



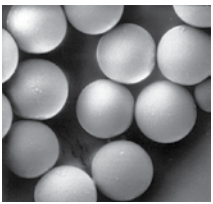
Perform reproducible immunoprecipitation
in less than 40 minutes

Dynabeads products

Immunoprecipitation made easy with low nonspecific binding, high yield, and reproducibility

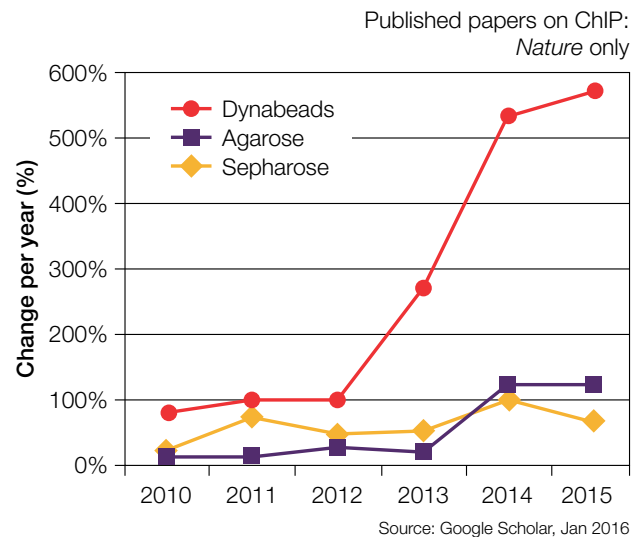
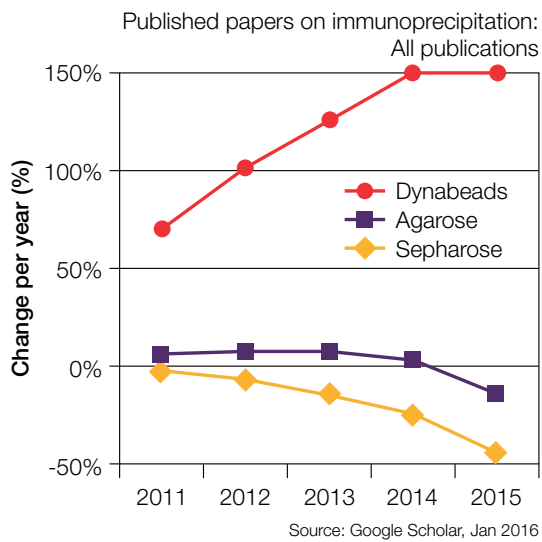


Magnetic beads have become the gold standard to use for immunoprecipitation (IP) and pull-downs because they are a faster, easier, and more efficient way of pulling down the proteins than traditional Sepharose™ agarose or other agarose resins.



IP is the small-scale affinity purification of antigens using a specific antibody, and one of the most widely used methods for antigen purification and detection. IP enables researchers to enrich for low-abundance proteins in order to improve downstream analyses, such as identifying the activation status, determining posttranslational modifications, or capturing protein-binding partners (co-immunoprecipitation, i.e., Co-IP). The target protein can also be bound to DNA (chromatin IP, i.e., ChIP) or to RNA (RNA IP, i.e., RIP) and be combined with sequencing or PCR assays.

We offer a wide variety of conjugated magnetic beads to meet most application and budget needs, including the most referenced technology—Invitrogen™ Dynabeads™ products.



Highlights:

- **Low background**—little to no nonspecific binding, and no preclearing
- **Highly reproducible**—uniform beads ensure the most consistent results
- **Highly sensitive**—Dynabeads technology is the most cited method for sensitive applications, such as ChIP and IP, of low abundance proteins
- **Fast and easy**—<40 min protocol with no centrifugation or preclearing steps
- **Antibody savings**—all binding occurs on the smooth outer surface of the beads which conserves precious antibodies and supports a cost-efficient solution per sample
- **Flexible**—products for IP, Co-IP, pull-down, and ChIP assays; ideal for both manual and automated protocols

Benchmarking: Dynabeads products vs. resin-based solutions

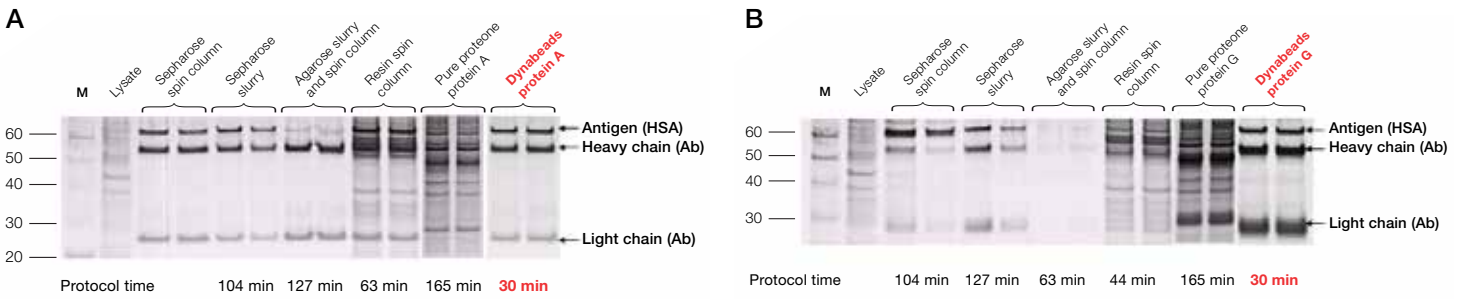


Figure 1. Shorter protocol time and better yields with Invitrogen Dynabeads. The same input of antibodies (Ab) and cell lysate was used for all IP protocols. With Dynabeads Protein A (left) and Dynabeads Protein G (right), all the antibodies on the bead surface are accessible for optimal, highly reproducible antigen binding.

Benchmarking: Dynabeads magnetic beads vs. other magnetic-based solutions

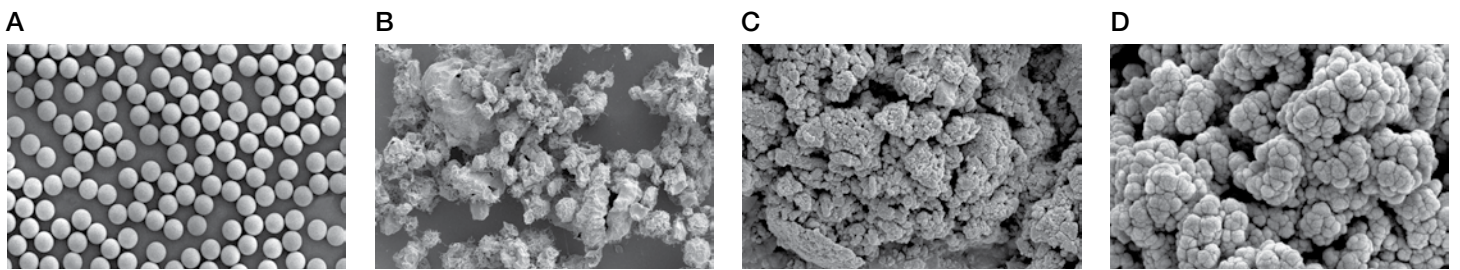
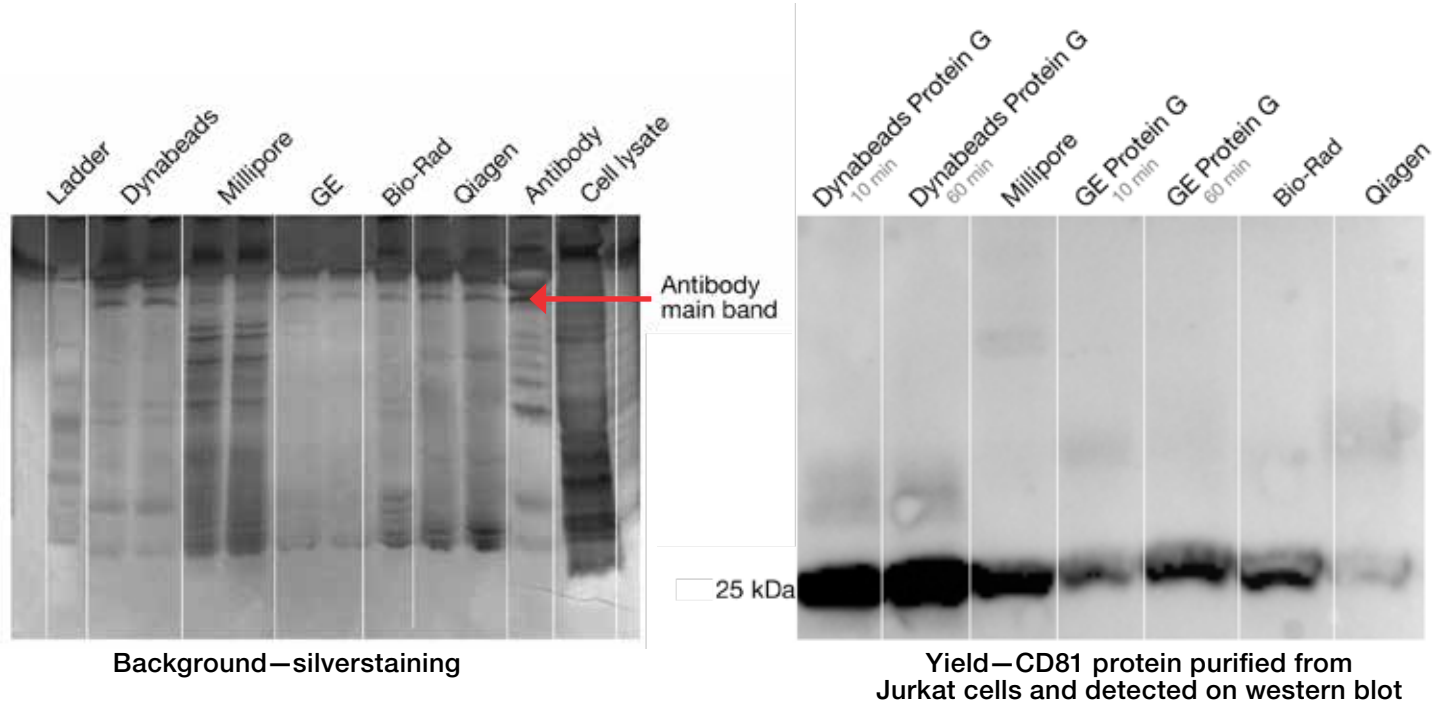


Figure 2. The magnetic bead you choose will affect your results. Dynabeads magnetic beads have a defined surface to carry out the necessary binding, with no inner surface to trap any unwanted proteins. (A) Dynabeads products are the most uniform, monodisperse superparamagnetic beads, manufactured with highly-controlled product qualities to ensure the highest degree of reproducibility. (B–D) Magnetic particles from alternative suppliers have variable shapes and sizes that trap impurities, resulting in lower reproducibility and increased nonspecific binding.



- Dynabeads Protein G provide very little nonspecific binding
- Dynabeads Protein G provide best signal/noise
- Dynabeads Protein G have the highest yield, even after only a 10-minute incubation with proteins
- Millipore also shows good yield, but with high nonspecific binding

Figure 3. Benchmarking data shows that Dynabeads magnetic products have the best performance when taking into account the combination of highest yield and lowest nonspecific binding. Our magnetic beads also have the fastest protocol, improving your lab life by removing unnecessary steps.

Choose your isolation strategy and find your product:

Choose (1) if you have an antibody that recognizes your protein—your choice of antibody binding products depends on whether your downstream assay method is mass spectrometry or if you don't want the antibody coeluted with your target protein.

Antibody binding is the most common method and is used when your target antibody can be bound directly to the beads or indirectly to a precoated ligand on the magnetic beads.

Choose (2) if you have a biotinylated antibody (or ligand) that recognizes your protein—main advantages for using a biotinylated antibody with streptavidin-coated beads for IP:

- If you have a sample rich in soluble IgGs
- If you have a recombinant antibody lacking Fc regions
- If you need a bead compatible with mass spectrometry (secondary-coated and epoxy-coated Dynabeads magnetic beads are also compatible with mass spectrometry)

Choose (3) if you have a recombinant protein (fusion tag)—the most popular fusion tags for recombinant protein expression are covered by Thermo Scientific™ Pierce™ and Dynabeads magnetic beads. These include His tag, GST tag, HA tag, and c-Myc tag. See [thermofisher.com/iptags](https://www.thermofisher.com/iptags) for product list.

| Choose this if you have | Surface coating on the magnetic beads | Type of ligand required | Mass spec compatible | Non-specific binding | IP protocol time | Main benefits for IP | Products |
|---|---------------------------------------|--|----------------------|----------------------|--|--|--|
| (1) Antibody recognizes your protein | Protein A, G, or L | Primary antibodies from most species. Protein A, G, and L bind different antibody species and subclasses with different specificities. | No | Low | Dynabeads: <40 min Pierce beads: 130–180 min | <ul style="list-style-type: none"> • Dynabeads—fastest, easiest protocol, low nonspecific binding | Dynabeads Protein A Dynabeads Protein G Immunoprecipitation Kit Dynabeads Protein A Immunoprecipitation Kit Dynabeads Protein G Pierce magnetic beads Protein A/G Pierce magnetic beads Protein L |
| | Secondary antibodies | Mouse IgGs or Rabbit IgGs | No** | Low | Dynabeads: ~40 min | <ul style="list-style-type: none"> • Fast and easy protocol • Low nonspecific binding • Specific binding of mouse or rabbit IgGs | Dynabeads M-280 Sheep anti-Mouse IgG Dynabeads M-280 Sheep anti-Rabbit IgG |
| | Epoxy-coated beads* | Any protein ligand (e.g. antibody, peptide) | Yes | Ultralow | Dynabeads Ab coupling time: overnight; Co-IP protocol time: 30–40 min | <ul style="list-style-type: none"> • Covalent coupling of the Ab gives ultralow nonspecific binding • No need for crosslinking • Gentle and efficient Co-IP of even large protein complexes | Dynabeads Antibody Coupling Kit Dynabeads Co-Immunoprecipitation Kit |
| (2) Biotinylated antibody | Streptavidin | Any biotinylated antibody or ligand | Yes | Low | 30–40 min | <ul style="list-style-type: none"> • Binds any biotinylated protein • For samples high in soluble IgGs • Recombinant Ab lacking the Fc-region | Dynabeads M-280 Streptavidin Dynabeads M-270 Streptavidin Dynabeads MyOne Streptavidin C1 Dynabeads MyOne Streptavidin T1 |
| (3) Recombinant protein | Fusion tags | Different beads bind proteins with the following tags (His, GST, HA, c-myc) | Yes | Low | Dynabeads (His-tag): ~25 min Pierce tags: ~70 min | <ul style="list-style-type: none"> • Purify many different proteins incorporated with the same tag • No need for antibodies | See thermofisher.com/iptags for product overview |

*See more choices in surface-activated Dynabeads products for the binding and capture of additional targets.

**Contains Tween-20 detergent that is contaminating for the mass spectrometry.

“Dynabeads are absolutely the best technology we have found so far for pulling out large complexes.”

–Dr. Michael P. Rout, Rockefeller University

Co-IP: With Dynabeads products you skip unnecessary steps and help ensure getting intact protein complexes

If you are using techniques such as Sepharose beads and spin columns for pull-down, note that your protein complexes can dissociate from exposure to large surfaces, mechanical strain (e.g., centrifugation), dilution, and excessive handling (preclearing). To preserve native protein conformations and large protein complexes, use the Invitrogen™ Dynabeads™ Co-Immunoprecipitation Kit. Just couple your antibody directly to the Dynabeads products, and use the magnet to separate your protein complexes.

Although some researchers choose to preclear using Sepharose beads, nonspecific binding can result in contamination.

Advantages of Dynabeads products for protein complex isolation:

- Quick and easy pull-down of intact, functional protein complexes
- No time-consuming preparation steps
- Only isolate the proteins you want
- Can be adapted for high-throughput applications

4 common IP myths debunked

Check out our myth-busting video series at: [thermofisher.com/ipmyths](https://www.thermofisher.com/ipmyths)

| Myth | Fact |
|---|---|
| Background can't be avoided. | Almost all background is removed using Dynabeads magnetic beads because all antibodies are accessible on the smooth bead surface, limiting nonspecific background. |
| Preclearing is necessary to get good IP results. | Preclearing step is unnecessary with Dynabeads magnetic beads. You can save time and you use half the amount of solid phase, which helps save money. |
| Higher capacity is better for IP. | The high capacity of Sepharose beads comes from high surface area, which may also trap a lot of unwanted protein, thereby wasting antibody. Even with lots of washing, you will end up with unwanted background. Good capacity with high yield is best. |
| Dynabeads magnetic beads are expensive. | With no preclearing and less antibody used, Dynabeads magnetic beads help save you money by balancing optimal capacity/yield, reproducibility, and purity. |

| Product | Quantity* | Cat. No. |
|---|--------------|----------|
| Dynabeads Protein A | 1 mL | 10001D |
| Dynabeads Protein G | 1 mL | 10003D |
| Immunoprecipitation Kit—Dynabeads Protein A | 40 reactions | 10006D |
| Immunoprecipitation Kit—Dynabeads Protein G | 40 reactions | 10007D |
| Pierce Protein A/G Magnetic Beads | 1 mL | 88802 |
| Pierce Protein L Magnetic Beads | 1 mL | 88849 |
| Dynabeads Antibody Coupling Kit | 1 kit | 14311D |
| Dynabeads Co-Immunoprecipitation Kit | 40 reactions | 14321D |
| Dynabeads His-Tag Isolation and Pulldown | 2 mL | 10103D |
| Dynabeads M-280 Sheep Anti-Mouse IgG | 2 mL | 11201D |
| Dynabeads M-280 Sheep Anti-Rabbit IgG | 2 mL | 11203D |
| Dynabeads M-280 Streptavidin | 2 mL | 60210 |
| Dynabeads M-270 Streptavidin | 2 mL | 65305 |
| Dynabeads MyOne Streptavidin C1 | 2 mL | 65001 |
| Dynabeads MyOne Streptavidin T1 | 2 mL | 65602 |

*Most products are available in larger pack sizes

Resources:

More information: thermofisher.com/immunoprecipitation
thermofisher.com/automation

FAQs: thermofisher.com/ipfaqs

Fusion tags: thermofisher.com/iptags

Videos: youtube.com/immunoprecipitation

Immunoprecipitation myth videos

Immunoprecipitation Publication Trends—The Reasons for the Shift

Immunoprecipitation Interactive Selection Guide

Magnetic stands

Invitrogen™ DynaMag™ magnets isolate any target in combination with Dynabeads magnetic beads. Your waiting time is minimized as these powerful magnets quickly pull your Dynabeads-bound target to the tube wall. DynaMag magnets help ensure optimal working positions and are functionally adapted to suit your workflow.



The most commonly used magnet for all molecular assays, including IP, is the DynaMag-2 magnet.

The Invitrogen™ DynaMag™-2 Magnet combines strong magnetic attraction with flexible ergonomic design

DynaMag-2 Magnet



Extra rack for DynaMag-2 Magnet

- Holds up to 16 standard 1.5 mL–2 mL microcentrifuge tubes in numbered spaces
- Rack can be removed and used to store tubes
- Rack makes it easy for resuspension, vortexing, rotation, or manual sample shaking: a center pin in the rack ensures equal vortexing of all tubes
- Efficient control and visibility of your proteins and nucleic acids isolation



Other magnets available for immunoprecipitation are:

Invitrogen™ DynaMag™-Spin Magnet

Holds six 1.5 mL microcentrifuge tubes. Circular top rack can be quickly removed from the magnet in the base, ready for vortexing or manual sample shaking.



Plate magnets

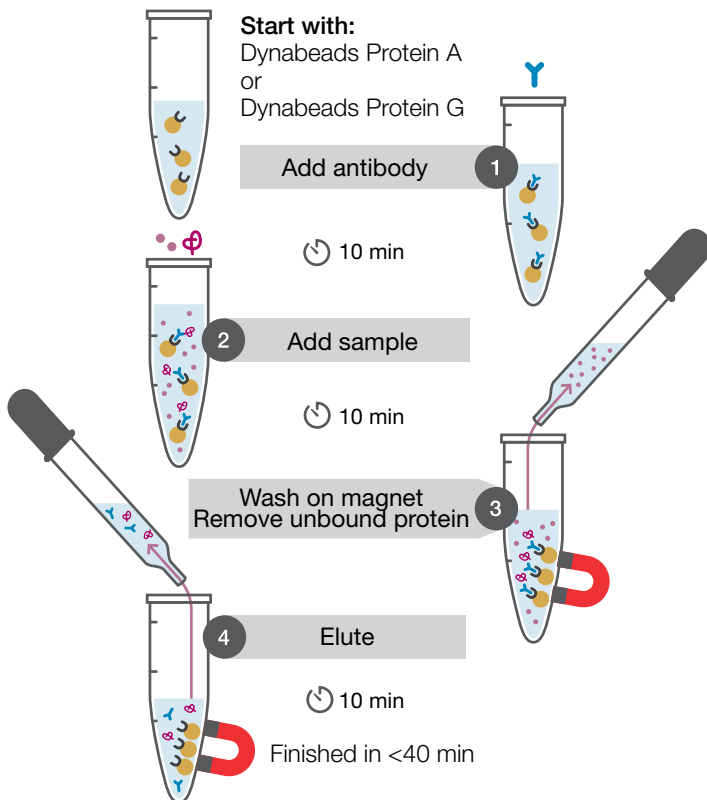
Optimum working volume 5 μ L–200 μ L. See thermofisher.com/magnets for more information.

| Product | Quantity | Cat. No. |
|---------------------------------|----------|----------|
| DynaMag-2 Magnet | 1 unit | 12321D |
| SampleRack for DynaMag-2 Magnet | 1 unit | 12322D |
| DynaMag-Spin Magnet | 1 unit | 12320D |
| DynaMag-96 Bottom Magnet | 1 unit | 12332D |
| DynaMag-96 Side Magnet | 1 unit | 12331D |
| DynaMag-96 Side Skirted Magnet | 1 unit | 12027 |

Resources and ordering info for magnetic stands

More information: thermofisher.com/magnets

- Dynabeads
- Y Antibody
- ⤿ Protein A or G
- ⊕ Target protein
- Nonspecific protein



“Dynabeads Protein G are so easy to work with and the background is minimal. I don’t know what I would ever do without them now.”

“I love how simple these are to use. They also save me a lot of time by not having to preclear or obsess about the wash steps.”

“I love the ease of this reagent... faster and cleaner.”

Figure 4. Immunoprecipitation in less than 40 min. Dynabeads magnetic beads precoupled with protein A or protein G act as a suspendable solid support that can be fixed by the use of a magnet. This allows for simple and efficient antibody capture, followed by immunoprecipitation of your pure target peptides, proteins, protein complexes, or other antigens.

Find out more at thermofisher.com/immunoprecipitation