Ver 1.2

HB 3410

Ribospin™ II

RNA PURIFICATION HANDBOOK

GeneAll

Customer & Technical Support

Should you have any further questions, do not hesitate to contact us.

We appreciate your comments and advice.

Contact Information

www.geneall.com

Tel : 82-2-407-0096

Fax : 82-2-407-0779

Sales Email : sales@geneall.com

Technical Information Email : tech@geneall.com

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This protocol handbook is included in :

GeneAll® Ribospin™ II (314-150, 314-103)

Visit www.geneall.com for FAQ, Q&A and more information.

Brief Protocol

Animal Cell

1. Prepare animal cell (5×10^6~1×10^7 cells)
2. Add 350 µl (700 µl) Buffer RAL
3. Add 1 volume of 70% ethanol
4. Transfer the lysate into Column Type F (mini)
5. Centrifuge at ≥10,000 x g for 1 min
6. Add 350 µl Buffer RW
7. Centrifuge at ≥10,000 x g for 30 sec
8. Apply 70 µl DNase I reaction mixture into mini column
9. Incubate for 10 min at RT
10. Add 350 µl Buffer RW
11. Centrifuge at ≥10,000 x g for 30 sec
12. Add 500 µl Buffer RSW
13. Centrifuge at ≥10,000 x g for 30 sec
14. Repeat step 12~13
15. Additional centrifuge at >13,000 x g for 1 min
16. Apply 50 µl Nuclease-free water into mini column
17. Incubate for 1 min at RT
18. Centrifuge at ≥10,000 x g for 1 min

Animal Tissue

1. Homogenize animal tissue (20~30 mg) in 350 µl (700 µl) Buffer RAL (including 1% β-mercaptoethanol)
2. Centrifuge at ≥10,000 x g for 2 min
3. Transfer the supernatant into a new microcentrifuge tube
4. Add 1 volume of 70% ethanol
5. Transfer the lysate into Column Type F (mini)
6. Centrifuge at ≥10,000 x g for 1 min
7. Add 350 µl Buffer RW
8. Centrifuge at ≥10,000 x g for 30 sec
9. Apply 70 µl DNase I reaction mixture into mini column
10. Incubate for 10 min at RT
11. Add 350 µl Buffer RW
12. Centrifuge at ≥10,000 x g for 30 sec
13. Add 500 µl Buffer RSW
14. Centrifuge at ≥10,000 x g for 30 sec
15. Repeat step 13~14
16. Additional centrifuge at >13,000 x g for 1 min
17. Apply 50 µl Nuclease-free water into mini column
18. Incubate for 1 min at RT
19. Centrifuge at ≥10,000 x g for 1 min

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Kit Contents

Cat. No.	314-150	314-103	Storage
Type	mini	mini	
Components	Quantity		
No. of preparation	50	300	Room temperature (15~25°C)
Column Type F (mini) (with collection tube)	50	300	
1.5 ml microcentrifuge tube	50	300	
Buffer RAL	40 ml	240 ml	
Buffer RW	40 ml	240 ml	
Buffer RSW (concentrate) *	12 ml	36 ml x 2	
Nuclease-free water	15 ml	90 ml	
Buffer DRB	5 ml	30 ml	
DNase I (lyophilized) **	240 Kunitz units	1,440 Kunitz units	
Protocol handbook	1	1	

** Before first use, add absolute ethanol (ACS grade or better) into Buffer RSW as indicated on the bottle.*

** Contains sodium azide as a preservative.*

*** For the long-term storage of lyophilized DNase I, store at 4°C. But after reconstitution of DNase I, store at -20°C. Refer to instruction of DNase I on page 8 and 10.*

Materials Not Provided

- Reagent : β-mercaptoethanol, 70% ethanol, Absolute ethanol (ACS grade or better)
- Disposable material : RNase-free pipette tips, Sterile 1.5 ml microcentrifuge tubes, Disposable gloves
- Equipment : Equipment for homogenizing sample, Microcentrifuge, Vortex mixer, Suitable protector

Product Specifications

Ribospin™ II	
Type	Spin
Maximum amount of starting samples	1 x 10^7 cells or 30 mg tissue/prep
Preparation time	≥30 min
Maximum loading volume of mini column	750 μl
Minimum elution volume	30 μl
Maximum binding capacity	500 μg

Quality Control

All components in Ribospin™ II are manufactured in strictly clean conditions, and its degree of cleanness is monitored periodically. Quality control is carried out thoroughly from lot to lot, and only the qualified kits are approved to be delivered.

Storage Conditions

All components of Ribospin™ II should be stored at room temperature (15~25°C). It should be protected from exposure to direct sunlight.

During shipment or storage under cool ambient condition, a precipitate can be formed in Buffer RAL, Buffer RW. In such a case, heat the bottle to 50°C to dissolve completely. Using precipitated buffers will lead to poor RNA recovery.

Ribospin™ II is guaranteed until the expiration date printed on the product box.

Safety Information

The buffers included in the Ribospin™ II contain irritants which are harmful when in contact with skin or eyes, or when inhaled or swallowed. Care should be taken when handling such materials. Always wear gloves and eye protection, and follow standard safety precautions. Buffer RAL and RW contains chaotropes agents, which can form highly reactive compounds when combined with bleach. Do NOT add bleach or acidic solutions directly to the sample-preparation waste.

Product Disclaimer

Ribospin™ II is for research use only, not for use in diagnostic procedure.

Preventing RNase Contamination

RNase can be introduced accidentally during RNA purification. Wear disposable gloves always, because skin often contains bacteria and molds that can be a source of RNase contamination. Use sterile, disposable plastic wares and automatic pipettes to prevent cross-contamination of RNase from shared equipment.

Preparation of DNase I Solution

The DNase I is provided in a lyophilized format. It should be reconstituted thoroughly with Nuclease-free water (provided for RNA elution) before experiment.

To obtain DNase I solution, add 120 μl (Cat. No. 314-150) Nuclease-free water to the tube containing lyophilized DNase I (240 Kuniz units), and mix carefully and gently to avoid foaming.

Dissolve the DNase I thoroughly, divide it into conveniently sized aliquots, and store at -20°C. For one preparation, 2 μl DNase I solution is required.

Product Description

Ribospin™ II is devised to purify RNA from cultured cells or animal tissues (~1 x 10^7 cells or ~30 mg Tissue). With the GeneAll's glassfiber membrane technology, highly pure RNA can be conveniently isolated in less than 30 minutes instead of the time consuming and hazardous conventional methods which require alcohol precipitation or toxic chemicals such as phenol/chloroform.

The optimized buffer system of Ribospin™ II maximizes the specific binding efficiency of RNA to the glassfiber membrane but minimizes the contamination of impurities by a series of optimized wash buffer. Also, the contaminated DNA residues can be easily eliminated during the preparation by on-column digestion using DNase I included in this kit. Pure RNA which finally prepared in Nuclease-free water can be applied to the most of downstream application which require the pure RNA, and this whole procedure can be completely performed at room temperature.

The purified RNA should be treated with care because RNA is relatively unstable and fragile. It is strongly recommended to store the eluate at 4°C for immediate analysis or at -70°C for long-term storage.

We strongly recommend reading the procedure to using Ribospin™ II.

GeneAll®
Protocol for total RNA purification with On-column DNase I treatment from animal cell

Before experiment

- *Prepare DNase I reaction mixture as below;*
  - ① *Thaw a working solution of DNase I on ice*
  - ② *Mix 2 μl of DNase I solution with 70 μl of Buffer DRB per preparation*
  - ③ *Mix gently by pipetting without vortex.*
    - *v Make the mixture as just before step 7 as possible*
    - *v Treat DNase I always on ice*

1. **Harvest cell samples in a tube.**

   Cells grown in monolayer

   Harvest 5 x 10^6 cells carefully using scraper, pellet cells by centrifugation at low speed (below 800 x g) for 5 minutes, and then discard the culture medium.

   Cells grown in suspension

   Pellet 5 x 10^6 cells by centrifugation at low speed (below 800 x g) for 5 minutes, and then discard the culture medium.

   * Do not wash the cells before lysing with Buffer RAL as this may cause mRNA degradation.

2. **Add 350 or 700 μl of Buffer RAL (Refer to Table 1) to the tube and lyse the sample by pipetting or micro-homogenizer.**

   Lyse the 5 x 10^6 cells in 350 μl Buffer RAL. An insufficient lysis may result in low RNA recovery rate or mini column clogging.

Table 1. Reagent volumes for sample amounts

Cell numbers	Buffer RAL
~5 x 10^6 cells	350 μl
5 x 10^6 ~1 x 10^7 cells	700 μl

3. **Add 1 volume (usually 350 or 700 μl) of 70% ethanol to the lysate and mix well by pipetting. Do not centrifuge.**

4. **Transfer 750 μl of the mixture to a Column Type F (mini).**
   If the mixture volume exceeds 750 μl, repeat the step 4~5 with the remainder of the sample.

5. **Centrifuge at ≥10,000 x g for 1 min at room temperature. Discard the pass-through and reinsert the mini column back into the collection tube.**

6. **Add 350 μl of Buffer RW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

7. **Add 70 μl of DNase I reaction mixture on to the center of the mini column membrane and incubate for 10 min at room temperature.**
   To make DNase I reaction mixture, add 2 μl of DNase I solution to 70 μl of Buffer DRB per isolation. And keep it on ice to protect the activity of DNase I until use.

8. **Add 350 μl of Buffer RW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

9. **Add 500 μl of Buffer RSW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

10. **Add 500 μl of Buffer RSW again and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

11. **Centrifuge at full speed (>13,000 x g) for 1 min to remove residual wash buffer. Place the mini column into a fresh 1.5 ml microcentrifuge tube (provided).**
    Residual ethanol may interfere with downstream applications. Care must be taken at this step for eliminating the carryover of Buffer RSW.

12. **Add 50 μl of Nuclease-free water to the center of the membrane in the mini column. Incubate at the room temperature for 1 min.**
    Elution volume can be adjusted according to an experiment's purpose.
    Using the eluent volume of less than 50 μl will be decrease the total RNA yield but increase the concentration of RNA. But for effective elution of RNA, more than 30 μl of the eluent should be applied, because too lower volume of eluent cannot soak the membrane completely.

13. **Centrifuge at ≥10,000 x g for 1 min at room temperature.**
    Purified RNA can be stored at 4°C for immediate analysis, otherwise it is recommended to store at -70°C for long-term storage.

GeneAll®
Protocol for total RNA purification with On-column DNase I treatment from animal tissue

Before experiment

- *The protocol is suitable for fresh, frozen and stabilized tissue sample in RiboSaver™.*
- *In case that the preserved sample in RNA stabilization solution like RiboSaver™, the stabilization solution should be discarded completely.*
- *Make 1% β-mercaptoethanol (ex, 10 μl per 1 ml) with Buffer RAL before every experiment.*
- *Prepare DNase I reaction mixture as below;*
  - *① Thaw a working solution of DNase I on ice*
  - *② Mix 2 μl of DNase I solution with 70 μl of Buffer DRB per preparation*
  - *③ Mix gently by pipetting without vortex.*
    - *v Make the mixture as just before step 7 as possible*
    - *v Treat DNase I always on ice*

1. Homogenize ~20 mg of tissue as described in step 1a, 1b, or 1c.

Thoroughly disrupt the tissue in Buffer RAL and lyse the samples perfectly. Unclarified sample may cause clogging of the mini column in subsequent steps.
For the effective application of fiber-rich tissues (ex, heart, muscle, skin), we strongly recommend to use up to 10 mg per preparation. If using more than 10 mg, the lysate would not be clarified completely and it will lead to clogging of spin mini column membrane.

Table 2. Reagent volumes for tissue amounts

Tissue amounts	Buffer RAL (including 1% β-mercaptoethanol)
~20 mg	350 μl
20 mg~30 mg	700 μl

1a. Grind the tissue sample to a fine powder with liquid nitrogen in a pre-chilled mortar and pestle. Put up to 20 mg of the powdered tissue into 1.5 ml microcentrifuge tube. Add 350 or 700 μl of Buffer RAL (Refer to Table 2) (including 1% β-mercaptoethanol) and pulse-vortex for 30 sec.

1b. Homogenize up to 20 mg of the tissue sample in 350 or 700 μl of Buffer RAL (including 1% β-mercaptoethanol) using homogenizer.

1c. Homogenize the tissue sample in 2.0 ml collection tube using bead-beater. Add 350 or 700 μl of Buffer RAL (including 1% β-mercaptoethanol) and pulse-vortex for 30 sec.

2. **Centrifuge at ≥10,000 x g for 2 min at room temperature and transfer the supernatant to a fresh 1.5 ml microcentrifuge tube (not provided).**
   This step can help avoid clogging of a mini column caused by incompletely homogenized debris.

3. **Add 1 volume (usually 350 or 700 μl) of 70% ethanol to the supernatant and mix well by pipetting. Do not centrifuge at this step.**

4. **Transfer 750 μl of the mixture to a Column Type F (mini).**
   If the mixture volume exceeds 750 μl, repeat the step 4~5 with the remainder of the sample.

5. **Centrifuge at ≥10,000 x g for 1 min at room temperature. Discard the pass-through and the mini column back into the collection tube.**
   Make sure that no lysate remains in the mini column after centrifugation. If the residual lysate has remained, centrifuge again at higher speed until all of the solution has passed through.

6. **Add 350 μl of Buffer RW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

7. **Add 70 μl of DNase I reaction mixture on to the center of the mini column membrane and incubate for 10 min at room temperature.**
   To make DNase I reaction mixture, add 2 μl of DNase I solution to 70 μl of Buffer DRB per isolation. And keep it on ice to protect the activity of DNase I until use.

8. **Add 350 μl of Buffer RW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

9. **Add 500 μl of Buffer RSW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

10. **Add 500 μl of Buffer RSW again and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

11. **Centrifuge at full speed (>13,000 x g) for 1 min to remove residual wash buffer. Place the mini column into a fresh 1.5 ml microcentrifuge tube (provided).**
    Residual ethanol may interfere with downstream applications. Care must be taken at this step for eliminating the carryover of Buffer RSW.

12. **Add 50 μl of of Nuclease-free water to the center of the membrane in the mini column. Incubate at the room temperature for 1 min.**
    Elution volume can be adjusted according to an experiment's purpose. Using the eluent volume of less than 50 μl will be decrease the total RNA yield but increase the concentration of RNA. But for effective elution of RNA, more than 30 μl of the eluent should be applied, because too lower volume of eluent cannot soak the membrane completely.

13. **Centrifuge at ≥10,000 x g for 1 min 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.

Troubleshooting Guide

Facts	Possible Causes	Suggestions
Low yield	**Sample not homogenized completely**	Insufficient disruption can lead to decrease in yield of total RNA. Insufficient disruption of samples may attributed to several reasons; - Insufficient mixing with Buffer RAL - Too much samples in the starting sample - Poor disruption of sample Confirm complete homogenization of the sample in Buffer RAL.
	Too much starting sample	Reduce the amount of starting sample. Especially for tissue sample, obey the correct amount of starting sample as indicated in the protocol.
	Poor quality of starting material	Process the sample immediately after harvest from animal if possible. Freeze the harvested tissue rapidly in liquid nitrogen and store at -70°C for later use.
	Culture media not completely removed	Remaining culture media affect lysis efficiency and binding condition. Discard the remaining culture media as completely as possible.
Column clogging	**Sample not homogenized completely**	Insufficient disruption can lead to decrease in yield of total RNA. Insufficient disruption of samples may attributed to several reasons; - Insufficient mixing with Buffer RAL - Too much samples in the starting sample - Poor disruption of sample Confirm complete homogenization of the sample in Buffer RAL.
	Too much starting sample	Reduce the amount of starting sample. Especially for tissue sample, obey the correct amount of starting sample as indicated in the protocol.

Facts	Possible Causes	Suggestions
RNA degradation	**Sample manipulated too much before process**	Process the tissue sample immediately after harvest from animal. For cultured cells sample, minimize washing steps in cell harvest.
	Improper storage of RNA	Store isolated RNA at -70°C, Do not store at -20°C.
	Use of RNase-contaminated reagents or disposables	Make sure to use RNase-free products only.
	Incorrect treatment of β-mercaptoethanol during lysis	Ensure that the correct volume of β -mercaptoethanol is used in lysis buffer for RNase elimination. The effective concentration of β-mercaptoethanol is 1% of the Buffer RAL.
DNA contamination	**Incorrect treatment of DNase I reaction mixture**	For sufficient enzymatic reaction, add DNase I reaction mixture onto the center of the membrane in the mini column.
Eluate does not perform well in downstream application	**Residual ethanol remains in eluate**	To remove any residual ethanol included in Buffer RSW from mini column membrane, additional centrifuge step should be performed certainly (step 13). If the carryover of ethanol still remains in the mini column membrane, perform step 13 again until completely done.

APPENDIX I

Purification of total RNA without DNase I treatment

Appendix I describes how to purify the total RNA without DNase I treatment from the samples. If DNase I treatment is not required, follow this procedure.

1. **Prepare the lysate using an appropriate sample preparation protocol as follows.**

   For Cell samples

   Add harvested cell samples into a 1.5 ml microcentrifuge tube (not provided) and add 350 or 700 μl of Buffer RAL (Refer to Table 3).

   Then, homogenize the cell sample by pipetting or microhomogenizer.

   Refer to Table 3 for suitable volume of Buffer RAL according to cell amount.

   For Tissue samples

   Prepare tissue sample in a tube and add 350 or 700 μl of Buffer RAL (including 1% β-mercaptoethanol). Then, homogenize the tissue sample by using an appropriate homogenizer.

   Centrifuge at ≥10,000 x g for 2 min at room temperature and transfer the supernatant to a fresh 1.5 ml microcentrifuge tube.

   β-mercaptoethanol must be added to Buffer RAL for homogenizing the tissue samples.

   Add 1% β-mercaptoethanol to Buffer RAL proportionally.

   (ex. Add 10 μl of β-mercaptoethanol to 1 ml of Buffer RAL)

   Refer to Table 3 for suitable volume of Buffer RAL according to tissue amount.

Table 3. Volume of Buffer RAL for homogenizing samples.

Amount of starting material	Volume of Buffer RAL
~5 x 10^6 cells or 20 mg tissues	350 μl
5 x 10^6~1 x 10^7 cells or 20~30 mg tissues	700 μl

2. **Add 1 volume (usually 350 or 700 μl) of 70% ethanol to the lysate and mix well by pipetting. Do not centrifuge.**

3. **Transfer the mixture to a Column Type F (mini).**

4. **Centrifuge ≥10,000 x g for 1 min at room temperature. Discard the pass-through and reinsert the mini column back into the same tube.**
   If the mixture volume exceeds 750 μl, repeat step 3~4 with the remainder of the sample.

5. **Add 700 μl of Buffer RW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

6. **Add 500 μl of Buffer RSW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

7. **Add 500 μl of Buffer RSW again and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

8. **Centrifuge at full speed (>13,000 x g) for 1 min to remove residual wash buffer. Place the mini column into a fresh 1.5 ml microcentrifuge tube (provided).**

9. **Add 50 μl of Nuclease-free water to the center of the membrane in the mini column. Incubate at the room temperature for 1 min.**
   Elution volume can be adjusted according to an experiment's purpose. Using the eluent volume of less than 50 μl will be decrease the total RNA yield but increase the concentration of RNA. But for effective elution of RNA, more than 30 μl of eluent should be applied, because too lower volume of eluent cannot soak the membrane completely.

10. **Centrifuge at ≥10,000 x g for 1 min 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.

APPENDIX 2

DNase I treatment in RNA eluate

Appendix 2 describes how to use the DNase I (included in this kit) to eliminate contaminating genomic DNA in RNA eluate. For high DNA contents samples, this procedure is more efficient than on-column DNase I treatment and we are strongly recommended for those samples.

1. **The mixture as below in a 1.5 ml microcentrifuge tube.**
   - 50 µl RNA eluate
   - 5 µl Buffer DRB
   - 1 µl DNase I solution

2. **Incubate the mixture for 10 min at room temperature.**

3. **Add 1 µl of 0.25 M EDTA per 50 µl eluate.**

4. **Inactivate DNase I enzyme at 75˚C for 10 min.**

** For efficient and convenient method of clean-up the DNase I treated-RNA eluate, refer to Appendix 3 or use Riboclear™ Plus (Cat. No. 313-150).*

APPENDIX 3

Clean-Up of total RNA

Appendix 3 provides a convenient method for clean-up of total RNA previously purified by other methods.

Before experiment

- *A maximum of 100 μg RNA/100 μl can be cleaned up by this protocol.*
- *In case that DNase I treatment step is needed, refer to Appendix 2.*

1. **Adjust the sample to 100 μl with Nuclease-free water, add 350 μl of Buffer RAL and mix thoroughly.**

2. **Add 250 μl of absolute ethanol to the sample and mix well by pipetting. Do not centrifuge.**

3. **Transfer the sample to a Column Type F (mini) and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

4. **Add 500 μl of Buffer RSW and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

5. **Add 500 μl of Buffer RSW again and centrifuge at ≥10,000 x g for 30 sec. Discard the pass-through and reinsert the mini column back into the collection tube.**

6. **Centrifuge at full speed (>13,000 x g) for 1 min to remove residual wash buffer. Place the mini column into a fresh 1.5 ml microcentrifuge tube.**
   Residual ethanol may interfere with downstream applications. Care must be taken at this step for eliminating the carryover of Buffer RSW.

7. **Add 50 μl of Nuclease-free water to the center of the membrane in the mini column. Incubate at the room temperature for 1 min.**
   Elution volume can be adjusted according to an experiment's purpose. Using the eluent volume less than 50 μl will be decrease the total RNA yield but increase the concentration of RNA. But for effective elution of RNA, more than 30 μl of eluent should be applied, because too lower volume of eluent cannot soak the membrane completely.

8. **Centrifuge at ≥10,000 x g for 1 min 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.

Ordering Information

GeneAll® *Hybrid-Q™* *for rapid preparation of plasmid DNA*

Products	Scale	Size	Cat. No.	Type
Plasmid Rapidprep	mini	50	100-150	spin
		200	100-102	

GeneAll® *Exprep™* *for preparation of plasmid DNA*

Products	Scale	Size	Cat. No.	Type
Plasmid SV	mini	50	101-150	spin / vacuum
		200	101-102	
	Midi	26	101-226	spin / vacuum
		50	101-250	
		100	101-201	

GeneAll® *Exfection™* *for preparation of transfection-grade plasmid DNA*

Products	Scale	Size	Cat. No.	Type
Plasmid LE *(Low Endotoxin)*	mini	50	111-150	spin / vacuum
		200	111-102	
	Midi	26	111-226	spin / vacuum
		100	111-201	
Plasmid EF *(Endotoxin Free)*	Midi	20	121-220	spin
		100	121-201	

GeneAll® *Expin™* *for purification of fragment DNA*

Products	Scale	Size	Cat. No.	Type
Gel SV	mini	50	102-150	spin / vacuum
		200	102-102	
PCR SV	mini	50	103-150	spin / vacuum
		200	103-102	
CleanUp SV	mini	50	113-150	spin / vacuum
		200	113-102	
Combo GP	mini	50	112-150	spin / vacuum
		200	112-102	

GeneAll® *Exgene™* *for isolation of total DNA*

Products	Scale	Size	Cat. No.	Type
Tissue SV	mini	100	104-101	spin / vacuum
		250	104-152	
	Midi	26	104-226	spin / vacuum
		100	104-201	
	MAXI	10	104-310	spin / vacuum
		26	104-326	
Tissue Plus SV	mini	100	109-101	spin / vacuum
		250	109-152	
	Midi	26	109-226	spin / vacuum
		100	109-201	
	MAXI	10	109-310	spin / vacuum
		26	109-326	

GeneAll® *Exgene™* *for isolation of total DNA*

Products	Scale	Size	Cat. No.	Type
Blood SV	mini	100	105-101	spin / vacuum
		250	105-152	
	Midi	26	105-226	spin / vacuum
		100	105-201	
	MAXI	10	105-310	spin / vacuum
		26	105-326	
Cell SV	mini	100	106-101	spin / vacuum
		250	106-152	
	MAXI	10	106-310	spin / vacuum
		26	106-326	
Clinic SV	mini	100	108-101	spin / vacuum
		250	108-152	
	Midi	26	108-226	spin / vacuum
		100	108-201	
	MAXI	10	108-310	spin / vacuum
		26	108-326	
Genomic DNA micro		50	118-050	spin
Plant SV	mini	100	117-101	spin / vacuum
		250	117-152	
	Midi	26	117-226	spin / vacuum
		100	117-201	
	MAXI	10	117-310	spin / vacuum
		26	117-326	
Soil DNA mini	mini	50	114-150	spin
Stool DNA mini	mini	50	115-150	spin
Stool-Bead DNA mini	mini	50	115-151	spin
Viral DNA/RNA	mini	50	128-150	spin
FFPE Tissue DNA	mini	50	138-150	spin
		250	138-152	

GeneAll® *GenEx™* *for isolation of total DNA without spin column*

Products	Scale	Size	Cat. No.	Type
GenEx™ Blood	Sx	100	220-101	solution
		500	220-105	
	Lx	100	220-301	solution
GenEx™ Cell	Sx	100	221-101	solution
		500	221-105	
	Lx	100	221-301	solution
GenEx™ Tissue	Sx	100	222-101	solution
		500	222-105	
	Lx	100	222-301	solution

Products	Scale	Size	Cat. No.	Type
GeneAll® *GenEx™* *for isolation of total DNA without spin column*				
GenEx™ Plant	Sx	100	227-101	solution
	Mx	100	227-201	
	Lx	100	227-301	
GenEx™ Plant Plus	Sx	100	228-101	solution
	Mx	50	228-250	
	Lx	20	228-320	
GeneAll® *DirEx™* series *for preperation of PCR-template without extraction*				
DirEx™		100	250-101	solution
DirEx™ *Fast*-Tissue		96 T	260-011	solution
DirEx™ *Fast*-Cultured cell		96 T	260-021	solution
DirEx™ *Fast*-Whole blood		96 T	260-031	solution
DirEx™ *Fast*-Blood stain		96 T	260-041	solution
DirEx™ *Fast*-Hair		96 T	260-051	solution
DirEx™ *Fast*-Buccal swab		96 T	260-061	solution
DirEx™ *Fast*-Cigarette		96 T	260-071	solution
GeneAll® RNA series *for preperation of total RNA*				
RiboEx™	mini	100	301-001	solution
		200	301-002	
Hybrid-R™	mini	100	305-101	spin
Hybrid-R™ Blood RNA	mini	50	315-150	spin
Hybrid-R™ miRNA	mini	50	325-150	spin
RiboEx™ LS	mini	100	302-001	solution
		200	302-002	
Riboclear™	mini	50	303-150	spin
Riboclear™ Plus	mini	50	313-150	spin
Ribospin™	mini	50	304-150	spin
Ribospin™ II	mini	50	314-150	spin
		300	314-103	
Ribospin ™ vRD	mini	50	302-150	spin
Ribospin ™ vRD Plus	mini	50	312-150	spin
Ribospin ™ vRD II	mini	50	322-150	spin
Ribospin ™ Plant	mini	50	307-150	spin
Ribospin™ Seed/Fruit	mini	50	317-150	spin
Ribospin™ Pathogen/TNA	mini	50	314-150	spin
		250	314-152	
Allspin™	mini	50	306-150	spin
RiboSaver™	mini	100	351- 001	solution

Products	Scale	Size	Cat. No.	Type
GeneAll® *AmpONE™* *for PCR amplification*				
Taq DNA polymerase		250 U	501-025	(2.5 U/μl)
		500 U	501-050	
		1,000 U	501-100	
Taq Premix		20 μl x 96 tubes	526-200	solution
		50 μl x 96 tubes	526-500	
GeneAll® *AmpMaster™* *for PCR amplification*				
Taq Master mix		0.5 ml x 2 tubes	541-010	solution
		0.5 ml x 10 tubes	541-050	solution
GeneAll® *HyperScript™* *for Reverse Transcription*				
Reverse Transcriptase		10,000 U	601-100	solution
RT Master mix		0.5 ml x 2 tubes	601-710	solution
One-step RT-PCR Master mix		0.5 ml x 2 tubes	602-110	solution
One-step RT-PCR Premix		20 μl x 96 tubes	602-102	solution
GeneAll® RealAmp™ *for qPCR amplification*				
SYBR qPCR Master mix (2X, Low ROX)	200 rxn	2 ml	801-020	solution
	500 rxn	5 ml	801-050	
SYBR qPCR Master mix (2X, High ROX)	200 rxn	2 ml	801-021	solution
	500 rxn	5 ml	801-051	
GeneAll® Protein series				
ProtinEx™ Animal cell/tissue		100 ml	701-001	solution
PAGESTA™ Reducing 5X SDS-PAGE Sample Buffer		1 ml x 10 tubes	751-001	solution

Products	Size	Cat. No.	Type
GeneAll® GENTi™ 32 ADVANCED *Newly designed automated extraction system*			
Automatic extraction equipment		GTI032A	system
Genomic DNA	48	901-048A	tube
	96	901-096A	plate
Viral DNA/RNA	48	902-048A	tube
	96	902-096A	plate
Blood DNA	48	903-048A	tube
	96	903-096A	plate
Plant DNA/RNA	48	904-048A	tube
	96	904-096A	plate
LMO	48	906-048A	tube
	96	906-096A	plate
Fecal DNA/RNA	48	913-048A	tube
	96	913-096A	plate
GeneAll® AllEx®64 *Compact yet Comprehensive automated extraction system*			
Automatic extraction equipment		AEX064	system
Genomic DNA	48	931-048	tube
	96	931-096	plate
Viral DNA/RNA	48	934-048	tube
	96	934-096	plate
Blood DNA	48	935-048	tube
	96	935-096	plate
Plant DNA/RNA	48	937-048	tube
	96	937-096	plate
Fecal DNA/RNA	48	948-048	tube
	96	948-096	plate
Forensic	48	936-048	tube
	96	936-096	plate

NOTE

NOTE

GENEALL BIOTECHNOLOGY CO., LTD.
GeneAll Bldg., 303-7, Dongnamro, Songpa-gu, Seoul, 05729, Republic of Korea
E-mail : sales@geneall.com
Tel. 82-2-407-0096 Fax. 82-2-407-0779
www.geneall.com

Factory

A-1201~A-1204, Hanam Techno Valley U1 Center,
947, Hanam-daero, Hanam-si, Gyeonggi-do, 12982, Republic of Korea

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