

# MagMAX™ DNA Multi-Sample Ultra 2.0 Kit

## High throughput isolation of DNA from buccal swabs

Catalog Number A36570

Pub. No. MAN0017205 Rev. E



**WARNING!** Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from [thermofisher.com/support](https://www.thermofisher.com/support).

### Product description

The Applied Biosystems™ MagMAX™ DNA Multi-Sample Ultra 2.0 Kit is developed for scalable, rapid purification of high-quality DNA from a variety of sample matrices. DNA purified with this kit can be used in a broad range of molecular biology downstream applications, such as sequencing, genotyping, and qPCR. This protocol guides through automated isolation of DNA from buccal swabs using the KingFisher™ Flex, KingFisher™ Apex, and the KingFisher™ Duo Prime.

### Contents and storage

Reagents provided in the kit are sufficient for 100 reactions.

**Table 1** MagMAX™ DNA Multi-Sample Ultra 2.0 Kit (Cat. No. [A36570](#))

| Component         | Quantity | Storage |
|-------------------|----------|---------|
| Enhancer Solution | 4.5 mL   | 15–30°C |
| Proteinase K      | 4.5 mL   |         |
| Binding Solution  | 45 mL    |         |
| DNA Binding Beads | 4.5 mL   |         |
| Wash I Solution   | 110 mL   |         |
| Elution Solution  | 12 mL    |         |

For 1,000 reaction volume use Cat. No. [A36578](#) (Proteinase K), [A36579](#) (DNA Binding Beads), [A36580](#) (Wash I Solution), [A36581](#) (Lysis/Binding Solution), [A36582](#) (Elution Solution), and [A36583](#) (Enhancer Solution).

### Required materials not supplied

Unless otherwise indicated, all materials are available through [thermofisher.com](https://www.thermofisher.com). "MLS" indicates that the material is available from [fisherscientific.com](https://www.fisherscientific.com) or another major laboratory supplier.

Catalog numbers that appear as links open the web pages for those products.

| Item                                                                                                    | Source                    |
|---------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Instrument</b>                                                                                       |                           |
| <b>Magnetic particle processor, one of the following:</b>                                               |                           |
| KingFisher™ Duo Prime Magnetic Particle Processor                                                       | <a href="#">5400110</a>   |
| KingFisher™ Flex Magnetic Particle Processor 96DW with 96 deep-well head                                | <a href="#">5400630</a>   |
| KingFisher™ Apex with 96 deep-well head                                                                 | <a href="#">5400930</a>   |
| <b>Consumables</b>                                                                                      |                           |
| <b>Deep-well plates, one of the following:</b>                                                          |                           |
| KingFisher™ 96 Deep-Well Plates, v-bottom, polypropylene                                                | <a href="#">95040450</a>  |
| KingFisher™ 96 Deep-Well Plates, barcoded                                                               | <a href="#">95040450B</a> |
| <b>96-well standard plates (for use with KingFisher™ Flex and KingFisher™ Apex only; elution step):</b> |                           |
| KingFisher™ 96 KF microplate                                                                            | <a href="#">97002540</a>  |
| <b>Tip comb, compatible with the magnetic particle processor used:</b>                                  |                           |
| KingFisher™ 12-tip comb, for 96 deep-well plate (KingFisher™ Duo Prime protocols only)                  | <a href="#">97003500</a>  |
| KingFisher™ 96 tip comb for DW magnets (KingFisher™ Flex and KingFisher™ Apex protocols only)           | <a href="#">97002534</a>  |
| <b>Equipment</b>                                                                                        |                           |
| Incubator with metal racks                                                                              | <a href="#">MLS</a>       |
| Plate shaker, capable of shaking plates at a minimum of 900 rpm                                         | 88880023                  |
| Adjustable micropipettors                                                                               | <a href="#">MLS</a>       |
| Multi-channel micropipettors                                                                            | <a href="#">MLS</a>       |

| Item                                         | Source   |
|----------------------------------------------|----------|
| <b>Reagents</b>                              |          |
| Ethanol, 96–100% (molecular biology grade)   | MLS      |
| Nuclease-free water                          | AM9932   |
| Phosphate buffered saline (PBS (1X), pH 7.4) | 10010023 |
| <b>Materials</b>                             |          |
| MicroAmp™ Clear Adhesive Film                | 4306311  |
| 4N6FLOQSwabs™, regular tip                   | 4473979  |

## General guidelines

- Perform all steps at room temperature (20–25°C) unless otherwise noted.
- Precipitates and high viscosity can occur if Enhancer Solution and Binding Solution are stored when room temperature is too cold. If this occurs, warm them at 37°C and gently mix to dissolve precipitates and reduce viscosity. Avoid creating bubbles.
- Yellowing of the Binding and Wash I Solution is normal and will not affect buffer performance
- Cover the plate during the incubation and shaking steps to prevent spill-over and cross-contamination. The same MicroAmp™ Clear Adhesive Film can be used throughout the procedure, unless it becomes contaminated.
- If using a plate shaker other than the recommended shaker, verify that:
  - a. The plate fits securely on the plate shaker.
  - b. The recommended speeds are compatible with the plate shaker (Ideal shaker speeds allow for thorough mixing without splashing).
- Per-plate volumes for reagent mixes are sufficient for one plate plus overage. To calculate volumes for other sample numbers, refer to the per-well volume and add 10% overage.
- (Optional) To prevent evaporation and contamination, cover the prepared processing plates with paraffin film or MicroAmp™ Clear Adhesive Film until they are loaded into the instrument.

## Guidelines for DNA Binding Bead Mix

- Vortex the DNA Binding Beads thoroughly, combine them with the Binding Solution in a nuclease-free tube, then invert the tube until homogeneous. This mixture can be stored for up to 1 day before aliquoting into the plates.

- Ensure that the beads stay fully mixed within the solution during pipetting.
- Avoid creating bubbles during mixing and aliquoting.

## Sample collection and storage

**IMPORTANT!** Use the recommended swab with a foam tip. Use of cotton or generic polyester swabs may result in lower DNA yields or DNA that contains PCR inhibitors.

1. Have test subjects thoroughly rinse their mouths with water and swallow prior to swabbing.
2. Remove swab from packaging and thoroughly swab both cheeks of the test subject for 30 seconds each to maximize collection of buccal cells.
3. If necessary, store buccal swabs in the original pouch.

**IMPORTANT!** Do not store buccal swabs in plastic tubes. Bacterial growth in sealed plastic tubes can cause DNA degradation.

Buccal swabs can be stored for up to 3 weeks at –20°C to 20°C before isolation.

## Before first use of the kit

Prepare Wash II Solution: Make 80% ethanol from 100% absolute ethanol and Nuclease-Free Water.

**IMPORTANT!** The Wash I Solution and Lysis/Binding Solution may develop inert white or brown particulates that float in the solution. Visual particulate is not a cause for concern and does not negatively affect performance.

## Before each use of the kit

Vortex DNA Binding Beads to fully resuspend the beads before each use.

## Prepare samples and digest with Proteinase K

1. **Prepare samples and digest with Proteinase K** Equilibrate buccal swabs to room temperature, before performing isolation, to maximize DNA recovery.

1. Place one swab, swab-head down, into a deep-well plate.

**Note:** When a higher concentration of DNA is required, process two swabs in one well and proceed with the isolation as indicated.

2. Break enough of the stick off the swab so that the swab sits in the well without protruding.  
The recommended swabs have an easy break point, below the swab, that appears as a slight indentation in the stick portion of the swab.
3. Prepare sufficient Proteinase K Mix according to the following table, then gently invert or pipet up and down several times to thoroughly mix components.

| Component <sup>[1]</sup> | Volume per well | Volume per plate (96 samples) |
|--------------------------|-----------------|-------------------------------|
| Enhancer Solution        | 40 µL           | 4.22 mL                       |
| PBS                      | 400 µL          | 42.24 mL                      |
| Proteinase K             | 40 µL           | 4.22 mL                       |
| <b>Total volume</b>      | <b>480 µL</b>   | <b>50.68 mL</b>               |

<sup>[1]</sup> Pipet the components in the order they are listed in the table.

**IMPORTANT!** Only make enough Mix for immediate use. Mix is not stable for prolonged periods and will result in a reduction of DNA yield.

4. Add 480 µL of the Proteinase K Mix to each well containing a swab.  
Be careful to avoid touching the pipette tip to the swab when pipetting the Proteinase K Mix into the sample wells.
5. Seal the plate with the clear adhesive film, then shake the sealed plate at 900 rpm for 5 minutes.
6. Take the plate off the plate shaker, then immediately incubate at 65°C for ≥ 20 minutes.

**IMPORTANT!** Arrange plate in the incubator to allow adequate flow around the plate wells to ensure that samples quickly reach and maintain the incubation temperature.

During the incubation, proceed with instrument and plate set up:

- For automated purification using the KingFisher™ Flex Magnetic Particle Processor, proceed to “Perform DNA purification using KingFisher™ Flex” on page 3.
- For automated purification using the KingFisher™ Apex instrument, proceed to “Perform DNA purification using KingFisher™ Apex” on page 5.
- For automated purification using the KingFisher™ Duo Prime Magnetic Particle Processor, proceed to “Perform DNA purification using KingFisher™ Duo Prime” on page 7.

## Perform DNA purification using KingFisher™ Flex

### 1 Set up the instrument

1. Ensure that the instrument is set up for processing with the proper magnetic head (96 deep-well) for your application.
2. Ensure that the proper heat block (96 well standard, not deep-well) is installed for your application.
3. Ensure that the proper program (**MagMAX\_Ultra2\_Direct\_FLEX**) has been downloaded from the product page and loaded onto the instrument.

## 2 Set up the processing plates

During the incubation at 65°C, set up the Wash, Elution, and Tip Comb Plates outside the instrument according to the following table.

| Plate ID                 | Plate position | Plate type                                        | Reagent          | Volume per well |
|--------------------------|----------------|---------------------------------------------------|------------------|-----------------|
| Wash I Solution Plate    | 2              | Deep Well                                         | Wash I Solution  | 1000 µL         |
| Wash II Solution Plate 1 | 3              | Deep Well                                         | Wash II Solution | 1000 µL         |
| Wash II Solution Plate 2 | 4              | Deep Well                                         | Wash II Solution | 500 µL          |
| Elution Plate            | 5              | Standard                                          | Elution Solution | 50 µL           |
| Tip Comb                 | 6              | Place a 96 Deep-well Tip Comb in a Standard Plate |                  |                 |

**Note:** The plates will be loaded onto the instrument immediately after the Sample Plate has been prepared.

## 3 Bind the gDNA

1. Prepare the DNA Binding Bead Mix according to the following table.

| Component           | Volume per well | Volume per plate (96 samples) |
|---------------------|-----------------|-------------------------------|
| Binding Solution    | 400 µL          | 42.24 mL                      |
| DNA Binding Beads   | 40 µL           | 4.22 mL                       |
| <b>Total volume</b> | <b>440 µL</b>   | <b>46.46 mL</b>               |

2. At the end of Proteinase K digestion, shake the sealed plate at 900 rpm for 2 minutes.
3. Transfer the lysates to the corresponding wells of a new deep-well plate (this will be called the Sample Plate), then discard the buccal swabs.

| To remove buccal swab from the lysate | Procedure                                                                                                                                                                                 |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transfer the lysate to a new plate.   | <ol style="list-style-type: none"><li>1. Set a multi-channel pipettor to 480 µL and transfer one row at a time.</li><li>2. Ensure each well contains 420–480 µL after transfer.</li></ol> |

4. Add 440 µL of DNA Binding Bead Mix to each sample.

**Note:** Remix Binding Bead Mix frequently during pipetting to ensure even distribution of beads to all samples/wells. Mixture is viscous, pipet slowly to ensure that the correct amount is added.

**IMPORTANT!** Avoid creating bubbles during mixing and aliquoting.

5. Immediately process the plates on the KingFisher™ Flex Magnetic Particle Processor 96DW.

## 4 Wash and elute the gDNA

1. Select the program **MagMAX\_Ultra2\_Direct\_FLEX** on the instrument.
2. Start the run, and load the prepared plates into position when prompted by the instrument.
3. At the end of the run, immediately remove the plates from the instrument.
4. Transfer the eluate to the final tube/plate of choice for final storage.

**Note:** If preferred, the elution plate may be used for final storage of the DNA.

The purified DNA is ready for immediate use. Alternatively, store the plate at –20°C for long-term storage.

## Perform DNA purification using KingFisher™ Apex

- 1 Set up the instrument**
  1. Ensure that the instrument is set up for processing with the proper magnetic head (96 deep-well) for your application.
  2. Ensure that both heat blocks (96 well standard and 96 deep-well) are installed on the KingFisher™ Apex instrument.
  3. Ensure that the proper program (**MagMAX\_Ultra2\_Direct**) has been downloaded from the product page and loaded onto the instrument.

- 2 Set up the processing plates**

During the incubation at 65°C, set up the Wash, Elution, and Tip Comb Plates outside the instrument according to the following table.

| Plate ID                 | Plate position | Plate type                                        | Reagent          | Volume per well |
|--------------------------|----------------|---------------------------------------------------|------------------|-----------------|
| Wash I Solution Plate    | 3              | Deep Well                                         | Wash I Solution  | 1000 µL         |
| Wash II Solution Plate 1 | 4              | Deep Well                                         | Wash II Solution | 1000 µL         |
| Wash II Solution Plate 2 | 5              | Deep Well                                         | Wash II Solution | 500 µL          |
| Elution Plate            | 6              | Standard                                          | Elution Solution | 50 µL           |
| Tip Comb                 | 1              | Place a 96 Deep-well Tip Comb in a Standard Plate |                  |                 |

**Note:** The plates will be loaded onto the instrument immediately after the Sample Plate has been prepared.

- 3 Bind the gDNA**
  1. Prepare the DNA Binding Bead Mix according to the following table.

| Component           | Volume per well | Volume per plate (96 samples) |
|---------------------|-----------------|-------------------------------|
| Binding Solution    | 400 µL          | 42.24 mL                      |
| DNA Binding Beads   | 40 µL           | 4.22 mL                       |
| <b>Total volume</b> | <b>440 µL</b>   | <b>46.46 mL</b>               |

2. At the end of Proteinase K digestion, shake the sealed plate at 900 rpm for 2 minutes.
3. Transfer the lysates to the corresponding wells of a new deep-well plate (this is the Sample Plate), then discard the buccal swabs.

| To remove buccal swab from the lysate | Procedure                                                                                                                                                                                 |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transfer the lysate to a new plate.   | <ol style="list-style-type: none"><li>1. Set a multi-channel pipettor to 480 µL and transfer one row at a time.</li><li>2. Ensure each well contains 420–480 µL after transfer.</li></ol> |

4. Add 440 µL of DNA Binding Bead Mix to each sample.

**Note:** Remix Binding Bead Mix frequently during pipetting to ensure even distribution of beads to all samples/wells. Mixture is viscous, pipet slowly to ensure that the correct amount is added.

**IMPORTANT!** Avoid creating bubbles during mixing and aliquoting.

5. Immediately process the plates on the KingFisher™ Apex instrument.

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## 4 Wash and elute the gDNA

1. Select the program **MagMAX\_Ultra2\_Direct** on the instrument.
2. Start the run, and load the prepared plates into position when prompted by the instrument.
3. At the end of the run, immediately remove the plates from the instrument.
4. Transfer the eluate to the final tube/plate of choice for final storage.

**Note:** If preferred, the elution plate may be used for final storage of the DNA.

The purified DNA is ready for immediate use. Alternatively, store the plate at –20°C for long-term storage.

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# Perform DNA purification using KingFisher™ Duo Prime

- 1 Set up the instrument
  1. Ensure that the instrument is set up for processing with the proper magnetic head (12 pin) and heat block for your application.
  2. Ensure that the proper program (**MagMAX\_Ultra2\_Direct\_DUO**) has been downloaded from the product page and loaded onto the instrument.

- 2 Set up the processing plate
 

Add processing reagents to the wells of the 96-well plate according to the following table.

| Row ID           | Plate Row | Reagent               | Volume per well |
|------------------|-----------|-----------------------|-----------------|
| Plate layout     |           |                       |                 |
| Elution Solution | A         | Elution Solution      | 50–100 µL       |
| Tip Comb         | B         | Tip Comb              | N/A             |
| —                | C         | Empty                 |                 |
| Wash II Solution | D         | Wash II Solution      | 500 µL          |
| Wash II Solution | E         | Wash II Solution      | 1000 µL         |
| Wash I Solution  | F         | Wash I Solution       | 1000 µL         |
| —                | G         | Empty                 |                 |
| Sample           | H         | Sample <sup>[1]</sup> | Varies          |

<sup>[1]</sup> See “Bind the gDNA” on page 7.

**Note:** The plate will be loaded onto the instrument immediately after the Sample Row has been prepared.

- 3 Bind the gDNA
  1. Prepare the DNA Binding Bead Mix according to the following table.

| Component           | Volume per well | Volume per plate (12 samples) |
|---------------------|-----------------|-------------------------------|
| Binding Buffer      | 400 µL          | 5.28 mL                       |
| DNA Binding Beads   | 40 µL           | 528 µL                        |
| <b>Total volume</b> | <b>440 µL</b>   | <b>5.81 mL</b>                |

2. At the end of Proteinase K digestion, shake the sealed plate at 900 rpm for 2 minutes.
3. Transfer the lysates to the corresponding wells (Row H) of the previously prepared processing plate, then discard the buccal swabs.

| To remove buccal swab from the lysate | Procedure                                                                                                                                                                                    |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transfer the lysate to a new plate.   | <ol style="list-style-type: none"> <li>1. Set a multi-channel pipettor to 480 µL and transfer one row at a time.</li> <li>2. Ensure each well contains 420–480 µL after transfer.</li> </ol> |

4. Add 440 µL of DNA Binding Bead Mix to each sample (Row H).

**Note:** Remix Binding Bead Mix frequently during pipetting to ensure even distribution of beads to all samples/wells. Mixture is viscous, pipet slowly to ensure correct amount is added.

**IMPORTANT!** Avoid creating bubbles during mixing and aliquoting.

5. Immediately process the plate on the KingFisher™ Duo Prime Magnetic Particle Processor.

## 4 Wash and elute the gDNA

1. Select the program **MagMAX\_Ultra2\_Direct\_DUO** on the instrument.
2. Start the run, and load the prepared plate into position when prompted by the instrument.
3. At the end of the run, immediately remove the plate from the instrument.
4. Transfer the eluate to the final tube/plate of choice for final storage.

The purified DNA is ready for immediate use. Alternatively, store the samples at –20°C for long-term storage.

## Quantitation

To most accurately quantitate gDNA samples isolated from buccal swabs, it is recommended to quantitate using either the Qubit™ dsDNA BR (Broad Range) Assay Kit (Cat. No. [Q32850](#)) or Qubit™ dsDNA HS (High Sensitivity) Assay Kit (Cat. No. [Q32851](#)). Another acceptable method is quantitation utilizing qPCR and the Applied Biosystems™ TaqMan™ RNase P Detection Reagents Kit (Cat. No. [4316831](#)).

## Limited product warranty

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For descriptions of symbols on product labels or product documents, go to [thermofisher.com/symbols-definition](http://thermofisher.com/symbols-definition).

Revision history: Pub. No. MAN0017205 E

| Revision | Date             | Description                                                                                               |
|----------|------------------|-----------------------------------------------------------------------------------------------------------|
| E        | 31 July 2024     | Important statement added to the user guide under the section "Before first use of the kit".              |
| D.0      | 12 April 2021    | Support added for KingFisher™ Apex Purification System.                                                   |
| C.0      | 15 March 2019    | Updated manufacturing address to Vilnius. Added note to address yellowing buffers and viscosity concerns. |
| B.0      | 6 December 2017  | Addition of quantitation section, and minor edits.                                                        |
| A.0      | 8 September 2017 | New document for theMagMAX™ DNA Multi-Sample Ultra 2.0 Kit.                                               |

The information in this guide is subject to change without notice.

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