omega BIO-TEK
innovations in nucleic acid isolation

# Product Manual

# Mag-Bind® cfDNA LSP Kit

## PS3298-1-96PF 4 x 24 preps

**Manual Date: December 2024**
**Revision Number v1.0**

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# Mag-Bind® cfDNA LSP Kit

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# Intended Use

For professional research use only.

The Mag-Bind® cfDNA LSP Kit is intended for use in a laboratory setting performing automated cfDNA extractions from up to 4 mL plasma/serum on open-ended liquid handlers such as the Hamilton MicroLab STAR.

The Mag-Bind® cfDNA LSP Kit is magnetic bead-based and capable of processing one to four 24-well sample plates on open-ended liquid handlers such as the Hamilton MicroLab STAR.

# Intended User

The Mag-Bind® cfDNA LSP Kit is intended for professional use and to be used by or under the supervision of professional users, such as laboratory personnel, technicians, researchers and physicians specifically instructed and trained in molecular biology techniques and familiar with magnetic bead-based purification, either manual or automated.

## Product Description

The Mag-Bind® cfDNA LSP Kit is designed for the efficient and reliable purification of circulating cell-free DNA (cfDNA) from plasma or serum samples, with the capability to process input volumes of up to 4 mL per sample in one to four 24-well plates with 50 to 200 µL elution volumes. This kit is automation-ready, featuring prefilled and barcoded reagent reservoirs and tubes for seamless integration with most open-ended liquid handling platforms, ensuring traceability, consistency, and high-quality results across large sample sets.

This workflow offers a fully automated solution for processing cfDNA, after samples have been transferred to sample plates, reducing hands-on time while improving extraction efficiency and accuracy. The prefilled reagents eliminate the need for preparation and dispensing steps, enhancing ease of use. Barcoded reagent reservoirs and tubes are scannable to allow the instrument to recognize reagent placement on liquid handler decks. The magnetic particle-based purification system ensures fast and efficient binding, washing, and elution of cfDNA, even when processing larger sample volumes. Up to 4 mL of plasma/serum can be eluted in 50-200 µL of elution buffer. The purified cfDNA is of high quality, suitable for immediate use in downstream applications such as PCR, qPCR, digital PCR, and next-generation sequencing (NGS).

Important:

1. Please contact your Omega Bio-tek representative for instrument specific instructions. It is the responsibility of the user to validate any automated method for any particular use.

# Kit Contents and Storage

## Kit Contents

| Product No | PS3298-1-96PF |
|---|---|
| Purifications | 4 x 24 |
| 24-well Sample Plates | 4 |
| 96-well Tip Isolator Plates | 4 |
| DS Buffer | 2 x 14.5 mL |
| GT7 Buffer v1.1 | 222 mL |
| JSB Buffer | 2 x 222 mL |
| eSPW Buffer | 222 mL |
| Elution Buffer | 2 x 180 mL |
| Mag-Bind® Particles CH | 2 x 1.4 mL |
| Proteinase K Solution | 2 x 3.4 mL |
| User Manual | ✓ |

## Storage and Stability

All of the Mag-Bind® cfDNA LSP Kit components are guaranteed for at least 12 months from the date of purchase when stored as follows. Mag-Bind® Particles CH should be stored at 2-8°C for long-term use. Proteinase K Solution can be stored at room temperature for up to 12 months. For long-term storage, store Proteinase K Solution at 2-8°C. All remaining components should be stored at ambient temperature and away from bright light. During shipment or storage in cool ambient conditions, precipitates may form in some buffers. Dissolve such deposits in reagent tubes by warming the solution at 37°C and gently shaking. For reagent reservoirs, invert 20 times to allow precipitates to go back into solution.

## Warnings

This kit is for professional research use.

Please decontaminate and dispose of all potentially infectious materials in accordance with applicable local, state/provincial, and/or national regulations. For any assistance, please contact Omega Bio-tek at info@omegabiotek.com.

If you use this kit following an automated extraction workflow, the surface of the automated platform is considered a biohazard. Use appropriate decontamination and disposal methods in adherence to all applicable local state/provincial, and/or national regulations.

## Safety Information

All chemicals and biological materials are potentially hazardous.

Biological samples such as plasma, serum, tissues, body fluids, blood, etc. are potentially infectious and must be treated as biohazardous materials. Use appropriate decontaminations and disposal methods in adherence to all applicable local state/provincial, and/or national regulations.

Please refer to safety data sheets (SDSs) for information on safe handling, transport, spills, and disposal of different reagents included in this kit. SDSs are made available in PDF format on the product page at www.omegabiotek.com. Discard all waste in accordance with local safety regulations.

# Precautions

Some of the buffers included in the Mag-Bind® cfDNA LSP Kit contain guanidine-based chaotropic agents which can form highly reactive compounds when combined with bleach. **DO NOT add bleach or acidic solutions** to guanidine containing sample-preparation waste. Please access the SDSs online for detailed information on the reagents.

| Component | Description |
|---|---|
| DS Buffer  | Contains: Anionic detergent. Danger! Causes serious eye damage. Causes skin irritation. Harmful to aquatic life. Wear protective gloves/protective clothing/eye protection/face protection. Avoid release to the environment. If exposed or concerned: call a poison center or doctor/physician. IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Take off contaminated clothing and wash before reuse. ON SKIN: Wash with plenty of water and soap. Get medical advice/attention if skin irritation occurs |
| Proteinase K Solution  | Contains: Proteinase K. Danger! Causes mild skin irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Avoid breathing dust/fume/gas/mist/vapors/spray. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. If exposed or concerned: Call a poison center or doctor/physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. |
| GT7 Buffer v1.1   | Contains: Guanidine thiocyanate. Danger! Harmful if swallowed. Causes severe skin burns and eye damage. Do not breathe mist/vapors/spray. Harmful to aquatic life with long lasting effects. Wear protective clothing, eye protection and face protection. Wash all exposed external body areas thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. SWALLOWED: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER/doctor/physician/first aider/ if you feel unwell. ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. 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/doctor/physician/first aider. INHALED: Remove person to fresh air and keep comfortable for breathing. |

# Precautions

| Component | Description |
|---|---|
| JSB Buffer  | Contains: Guanidine thiocyanate and isopropanol. Danger! Flammable liquid and vapor. Causes serious eye damage. Harmful if swallowed. Causes skin irritation. Harmful to aquatic life with long lasting effects. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash all exposed external body areas thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves, protective clothing, eye protection and face protection. Avoid release to the environment. IN CASE OF FIRE: Use alcohol resistant foam or normal protein foam to extinguish. IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call POISON CENTER/doctor/physician/first aider. ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash with plenty of water and soap. Rinse mouth. If skin irritation occurs, get medical advice/attention. Take off contaminated clothing and wash it before reuse. |
| eSPW Buffer  | Contains: Ethanol. Danger! Highly flammable liquid and vapor. Causes serious eye damage. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash all exposed external body areas thoroughly after handling. Wear protective gloves, protective clothing, eye protection, and face protection. IN CASE OF FIRE: Use alcohol resistant foam or normal protein foam to extinguish. IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. If eye irritation persists, get medical advice/attention. ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |

## Guidelines for cfDNA Quantification

DNA quantification is typically done by spectrophotometric-based (NanoDrop®) or fluorometric-based methods (Qubit®). Both of these methods are inaccurate when it comes to quantifying circulating, cell-free DNA because cfDNA is usually present in low amounts and these methods are unable to distinguish between cfDNA and high molecular weight cellular genomic DNA. It is important to establish accurate strategies to not only precisely quantify cfDNA but also to draw pertinent conclusions about the extraction efficiency. Some of the strategies that can aid in quantification of cfDNA are elucidated below.

### TapeStation

The Cell-free DNA ScreenTape assay for TapeStation systems provides accurate sizing and quantification of cfDNA, as well as DNA quality assessment with %cfDNA information. The %cfDNA is indicative of the percentage of cfDNA compared to the genomic DNA in the purified sample.

### qPCR

Quantification based on qPCR analysis is effective if the primers are targeting just the cfDNA fraction and not the gDNA fraction. If not, the primers are going to amplify from both the cfDNA and gDNA fractions present in the eluate skewing the results. For example, use of tumor-specific primers if the cfDNA is tumor-derived can analyze the cfDNA fraction without the gDNA interference. For kit evaluation purposes, using a spikein such as 200 bp sheared bacterial DNA in plasma/serum along with bacterial specific primers can offer information about the extraction efficiency in terms of actual cfDNA present in the total DNA isolated.

### cfDNA integrity analysis

cfDNA integrity analysis is done by real-time PCR of ALU-repeats using two sets of primers to amplify different lengths of DNA fragments (115 bp and 247 bp). ALU sequences are highly abundant in the human genome and amplification of the 115-bp ALU amplicon represents the total amount of DNA fragments (both short and long fragments) whereas the 247-bp ALU amplicon primarily reflects the amount of long DNA fragments. cfDNA integrity can be reported as integrity index, which is calculated as the ratio of ALU247 to ALU115. If the isolated DNA is mainly gDNA, ALU247/ALU115 is expected to be 1. The ratio is between 0 to 1 if short fragments (cfDNA) are present. Typically, the higher the amount of cfDNA in the sample, the higher the integrity index.

## Plasticware Handling and Preparation

1. Upon arrival of the kit, unpack and inspect the contents.

2. Store reagent reservoirs upright before use, ideally for at least 24 hours to ensure reagents are not retained on the sealed lid

3. Always check reagent reservoirs and tubes for presence of precipitation before starting extraction. Dissolve precipitates in reagent tubes by warming at 37°C with gentle shaking. For reagent reservoirs, invert 20 times.

4. Mag-Bind® Particles CH should be vortexed for at least 1 minute before loading on instrument deck.

5. When loading the deck, ensure that all barcodes are facing in the correct orientation so that they can be scanned by the instrument's barcode reader.

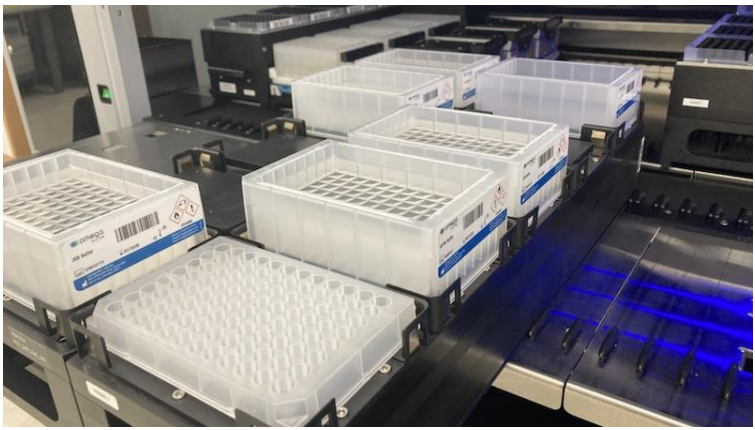


*Figure 1. Loaded reagent reservoirs.*


*Figure 2. Loaded reagent tubes.*

## Important Notes

1. Please consult an Omega Bio-tek Field Application Scientist before running this kit for the first time.

2. Reservoirs can be resealed with parafilm (4" width) when not in use and are stable for up to 7 days after removing the original seal.

## Protocol for 4 mL Plasma/Serum

**Important:** If using this kit for the first time, please consult an Omega Bio-tek Field Application Scientist (FAS) at automation@omegabiotek.com.

Materials and Equipment to be Supplied by User:

- Serological pipette capable of 10 mL
- 96-well elution plate
- Parafilm, 4-inch width (for partial runs)

Before Starting:

- Prepare reagent reservoirs and tubes according to the "Plasticware Handling and Preparation" on Page 9.

1. Add up to 4 mL plasma/serum sample to 24-well Sample Plate. Bring volume up to 4 mL with Elution Buffer or 1x PBS if the volume of sample is less than 4 mL. Add 4 mL Elution Buffer or 1x PBS to any unused wells of the Sample Plate.

   **Note:** Additional Elution Buffer can be purchased separately.

2. Start the program on the liquid handler instrument.

3. When prompted, select the number of sample plates (1-4) and the elution volume (50-200 µL).

4. When prompted, load isolator plates, tip racks (user-supplied), sample plates, and elution plate (user-supplied) in the designated positions on the liquid handler deck.

5. When prompted, load reagent reservoirs in the designated positions and carefully remove the seals.

6. When prompted, load reagent tubes in the designated positions and remove the caps.

   **Note:** Mag-Bind® Particles CH should be vortexed for at least 1 minute before loading on instrument deck.

7. When prompted, select START to begin running the method.

8. Once run is completed, remove Elution plate from instrument.

9. Store DNA at -20°C.

10. Cover unused reagent reservoirs with parafilm for storage up to 7 days, replace caps of unused reagent tubes, and store at recommended temperature.

## Troubleshooting Guide

Please use this guide to solve any problems that may arise. We hope that it will aid in clearing up any questions for you. If you need further assistance, please contact our technical support staff at our Toll Free Number, 1-800-832-8896.

Possible Problems and Suggestions

| Problem | Cause | Solution |
|---|---|---|
| Low DNA yield | Loss of Mag-Bind® Particles CH during operation | Contact Omega Bio-tek product support. |
| | Incorrect plasticware used during operation | Make sure to use the plasticware that is included in the kit and plasticware approved for use on the liquid handler. Contact Omega Bio-tek product support. |
| | Incorrect reagent reservoir and tube storage | Store reagent reservoirs and tubes at recommended temperatures. |
| Problems in downstream applications | Ethanol carryover | Dry the Mag-Bind® Particles CH before elution. Contact Omega Bio-tek product support for protocol adjustments. |
| Problems with instrument operation | Wrong method run on instrument | Double check that the correct method was used. |
| | Instrument errors during operation | Contact instrument manufacturer and/or Omega Bio-tek product support. |

## Notices and Disclaimers

**For European Union Use.**

JSB Buffer and GT7 Buffer v1.1 contain Triton X-100, 2-[4-(2,4,4-trimethylpentan-2-yl) phenoxy]ethanol (CAS 9002-93-1), a substance included in the European Authorization list (Annex XIV) of REACH regulation (EC) No 1907/2006. Substances and mixtures used for the purpose of Scientific Research and Development (SR&D) are exempt from authorization requirements if used below 1 tonne per year in volume.

Scientific Research and Development includes experimental research or analytical activities at a laboratory scale such as synthesis and testing of applications of chemicals, release tests, etc. as well as the use of the substance in monitoring and routine quality control or in vitro diagnostics.

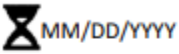
## Contact Information

To reorder supplies, report a device failure or complaint, please contact:

| | |
|---|---|
|  | **Manufacturer**<br>Omega Bio-tek, Inc.<br>400 Pinnacle Way<br>Suite #450<br>Norcross, GA 30071, USA<br>Website: www.omegabiotek.com<br>Email: info@omegabiotek.com |

## Symbols

The following symbols may appear in the instructions for use or on the packaging and labeling:

| Picture | Description |
|---|---|
|   | No additional hazards or not classified as hazardous according to GHS |
|   | Use-by date |
|  | Check components for storage conditions. |
|   | Lot number |
|  | Manufacturer |
|  | Website |
|  | Telephone |
|  | Fax |
|  | Email |
|  | LinkedIn |
|  | Twitter |
|  | Facebook |

## Document Revision History

| Revision | Description |
|---|---|
| v1.0, December 2024 | Initial release |

# Notes

# Notes

For more purification solutions, visit www.omegabiotek.com

## AVAILABLE FORMATS


Spin Columns

96-Well Silica Plates


Mag Beads

## SAMPLE TYPES


Blood / Plasma

Plasmid


Cultured Cells


Plant & Soil


NGS Clean Up


Tissue


FFPE


Fecal Matter

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