

Streptavidin Magnetic Beads

CATALOG #MB-SA001 and #MB-SA002

PRODUCT INTRODUCTION

Streptavidin magnetic beads are superparamagnetic microspheres characterized by uniform particle size and regular morphology. These beads are covalently conjugated with streptavidin and blocked with BSA, which gives them high biotin-binding capacity while minimizing nonspecific interactions. The beads are particularly suitable for capturing biotinylated proteins and other target molecules.

PRODUCT SPECIFICATIONS

Catalog No.		MB-SA001	MB-SA002
Binding Capacity	Biotinylated IgG ($\mu\text{g}/\text{mg}$ beads)	≥ 15	≥ 15
	Biotinylated single stranded oligonucleotide (24nt) ($\mu\text{mol}/\text{mg}$ beads)	≥ 350	≥ 450
Particle Size		2 μm	300 nm
Concentration		10 mg/mL	
Surface		Hydrophilic	
Sterility		No	Yes
Suspension Medium		1 \times PBS with 0.1% (w/v) BSA and 0.1% (v/v) ProClin 300	
Storage		2°C to 8°C, avoid freezing or drying	
Shelf Life		2 years from date of manufacture	

APPLICATIONS

The streptavidin magnetic beads can be used to isolate biotinylated molecules, such as antigens and antibodies. They are suitable for immunocapture, phage display, biopanning, drug screening, and cell isolation.

GENERAL GUIDELINES

- Avoid freezing or drying magnetic beads.
- Avoid air bubbles during pipetting.
- To ensure all the beads are collected, please keep the tube on the magnet for no less than 1 minute. 1-2 minutes is recommended.
- Both the size of the molecule to be immobilized and the biotinylating procedure will affect the binding capacity. Please note:

- Optimize the quantity of beads used for each individual application.
- Biotinylated molecules should be added at 1–2 times the beads' binding capacity for saturation.
- Binding efficiency can be determined by comparing molecule concentration before and after coupling.

REQUIRED MATERIALS

- Magnetic Separator: Select and use a suitable magnetic separator for your experiment.
- Mixing device with tilting and rotation.

PROTOCOLS

Magnetic Bead Handling

Calculate the number of beads required based on binding capacity, vortex the magnetic bead for 20 seconds to fully resuspend. Transfer the desired volume beads to a new tube. Place the tube on a magnetic separator for 1 min. Carefully remove the supernatant while the tube remains on the separator.

Recommended Washing Buffers

- For biotinylated antibodies/proteins: PBS, 0.05% Tween-20, pH 7.4. Optionally add 0.01–0.1% (w/v) BSA.
- For biotinylated nucleic acids: 10 mM Tris-HCl (pH 7.5, 1 mM EDTA, 1 M NaCl, 0.01%~0.1% Tween-20.
- For cell isolation: PBS containing 2 mM EDTA and either 2% fetal bovine serum (FBS) or 0.5% BSA. Filter the buffer through a 0.22 µm membrane for sterilization before use.

Note: The salt concentration and pH (typically 5–9) can be optimized as required. Beads are stable in common buffers.

Immobilize Antibodies/Proteins

1. Wash the magnetic beads with washing buffer (1 mL per wash, when the bead volume exceeds 1 mL, maintain a 1:1 (v/v) washing buffer-to-bead ratio). Place the beads on the magnetic separator for 1-2 minutes. Remove the supernatant.
2. Remove the tube from the magnetic separator and resuspend the pelleted beads in washing buffer.
3. Wash the beads for a total of 3 times by repeating steps 1-2. Remove the supernatant.
4. Add biotinylated antibodies/proteins diluted in washing buffer with magnetic beads (1 mg beads/mL). Incubate at room temperature for 30 minutes.
5. Separate with magnetic separator for 1-2 minutes. Remove the supernatant.
6. Wash the coated beads 5 times with washing buffer.
7. Resuspend to the desired concentration for your application.

Immobilize Nucleic Acids

1. Wash the magnetic beads with washing buffer (1 mL per wash; when the bead volume exceeds 1 mL, maintain a 1:1 (v/v) washing buffer-to-bead ratio). Place the beads on the magnetic separator for 1-2 minutes. Remove the supernatant.
2. Remove the tube from the magnetic separator and resuspend the pelleted beads in washing buffer.

3. Wash the beads for a total of 3 times by repeating steps 1-2. Remove the supernatant.
4. Add Biotinylated nucleic acids diluted in washing buffer with magnetic beads (2 mg beads/mL). Incubate at room temperature for 30 minutes.
5. Separate with magnetic separator for 1-2 minutes. Remove the supernatant.
6. Wash the coated beads 3 times with washing buffer.
7. Resuspend to the desired concentration for your application.

Cell Isolation (Cat No. MB-SA002 Recommended)

Here we described the isolation of CD3+ T cells from human PBMC as an example.

1. Preparation of the beads. The Streptavidin Magnetic Beads must be pre-washed before use.
 - a) To wash the beads: Vortex the magnetic beads for 20 seconds to fully resuspend. Transfer the desired volume beads (e.g., 20 μ L) to a new tube. Add 1 mL isolation buffer. Centrifuge at 10,000 \times g for 1 minute. Remove the supernatant. Resuspend the beads in 1 mL isolation buffer and then centrifuge as before. Resuspend the beads in original volume of isolation buffer (e.g., 20 μ L).
 - b) Scale bead volume proportionally based on cell count:
 - i. For 5×10^7 cells (in 500 μ L suspension): 10 μ L Biotin-Antibody Mix + 100 μ L beads.
 - ii. For $<1 \times 10^7$ cells: Adjust suspension volume to 100 μ L. Then add 2 μ L Biotin-Antibody Mix + 20 μ L beads.
2. Preparation of human PBMCs.
 - a) Isolate PBMCs from human peripheral blood using Ficoll density gradient centrifugation. Collect PBMCs, wash cells with PBS, and centrifuge. Resuspend PBMCs in isolation buffer at a density of 1×10^8 cells/mL.
 - b) Add 100 μ L of cell suspension (1×10^7 cells) to the bottom of a sterile flow cytometry tube. Add 2 μ L of Biotin-Antibody Mix, mix gently, and incubate at 4°C for 10 minutes.

Note: Dispense the cell suspension directly to the tube bottom (avoid pipetting along the tube wall).

Depending on the magnetic separator used, centrifuge tubes may also be suitable for cell isolation. Scale up antibody volumes proportionally for larger cell numbers.

3. Incubation with Streptavidin Magnetic Beads. Add 20 μ L of pre-washed beads to the tube. Mix gently and incubate at 4°C for 10 minutes.
4. After incubation, add 2.5 mL of isolation buffer to the tube. Gently mix by pipetting up and down 5 times (avoid vigorous vortexing or tube inversion to prevent cell damage or bead detachment).
5. Magnetic Separation. Place the tube in the magnetic separator for 5 minutes. Keep the tube on the magnet during the following steps to maintain separation.
6. Collection of purified CD3+ T Cells. Carefully remove the supernatant into a new sterile centrifuge tube—the supernatant contains CD3+ T cells.

Note: Do not remove the tube from the Magnet Separator.

7. Centrifuge the collected supernatant (300 \times g, 5 min) to pellet the purified CD3+ T cells.
8. Discard the supernatant and resuspend the cell pellet in an appropriate buffer (e.g., PBS with 0.5% BSA) or culture medium (e.g., RPMI-1640 + 10% FBS) for downstream applications.