MGIEasy Magnetic Beads Blood Genomic DNA Extraction Kit User Manual

Manual Version: 3.0 Model: BDT-96, BDT-864

【Product Name】

MGIEasy Magnetic Beads Blood Genomic DNA Extraction Kit

【Package】

Cat. No.	Model	Specification
940-000633-00	BDT-96	96 preps
1000019634	BDT-864	864 preps

【Intended Use】

Used for nucleic acid extraction, enrichment, purification.

【Inspection principle】

In this product, the high salt lysate can release DNA from the sample. The released nucleic acid is captured by the superparamagnetic nano magnetic beads with high binding force. The impurities bound on the surface of nucleic acid are washed away by the washing effect of the washing solution. Finally, the nucleic acid on the magnetic beads is eluted to obtain high-quality genomic DNA. The extracted genomic DNA can be used in a variety of routine operations, including enzyme digestion, PCR, fluorescent quantitative PCR, library construction, microarray hybridization, high-throughput sequencing and so on.

【Kit Components】

Table 1 Main Components and Specification

Reagent	Package and Specification	
	(96 **Preps**)	(864 **Preps**)
Buffer LYS	30 mL×1 bottle	260 mL×1 bottle
Buffer WB1	28 mL×1 bottle	240 mL×1 bottle
Buffer EB	20 mL×1 bottle	180 mL×1 bottle
Proteinase K	2.0 mL×1 tube	18 mL×1 bottle
Magnetic Beads H	2.0 mL×1 tube	18 mL×1 bottle

⚠ **Note: Do not mix components of the reagent kits from different batches.**

【Storage Conditions】

Different reagents in this kit have different storage conditions. Please store them respectively according to the following conditions.

Table 2 Reagents storage conditions and validity period

Reagent	Storage Conditions	Validity Period
Proteinase K	2°C to 30°C	18 months
Magnetic Beads H	2°C to 30°C	18 months
Others	0°C to 30°C	18 months

⚠ **Note: Proteinase K and magnetic beads H can be transported at 2°C to 30°C. For long-term storage, please store the above components at 2°C to 8°C after receiving the kit.**

⚠ **Note: The Buffer LYS and Buffer WB1 may have some precipitation which will not affect the function. If the precipitation occurs, please heat the reagent bottle in a 37°C water bath properly for around 10 minutes until the precipitation disappear, then mix thoroughly for use.**

【Applicable Automation Instrument】

Applicable automation instrument:

High-throughput automated sample preparation system, Model: MGISP-960, Config 1/2/6/7/8/9/10

High-throughput automated nucleic acid extractor, Model: MGISP-NE384

【Sample Conditions】

1. Samples that are suitable for the kit

   Whole blood, buffy coat, plasma-free frozen blood, fresh saliva, salivary preservation fluid sample.

2. Sample storage

   Blood samples that need to be tested within 24 hours after collection, store it at 2°C to 8°C; if the samples will not be tested within 24 hours, store it at -70°C or below after collection (If there is no -70°C storage condition, temporarily store in -25°C to -15°C refrigerator). Avoid repeated freezing and thawing.

Fresh saliva samples should be tested immediately after collection. Saliva samples are recommended to be used with a saliva sample collection kit (MGI, Cat. No. 1000025954), and can be stored at room temperature after collection.

⚠ **Note: Before using frozen samples, thaw and mix them thoroughly.**

3. Sample transportation

   Transport the blood samples with dry ice. The transportation duration should last no more than 7 days. Avoid repeated freezing and thawing during transportation.

   Use the saliva sample collection kit to preserve the sample and transport at room temperature.

4. Sample Safety

   All samples are regarded as potentially infectious items. The operations shall be performed in accordance with relevant national standards.

【 Experimental Workflow 】

Please follow the workflow as below:

A. Required Materials Not Supplied

a) Required Materials for Manual Workflow:

Table 3 Required Materials for Manual Extraction

Type	Item Name	Note
Instrument	Centrifuge	Maximum centrifuge speed ≥ 12,000 rpm/min
	Vortex mixer	/
	Metal heater	Or instead by water bath
	1.5 mL magnetic rack	/
	Pipette	1 mL、200 μL、20 μL
Reagent	Absolute ethanol	Analytical reagent
	Isopropanol	Analytical reagent
	Saliva Sample Collection Kit (optional)	MGI, Cat. No. 1000025954
Consumable	1.5 mL centrifuge tube	Nonstick, DNase-free, RNase-free
	Tips	1 mL、200 μL、20 μL

	50 mL centrifuge tube	Nonstick, DNase-free, RNase-free

b) Required Materials for Automatic Workflow:

Table 4 Required Materials for MGISP-960

Type	Name	Brand	Item	96 Preps	864 Preps
Instrument	Vortex mixer	/	/	1	1
	Plate centrifuge	/	/	1	1
	Pipette	/	/	1 set	1 set
Reagent	Absolute ethanol (Analytical Reagent)	/	/	/	/
	Isopropanol (Analytical Reagent)	/	/	/	/
	Saliva Sample Collection Kit (optional)	MGI	1000025954	/	/
Consumable	Tips	/	/	/	/
	250 μL automated filter tips	MGI	1000000723	8	9×8
	1.3 mL U-bottom deep-well plate	MGI	1000004644	5	9×5
	Half-skirted 96-well PCR plate	MGI	1000000671	2	9×2
	Adapters (for Half-skirted 96-well PCR plate)	MGI	010-901739-00	2	2
	50 mL centrifuge tube (DNase-free, RNase-free)	/	/	/	/

⚠ **Note:** For configuration 1/2/6/7/8/10-MGISP-960, adapter (MGI, 010-901739-00) needs to be purchased.

⚠ **Note:** The usage of Adapter and half-skirted 96-well PCR plate is as shown in the following figure (Adapter reusable), and can directly replace the Hard-shell thin-well skirted PCR plates, white shell/clear well (MGI, 1000012059).

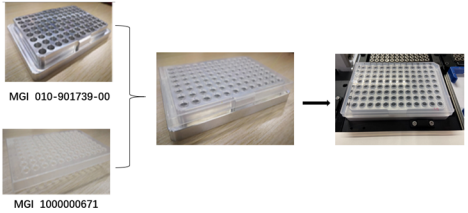

Figure 1 The usage of Adapter and half-skirted 96-well PCR Plate

Table 5 Required Materials for MGISP-NE384

Type	Name	Brand	item
Instrument	Vortex mixer	/	/
	Plate centrifuge	/	/
	Pipette	/	/
Reagent	Absolute ethanol (Analytical Reagent)	/	/
	Isopropanol (Analytical Reagent)	/	/
	Saliva Sample Collection Kit (optional)	MGI	1000025954
Consumable	Tips	/	/
	96-well tips comb	MGI	1000025661
	2.2 mL V-bottom deep-well plate	MGI	1000008088
	96-well PCR plate	/	/
	50 mL centrifuge tube (DNase-free, RNase-free)	/	/

B. Read before use

1. Avoid repeatedly freezing and thawing samples, which may result in low DNA quality.
2. If Buffer LYS and Buffer WB1 has a precipitate, it can be re-dissolved in a 37°C water bath. Shake and mix well before use.
3. All reagents and samples need to equilibrate to room temperature (10°C -30°C) before use.
4. Before use, please make sure to add absolute (100%) ethanol into Buffer WB1 according to

the amount indicated on the reagent bottle label. And please prepare 75% ethanol labeled as Buffer W2. Isopropanol needs to prepared by customer.

5. Please use the recommended consumables for automated or manual operations.
6. Please read the manual carefully before the experiment.
7. Buffer EB is divided into 10 mM Tris-HCl (pH8.0) and 0.5 mM EDTA (pH8.0), if there is a special need to provide their own elution buffer.

C. Manual Extraction Standard Workflow

1. Take the corresponding volume of sample to a new 1.5 mL centrifuge tube according to table 6.

Table 6 The amount of reagent added according to different sample types

Sample types	Sample	Buffer LYS	Isopropanol
Buffy coat, plasma-free frozen blood	150 μL	300 μL	280 μL
Whole blood, Fresh saliva	200 μL	300 μL	310 μL
Saliva (with Salivary preservation)	400 μL	/	250 μL

2. Add 20 μL Proteinase K, vortex once during this period.
3. Add Buffer LYS according to table 6, vortex once during this period, place the centrifuge tube on the Metal heater, incubate at 65℃, 1000 rpm, 15 minutes. (***Buffy coat, Freeze blood without plasma*** and ***Frozen blood*** for more than three years should extended to 30 minutes)
4. Add Isopropanol according to table 6, vortex once during this period.
5. Add 20 μL Magnetic Beads H, vortex once during this period, incubate at room temperature for 5 minutes, mix once or twice during the process.

⚠ **Note: Mix Magnetic Beads H thoroughly before use, ensure that the beads are completely resuspended.**

6. Centrifuge shortly and place the centrifuge tube on the magnetic rack for 2 minutes. After the liquid clears, carefully discard the supernatant liquid.
7. Remove the centrifuge tube from the magnetic stand. After ensuring absolute ethanol has been added, add 500 μL Buffer WB1, mix thoroughly for 1 minute, and incubate at room temperature for 1 minute.

⚠ **Note: Insufficient mixing will affect the purity of the extracted nucleic acid.**

8. Centrifuge shortly and place it on the magnetic rack for 1 minute. After the liquid clears, carefully discard the supernatant liquid.
9. Remove the centrifuge tube from the magnetic rack. Add 600 μL Buffer W2 (75% ethanol), and mix thoroughly for 5 seconds to 10 seconds, incubate at room temperature for 1 minute.
10. Centrifuge shortly and place it on the magnetic rack for 1 minute. After the liquid clears, carefully discard the supernatant liquid.
11. Repeat step 9 and step 10, and discard the remaining liquid in the centrifuge tube as much as possible.
12. Open the centrifuge tube cap, and dry it at room temperature for 5 minutes to 10 minutes to ensure that the ethanol is completely evaporated.
13. Remove the centrifuge tube from the magnetic rack. Add 60 μL to 100 μL Buffer EB, mix by vortex mixer and place it on a metal heater. Incubate at 56°C, 1000 rpm for 5 minutes.
14. Centrifuge shortly and place the centrifuge tube on the magnetic rack. After the liquid is completely clear, carefully transfer nucleic acid solution to a new 1.5 mL centrifuge tube. Label the centrifuge tube and store at -20°C and below.

⚠ **Note: When the extraction yield is too large, a small amount of magnetic beads will adhere to the transfer DNA solution. The centrifuge tube can be placed on a centrifuge, the speed is set to 8000 rpm, centrifuged for 1 minute, and then the upper DNA solution is transferred, labeled and stored below -20°C.**

✔ **Stopping point: The extracted nucleic acid products can be stored in the -20°C and below refrigerator.**

D. MGISP-960 Automated Extraction Standard Workflow

D1. MGISP-960 Automated Extraction Preparation for Blood

1. Instrument Setup

1) Before first use, install application scripts according to ***MGISP-100 & MGISP-960 Application Script Installation Instructions***. Script **[Genomic DNA Extraction for Blood.py]** for blood and fresh saliva samples, Script **[Genomic DNA Extraction for Saliva.py]** for saliva samples in preservation fluid, Script **[Genomic DNA Extraction for Buffy Coat.py]** for buffy coat samples.

2) Perform a pre-clean after powering on the device and before experiment according to ***MGISP-100 & MGISP-960 Cleaning Instructions***.

2. Preparing Consumables

Take out the consumables required for one workflow at room temperature for further use, as listed in the table 7.

Table 7 Material required but not provided

Consumables	Brand	Cat. No.	Quantity
250 μL automated filter tips	MGI	1000000723	8 Boxes
1.3 mL U-bottom deep-well plate	MGI	1000004644	5 Plates
Half-skirted 96-well PCR plate	MGI	1000000671	2 Plates
Adapters (for Half-skirted 96-well PCR plate)	MGI	010-901739-00	2 Plates

3. Preparing Samples

The script of MGISP-960 automation system is suitable for 96 sample.

The samples were taken out in advance before the experiment, equilibrated at room temperature, and vortexed to mix for use.

4. Preparing Reagents

1) Preparation of Buffer WB1: absolute ethanol needs to be added according to the label.

2) Preparation of Buffer W2: prepare 75% ethanol labeled as Buffer W2.

3) Isopropanol needed to prepared by customer.

4) Take out 5 U-bottom deep-well plate (MGI, 1000004644) and 1 half-skirted 96-well PCR

Plate (MGI, 1000000671), label the plate and add the reagents according to the table 8.

Table 8 The reagent added according to different sample types

Reagent	Volume (μL)			Consumables	Plate Name
	Whole blood, Fresh saliva	Saliva (with salivary preservation)	Buffy coat, Plasma-free frozen blood		
Proteinase K	20	20	20	1.3 mL U-bottom deep-well plate	Sample
Sample	140	400	100		
Buffer LYS	210	/	200		
Buffer WB1	400	400	400		W1
Buffer W2	800	800	800		W2
Buffer EB	110	80	110		EB
Isopropanol	300	300	300		Isopropanol
Magnetic Beads H	20	20	20	Adapter+ half-skirted 96-well PCR Plate	Beads

⚠ **Note: Mix Magnetic Beads H and Proteinase K thoroughly before use. Make sure there is no bubble at the bottom and no hanging fluid on the side wall.**

D2. MGISP-960 Operation for Blood

1) Double-click the icon of MGISP-960 on the desktop. The mode selection interface is displayed, as shown in following figure 2. Select **"Real"** and click **"Create"**.

Figure 2 Mode Selection Interface

2) In the Authentication interface, click **"User Entry"** to enter the initialization interface.

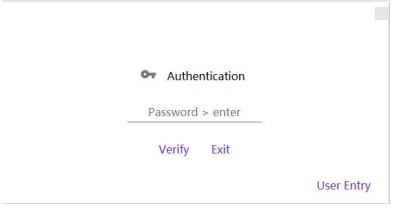

Figure 3 Mode Selection Interface

3) The initialization interface is displayed, as shown in following figure 4.

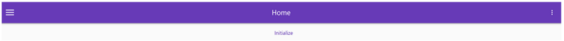

Figure 4 Initialization Interface

4) Click **"Initialize"**. The initialization takes about 2 minutes. If Initialized successfully is displayed (as shown in following figure 5, the device is connected successfully, and you can go to the next step.

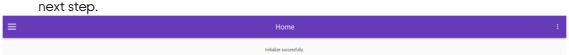

Figure 5 Initialization Successful Interface

⚠ **Note: If the initialization fails, check whether the power switch is turned on, and whether more than one software program is running. Try to restart the software. If the problem persists, contact technical support.**

5) Click the menu button and select **"Run Wizard"** in the menu. In the Run Wizard interface, click **"Solution"**, and select **[JB-A09-027 MGIEasy Magnetic Beads Blood Genomic DNA Extraction Kit_RV1.0_SV1.1]**, click **"Script"**, select **[Genomic DNA Extraction for Blood.py]** or **[Genomic DNA Extraction for Buffy Coat.py]** or **[Genomic DNA Extraction for Saliva.py]**. Take blood samples extraction as an example, operation deck arrangement of the nucleic acid extraction phase is displayed, as shown in following figure 7 and table 9. Follow the on-screen instructions to place the consumables, samples, and reagents, as shown in the figure 7. Confirm the placement and close the door.

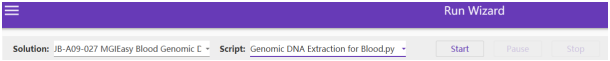

Figure 6 Run Wizard Interface

Figure 7 Nucleic Acid Extraction Operation Deck Arrangement

Table 9 Nucleic Acid Extraction Operation Deck Arrangement

Name	Position
250 µL automated filter tips	Pos1-Pos8
gDNA (Adapter+ half-skirted 96-well PCR Plate)	Pos12
EB	Pos13
W1	Pos14
W2	Pos15
Beads	Pos16
Isopropanol	Pos18
Sample	Pos20

6) Click **"Run"** to start extraction workflow.

7) It is expected to run 1 hour 40 minutes to 1 hour 50 minutes. After the process is finished, the product at Pos12 can be taken out.

8) Perform the next testing operation.

9) Dispose of the used deep-well plates, PCR plates, and waste bag to the designated waste area. Perform a post-clean before powering off the device according to ***MGISP-100 & MGISP-960 Cleaning Instructions***.

✔ **Stopping point: The extracted samples can be stored in the -20 °C and below refrigerator.**

E. MGISP-NE384 Automated Extraction Standard Workflow

E1. MGISP- NE384 Automated Extraction Preparation

1. 1. Preparing Device

Before first use, please confirm that the application script has been imported into the location of MGISP-NE384. For example, C:/ MGISP-NE384/ Scripts/ MGI864 Genomic DNA Extraction for Blood Kit_V1.0.mgi.

Before starting each round of experiment, please make sure that the machine has finished [clean].

2. Preparing Consumable

Take out the consumables required for one workflow for 384 samples, as listed in the table 10.

Table 10 Materials required but not provided

Consumables	Brand	Cat. No.	Quantity
96 well tips comb	MGI	1000025661	4 pieces
2.2 mL V-bottom deep-well plate	MGI	1000008088	20 plates

3. Preparing Samples

1) The Automated Nucleic Acid Extractor can process 1-384 samples at one time.

2) The samples were taken out in advance before the experiment, equilibrated at room temperature, and vortexed to mix for use.

4. Preparing Reagents

1) Preparation of Buffer WB1: absolute ethanol needs to be added according to the label.

2) Preparation of Buffer W2: prepare 75% ethanol labeled as Buffer W2.

3) Isopropanol needed to prepared by customer.

4) According to the number of samples, transfer the extraction reagents into new 2.2 mL V-bottom deep-well plate according to the table 11 and table 12. And label the plates as **Sample**, **Buffer WB1 + Magnetic Beads H**, **Buffer W2**, and **Buffer EB** respectively. MGISP-NE384 supports extraction experiments of 1-4 lanes of reagents. The input amount of each lane of reagents is as follows:

⚠ **Note: Each lane requires 2 Buffer W2 plates.**

Table 11 Input volume of each set of reagents

Plate Name	Consumables	Volume/well
Sample	2.2 mL V-bottom deep-well plate	According to table 12
Buffer WB1 + Magnetic Beads H	2.2 mL V-bottom deep-well plate	Buffer WB1: 600 μL Magnetic Beads H: 20μL
Buffer W2	2.2 mL V-bottom deep-well plate	Buffer W2: 600 μL
Buffer W2	2.2 mL V-bottom deep-well plate	Buffer W2: 600 μL
Buffer EB	2.2 mL V-bottom deep-well plate	Buffer EB: 60 μL - 150 μL

Table 12 The reagent added according to different sample types in the sample plate

Reagent	Volume（μL）			Adding Stage
	Whole blood, Fresh saliva	Saliva (with salivary preservation)	Buffy coat, Plasma-free frozen blood	
Proteinase K	20	20	20	Sample Preparation
Sample	200	500	165	Sample Preparation
Buffer LYS	300	/	330	Sample Preparation
Isopropanol	300	300	300	Pause After Lysis

⚠ **Note: Mix Magnetic Beads H and Proteinase K thoroughly before use. Make sure there is no bubble at the bottom and no hanging fluid on the side wall.**

E2. MGISP-NE384 Operation

1. Instrument Operation

1) Double-click the icon of MGISP-NE384 on the desktop. The authentication interface will be displayed, enter account and password.

2) Click **"login"**, the initialization interface will be displayed.

3) Click **"Initialize".** The initialization will take approximate 1 minute. If Initialized successfully displayed, means the device connected successfully, and you can go to the main interface.

Note: If the initialization fails, check whether the power switch is turned on, and whether more than one software program is running. If yes, please restart the software. If the problem unsettled, please contact technical support

4) Select the **"Clean"** option, emptying the console, wiping the console and tray with a dust-free paper soaked with 75% disinfection alcohol and closing the window. click **"Start"**, and the instrument will open the fan filter unit and UV lamp to clean the internal environment of the instrument. The default cleaning time is 20 minutes. You can also modify the cleaning time accordingly.

⚠ **Note: Instrument cleaning can be done in advance.**

5) After **"Clean"**, return to the main interface select **"Workflow"**.

6) In the Workflow interface, click **"Script"**, select script **"MGI864 Genomic DNA Extraction for Blood Kit_V1.0.mgi"**. Follow the on-screen instructions to place the consumables and reagents (table 13). Install the tips comb.

Table 13 Operation Deck layout

Plate	Position
Sample	LaneA、LaneB、LaneC、LaneD: Pos1
Buffer WB1 + Magnetic Beads H	LaneA、LaneB、LaneC、LaneD: Pos2
Buffer W2	LaneA、LaneB、LaneC、LaneD: Pos3
Buffer W2	LaneA、LaneB、LaneC、LaneD: Pos4
Buffer EB	LaneA、LaneB、LaneC、LaneD: Pos6

7) Confirming the consumables and reagents are placed correctly, close the instrument window. Click **"Run"**. Check the corresponding test channel according to the number of samples and check the tips comb are placed correctly. Click the **"Confirm"**.

8) After the process runs for 30 minutes, the interface will appear. According to the reminder, take out the plate in Pos1 and add isopropanol into each well with the pipette then put it back to Pos1. Clicking the **"Confirm"** button, the process continues to run.

9) The whole run will take approximate 60 minutes, please arrange the following work properly.

10) After the run ended, please take out the extraction product of Pos6 immediately. It can be used directly for subsequent experiments or stored at -20°C and below.

⚠ **Note: After the experiment, please take out the extracted product immediately. It is forbidden to leave the product at pos6 for a long time, otherwise it will affect the quality of the product.**

11) Dispose the used deep-well plates and tips comb. Select the **"Clean"** option, emptying the

console, wiping the console and tray with a dust-free paper soaked with 75% disinfection alcohol and closing the window. click **"Start"**, and the instrument will open the fan filter unit and UV lamp to clean the internal environment of the instrument. The default cleaning time is 20 minutes. You can also modify the cleaning time as needed.

【 Precautions 】

1. This kit is research use only, not for clinical diagnosis, please read this manual carefully before use.
2. Please familiarize the operation and precautions of various instruments to be used before testing.
3. When all the reagents are taken out from the specified storage environment, please use them according to the requirements. The reagents should be shaken and mixed before use.
4. The micro-Pipette should be used for sample addition.
5. All samples and reagents should be avoided to directly contact with skin and eyes, do not swallow, once happen, immediately rinse with plenty of water and go to the hospital for treatment in time.
6. All samples and various wastes should be treated in accordance with relevant regulations.

【 Production Company Information 】

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