OxMag DNA Purification Kit

High-Throughput Technology

Qualitative Assay for Automatic Extraction Systems

INSTRUCTION FOR USE

RUO

REF

Version 1. MAG-018.10.25

Research Use Only

MAG-018

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List of content

Description of the kit

Intended use

OxMag DNA Purification Kit is a universal, magnetic bead-based product for the rapid and reliable isolation of genomic DNA from whole blood, buffy coat, saliva, buccal swabs. The kit can be used for automated and manual purifications. It can be adapted to any magnetic processors or liquid handling systems. The analytical performance and sensitivity of the kit were thoroughly tested in laboratory and clinical settings according to the "EU Regulation 2017/746 on In Vitro Diagnostic Medical Devices".

The kit components

- The kit composition is described in "**Table 1. The buffers and components of the kit.**"
- Instructions for Use (IFU) – detailed guidelines for high-quality DNA Purification methodology, which could be easily adapted to the various automated systems and samples.
- Material Safety Data Sheet (MSDS) – the documents contain information about hazard identification, first aid measures, firefighting, accidental release measures, handling and storage, exposure control, and personal protection.

Table 1. The buffers and components of the kit

OxMag DNA Purification Kit		200 rxn	500 rxn	2000 rxn
Solution A	Lysis Activator	4.2 ml	10.5 ml	42 ml
Solution B	Lysis/Binding Buffer	84 ml	105 ml × 2	840 ml
Solution W1 (conc.)	Wash Buffer 1	30 ml × 2	150 ml	300 ml × 2
Solution W2 (conc.)	Wash Buffer 2	52 ml	131 ml	175 ml × 3
Solution E	Elution Buffer	42 ml	105 ml	105 ml × 4
OxMag® Beads[1] *Magnetite*	Synthetic Magnetic Beads	4.2 ml	10.5 ml	42 ml
Proteinase K	Enzyme *Lyophilized Powder*	20 mg × 4	25 mg × 8	100 mg × 8
Proteinase K Storage Buffer	Storage Buffer for Enzyme	1.5 ml × 4	15 ml	45 ml

[1] Do not freeze OxMag® Beads solution. Store at 2-8 ºC

Reagents Preparation

Solution W1

Wash Buffer 1 comes as a concentrate. Prior to initial use, combine the recommended quantity of ethanol, which must be at least 95% pure, as specified in "Table 2. Preparation of Solution Wash 1". If the labels of Solution W1 indicate that ethanol has already been added by the manufacturer, omit this step.

Table 2. Preparation of Solution Wash 1

No. Reactions	Solution W1	Ethanol ≥95%	Final Volume
200	30 ml x 2	75 ml (In each bottle)	105 ml x 2 bottles
500	150 ml	375 ml	525 ml
2000	300 ml x 2	750 ml (In each bottle)	1050 ml x 2 bottles

Solution W2

Wash Buffer 2 comes as a concentrate. Before initial use, combine the recommended quantity of ethanol, which must be at least 95% pure, as specified in "Table 3. Preparation of Solution Wash 2". If the labels of Solution W2 indicate that ethanol has already been added by the manufacturer, omit this step.

Table 3. Preparation of Solution Wash 2

No. Reactions	Solution W2	Ethanol ≥95%	Final Volume
200	52 ml	263 ml	315 ml
500	131 ml	657 ml	788 ml
2000	175 ml x 3	875 ml (In each bottle)	1050 ml x 3 bottles

Proteinase K

Proteinase K is supplied as a lyophilized powder. Before using it for the first time, add the appropriate amount of Proteinase K Storage Buffer, as indicated in "Table 4. Preparation of Proteinase K enzyme". Aliquoted Proteinase K should be stored at -20 °C.

Table 4. Preparation of Proteinase K enzyme

No. Reactions	Proteinase K	Proteinase K Storage Buffer	Final Volume
200	20 mg x 4	1 ml (In each vial)	1 ml x 4 vial
500	25 mg x 8	1.25 ml (In each vial)	1.25 ml x 8 vials
2000	100 mg x 8	5 ml (In each vial)	5 ml x 8 vials

Binding Bead Mix (For Routine Testing)

Prepare Solution B with Magnetic Beads for routine testing. Add the appropriate volume of components indicated in "Table 6. Preparation of Solution B with Magnetic Beads" for same-day use. To calculate volumes for other sample numbers, refer to the per-well volume and add 5% overage of Solution B and OxMag® Beads.

Table 6. Preparation of Solution B with Magnetic Beads

No. Reactions	Solution B	OxMag® Beads	Final Volume
1	400 µl	20 µl	420 µl
96	40.32 ml	2.02 ml	42.34 ml
192	80.64 ml	4.04 ml	84.68 ml

Recommended Sample Pretreatment

The specimens and transport materials are not provided with the kit. The samples should be collected and transported by end-user laboratories according to the national or international guidelines (e.g. "Guidelines for the collection of clinical specimens during field investigation of outbreaks", Department of Communicable Disease Surveillance and Response, World Health Organization).

Note: For liquid sample input material volumes of 50 µl, add 1X PBS solution to bring the total volume to 200 µl, then proceed with the standard extraction protocol. For larger input materials (e.g., 400 µl), scale up all buffer volumes proportionally according to the increased sample input.

Buffy coats

To prepare the buffy coat, collect blood specimens in an anticoagulant tube (K2EDTA, K3EDTA, Streck DNA, and Sodium Citrate). **Note:** Do not collect blood in Sodium Heparin as the heparin used as the anticoagulant in these tubes inhibits downstream applications. Centrifuge the sample at 900–1100 × g for 10 minutes at room temperature.

Whole Blood

Blood specimens can be stored in an anticoagulant tube (K2EDTA, K3EDTA, Streck DNA, Sodium Citrate). **Note:** Do not collect blood in Sodium Heparin as the heparin used as the anticoagulant in these tubes inhibits downstream applications. Before processing, ensure that the entire blood samples are fully liquefied to prevent clot carryover, which could interfere with nucleic acid purification. For input material volumes of 50 µl, add 1X PBS solution to bring the total volume to 200 µl, then proceed with the standard extraction protocol. For larger input materials (e.g., 400 µl), scale up all buffer volumes proportionally according to the increased sample input.

Saliva

Thoroughly rinse the mouth with water at least 30 minutes before collection. Collect up to 500 µl of saliva in a 15 ml in 1X PBS tubes and keep on ice. Transfer the sample to a 1.5 ml reaction tube and centrifuge at 1000 × g for 1 minute in a pre-chilled (4°C) centrifuge. Carefully remove the supernatant without disturbing the pellet. Add 1 ml cold 1X PBS, vortex, and transfer 200 µl to the lysis plate.

Buccal Swabs

Use only polyester or foam-tipped swabs, as cotton swabs may lead to lower DNA yield or the presence of PCR inhibitors. Thoroughly rinse mouth with water and swallow prior to swabbing. Thoroughly swab only both cheeks for 30s to maximise the collection of Buccal Swabs. After sampling, swabs should be stored in their original pouches rather than in plastic tubes, since bacterial growth in sealed plastic containers can cause DNA degradation. Air dry swabs after sample collection for at least 2 hours, to avoid bacterial growth and enzymatic DNA degradation during storage. Buccal swabs can be stored for up to three weeks at temperatures ranging from -20 °C to +4 °C before DNA extraction.

The List of Materials to be Supplied by the User

Table 7. Equipment and Reagents to be Supplied by the User

Equipment	Consumables
Thermoshaker or Thermomixer	Ethanol ≥95%
Magnetic separation rack	DNase-free 1.5 ml microcentrifuge tubes
Pipette 0.5 - 10 µl	Adhesive plate seals
Pipette 20 - 200 µl	0.5 - 10 µl pipette filter tips
Pipette 100 - 1000 µl	20 - 200 µl pipette filter tips
Magnetic rod–based platforms (e.g. KingFisher Flex)	100 - 1000 µl pipette filter tips
Liquid handlers (e.g. Tecan Fluent)	Automation platform-compatible plastics

Instructions for gDNA purification from liquid samples (Whole Blood, Buffy coats, Saliva)

The sample should be stored according to "Interim Guidelines for Collecting and Handling of Clinical Specimens (Center for Disease Control, CDC)". Before analysis, ensure the samples do not contain inhibiting mucus and sediments.

Before starting the procedure, prepare the solutions and enzymes according to the solution preparation guide (Table 2-6). **Do not freeze OxMag® Beads solution**. Before pipetting, ensure that the OxMag® Beads solution is homogeneous and has an even distribution of nanoparticles (use a vortex). Solution A and Solution B may form precipitates upon storage. Warm it up to 60°C until the residues have fully dissolved.

Protocol for magnetic rod–based platforms

Stage ▼	Description
Prepare Binding Bead Mix►	1. For one reaction, add 20 µl of OxMag Beads to 400 µl Solution B (Binding buffer). For routing testing use Table 6.
Prepare sample plate ► (Position 1)	1. Add 20 µl of Solution A (Lysis Activator) to the 2 ml deep-well plate; 2. Add 200 µl of the pretreated sample; 3. Add 20 µl of Proteinase K. 4. Seal the plate with a clear adhesive film. Mix and incubate the sample at 65 °C for 20 minutes in a heat block with shaking at 150-200 rpm. 5. Invert Solution B mixed with Magnetic Beads gently to have a homogeneous mixture, then add 420 µl to each sample well.
Prepare the processing plates ►	1. Plate wash (plate position 2): Add 1000 µl of Solution W1 to each well in the plate; 2. Plate wash (plate position 3): Add 1000 µl of Solution W2 to each well in the plate; 3. Plate wash (plate position 4): Add 500 µl of Solution W2 to each well in the plate; 4. Plate elution (plate position 5): Add 50-200 µl of Solution E to each well in the plate.
Run the instrument ►	1. Load the prepared plates into the appliance according to the relevant appliance instructions e.g. "A25597_Blood_Buccal", "4413021 DW blood". 2. Run the instrument.

Protocol for liquid handlers

This procedure can also be applied for manual nucleic acid purification using the appropriate plasticware and a magnetic rack compatible with the DNase-free 1.5-2.0 ml tubes.

Stage ▼	Description
Lysis/binding stage ►	1. Add 20 µl of Solution A to the well of a 2 ml deep-well plate, followed by 200 µl of the pretreated sample. 2. Add 20 µl of Proteinase K to each sample well. 3. Seal the plate with a clear adhesive film. Mix and incubate the sample at 65 °C for 20 minutes with shaking at 150-200 rpm. 4. Add 420 µl of premixed Solution with Magnetic Beads (For one reaction 400 µl of Solution B and 20 µl of OxMag Beads. For routing testing use Table 6.) 5. Seal the plate with a clear adhesive film. Mix and incubate the sample at room temperature for 5 minutes with shaking at 500-800 rpm.
Washing stage ►	1. Place the deep-well plate on the magnetic separation rack for 3-5 min. Note: Wait for the solution to become transparent/clear before proceeding to the next step. 2. Keep the deep-well plate on the magnetic separation rack and remove the solution by pipette without disturbing the pellet/ring of separated magnetic beads. 3. Remove the deep-well plate from the magnetic separation rack, add 1000 µl of Solution W1. Seal the plate with a clear adhesive film and shake at 800-1000 rpm for 1 minute. 4. Put the deep-well plate on the magnetic separation rack. Wait 1-2 min for precipitation or until the solution becomes transparent/clear. 5. Remove the solution by pipette without disturbing the pellet/ring of separated magnetic beads. 6. Remove the deep-well plate from the magnetic separation rack, add 1000 µl of Solution W2. Seal the plate with a clear adhesive film and shake at 800-1000 rpm for 1 minute. 7. Put the deep-well plate on the magnetic separation rack. Wait 1-2 min for precipitation or until the solution becomes transparent/clear. 8. Remove the solution by pipette without disturbing the pellet/ring of separated magnetic beads. 9. Remove the deep-well plate from the magnetic separation rack, add 500 µl of Solution W2. Seal the plate with a clear adhesive film and shake at 800-1000 rpm for 1 minute. 10. Put the deep-well plate on the magnetic separation rack. Wait 1-2 min for precipitation or until the solution becomes transparent/clear. 11. Remove the solution by pipette without disturbing the pellet/ring of beads. Do not leave any traces of Solution W2. 12. Leave the sample to air-dry for 2-3 min. Caution must be taken not to over-dry the pellet.
Elution stage ►	1. Add from 50-200 µl of Solution E (Elution Buffer). Seal the plate with a clear adhesive film. 2. Incubate sealed plate at 65 °C for 5-7 minutes with shaking at 800-1000 rpm. 3. Place the sealed plate on the magnetic separation rack for 1 min. 4. Transfer the eluate to a new microfuge tube or standard 96-well plate. Seal the eluate plate with adhesive firm. deep-well plate and store at -20°C.

Troubleshooting DNA purification

Table 8. Possible causes and solutions for problems that may occur during DNA preparation

Problem	Possible Cause	Corrective Action
Agglomerated Magnetic Nanoparticle Solution	Magnetic Nanoparticle Solution has been frozen or stored below the recommended temperature	Do not freeze Magnetic Nanoparticle Solution. Store according to the manufacturer's recommended conditions. Discard if aggregation is observed, as performance will be compromised.
Low Yield	Incorrect preparation or storage of buffers and reagents	Store OxMag Magnetic Beads at room temperature (do not freeze). Freezing affects performance. Vortex immediately before use. Prepare Lysis/Binding Bead Mix immediately before use and ensure it is homogeneous.
	Beads over-dried	After final wash, ensure ethanol is completely removed but do not overdry; this reduces yield.
	Incomplete elution	Thoroughly mix beads with elution buffer incubate at 65 °C with mixing for full recovery.
Purified Nucleic Acid is Degraded	Improper handling or storage of sample	Follow collection and storage instructions carefully.
	DNase contamination	Always wear gloves; use DNase-free tips and tubes. Keep all reagents tightly sealed.
	Improper storage of eluted nucleic acid	Store eluates on ice if used immediately, or at –80 °C for long-term storage. Avoid repeated freeze–thaw cycles.

Magnetic Beads in Eluate	Bead carryover	Small bead carryover may occur and typically does not affect downstream applications. To remove, place eluate tube on a magnetic rack and transfer the clear supernatant to a new DNase-free tube.
Inhibition of downstream applications (e.g., PCR, RT-PCR)	Excess sample material or improper elution volume	Optimize input sample amount. Adjust the elution buffer volume (increase or decrease as needed).
	Residual salts, ethanol, or contaminants in the eluate	Ensure all wash steps are performed correctly. Use fresh wash buffers. Completely dry magnetic beads before elution to prevent ethanol carryover.

Precautions for Users

- The kit is intended to be used by laboratory and healthcare professionals. It is not intended for self-testing and near patient testing.
- Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user and/or the patient is established.
- Handle all biological samples as potentially infectious and avoid direct contact.
- Follow relevant national biosafety regulations and WHO and CDC guidelines for specimen collection and processing.
- Trained professionals should only use the kit in a diagnostic or research laboratory with appropriate equipment and safety standards.
- Review the safety data sheets (MSDS) provided with the kit.
- Use designated laboratory equipment, consumables, and personal protective equipment in each room.
- Follow Good Laboratory Practices by wearing protective clothing, gloves, goggles, and a mask. Avoid eating, drinking, smoking, or applying cosmetics in the working area.
- Do not mix reagents from different sources or kits.
- Clean equipment and surfaces regularly with appropriate bleach concentration or equivalent decontaminants that remove nucleic acids, followed by 70% ethanol.

Chemical Safety

The components of the kit with hazardous content and handling instructions are summarized in "Table 9. Hazardous content and handling instructions". Wear gloves, goggles and protective equipment and follow the safety instructions given in the table.

Component	GHS symbol	Category	Statements
Solution A	 GHS05, GHS07	Acute Toxicity (Oral) – Category 4 Acute Toxicity (Dermal) – Category 4 Skin Corrosion/Irritation – Category 1B Hazardous to the Aquatic Environment (Chronic) – Category 3	**Hazard Statements:** H302, H312, H314, H412 **Precautionary Statements:** P260, P273, P280, P303 + P361 + P353, P304 + P340 + P312, P305 + P351 + P338 + P310, P301 + P312 + P330, P363
Solution B	 GHS05, GHS07	Acute Toxicity (Oral) – Category 4 Acute Toxicity (Dermal) – Category 4 Skin Corrosion/Irritation – Category 1B Hazardous to the Aquatic Environment (Chronic) – Category 3	**Hazard Statements:** H302, H312, H314, H412 **Precautionary Statements:** P260, P273, P280, P303 + P361 + P353, P304 + P340 + P312, P305 + P351 + P338 + P310, P301 + P312 + P330, P363
Solution W1	 GHS07	Acute Toxicity (Oral) – Category 4 Skin Corrosion/Irritation – Category 2 Serious Eye Damage/Eye Irritation – Category 2A	**Hazard Statements:** H302, H315, H319 **Precautionary Statements**: P264, P270, P280, P301 + P312, P302 + P352, P305 + P351 + P338, P330, P332 + P313, P337 + P313, P362 + P364
Proteinase K	 GHS07, GHS08	SKIN IRRITATION – Category 2 EYE IRRITATION – Category 2 RESPIRATORY SENSITIZATION – Category 1	**Hazard Statements:** H315; H317; H319; H334; H335 **Precautionary Statements:** P260, P285, P304 + P341, P342 + P311

Table 9. Hazardous content and handling instructions

Hazard Statements

H302	Harmful if swallowed
H312	Harmful in contact with skin
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335	May cause respiratory irritation
H412	Harmful to aquatic life with long lasting effects

Precaution Statements

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P285	In case of inadequate ventilation, wear respiratory protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P303 + P361 + P353	IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.
P304 + P341	IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER or doctor.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Disposal

Dispose of used kit reagents, human clinical samples, and sealed amplification plates as laboratory clinical waste according to local, state, and federal regulations.

Version History

Instruction for Use Version 1. MAG-018. October, 2025. EN.

Quality Control System

The Kit is in accordance with 2017/746-EN Medical Device Regulations.

Technical support

For technical support, please contact our dedicated Technical Support Team at:

TEL: +995 599 374 374, Email: info@oxgen.ge

Trademarks and Disclaimers

OxMag is a trademark of OxGEn, LLC. AM 2021 11324.

Explanation of Symbols

	Attention
	Lot Number
	Catalogue Number
	Production Date
	Refer to the Operating Instructions
	Shelf life
	If the Package Is Damaged “Do Not Use It”
	Manufacturer Information
	EC Representative
	Temperature limit