AccuNanoBead™

Making the Best of a
Rapid Solution for
Biomolecule Purification

BIONEER
Innovation • Value • Discovery

01. Product Description

Recently, many of bio related institutes and industries are approaching their research applying magnetic beads.
Magnetic beads have been used widely in purification of biosimilar proteins and antibody drugs. Magnetic beads have been developed to overcome weakness of existing resin and to automate purification process. The principle of magnetic beads are coating with appropriate functional group in the surface of magnetic beads. With the functional group, magnetic beads can combine protein and then using external magnetic field, Magnetic beads is moved for isolation.

02. Features of Magnetic Beads

- Spherical and Magnetic, Nano-sized Silica Beads
- Sufficient Surface Area-to-Volume Ratio for Effective Purification
- Suitable for Separating Target Biomolecules
- Superior Purification Method in terms of Speed, Accuracy and Cost
- Rapid Experiment as Result of Fast Binding and Easy Handling
- Notably Efficient Purification Yield due to Large Surface Area
- High Quality Results by Reducing Nonspecific Binding
- Easily Applicable to Automated System

03. Specifications of Silica Magnetic Beads

- Matrix : silica-coated Fe_3O_4
- Average particle size : 100 nm, 200 nm, 400 nm
- Working temperature : 0~100℃
- Storage solution : D.W.
- Storage temperature : Room Temperature
- pH stability : pH 2 to 10

04. Applications of Silica Magnetic Beads

- Nucleic Acid Purification
- Total RNA Purification
- Viral DNA and RNA Purification
- Cell Purification
- mRNA Purification
- Peptide Preparation
- Antibody Purification

05. FE-SEM and TEM Image of Magnetic Beads

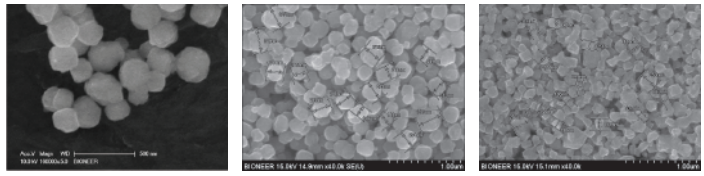


Figure 1. FE-SEM photograph shows Bioneer's 400 nm, 200 nm, 100 nm Magnetic Nanobeads are uniform spheres.

06. Comparison of Bead Appearance

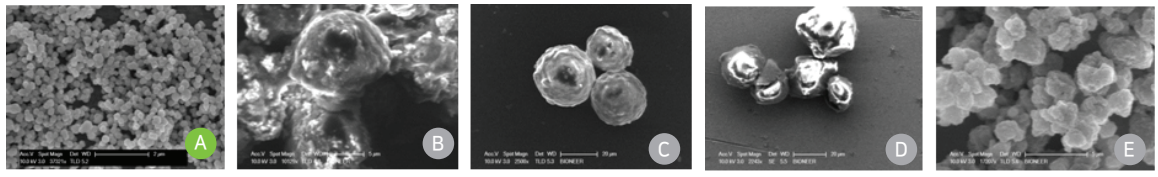


Figure 2. SEM photographs of Magnetic Beads from: (A) Bioneer; (B) company A; (C) company B; (D) company C; (E) company D.
The photographs above show Bioneer's Magnetic Beads are uniform spheres that are much smaller in size than others.

07. Simpler, Faster and More Effective Purification

Eliminate Repeated Pipetting or Centrifugation

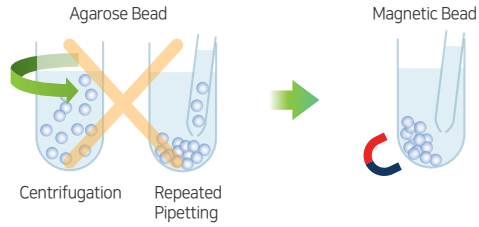


Figure 3. Schematic Purification Process.
Traditional purification method using agarose beads needed centrifugation and repeatated pipetting. For this reason, purification procedure is complicated and lose of samples is unavoidable during each step. *AccuNanoBead*™ enable user to remove supernatant easily without lose of samples, because it can be immobilized by magnet.

Complete Recovery within 1 Second

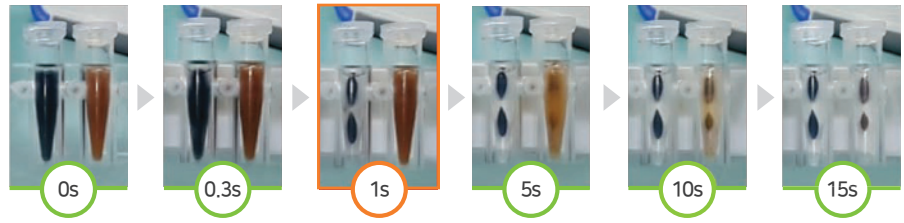


Figure 4. Recovery test of Magnetic Beads from *AccuNanoBead*™ (Dark Blue) and Competitor L (Brown).
Recovery of *AccuNanoBead*™ is completed within 1 second. It is 15 times faster than Competitor L product. Rapid recovery allows user to finish experiment quickly, thus save time.

Acquire Increased Purification Yield

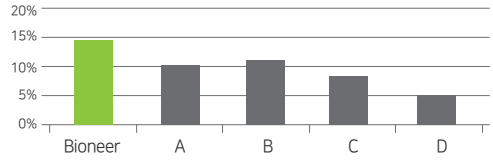
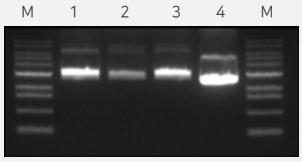


Figure 5. Comparison of purification yield.
Purification yield with *AccuNanoBead*™ is notably higher than competitors' products. This is due to increased surface area of Bioneer's beads in accordance with a smaller particle size. Purification yield is amount of purified target protein from loading protein (Ni-NTA magnetic beads).

AccuNanoBead™ Silica Coated Magnetic Nanobeads
Plasmid DNA Purification Using Magnetic Nanobeads



M: DNA 1Kb ladder
Lane 1 : Column prep
Lane 2 : *AccuNanoBead*™ prep w/ *MagListo*™-2
Lane 3 : *AccuNanoBead*™ prep w/ *MagListo*™-15
Lane 4 : *AccuNanoBead*™ prep w/ *MagListo*™-50

Figure 6. Silica coupling reaction.

Plasmid DNA was purified using *AccuNanoBead*™ Silica Magnetic Beads and *MagListo*™ Magnetic Separation Rack through the process of cell lysis, DNA capture, impurity removal and finally DNA elution without the use of centrifugation, and the result was compared with that from column prep.

Sample	Nucleic Acid Conc. (ng/μl)	$A_{260/280}$
Lane 1 : Column prep	57.6 ng/μl	1.78
Lane 2 : *AccuNanoBead*™ prep w/ *MagListo*™-2	40.7 ng/μl	1.77
Lane 3 : *AccuNanoBead*™ prep w/ *MagListo*™-15	69.9 ng/μl	1.78
Lane 4 : *AccuNanoBead*™ prep w/ *MagListo*™-50	637.2 ng/μl	1.98

AccuNanoBead™ Amine Magnetic Nanobeads

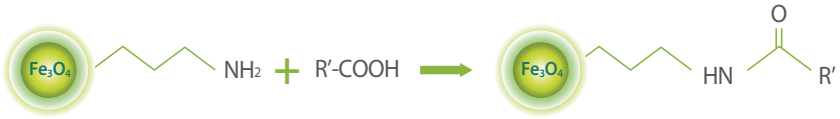


Figure 7. Amine coupling reaction.

Bioneer *AccuNanoBead*™ NH2 Magnetic Nanobeads are product coated with Amine on the surface of silica magnetic nano beads and are suitable for conjugation of large protein. The Beads can form covalent conjugation with epoxide- or carboxy-containing ligands. The simple and efficient collection in magnetic fields, such as *MagListo*™ Magnetic Separation Rack, allows for easy washing and removal of supernatant after coupling.

AccuNanoBead™ Carboxyl Magnetic Nanobeads

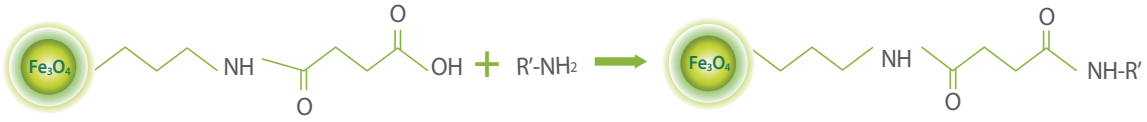


Figure 8. Carboxyl coupling reaction.

Bioneer *AccuNanoBead*™ COOH Magnetic Nanobeads are magnetic beads coated with high density of carboxyl functional groups on the surface. The beads are used to covalently conjugate primary amine- containing ligands via a stable amide bond. Bioneer *AccuNanoBead*™ COOH Magnetic Nanobeads are suitable for conjugation of Amine modified Oligo Nucleic Acid (DNA & RNA) and large size of protein. The simple and efficient collection in magnetic fields, such as *MagListo*™, allows for easy washing and removal of supernatant after coupling.

AccuNanoBead™ Epoxy Magnetic Nanobeads

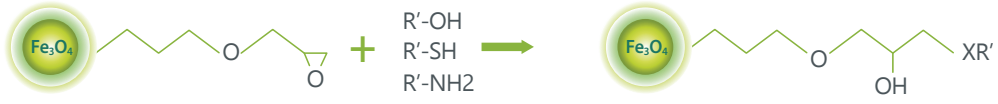


Figure 9. Epoxy-Coupling Reaction.

AccuNanoBead™ Epoxy Magnetic Nanobeads are silica magnetic nano beads coated with high density epoxy ligands on the surface. Beads can form covalent bond with hydroxyl-, amine and thiol- ligands. Coupling reaction of each ligand is favored at pH 11-12, pH>9 and pH 7.508.5, respectively. Epoxy ligands is able to react with these ligands. It can be applied to cell sorting, immunoprecipitation and etc.

AccuNanoBead™ C18 Magnetic Nanobeads

Figure 10. C18 Coupling Reaction.

AccuNanoBead™ C18 Nano Beads is silica magnetic nano beads containing hydrophobic C18 alkyl groups on the surface. It binds to peptides or proteins using strong hydrophobic absorption interaction. Therefore, beads can be used for purification and determining concentration of peptides or protein fragments and de-salting prior to mass-spectrometry (MS) analysis.

AccuNanoBead™ Streptavidin & Biotin Magnetic Nanobeads

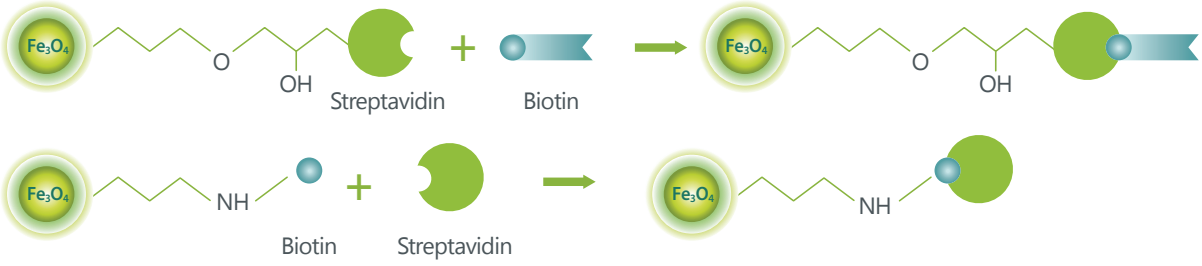


Figure 11. Streptavidin & Biotin coupling reaction.

Bioneer *AccuNanoBead*™ streptavidin Magnetic Nanobeads are silica-based magnetic beads coated with high density streptavidin on the surface. The Beads are designed, tested and quality controlled for use in immunoprecipitation, co-immunoprecipitation, in-vitro diagnostic assay and magnetic bead cell sorting, rapid single-step capture of biotinylated molecules such as DNA, RNA, antibody or protein from cell lysates or hybridization reactions.

Bioneer *AccuNanoBead*™ Biotin Magnetic Nanobeads are densely coated with Biotin. Nanobeads are utilized in the magnetic separation of avidin and streptavidin-labeled molecules. Biotin magnetic beads are stable, pre-blocked beads with high binding capacity that provide rapid and efficient biomolecule purification from complex samples. Design of Bioneer *AccuNanoBead*™ Biotin Magnetic Nanobeads enables faster binding kinetics, High yield, purity, and quality in many biomedical and research applications.

AccuNanoBead™ Ni-NTA Magnetic Nanobeads

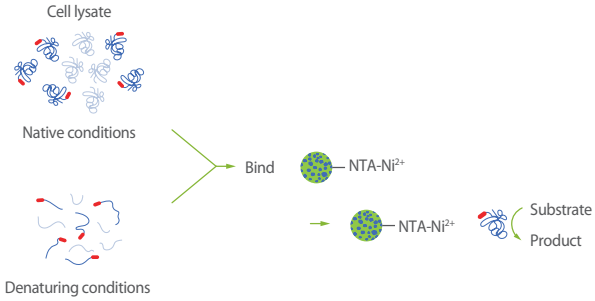


Figure 12. Ni-NTA magnetic bead binding reaction.

Bioneer *AccuNanoBead*™ Ni-NTA Magnetic Nanobeads is designed for specific purification of 6x His-tagged proteins. Ni-NTA Nanobeads have nitrilotriacetic acid (NTA) groups with charged nickel covalently bind to surface of silica nanobeads. Due to the high affinity, Ni-NTA beads can be used for capturing 6x His-tagged proteins easily and efficiently. Among them, Ni-Charged magnetic particles coating physiological lipids have excellent compatibility for in vivo studies. These highly binding beads are suitable for a wide range of research.

AccuNanoBead™ Thiol Magnetic Nanobeads

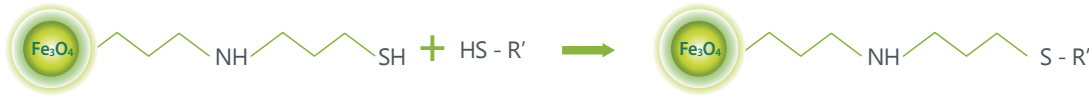


Figure 13. Thiol coupling reaction.

Bioneer *AccuNanoBead*™ Thiol Magnetic Nanobeads, silica-based magnetic beads coated with high density Thiol functional groups on the surface. The beads are used to reversible couple thiol-containing ligands. Thiol-coated magnetic Beads are recommended for conjugation of DNA, RNA, proteins, and specific cells. The beads are useful for small peptides because the long-arm hydrophilic linker may reduce steric hindrance.

AccuNanoBead™ Protein A,G,L Magnetic Nanobeads

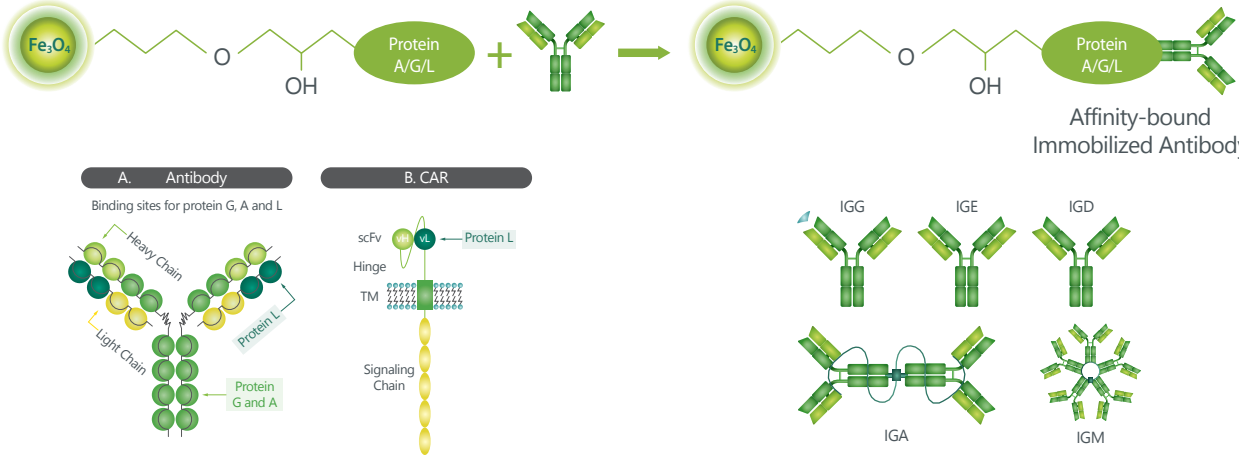


Figure 14. Antibody Binding region of Protein A, G, L and coupling reaction scheme.

Bioneer *AccuNanoBead*™ Protein A, G, L Magnetic Nanobeads are product coated with recombinant Protein A, Protein G or Protein L on the surface of silica magnetic nano beads. Protein A, G, L exhibits high affinity for subclasses of IgG from many species (include Human, Mouse, Rat, Guinea Pig and Pig) and can be used for immunoprecipitation assays with these antiboies. The beads are also widely used for efficient purification of IgG antibodies. But IgM cannot bind to Protein A and G because of their structure. Only Protein L binds to IgM. Bioneer AccuNanoBeadTM Protein A, G, L Magnetic Nanobeads are suitable for Antibody purification, Immunoprecipitation, Antigen-Antibody interaction studies and etc.

AccuNanoBead™

Ordering Information

Cat No.	Product	Size
TA-1010-1	*AccuNanoBead*™ Silica Magnetic Nanobeads, size 400 nm	0.5 g / 25 ml
TA-1010-2	*AccuNanoBead*™ Silica Magnetic Nanobeads, size 400 nm	1.0 g / 50 ml
TA-1010-3	*AccuNanoBead*™ Silica Magnetic Nanobeads, size 400 nm	10 g / 500 ml
TB-1010-1	*AccuNanoBead*™ Silica Magnetic Nanobeads, size 200 nm	0.5 g / 25 ml
TD-1010-1	*AccuNanoBead*™ Silica Magnetic Nanobeads, size 100 nm	0.5 g / 25 ml
TA-1011-1	*AccuNanoBead*™ NH2 Magnetic Nanobeads, size 400 nm	0.5 g
TA-1012-1	*AccuNanoBead*™ COOH Magnetic Nanobeads, size 400 nm	0.5 g
TB-1012-1	*AccuNanoBead*™ COOH Magnetic Nanobeads, size 200 nm	0.5 g
TF-1012-1	*AccuNanoBead*™ COOH Magnetic Beads for NGS	0.5 g
TF-1012-2	*AccuNanoBead*™ COOH Magnetic Beads for NGS	1 g
TF-1012-3	*AccuNanoBead*™ COOH Magnetic Beads for NGS	4 g
TA-1013-1	*AccuNanoBead*™ Epoxy Magnetic Nanobeads, size 400 nm	0.5 g
TA-1014-1	*AccuNanoBead*™ C18 Magnetic Nanobeads, size 400 nm	0.5 g
TA-1015-1	*AccuNanoBead*™ Streptavidin Magnetic Nanobeads, size 400 nm	50 mg / 5 ml
TB-1015-1	*AccuNanoBead*™ Streptavidin Magnetic Nanobeads, size 200 nm	50 mg / 5 ml
TA-1016-1	*AccuNanoBead*™ Biotin Magnetic Nanobeads, size 400 nm	0.5 g / 25 ml
TA-1017-1	*AccuNanoBead*™ Ni-NTA Magnetic Nanobeads, size 400 nm	0.5 g / 25 ml
TA-1019-1	*AccuNanoBead*™ Thiol Magnetic Nanobeads, size 400 nm	0.5 g
TA-1021-1	*AccuNanoBead*™ Protein G Magnetic Nanobeads, size 400 nm	40 mg / 1 ml
TA-1022-1	*AccuNanoBead*™ Protein A Magnetic Nanobeads, size 400 nm	40 mg / 1 ml
TA-1023-1	*AccuNanoBead*™ Protein L Magnetic Nanobeads, size 400 nm	40 mg / 1 ml
TS-1000-1	Magnet Φ15x1.5 and Screw Tube 1.5 ml	1 set

Please contact us by e-mail to inquire about large quantity orders.
E-mail: nano-support@bioneer.com

Healthier Future for
Humanity with Genomic Technology

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