mini, Midi, and MAXI plus! kit provide the additional methods for the purification from animal whole blood.*
*** GeneAll® SV Midi / MAXI kits require the centrifuge which has a swinging-bucket rotor and ability of 4,000 ~ 5,000 xg.*
† On the basis of DNA purification from 300 ul whole blood, 2 x 10^6 cells or 10 mg animal tissue.
†† On the basis of DNA purification from 10 ml whole blood. 1 x 10^8 cells or 100 mg animal tissue.

Note

www.geneall.com

Banseok Bld., 128 Oguem-dong,
Songpa-gu, Seoul, KOREA 138-859
E-MAIL sales@geneall.com
T E L 82-2-407-0096
F A X 82-2-407-0779

Edited by SR
Designed by Joo Sang Mi