Strep-Tactin Magnetic Beads

Introduction

The Strep-Tag II is a small 8-amino acid tag (WSHPQFEK) with a molecular weight of about 1 kDa, which does not affect the structure of the fusion protein and is widely used for detection and purification. Strep-Tactin Magnetic Beads contain a mutant streptavidin ligand with an affinity for Strep-Tag II that is at least 10-fold higher than the wild-type protein. Its binding to the tag is weaker than that to biotin, allowing mild elution conditions (e.g., with desthiobiotin). While the beads can also bind biotin, elution of biotinylated molecules requires harsher conditions.

Strep-Tactin Magnetic Beads are a next-generation affinity magnetic bead tool designed for life science research. They consist of mutant streptavidin covalently coupled to superparamagnetic beads, enabling specific binding to Strep-Tag II-tagged or (desthio)biotin-labeled proteins. Combined with magnetic separation, the beads allow rapid purification and detection of target proteins. The purification is gentle and efficient, typically yielding >99% pure protein in a single step while preserving biological activity-achieving an optimal balance of speed, yield, and purity.

The product is suitable for tagged-protein purification (Strep-Tag II), pull-down assays, and other applications. It is available in multiple formats including 1.5 mL, 5 mL, 10 mL, and 50 mL sizes.

Product parameters:

Product name	Strep-Tactin Magnetic Beads
Product Size	1.5 mL/5 mL/10 mL/50 mL
Matrix spherical	Superparamagnetic magnetic beads
Ligand	Mutant of streptavidin (~6 mg/mL).
Particle size	30-150 μm
Binding Capacity	≥ 7 mg Strep-tag II protein /mL of beads
Concentration	10% (v/v)
Storage Buffer	1X PBS (0.I%Tween-20, 0.05%NaN3)
Application	Strep-Tag II-tagged Protein Purification, Pull-down Assay
Storage	Store at 4°C for 12 months, avoid lower temperature storage

Protocol

1. Sample Preparation (Keep on ice)

- Fusion proteins (Strep-Tag II tagged): For intracellularly expressed proteins (e.g., from E. coli, yeast, or animal cells), lyse cells in the presence of a protease inhibitor cocktail. After centrifugation, retain the crude protein supernatant. For secreted proteins, collect the culture supernatant. It is optional to add a protease inhibitor cocktail.
- Biotinylated proteins: Biotin-labeled proteins such as in vitro biotin labeling (e.g., Sulfo-NHS-LC-Biotin Kit, K1001) and in vivo enzyme labeling methods such as Avi-tagged Protein Biotin Labeling Kit (BirA method), K4402.

***Note:** Recommended general-purpose protease inhibitor: Protease Inhibitor Cocktail (EDTA-Free, 100X in DMSO) (Cat. #: K1007 or K4002), which provides more comprehensive protection compared to PMSF (Cat. #: A2587).

2. Magnetic Bead Pre-treatment

As the beads are stored in a special preservation solution, appropriate washing is required before sample addition.

a Gently resuspend the Strep-Tactin Magnetic Beads by pipetting or vortexing, then transfer an appropriate volume of the bead suspension to a clean 1.5 mL tube. The amount of beads should be estimated based on the target protein yield and the binding capacity of the beads.

b Add a suitable volume of binding/wash buffer, resuspend thoroughly, place the tube on a magnetic stand for 1 min, and discard the supernatant.

c Repeat step (b) 1-2 times. The beads are now ready for use.

3. Sample Binding to Beads

Add an appropriate amount of sample to the beads, mix by inverting, and incubate on a rocking shaker for 30 min (incubation can be extended to 1 h if needed). Place the tube on a magnetic stand for 1 min, discard the supernatant, and repeat the washing step 2–3 times.

4. Elution

- Fusion proteins (Strep-Tag II tagged): Elute with a desthiobiotin-containing solution, such as Tris buffer (10 mM Tris-HCl, 150 mM NaCl, 1 mM EDTA) supplemented with 2.5 mM desthiobiotin. Recommended desthiobiotin: D-Desthiobiotin (Cat. # A8014).
- Biotinylated proteins: For biotin-labeled proteins, use acidic elution (refer to the manual of Cat. # K4410). For desthiobiotin-labeled proteins (e.g., labeled with Sulfo-NHS-LC-D-Desthiobiotin, Cat. # A8018), elute with biotin (refer to the manual of Cat. # K4409).

5. Beads Regeneration and Storage

The following regeneration procedure is described for a 5 mL scale; adjust volumes accordingly for other scales. Either regeneration method may be used.

- NaOH regeneration: After elution, wash the beads sequentially with: 3-5 mL purified water (3 times); 3-5 mL of 0.5 M NaOH (3 times); purified water until neutral pH. Finally, add 5 mL storage buffer and store the beads at 2-8 °C.
- HABA regeneration: Beads eluted with desthiobiotin can also be regenerated using HABA buffer (1 mM HABA). Wash the beads 5 times with 3-5 mL HABA, followed by washing with Tris buffer (10 mM Tris-HCl, 150 mM NaCl, 1 mM EDTA, pH 8.0) until the beads regain their original color (5 min per wash). Finally, add 5 mL storage buffer and store at 2-8 °C. Recommended HABA product: Cat. # B7918.

Regenerated beads should be stored in a separate tube to avoid potential contamination. Beads can typically be regenerated 10–20 times; actual reuse should be determined based on binding performance and purification efficiency.

FAQs

1. Can magnetic beads be stored to -20°C and below?

A: No, you cannot. Magnetic bead series products cannot be stored and transported at low temperature, and must be stored in accordance with the instructions in the manual, and stored in an environment of 2-8°C.

2. Is there a specific species range for the purification of fusion proteins (Strep-Tag II tags) using these beads?

A: There is no defined species range. Can be used for isolation and purification of Strep-Tag II-tagged proteins from any expression system, including baculovirus, mammalian cells, yeast, and bacteria.

3. How to avoid magnetic bead aggregation?

Answer: You can choose the following methods: 1. Storage conditions: Magnetic beads should be stored in an environment of 2~8°C; 2. Prevent contamination and dryness: Avoid contamination during use and ensure that the beads do not dry out; 3. Add detergent: Adding 0.1% non-ionic detergent (such as Triton X-100, Tween-20, or NP-40) to the binding/wash buffer can effectively prevent magnetic bead aggregation.

4. How to solve the problem of magnetic beads adhering to the tube wall?

Answer: 1. Use low adsorption consumables: When performing magnetic bead operation, it is recommended to use experimental consumables with low adsorption rate; 2. Add detergent: Add 0.01%~0.1% non-ionic detergent to the buffer to reduce bead adhesion.

5. How to improve target protein recovery?

Answer: 1prolonged the incubation time of protein solution and magnetic beads; 2. Add appropriate protease inhibitors to prevent the degradation of the target protein; 3. Increase the amount of magnetic beads; 4. Extend the elution time or increase the number of elutions.

6. How to improve the purity of the target protein?

Answer: 1. Appropriate protease inhibitors are added during purification to prevent degradation of the target protein. 2. Extend the washing time and increase the number of washes.

7. Are magnetic beads reusable?

A: It can be reused. When reusing, it is recommended to use different or new magnetic beads when purifying different types of proteins to prevent cross-contamination.

Note

1. This product should avoid high-speed centrifugation and drying; Do not place the beads in the magnetic field for a long time, otherwise it may cause the beads to agglomerate.
2. Before using this product, it should be properly and fully resuspended, that is, reversed several times to mix the beads evenly, and the mixing operation should be gentle, not violent vortex oscillation, etc., to avoid antibody denaturation.
3. Protein samples should be purified as soon as possible after collection and should always be placed at 4°C or in an ice bath to slow down protein degradation or denaturation.
4. This product is for scientific research use only.

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