CE

G2M

MAGNXT

Blood DNA Extraction Kit

REF G2M182121

S. No.	Product Name	SKU Code	Pack Size
1.	MagNXT Blood DNA Extraction Kit	G2M182121-50T	50T
2.	MagNXT Blood DNA Extraction Kit	G2M182121-250T	250T
3.	MagNXT Blood DNA Extraction Kit	G2M182121-96T	96T
4.	MagNXT Blood DNA Extraction Kit	G2M182121-192T	192T
5.	MagNXT Blood DNA Extraction Kit (RX)	G2M182121RX-480T	480T
6.	MagNXT Blood DNA Extraction Kit (TK)	G2M182121TK-480T	480T
7.	MagNXT Blood DNA Extraction Kit (MG)	G2M182121MG-480T	480T

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Intended Use

MagNXT Blood DNA Extraction kit is an *in-vitro* diagnostic test kit, intended for isolation and purification of DNA from clinical samples such as whole blood, serum, plasma. MagNXT Blood DNA Extraction Kit utilizes magnetic bead-based technology, can be processed manually or automated on open-ended liquid handling platforms as well as magnetic processors. MagNXT Blood DNA Extraction Kit for professional, laboratory trained personnel use only.

Intended User

The assay is intended to be performed by a laboratory professional in clinical laboratory.

Test Principle

The Magnetic Blood DNA Extraction Kit uses a combination of magnetic bead technology and enzymatic reactions to extract DNA from samples such as whole blood, serum and plasma. The cell membranes and nuclear membrane are lysed by the action of buffer and detergents to break down the cells and release the DNA. Proteinase K is added to digest proteins and help to release the DNA from the cell nuclei. Magnetic beads coated with a DNA-binding agent are added to the sample. The DNA binds to the beads, allowing for efficient separation from other cellular components. The magnetic beads with bound DNA are washed to remove contaminants and impurities. The DNA is then eluted from the magnetic beads using a low-salt buffer, releasing the purified DNA into the solution. The purified DNA is collected and ready for downstream applications like PCR, sequencing, or genotyping. This kit provides a rapid, efficient, and reliable method for extracting high-quality DNA from blood samples, making it suitable for various molecular biology applications.

Summary

The MagNXT Blood DNA Extraction Kit allows rapid, efficient and reliable method for extracting high-quality DNA from blood samples, making it suitable for various molecular biology applications. Purification requires no phenol/chloroform extraction or alcohol precipitation and involves minimal handling. The kit is based on super paramagnetic particle purification technology with no phenol/chloroform extraction.

Materials Required but Not Provided

- Water bath or Heating block
- Micropipettes (Adjustable)
- Disposable barrier (Filter) pipette tips
- 1.5 ml microcentrifuge tubes (DNase/RNase Free)
- Table top microcentrifuge
- Molecular biology grade ethanol (96-100%)
- Personal protective equipment (Aprons, disposable gloves, goggles etc).
- Disposable Powder-free Gloves
- Vortexer
- 1X PBS

Storage, Operating Conditions and Stability

- The kit has a shelf life of 18 months from the date of manufacturing.
- The test kit and its component are stable until the expiration date mentioned on the kit box.

⚠ All the kit components are shipped and stored at 15-25 °C except MagPure Particles & Proteinase K (Before reconstitution) should be shipped and stored at 2- 8 °C whereas, Proteinase K (After reconstitution) should be stored at -20 °C.

Instructions Before Use

- Buffer BW1 and Buffer BW2 are supplied as concentrates. Before using for the first time, add the appropriate volume of molecular biology grade ethanol (96-100%) as indicated on the bottle and shake thoroughly. Buffer BW1 and Buffer BW2 are stable for 18 months after reconstitution with ethanol, when stored closed at room temperature (15-25 °C).

⚠ Add Protease Dissolve Buffer into absolute amount of Proteinase K as mentioned on the label and store it at -20 °C.

- Spray the sealed package (for Infectious samples) containing the specimen with 75% ethanol in a biosafety cabinet.

Sample Preparation Protocol

A) DNA Purification from Whole Blood, Plasma or Serum

1) Transfer 20 µl Proteinase K to a new 1.5 ml microcentrifuge tube.

2) Add 200 µl whole blood, plasma or serum to the microcentrifuge tube, shake to mix for 5 sec.

3) Add 200 µl Binding Buffer to the samples, invert mix for 3-5 times, and then vortex at maximum speed for 10 sec. Incubate at 70 °C for 10 min.

4) Proceed with step 1 of manual or automated protocol.

B) DNA Purification from Buffy Coat/Lymphocytes

1) Buffy coat is a leukocyte enriched portion of whole blood and contains approximately 5-10 times more DNA than an equivalent volume of whole blood. Prepare the buffy coat by centrifuging whole blood at 1000x*g* for 10 min at room temperature.

2) After centrifugation, three different fractions will be distinguished, the upper clear layer contains plasma; the intermediate buffy coat layer containing concentrated leukocytes, and the bottom layer containing concentrated erythrocytes.

3) Collect approximately 200 µl of intermediate layer using micropipette (If necessary, adjust the volume to 200 µl with 1X PBS), into a fresh and sterile 1.5 ml microcentrifuge tube.

4) Add 20 µl Proteinase K. Mix for 10 sec by short vortexing and incubate at 56 °C for 10-15 min in water bath/heating block.

MagNXT Blood DNA Extraction Kit

Platform-Manual

SKU Code-G2M182121-50T, G2M182121-250T

Table 1. Kit Components

Kit Contents	Kit Content Code	Kit Content Quantity	Kit Content Code	Kit Content Quantity
	50 Tests	50 Tests	250 Tests	250 Tests
MagPure Particles	G2MA3-2198-1	1 X 1 ml	G2MA3-2198-2	1 X 5 ml
Buffer LB	G2MA3-3019-1	1 X 20 ml	G2MA3-3019-2	1 X 100 ml
Wash BW1	G2MA3-2200-1	1 X 20 ml	G2MA3-2200-3	1 X 100 ml
Wash BW2	G2MA3-2201-1	1 X 20 ml	G2MA3-2201-3	2 X 50 ml
Proteinase K	G2MA3-3020-1	1 X 20 mg	G2MA3-3020-2	1 X 100 mg
Protease Dissolve Buffer	G2MA3-3021-1	1 X 2 ml	G2MA3-3021-2	1 X 6 ml
Binding Buffer	G2MA3-3022-1	1 X 10 ml	G2MA3-3022-2	1 X 55 ml
Buffer AE	G2MA3-3023-1	1 X 5 ml	G2MA3-3023-2	1 X 25 ml

Manual Protocol

1) Add 20 µl MagPure Particles and 400 µl Buffer LB to the lysate as sample. Mix thoroughly by inverting for 15-30 times. Incubate for 3 min at RT with intermittent inverting to mix. Place the tube in the magnetic stand for 1 min until the beads form a tight pellet. Then remove the supernatant.

2) Add 600 µl Buffer BW1 and vortex for 15 sec to resuspend beads. Place the tube in the magnetic stand for 1 min until the beads form a tight pellet. Then remove the supernatant.

3) Add 600 µl Buffer BW2, and vortex for 15 sec to resuspend beads. Place the tube in the magnetic stand for 1 min until the beads form a tight pellet. Then remove the supernatant.

4) Repeat step 3 one more time.

5) Centrifuge briefly to collect liquid on the tube. Place the tube to the magnetic stand and remove all the liquid carefully, air dry for 10 min.

6) Add 50-100 µl Buffer AE to the sample, re-suspend the beads by vortexing. Incubate at 55 °C for 10 min by shaking. If there is no shaking device, vortex for 2-3 times.

7) Place the tubes in the magnetic rack for 2 min. Transfer the supernatant containing the purified DNA to a clean 1.5 ml microcentrifuge tube.

MagNXT Blood DNA Extraction Kit

Platform- Rapi-X16 Automated Nucleic acid Extraction System

SKU Code-G2M182121-96T (PF) R1-R8), G2M182121-192T (PF) R16)

Table 2. Kit Components

Kit Contents	Kit Content Code		Kit Content Quantity	Kit Content Code		Kit Content Quantity
	96 Tests		96 Tests	192 Tests		192 Tests
MagPure Particles	G2MA3-2661-1	Single Test Cartridge code G2MA3-3033-1	96-Cartridges	G2MA3-2661-2	Prefilled Plates code G2MA3-3034-1	12 Plates (96-well)
Buffer LB	G2MA3-2657-1			G2MA3-2657-2		
Wash BW1	G2MA3-2658-1			G2MA3-2658-2		
Wash BW2	G2MA3-2659-1			G2MA3-2659-2		
Buffer AE	G2MA3-2660-1			G2MA3-2660-2		
Proteinase K	G2MA3-2662-3		40 mg	G2MA3-2662-4		80 mg
Proteinase Dissolving Buffer	G2MA3-3024-1		3 ml	G2MA3-3024-2		5 ml
Binding Buffer	G2MA3-2664-3		25 ml	G2MA3-2664-4		40 ml

*96 cartridges, 24 combs with all the buffers and other kit components preloaded.

**12 Prefilled plates, 24 combs with all the buffers and other kit components preloaded.

Automation Protocol (Rapi-X16)

1) Transfer 0.4 ml aspirate from sample preparation step (of respective sample type) to Column 2 and/or Column 8 of the Prefilled plate.

For R16: For extraction of 16 samples, the sample needs to be loaded in the 2nd and 8th column, the 3/4/5 and 9/10/11 is the washing position, and the 6th and 12th is the elution position.

For R1 to R8: For extraction of 1-8 samples, If the channel 1-8 or 9-16 is selected, the sample needs to be loaded in the 2nd well of the individual cartridge for each individual samples, Column 3/4/5 is the washing position, and column 6 is the elution position.

Note: Each cartridge is used single time for single sample.

For single sample run, use empty cartridge for balancing the run. If cartridge is placed at position 1 and 5 then balance with empty cartridge at position 4 and 8.

If cartridge is placed at position 2 and 6 then balance with empty cartridge at position 3 and 7.

2) Place the pre-filled plate or individual cartridge in Block and then place the combs on position 1 & 7.

3) Close the door after selecting the corresponding program 'Blood DNA' on Genes 2Me Rapi-X16 Automated Extraction system.

4) Click 'Start' to run the current program and wait to finish the operation.

5) Take out the eluted product and it can be proceed for any downstream applications.

MagNXT Blood DNA Extraction Kit

Platform- Rapi-X96 Automated Nucleic acid Extraction System & GENFast Automated DNA/RNA Extraction System

SKU Code -G2M182121RX-480T

Table 3. Kit Components

Kit Contents	Kit Content Code	Kit Content Quantity
	480 Tests	480 Tests
MagPure Particles	G2MA3-3025-1	Pre-Mixed in buffer plate
Buffer LB	G2MA3-3026-1	05 Plates (96-well)
Wash BW1	G2MA3-3027-1	05 Plates (96-well)
Wash BW2	G2MA3-3028-1	05 Plates (96-well)
Buffer AE	G2MA3-3029-1	05 Plates (96-well)
Proteinase K	G2MA3-3030-1	200 mg
Protease Dissolve Buffer	G2MA3-3031-1	12 ml
Binding Buffer	G2MA3-3032-1	100 ml

*20 Prefilled plates, 5 combs with all the buffers and other kit components preloaded.

Automation Protocol (Rapi-X96)

For Rapi-X96 Automated Nucleic acid Extraction System

1) Add 0.4 ml of sample into corresponding wells of Buffer LB plate.

2) Turn-on the machine, select and start the corresponding program.

3) Place the pre-filled plates at defined workstations as per table below (Table 4).

4) Upon completion of the 20 min processing period, the extracted elute (DNA) will be stored at -20 °C.

For GENFast Automated Nucleic acid Extraction System

1) Add 400 µl of sample into corresponding wells of Buffer LB plate.

2) Turn-on the machine, start the corresponding program.

3) Place the pre-filled plates at defined workstations as per table below.

4) Upon completion of the 20 min processing period, the extracted elute in case of DNA will be stored at -20 °C.

Table 4. Details of Work Station for GenFast 96

Workstation	Pre-filled Plates
Pos-1	Buffer LB
Pos-2	Wash BW1
Pos-3	Wash BW2
Pos-6	Buffer AE

Table 5. Details of Protocol for GenFast 96.

Step	Station	Waiting T (Min)	Mixing T (Min)	Mixing S	Magnet T (Sec)	Magnet S	Volume (µl)
1	3	0	1	3	50	1	500
2	1	0	1	3	0	1	700
3	1	2	0	3	45	3	700
4	2	0	1	4	45	2	500
5	3	0	1	4	45	2	500
6	6	3	1	3	0	1	100
7	6	3	1	3	60	1	100
8	1	0	1	3	0	1	0

Cracking Set (T1)	56.0 °C	Open fan temperature	35 °C	Open time	000 min
Elution Set	56.0 °C	Storage set	000.0 °C		

MagNXT Blood DNA Extraction Kit

Platform-KingFisher Flex System (Thermo Fisher)

SKU Code-G2M182121TK-480T

Table 6. Kit Components

Kit Contents	Kit Content Code	Kit Content Quantity
	480 Tests	480 Tests
MagPure Particles	G2MA3-3025-1	Pre-Mixed in buffer plate
Buffer LB	G2MA3-3026-1	05 Plates (96-well)
Wash BW1	G2MA3-3027-1	05 Plates (96-well)
Wash BW2	G2MA3-3028-1	05 Plates (96-well)
Buffer AE	G2MA3-3029-1	05 Plates (96-well)
Proteinase K	G2MA3-3030-1	200 mg
Protease Dissolve Buffer	G2MA3-3031-1	12 ml
Binding Buffer	G2MA3-3032-1	100 ml

Automation Protocol (KingFisher Flex System (Thermo Fisher)

1) Add 400 µl of sample into corresponding wells of Buffer LB plate.

2) Turn-on the machine, start the corresponding program.

3) Place the pre-filled plates at defined workstations as per table below (Table 7).

4) Upon completion of the 20 min processing period, the extracted elute containing DNA shall be stored at -20 °C.

Table 7.

Workstation	Pre-filled Plates
Pos-1	Buffer LB
Pos-2	Wash BW1
Pos-3	Wash BW2
Pos-4	Buffer AE
Pos-5	Tip Comb Plate

MagNXT Blood DNA Extraction Kit

Platform-MGISP-960

SKU Code -G2M182121MG-480T

Table 8. Kit Components

Kit Contents	Kit Content Code	Kit Content Quantity
	480 Tests	480 Tests
MagPure Particles	G2MA3-3025-1	Pre-Mixed in buffer plate
Buffer LB	G2MA3-3026-1	05 Plates (96-well)
Wash BW1	G2MA3-3027-1	05 Plates (96-well)
Wash BW2	G2MA3-3028-1	05 Plates (96-well)
Buffer AE	G2MA3-3029-1	05 Plates (96-well)
Proteinase K	G2MA3-3030-1	200 mg
Protease Dissolve Buffer	G2MA3-3031-1	12 ml
Binding Buffer	G2MA3-3032-1	100 ml

Automation Protocol (MGISP-960)

- Add the reagents/sample to the corresponding wells of the deep well plate according to the table below (Table 9).

Table 9.

Position	Pre-filled Cartridges	Volume/Nos.
Pos1-Pos4	250 µl automated filter tips	4 Nos.
Pos12	Hard-shell thin-wall 96-well skirted PCR plates, white shell/clear well	1 Nos.
Pos21	Buffer LB (360 µl) add 20 µl MagPure Particles	380 µl
Pos17	Sample	180 µl
Pos13	Buffer AE	50 µl
Pos23	Wash BW1	170 µl
Pos14	Wash BW2	340 µl

- Double-click the icon of MGISP-960 on the desktop. The mode selection interface is displayed.
- The initialization interface is displayed. Click to initialize. The initialization takes about 2 min.
- Click the Menu button and select Wizard in the menu.
- In the Wizard interface, click Application. Operation deck layout for the script is displayed and select the (JB-A09-039 MGISP-960 Nucleic Acid Extraction Kit).
- Follow the onscreen instructions to place the consumables, samples, and reagents. Confirm the Placement and close the door.
- Upon completion of the 60 min processing period, the extracted elute, containing DNA, shall be stored at -20 °C.

Troubleshooting Guide

A) Poor yield / low sensitivity

1) Incomplete sample lysis

- Sample mixed with Lysis Buffer and was not thoroughly homogenized. The mixture has to be shaken continuously. Alternatively, prolong the incubation time with Lysis Buffer.

2) Insufficient elution buffer volume

- Bead pellet must be covered completely with elution buffer and needs to be fully resuspended. Insufficient performance of elution buffer during elution step.
- Remove all buffers completely from the bead pellet after the binding and wash steps. Remaining buffer reduces the efficiency of the subsequent steps. Aspiration of adsorbed bead pellet.
- Do not disturb the attracted beads while aspirating the supernatant. This requires special caution when removing the lysate from the beads as the lysate is usually too opaque to allow visual control of the pellet.
- Time for magnetic separation too short or aspiration speed too high.

B) Low Purity/Low Sensitivity Insufficient washing procedure

- Make sure that beads are resuspended completely during the washing procedure. If shaking is not sufficient to resuspend the beads completely mix by repeated pipetting up and down.

C) Poor performance of Nucleic acid in down-stream applications Carry-over of ethanol from wash buffers

- Ensure to remove all of the 80% ethanolic wash solution from the final wash, as residual ethanol may interfere with downstream applications.
- Close the buffer bottles tightly, avoid ethanol evaporation from buffer bottles as well as from buffer filled in reservoirs. Do not reuse buffer reservoirs.

Limitations

- **Sample Variability:** Different body fluids may contain varying amounts of DNA, leading to differences in extraction efficiency and yield. Each sample type requires specific preprocessing and the use of appropriate buffers and protocols. Failure to preprocess samples adequately may result in reduced efficiency or failure of DNA extraction due to potential inhibitors present in certain body fluids.
- **Cross-Contamination:** Improper handling or inadequate cleaning of equipment may lead to cross-contamination between samples, compromising the reliability of the extracted DNA. Maintaining a contamination-free environment and following proper cleaning protocols are essential to minimize the risk of cross-contamination.
- **Processing Time:** The extraction process can be time-consuming, particularly when dealing with multiple types of body fluids. This can lead to workflow bottlenecks, especially in high-throughput settings. Efficient workflow management and optimization of extraction protocols are necessary to minimize processing time and increase productivity.
- **Operator Skill:** The efficiency of the extraction process may vary depending on the expertise of the operator. Variability in results between different users can occur if operators lack sufficient training or experience. Standardized protocols and regular training sessions can help to ensure consistency in results across different operators.

Safety and Precautions

- **Chemical Handling:** Reagent cartridges/plates contain guanidine hydrochloride/guanidine thiocyanate, which may react with bleach to form highly reactive compounds. In case of spillage, clean with laboratory detergent and water.
- **Biological Samples:** Tissues, body fluids, infectious agents, and blood may carry infectious diseases. Ensure all laboratory personnel are familiar with general safety guidelines for chemical usage, storage, and waste disposal. Refer to relevant Safety Data Sheets (SDS) for specific precautions.
- **Personal Protective Equipment (PPE):** Wear appropriate attire, including lab coats, gloves, goggles, and closed-toe shoes to protect against spills, splashes, and inhalation.
- **Ventilation:** Work in well-ventilated areas or use fume hoods to minimize exposure to harmful vapors or inhalation of chemicals. Handle the chemical waste in designated fume hoods.
- **Storage:** Store the chemicals correctly in designated areas, adhering to guidelines for temperature, compatibility, and segregation.
- **Labeling:** Ensure all the containers are clearly labeled with the chemical name, concentration, and hazard warnings to prevent accidents or confusion.
- **Handling:** Employ proper techniques, while handling chemicals, pour chemicals carefully and steadily to avoid spills, splashes, and excessive vapor release. Keep chemical containers closed while not in use.
- **Emergency Equipment:** Familiarize yourself with the location and proper use of safety showers, eyewash stations, fire extinguishers, and spill kits for swift response to emergencies.
- **Training:** All individuals must undergo comprehensive training on chemical handling, emergency procedures, and the use of safety equipment as per regulatory and institutional requirements before handling potentially biohazardous materials.

Symbols for Use in the Labeling	
Symbols	**Definition**
	KEEP AWAY FROM SUNLIGHT
	TEMPERATURE LIMIT
IVD	IN VITRO DIAGNOSTIC MEDICAL DEVICE
	UPWARD
	CONSULT INSTRUCTIONS FOR USE
LOT	BATCH CODE
REF	CATALOGUE NUMBER
	USE BY DATE
	DATE OF MANUFACTURE
	MANUFACTURER
	CONTAINS SUFFICIENT FOR <n> TESTS
	CAUTION
	DO NOT USE IF PACKAGE IS DAMAGED
EC REP	AUTHORIZED REPRESENTATIVE IN THE EUROPEAN COMMUNITY/ EUROPEAN UNION
CE	EUROPEAN CONFORMITY

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EC REP

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