FavorPrep™ Whole Blood RNA Mini Kit

-- For isolation of total RNA from whole blood

Kit Contents:

Cat. No.:	FAWBR004	FAWBR050	FAWBR100
Lysis Buffer CX	1.5 ml	20 ml	40 ml
Wash Buffer R1 ■ (concentrate)	1 ml [a]	13 ml [b]	26 ml [c]
Wash Buffer R2 ♦ (concentrate)	1.5 ml [d]	15 ml [e]	30 ml [f]
RNase-free Water	0.5 ml	6 ml	6 ml
Proteinase K □	2 mg [g]	11 mg x2 [h]	11 mg x 4 [h]
RNA Binding Column	4 pcs	50 pcs	100 pcs
Collection Tube	8 pcs	100 pcs	200 pcs
Elution Tube	4 pcs	50 pcs	100 pcs
User Manual	1	1	1

■ Preparation of Wash Buffer R1 by adding **(a) 1.3 ml, (b) 17 ml , (c) 34 ml** of ethanol (96~100%).
♦ Preparation of Wash Buffer R2 by adding **(d) 6 ml, (e) 60 ml, (f) 120 ml** of ethanol (96~100%).
□ Preparation of 10 mg/ml Proteinase K by adding **(g) 0.2 ml, (h) 1.1 ml** of ddH2O (96~100%).

Storage:

All component of FavorPrep™ Whole Blood RNA Mini Kit should be stored at room temperature (15 - 25 °C).

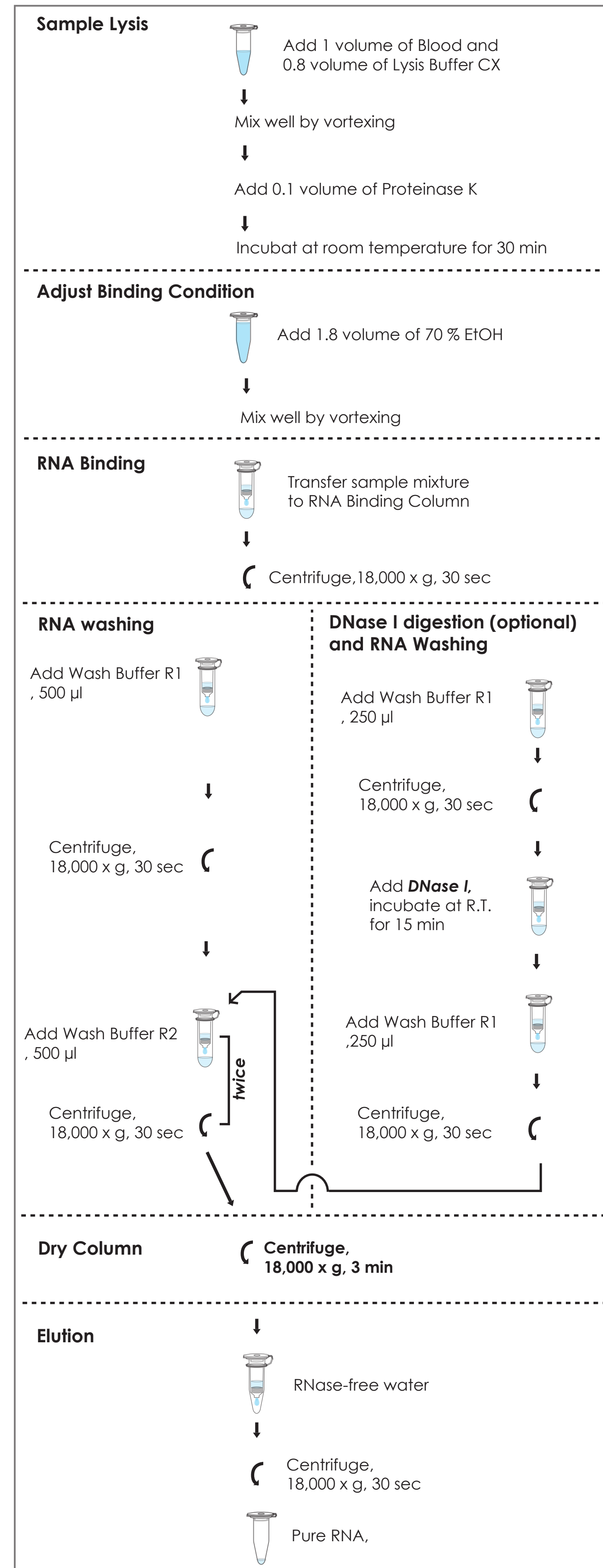
Quality Control:

The quality of FavorPrep™ Whole Blood RNA Mini Kit is tested on a lot-to -lot basis. 200 µl of whole blood were processed according to the Protocol **"Isolation of Total RNA from Whole Blood"**. The yield of RNA yield should be at least reach to 6 µg determined by measuring the absorbance at 260 nm (A_{260}) in a spectrophoto-meter. RNA purity was determined by A_{260}/A_{280} ratio at pH 7.0 and the value should be 1.7/1.9. The integrity of isolated RNA was check by RIN ≥7 on capillary electrophoresis.

Specification:

1. Format: mini spin column (RNA Binding Column)
2. Principle: silica-membrane technology /chaotropic salt binding
3. Sample size: 200 ~ 400 µl of whole blood
4. Size of isolated RNA: >200 nucleotides
5. Typical RNA yield: 5 ~7 µg/ 1 ml whole blood
6. Operation time: ~ 50 minutes
7. Binding capacity: up to 100 µg/ RNA Binding Column
8. Column applicability: centrifugation and vaccum
9. Minimum elution volume: 20 µl / RNA Binding Column

Procedure Overview:



Product description:

FavorPrep™ Whole Blood Total RNA Mini Kit is designed for isolation of total RNA from whole blood RNA and prevention of RNA degradation during the isolation procedure. The technology using a chaotropic salt buffer to lyses the cells, inactives the RNase and binds RNA (> 200 nt, e.g., 18S, 28S RNA, pri-miRNA) to the silica membranes of the RNA Binding Column. With the on-column DNase I digestion for further DNA removal and membrane washed by 2 wash buffers. The highly pure RNA are eluted from the membrane in a low-ionic-strength buffer and are captured in a Elution Tube. This extracted total RNA can be used directly for the downstream applications such as Real-time RT-PCR, cDNA synthesis, Northern blotting, primer extension and mRNA selection etc.

Additional materials required

- Pipets and pipet tips, sterile (nuclease-free)
- ß-mercaptoethanol (ß-Me)
- 96 ~100 % RNase-free ethanol (for preparation of Wash Buffer).
- 70 % RNase-free ethanol
- Crushed ice
- RNase-free DNase I and DNase I reaction buffer (DNase I Reaction Set -100 reactions, Cat. No.: FADNE-100 could be ordered from Favorgen ; see " Ordering information for related products")

Ordering information for related products:

	Description:
DNase I Reaction Set (~100 reactions) ***(Cat. No: FADASE-100)***	• Content: 1. DNase I (lyophilized) 2. RNase-free water 3. DNase I Buffer • Molecular Biology Grade. • Chromatographically purified to remove RNase and protease. • Store at 2~8 °C.

Preparation of working buffers:

1. **Working Wash Buffer**
   Add RNase-free ethanol to Wash Buffer R1 and Wash Buffer R2 when first use. Store the buffers at room temperature (15~25 °C).
2. **Proteinase K solution**
   Store proteinase K tube at -20 °C. Before first use, add sterile ddH2O to Proteinase K tube to make a 10 mg/ml stock solution. Vortex and make sure that Proteinase K has been completely dissolved. **Store the stock solution at 4 °C.**
3. **Working DNase I reaction solution (*for Optional Step*)**
   For DNase I Reaction Set (Cat. No.: FADNE-100)
   2-1. Add 1100 µl RNase-free water (provided) to lyphilized DNase I and flick the tube to dissolve lyophilized DNase I, ***Do not vortex!***
   2-2. Add 1100 µl of dissolved DNase I to 5500 µl of DNase I buffer to make a 6600 µl of DNase I reaction solution for 96 wells on-column DNase I digestion.
   --Note! For orage of DNase I reaction solution, store at –20 °C for up to 6 months. And store at 4 °C for up to 4 weeks.
   Do not refreeze the solutioon after thawing!
   2-3. If DNase I and DNase I Buffer are provided by user, it is recommended that the concentration of DNase I is "0.5 U/µl" and the composition of DNase I Buffer is "1M NaCl, 10 mM MnCl2, 20 mM Tris-HCl, pH 7.0". And stored at 4 °C before use.

Important note:

1. Make sure the workstation is RNase-free when handling RNA.
2. Buffers provided in this system contain irritants. Wear gloves and lab coat when handling these buffers.
3. Add ethanol (RNase-free, 96~100%) to Wash Buffer 1 and Wash Buffer 2 when first use.
4. Add sterile ddH2O to Proteinase K tube to make a 10 mg/ml stock solution when first use.
5. Prepar working DNase I solution (for optional step: Digest DNA by DNase I) before starting the isolation procedure.
6. The eluted RNA should immediately be kept on ice. For long-term storage, freeze it at -70 °C.

Safety Information:

- ***CAUTION:*** Lysis Buffers CX and Wash Buffer R1 contain guanidinium salts which can form highly reactive compounds when combined with bleach. ***DO NOT add bleach or acidic solutions directly to the preparation waste.***

Kit Component: Lysis Buffer CX

Hazard contents
Guanidinium thiocyanate
CAS-No. 593-84-0
EC-No. 209-812-1

Hazard statement(s)

H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Kit Component: Wash Buffer R1

Hazard contents
Guanidine hydrochloride
CAS-No. 50-01-1
EC-No. 200-002-3

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Protocol: Isolation of Total RNA from Whole Blood

Please Read Important Notes and Safety information Before Starting Following Steps.

1. Sample Lysis

1-1. Transfer ● 200 µl or ▲ 400 µl of whole blood sample to a microcentrifuge tube (not provided).
- If the sample volume is less than 200 µl or 400 µl , add the appropriate volume of PBS.

1-2. Add 0.8 volume of Lysis Buffer CX (● 160 µl or ▲ 320 µl) to the sample. **Mix thoroughly by pulse-vortexing for 10 sec.**

1-3. Briefly spin the tube to remove drops from the inside of the lid.

1-4. Add 0.1 volume of Proteinase K (● 20 µl or ▲40 µl) to the sample. **Mix thoroughly by pulse-vortexing.**
--Note! Do not add Proteinase K directly to Lysis Buffer CX.

1-5. Incubate at room temperature for 30 min.
During incubation, vortex the sample every 10 min.

1-6. Briefly spin the tube to remove drops from the inside of the lid.

2. Adjust Binding Condition

2-1. Add 1.8 volume of 70 % ethanol (● 360 µl or ▲720 µl) to the sample mixture. **Mix thoroughly by pulse-vortexing for 10 sec.**

2-2. Briefly spin the tube to remove drops from the inside of the lid.

3. RNA Binding

3-1. Place a RNA Binding Column to a Collection Tube.

3-2. Transfer the sample mixture carefully to the RNA Binding Column. Centrifuge at 6,000 x g for 30 sec **then place the RNA Binding Column to a new Collection Tube.**

4. DNase I digestion (optional) & RNA Washing

Steps 4-1-a to 4-1-d are for elimination of genomic DNA contamination. Otherwise, proceed to step 4-2 directly.

4-1-a. Add 250 µl of Wash Buffer R1 to the RNA Binding Column. Centrifuge at 18,000 x g for 30 sec. Discard the flow-through and return the RNA Binding Column back to the Collection Tube.
-- Note: Make sure that ethanol has been added into Wash Buffer R1 when first use.

4-1-b. Add 60 µl of RNase-free DNase 1 solution (0.5U/ul, not provided) to the membrane center of the RNA Binding Column. Incubate the column on the benchtop for 15 min.
-- Note! after incubation, do not centrifuge and proceed step 4-1-c directly

4-1-c. Add 250 µl of Wash Buffer R1 to the RNA Binding Column. Centrifuge at 18,000 x g for 30 sec. Discard the flow-through and return the RNA Binding Column back to the Collection Tube.

4-1-d. **After DNase 1 treatment, proceed to step 4-3.**

4-2. Add 500 µl of Wash Buffer R1 to the RNA Binding Column. Centrifuge at 18,000 x g for 30 sec. Discard the flow-through and return the RNA Binding Column back to the Collection Tube.
-- Note: Make sure that ethanol has been added into Wash Buffer R1 when first use.

4-3. Add 500 µl of Wash Buffer R2 to the RNA Binding Column. Centrifuge at 18,000 x g for 30 sec. Discard the flow-through and return the RNA Binding Column back to the Collection Tube.
-- Note: Make sure that ethanol has been added into Wash Buffer R2 when first use.

4-4. Repeat step 4-3 for one more washing.

5. Dry column

5-1. Centrifuge the RNA Binding Column at 18,000 x g for an 3 min to dry the RNA Binding Column.
-- Important Step! This step will avoid the residual liquid to inhibit subsequent enzymatic reaction.

6. Elution

6-1. Place the RNA Binding Column to a Elution Tube (provided, 1.5 ml microcentrifuge tube).

6-2. Add 20 ~ 50 µl of RNase-free ddH_2O to the membrane center of the RNA Binding Column. Stand the RNA Binding Column for 1 min.
-- Important Step! For effective elution, make sure that RNase-free ddH_2O is dispensed on the membrane center and is absorbed completely.
-- Important : Do not elute the RNA using RNase-free water less than suggested volume (< 20 µl). It will lower the RNA yield.

6-3. Centrifuge the RNA Binding Column at 18,000 x g for 1 min to elute RNA. Store RNA at -70C.

Problem shooting:

Problem/ Prossible Reason/ Solution

Little or no RNA eluted

Poor sample lysis because of insufficient mixing with Lysis Buffer CX
Mix the sample and Lysis Buffer CX immediately and thoroughly by pulse-vortexing 10 sec

Poor sample lysis because of insufficient Proteinase K activity
1. Use a fresh or well-stored Proteinase K stock solution.
2. Do not add Proteinase K into Lysis Buffer CX directly.

Insufficient lysis time
Make sure the sample has been incubated at R.T. for 30 min after mixing with Lysis Buffer CX and Proteinase K.

Poor sample lysis because of to much sample be used
Reduce the sample size or increase the volume of Lysis Buffer CX and 70% ethanol proportionally.

Using bad quality blood
1. Fresh blood is always recommended.
2. Make sure blood is collected in a standard blood collection tube (e.g., EDTA tube) and be stored at -70 °C.

Kit stored under improper conditions
All components of FavorPrep Whole Blood Total RNA Mini Kit except Proteinase K should be stored 15-25 °C. Proteinase K should be stored at -20 °C upon receipt and be stored at 4 ~ 8 °C after dissolved in ddH_2O.

RNA is not completely eluted
Add RNase-free ddH2O onto the membrane center of the RNA Binding Column, stand the column until RNase-free ddH_2O has heen absorbed compleetely.

Improper preparation of the Wash Buffer R1 and Wash Buffer R2
Make sure that correct amount of ethanol has been added to Wash Buffer R1 Wash Buffer R2 when first use.

Problem/ Prossible Reason/ Solution

RNA is degraded

To many cell in the sample
Reduce the sample size.

RNase contamination
Make sure the environment is RNase-free. Use disposable RNase–free plasticware or use the sterilized glassware to be processed at 250 °C for 2 hrs before use.

Sample stored under improper conditions
Flash freeze fresh samples(cultured Cells) in liquid nitrogen and store at -80˚C if not used immediately.

Ethanol contains RNases
Make sure that the ethanol be used is RNase free.

Sample is old or not stored well
Make sure that sample blood is fresh and stored well.

DNA contamination

The activity of DNase I is insufficient
Use a fresh or well-stored DNase I and reaction buffer.

To many cell in the sample
Reduce the sample size.

A260/A280 ration of eluted total RNA is low

Use ddH2O of acidic pH to dilute RNA samples for spectro-photometric analysis
Use 10 mM Tris-HCl of pH 7.5 or TE buffer to dilute the RNA samples.

Poor performance in downstream applications

Eluted RNA carries ethanol residue
Make sure the Dry Column Step "centrifigation for 3 min" has been done after washing the RNA Binding Column.