Instruction Manual

Research Use Only

MagBeads FastRNA Kit

For Easy Isolation of RNA from Various Samples

Size: 96 and 5 Preps
Storage: 15-25 °C
Cat. No.: 116572096 (96 Preps)
/116572000 (5 Preps)
Content Version: July 2026

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1. Introduction to MagBeads FastRNA Kit

The MagBeads FastRNA Kit offers an efficient solution for RNA purification from various samples (e.g., animal and plant tissues, microorganisms, cells, and blood). It is designed for compatibility with the automated platforms such as the MagFlex-96 and MPure aNAP Systems. The magnetic beads simplify the RNA purification process by eliminating complicated DNA removal steps, ensuring highly efficient and specific binding of RNA. Specialized wash buffers provided in the kit ensure high washing efficiency by eliminating proteins, salts, and other impurities through a short wash procedure. The nucleic acid isolated is of high quality, free from contaminants, and fully compatible with downstream applications such as RT-qPCR and other molecular techniques.

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Kit Specifications at a Glance

Technology	Magnetic beads technology
Format	Magnetic beads
Sample Type	Animal and plant tissues, microorganisms, cells and blood
Sample Input	Sample-dependent
Observed Yield	Sample-dependent
Elution Volume	60-100 µL (sample-dependent)
Extraction Time	40 min

2. Kit Components and User Supplied Materials

2.1 MagBeads FastRNA Kit Component

Product	5 PREPS (Cat. No. 116572000)		96 PREPS (Cat. No. 116572096)	
	Pack Size	Cat. No.	Pack Size	Cat. No.
Buffer RTL	3.2 mL	116572001	60 mL	117033402
Buffer PA	4.2 mL	116572002	80 mL	119620097
Buffer PB	550 µL	116572003	11 mL	119620098
Buffer PC	550 µL	116572004	11 mL	119620099
Buffer MW1	800 µL	116572005	16 mL	116572097
Buffer MW2	550 µL	116572006	10 mL	116572100
Buffer MCB	400 µL	116572007	8 mL	116572095
RNase-free Water	1 mL	116572008	12 mL	116572099
Buffer RB	500 µL	116572009	10 mL	116572101
Magbeads RNA Particles	135 µL	116572010	2.5 mL	116572090
Proteinase K	110 µL	116572011	2 mL	117033601
DNase I	22 µL	116572012	400 µL	116572092
DNase I Buffer	320 µL	116572013	6 mL	116572093
Quick-Start Protocol	1 each	-	1 each	-
Instruction Manual	Available www.mpbio.com			
MSDS & CoA	Available www.mpbio.com			

2.2 User Supplied Materials

- ❑ FastPrep-24 5G (Cat. No.116005500) or vortex (with an adapter for 1.5 mL & 2 mL tube) is recommended, especially when multiple samples are to be processed simultaneously.
- ❑ Lysing Matrix M (Cat. No. 116923100) for plant and animal samples
- ❑ Lysing Matrix E (Cat. No. 116914100) for microbial samples
- ❑ Microcentrifuge or mini centrifuge
- ❑ Magnetic rack
- ❑ Single-channel pipettors (5 µL–1000 µL)
- ❑ Nuclease-free, aerosol-preventive tips
- ❑ 2 mL &1.5 mL microcentrifuge tubes

3. Storage and Kit Stability

- Upon receipt, store Magbeads RNA Particles and Proteinase K at 2-8°C and DNase I at -20°C. All other components and reagents of MagBeads FastRNA Kit can be stored at room temperature (15-25 ℃) until the expiration date printed on the kit label.

4. Important Consideration Before Use

- Add 50 mL (2.5 mL for sample Kit) of isopropanol to Buffer MCB.
- Add 45 mL (2.5 mL for sample Kit) of isopropanol to Buffer RB.
- Add 40 mL (2 mL for sample Kit) of absolute ethanol to Buffer MW1.
- Add 100 mL (5 mL for sample Kit) of absolute ethanol to Buffer MW2.
- Vortex speed stated in the manual is a guideline; use the maximum speed available if the stated speed setting is not feasible.

5. Safety Precaution

Wear personal protective equipment (gloves, lab coat and eye protection) to prevent contact with the skin or mucous membranes. Consult the Material Safety Data Sheet at www.mpbio.com for additional details. Buffers RTL, PA, PB, PC, MCB, and MW1 can be harmful if swallowed and may cause irritation when in contact with skin and eyes. Buffers RTL, PA, PC, MCB and MW1 contain chaotropic salts, which can form highly reactive compounds when combined with bleach.

6. Protocol

6.1 Sample lysate preparation

A. Cell

Harvest cells (not exceeding **1 x 10^7 cells**). For pelleted cells, loosen the cell pellet thoroughly by flicking the tube and add **500 µL Buffer RTL**. Vortex @ **2000 rpm** for **5 min**.

B. Animal Tissue

Weigh **3-20 mg** of animal tissue into Lysing Matrix M (not provided, Cat. No. 116923100). For samples with low nucleic acid content such as muscle tissue, use up to 50 mg. Add **600 µL Buffer RTL** and **20 µL Proteinase K**. Homogenize using FastPrep @ **5 m/sec** for **35 sec**. Centrifuge @ **15,000 g** for **2 min**.

C. Plant Tissue

Weigh **30-50 mg** of plant tissue into Lysing Matrix M (not provided, Cat. No. 116923100). Add **800 µL Buffer PA** and **100 µL Buffer PB**. Homogenize using FastPrep @ **5 m/sec** for **35 sec, twice**. Centrifuge @ **15,000 g** for **2 min**.

Transfer **500 µL** of the supernatant into a 1.5 mL centrifuge tube (not provided), add **100 µL Buffer PC**, and mix thoroughly by inverting the tube several times. Centrifuge @ **15,000 g** for **2 min**.

D. Yeast Cell

Collect **1 x 10^7 yeast cells**, add **600 µL Buffer RTL,** transfer the yeast cells into Lysing Matrix E (not provided, Cat. No. 116914100). Homogenize using FastPrep @ **5 m/sec** for **35 sec**. Centrifuge @ **15,000 g** for **2 min**.

E. Bacterial Cell

Collect **1 x 10^9 bacterial cells**, add **600 µL Buffer RTL,** transfer the bacterial cells into Lysing Matrix E (not provided, Cat. No. 116914100). Homogenize using FastPrep @ **5 m/sec** for **35 sec**. Centrifuge @ **15,000 g** for **2 min**.

F. Whole Blood

For fresh blood, transfer **200 µL** of blood into a 1.5 mL centrifuge tube (not provided). Add **300 µL Buffer RTL** and **20 µL Proteinase K**, then vortex thoroughly. For frozen blood samples, dissolve them in Buffer RTL to ensure RNA is not degraded.

G. TRIzol Pre-treatment

Homogenize and lyse the samples, then perform chloroform extraction according to the TRIzol reagent instructions. After centrifugation, collect 500 µL of the supernatant

for binding and purification.

6.2 Manual protocol for Bind Wash and Elution

1. Carefully transfer ~**500 µL** of lysate supernatant from **Section 6.1** to a clean 1.5 mL microcentrifuge tube (not provided).
2. Add **500 µL Buffer MCB** and **25 µL Magbeads RNA Particles** to the sample. Vortex @ **2000 rpm** for **5 min**.
3. Place the tube on a magnetic rack for **1 min** to allow magnetic beads to fully separate from the solution, then aspirate and discard the supernatant.
4. Add **500 µL Buffer MW1**. Vortex @ **2000 rpm** for **1 min**.
   Note: *For blood samples, briefly centrifuge after Step 4, then transfer all the supernatant and magnetic beads into a new 1.5 mL microcentrifuge tube (not provided).*
5. Place the tube on a magnetic rack for **1 min** to allow magnetic beads to fully separate from the solution, then aspirate and discard the supernatant.
6. Prepare the DNA digestion solution by mixing **4 µL DNase I** with **60 µL DNase I Buffer** per sample.
7. Add **500 µL Buffer RB and 64 µL** DNA digestion solution. Vortex thoroughly, then incubate at **room temperature** for **5 min** for DNA digestion.
8. Place the tube on a magnetic rack for **1 min** to allow magnetic beads to fully separate from the solution, then aspirate and discard the supernatant.
9. Add **500 µL Buffer MW2**. Vortex @ **2000 rpm** for **1 min**.
10. Place the tube on a magnetic rack for **1 min** to allow magnetic beads to fully separate from the solution, then aspirate and discard the supernatant.
11. Add **500 µL Buffer MW2**. Vortex @ **2000 rpm** for **1 min**. Briefly spin down the tube.
12. Place the tube on a magnetic rack for **1 min** to allow magnetic beads to fully separate from the solution, then aspirate and discard the supernatant.
13. Use a smaller pipette tip to remove excess buffer.
14. Keep the tube cap open and dry at **room temperature** for **10 min**.
15. Add **100 µL RNase-free Water**. Vortex @ **2000 rpm** for **5 min**.
16. Spin down briefly to collect contents at the bottom of the tube.
17. Place the tube on a magnetic rack for **1 min**, and transfer the supernatant containing the eluted RNA into a clean 1.5 mL microcentrifuge tube (not provided).

6.3 Automated extraction protocol using MPure-32™ aNAP System

1. Prepare the DNA digestion solution by mixing **4 µL DNase I** with **60 µL DNase I Buffer** per sample.
2. In a 96-well plate (not provided), prepare the following reagents for each sample.

Well(s)	Reagents	Volume (µL)
#1 and/or #7	Buffer MCB	500
#2 and/or #8	Buffer MW2	500
#3 and/or #9	Buffer MW1	500
#4 and/or #10	Buffer RB	500
	DNA digestion solution	64
#5 and/or #11	Buffer MW2	500
#6 and/or #12	RNase-free Water	100
	Magbeads RNA Particles	25

3. Carefully transfer **~500 µL** of lysate supernatant from Section 6.1 to **well #1 or #7** of the 96-Well reagent plates.
4. Insert the magnetic rod (not provided) cover prep into the slot, then place the reagent plate in the MPure-32 aNAP System and start the program **FastRNA** or the following setting:

Step	Well(s)	Process	Volume (µL)	Time (s)			Mixing Speed	Temp (℃)
				Mix	Attract	Wait		
1	#6/#12	Beads Preparation	100	60	60	0	Fast	RT
2	#1/#7	Bind	1000	300	60	0	Fast	RT
3	#3/#9	1st Wash	500	60	60	0	Fast	RT
4	#4/#10	DNase I Digestion	500	30	0	300	Fast	RT
5	#4/#10	DNase I Digestion	500	30	60	0	Fast	RT
6	#2/#8	2nd Wash	500	60	60	0	Fast	RT
7	#5/#11	3rd Wash	500	60	60	420	Fast	RT
8	#6/#12	Elute	100	300	90	0	Fast	RT
9	#3/#9	Beads Release	500	60	0	0	Fast	RT

5. Once the extraction is completed, transfer the eluted RNA from **well #6** or **# 12** into clean 1.5 mL microcentrifuge tubes (not provided). The RNA is now ready for

downstream applications. For long-term storage, store at -80°C.

6.4 Automated extraction protocol using MPure-96 aNAP System

1. Prepare the DNA digestion solution by mixing **4 µL DNase I** with **60 µL DNase I Buffer** per sample.
2. Add the reagents to the respective 96-deep well plates (not provided) as shown below:

Plate	Reagents	Volume (µL)
#1	Buffer MCB	500
#2	Buffer MW1	500
#3	Buffer RB	500
	DNA digestion solution	64
#4	Buffer MW2	500
#5	Buffer MW2	500
#6	RNase-free Water	100
	Magbeads RNA Particles	25

3. Carefully transfer ~**500 µL** of lysate supernatant from Section 6.1 to **plate #1**.
4. Place the reagent plate in the MPure-96 aNAP System and start the program **FastRNA** or the following setting:

Position	1	2	3	4	5	6	7	8
Plate	#1	# 2	# 3	# 4	# 5	# 6	-	96 spin tips
Volume	1000	500	500	500	500	100	-	
Preheat	-	-	-	-	-	-	-	
Action	For.U/D	For.U/D	For.U/D	For.U/D	For.U/D	For.U/D	For.U/D	
Name	Bind	Wash	DNS	Wash	Wash	Elute	-	TIP

Step	Plate	Process	Time (s)			Mixing Speed	Temp (°C)
			Mix	Attract	Wait		
1	#6	Beads Preparation	60	60	0	3000 rpm	RT
2	#1	Bind	300	60	0	3000 rpm	RT
3	#2	1st Wash	60	60	0	3000 rpm	RT
4	#3	DNase I Digestion	30	0	300	3000 rpm	RT
5	#3	DNase I Digestion	30	60	0	3000 rpm	RT
6	#4	2nd Wash	60	60	0	3000 rpm	RT
7	#5	3rd Wash	60	60	420	3000 rpm	RT

8	#6	Elute	300	90	0	3000 rpm	RT
9	#2	Beads Release	60	0	0	3000 rpm	RT

5. Once the extraction is completed, transfer the eluted RNA from **plate # 6** into clean 1.5 mL microcentrifuge tubes (not provided). The RNA is now ready for downstream applications. For long-term storage, store at -80°C.

6.5 Automated extraction protocol using MagFlex-96 aNAP System

1. Prepare the DNA digestion solution by mixing **4 µL DNase I** with **60 µL DNase I Buffer** per sample.
2. In a 96-well plate (not provided), prepare the following reagents for each sample.

Well	Reagents	Volume (µL)
#1 and/or #7	Buffer MCB	500
#2 and/or #8	Buffer MW2	500
#3 and/or #9	Buffer MW1	500
#4 and/or #10	Buffer RB	500
	DNA digestion solution	64
#5 and/or #11	Buffer MW2	500
#6 and/or #12	RNase-free Water	100
	Magbeads RNA Particles	25

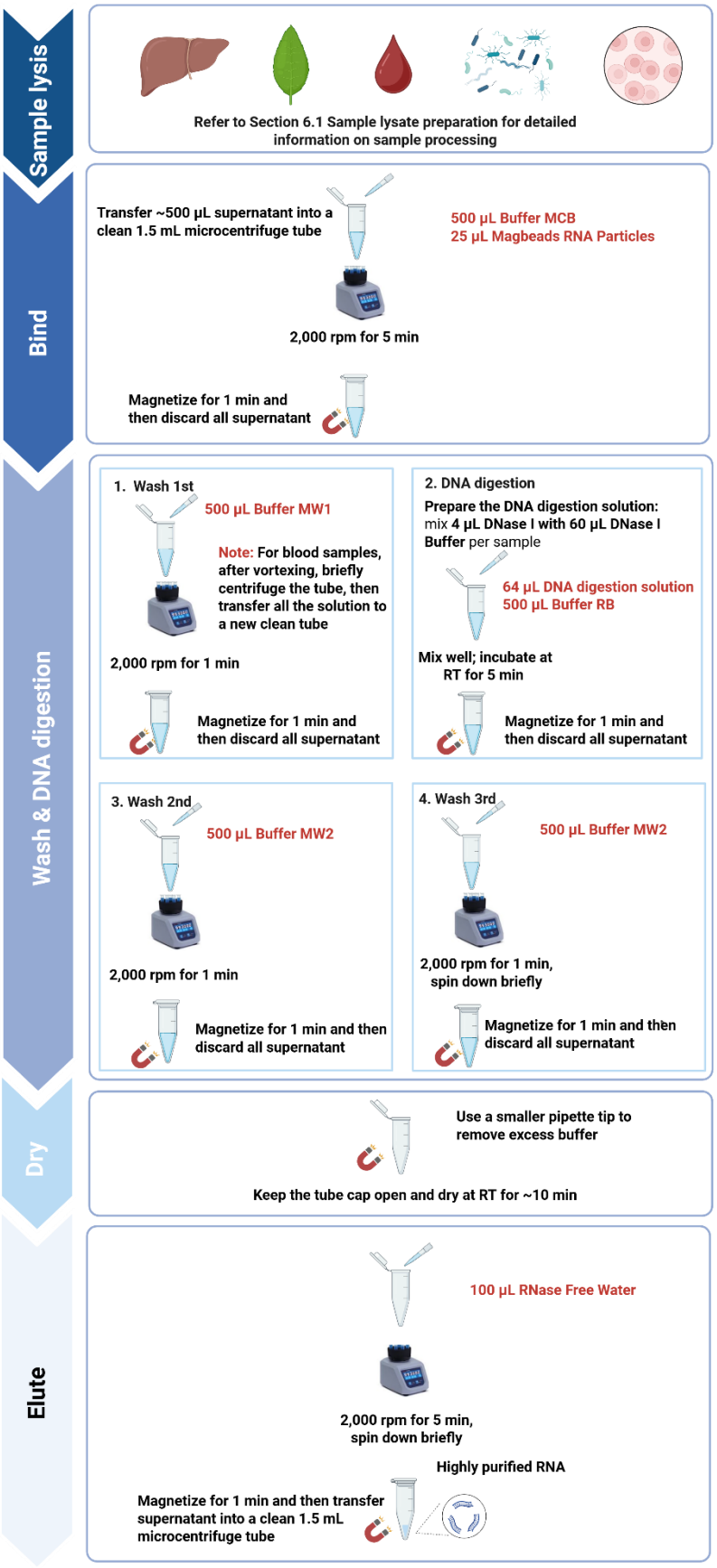
3. Carefully transfer **~500 µL** of lysate supernatant from Section 6.1 to **well #1** or **#7** of the 96-well reagent plates.
4. Insert the MagFlex Mixing Sleeves (not provided) into **well #2** or **#8**, then place the reagent plate in the MagFlex-96 aNAP System and start the program **FastRNA** or the following setting:

Step	Well(s)	Process	Volume (µL)	Time (s)			Mixing Speed	Temp (°C)
				Mix	Attract	Wait		
1	#2/#8	Dry	500	0	0	420	100 rpm	RT
2	#6/#12	Beads Preparation	100	60	60	0	3000 rpm	RT
3	#1/#7	Bind	1000	300	60	0	3000 rpm	RT
4	#3/#9	1st Wash	500	60	60	0	3000 rpm	RT
5	#4/#10	DNase I Digestion	500	30	0	300	3000 rpm	RT
6	#4/#10	DNase I Digestion	500	30	60	0	3000 rpm	RT

7	#2/#8	2nd Wash	500	60	60	0	3000 rpm	RT
8	#5/#11	3rd Wash	500	60	60	420	3000 rpm	RT
9	#6/#12	Elute	100	300	90	0	3000 rpm	RT

5. Once the extraction is completed, transfer the eluted RNA from **well #6** or **# 12** into clean 1.5 mL microcentrifuge tubes (not provided) . The RNA is now ready for downstream applications. For long-term storage, store at -80°C.

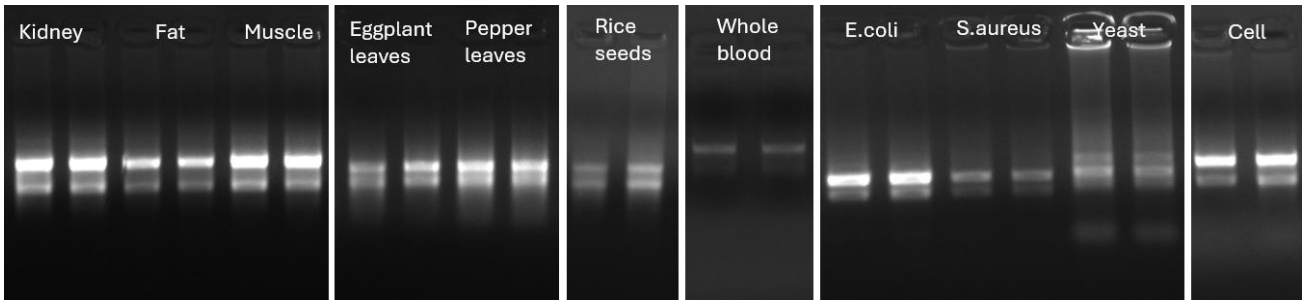
7. Flow Chart


Sample lysis
Refer to Section 6.1 Sample lysate preparation for detailed information on sample processing
Bind
Transfer ~500 µL supernatant into a clean 1.5 mL microcentrifuge tube
500 µL Buffer MCB
25 µL Magbeads RNA Particles
2,000 rpm for 5 min
Magnetize for 1 min and then discard all supernatant
Wash & DNA digestion
1. Wash 1st
500 µL Buffer MW1
Note: For blood samples, after vortexing, briefly centrifuge the tube, then transfer all the solution to a new clean tube
2,000 rpm for 1 min
Magnetize for 1 min and then discard all supernatant
2. DNA digestion
Prepare the DNA digestion solution: mix 4 µL DNase I with 60 µL DNase I Buffer per sample
64 µL DNA digestion solution
500 µL Buffer RB
Mix well; incubate at RT for 5 min
Magnetize for 1 min and then discard all supernatant
3. Wash 2nd
500 µL Buffer MW2
2,000 rpm for 1 min
Magnetize for 1 min and then discard all supernatant
4. Wash 3rd
500 µL Buffer MW2
2,000 rpm for 1 min, spin down briefly
Magnetize for 1 min and then discard all supernatant
Dry
Use a smaller pipette tip to remove excess buffer
Keep the tube cap open and dry at RT for ~10 min
Elute
100 µL RNase Free Water
2,000 rpm for 5 min, spin down briefly
Highly purified RNA
Magnetize for 1 min and then transfer supernatant into a clean 1.5 mL microcentrifuge tube

8. Data

MagBeads FastRNA Kit has been rigorously tested for its performance. RNA was extracted from various samples. The kit consistently produced high RNA yields with minimal gDNA contamination along with optimal A260/A280 and A260/A230 ratios. This demonstrates the high extraction performance across a wide range of samples. Representative extraction data and gel images are shown below.

Sample Type	Yield (μg)	A260/A280	A260/A230
3 mg kidney	15.04	2.08	1.43
20 mg fat	7.68	2.07	1.28
20 mg muscle	14.76	2.09	1.82
50 mg eggplant leaves	12.52	2.04	1.54
50 mg pepper leaves	17.68	2.10	1.92
2 rice seeds	4.67	2.23	3.08
200 μL whole blood	4.40	2.08	4.29
1 x 10^9 *E. coli*	34.28	2.11	2.15
1 x 10^9 S. aureus	13.83	2.13	2.16
1 x 10^7 Yeast	11.61	2.18	2.03
4 x 10^5 Cells	6.26	2.20	1.61



9. Troubleshooting

This guide may be useful in solving any problems that may arise. For further assistance, please contact our technical support team at **apac-techsupport@mpbio.com**

Problem	Possible Cause	Recommendation
Low RNA Yield	low RNA content in the sample	Concentrate the eluate: Elute with a smaller volume (e.g., 50 µL) using RNase-free Water. Increase sample input: Use up to twice the recommended sample amount, where appropriate.
	Incomplete resuspension of magnetic beads	Magnetic beads settle rapidly. Thoroughly resuspend the beads before aliquoting them into the lysate to ensure consistent RNA binding and recovery.
Sheared RNA	Prolonged DNase I treatment or sample processing	Follow the recommended incubation times and process samples promptly.
	Sample degradation	RNase contamination will result in compromised RNA integrity. Practice good lab techniques and use RNase-free consumables and equipment.
Low purity	Inaccurate readings due to low RNA concentration	The readings of A260/280 or A260/230 may be inaccurate when the RNA concentration is < 30 ng/µL.
	Contamination on the tube caps	Ensure the tube caps are clean to prevent carryover of buffers or sample residue. Spin down or wipe with clean tissue to remove suspecting contaminants.
Poor PCR Performance	Excessive RNA template	Test a range of RNA amounts in the RT reaction to identify the optimal concentration. Overloading can inhibit enzymes or introduce inhibitors.
	Co-purified inhibitors	Dilute RNA 5-10-fold in nuclease-free water to reduce inhibitor concentration.
	Suboptimal PCR conditions	Verify PCR reagents and protocol with positive control; adjustment on reaction conditions or primer selection may be necessary.
	Non-specific amplification	Optimize annealing temperature via gradient PCR; reduce primer concentration.

10. Product Use Limitation & Warranty

The products presented in this instruction manual are for research or manufacturing use only. They are not to be used as drugs or medical devices in order to diagnose, cure, mitigate, treat or prevent diseases in humans or animals, either as part of an accepted course of therapy or in experimental clinical investigation. These products are not to be used as food, food additives or general household items. Purchase of MP Biomedicals products does not grant rights to reproduce, modify, or repackage the products or any derivative thereof to third parties. MP Biomedicals makes no warranty of any kind, expressed or implied, including merchantability or fitness for any particular purpose, except that the products sold will meet our specifications at the time of delivery.

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