MagRack 6
MagRack Maxi

PROTEIN SAMPLE PREPARATION

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MagRack 6 and MagRack Maxi (Fig 1) are magnetic racks for small-scale protein purification and sample enrichment with magnetic beads. MagRack 6 is for sample volumes of up to 1.5 ml while MagRack Maxi can be used for sample volumes of up to 50 ml. The racks make an excellent complement to the following products (containing magnetic beads) from Cytiva: Protein A Mag Sepharose™, Protein A Mag Sepharose Xtra, Protein G Mag Sepharose, Protein G Mag Sepharose Xtra, His Mag Sepharose Ni, NHS Mag Sepharose, TiO_2 Mag Sepharose, and Streptavidin Mag Sepharose.

One of the main advantages of the magnetic beads separation method is the ability to vary the amount of medium as well as the sample volume. MagRack 6 and MagRack Maxi together cover a broad range of sample volumes from low-microliter to high-milliliter purification scales and this further enhances the flexibility of magnetic beads separations. The ability to use a larger sample volume allows you to obtain high yields in a single purification run and also capture lowly expressed target proteins.

MagRack 6 and MagRack Maxi deliver:

- Convenience — by making it easy for you to perform small-scale purifications and enrichment of sample volumes up to 50 ml
- Flexibility — you can process up to six samples in parallel with MagRack 6, and MagRack Maxi can be used with a 15 ml and a 50 ml tube
- Simplicity — each rack consists of an anodized aluminum housing (blue) with a detachable plastic bar (white) containing a neodymium magnet and this design allows for optimal performance during protein purifications or enrichments



Fig 1. MagRack 6 (lower) and MagRack Maxi (upper) are designed for efficient small-scale purification using magnetic beads.

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Simplified handling

MagRack 6 and MagRack Maxi magnetic racks consist of an aluminum housing with a detachable magnetic bar. When you insert the magnetic bar (Figures 2 and 3), the high-density magnetic beads become attracted to the magnet in seconds. This allows you to easily remove the supernatant while the magnetic beads are left in the tube. To allow for optimal mixing, remove the magnetic bar before you apply liquid samples.



Fig 2. The high density of the beads allows rapid capture with MagRack 6.

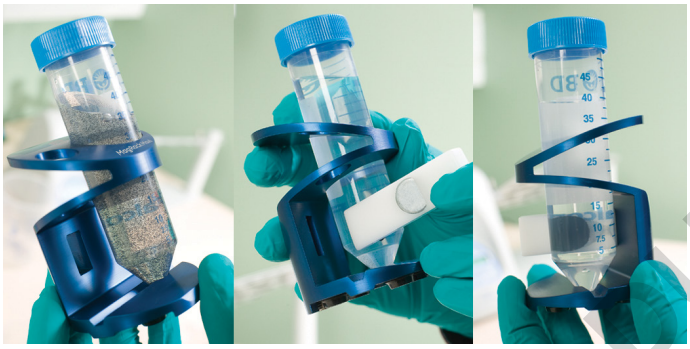


Fig 3. MagRack Maxi showing the magnetic bar detached (left) and inserted (right).

MagRack 6 and MagRack Maxi magnetic racks can be used to incubate your samples via end-over-end (the tube holes are adjusted to keep the tubes in the rack even though it is turned upside-down) or by a benchtop shaker. Alternatively, MagRack Maxi can be rolled horizontally on a rolling table.

Repeatable antibody purification with high purity

To show that MagRack 6 can be used with six samples in parallel, we conducted 6 replicate antibody purification runs (Table 1) using Protein A Mag Sepharose Xtra and Protein G Mag Sepharose Xtra. The load was half of the total binding capacity for Protein A Mag Sepharose Xtra and Protein G Mag Sepharose Xtra. The antibody yield was consistently high (> 80%), and the purity analyzed by SDS gel electrophoresis was > 90%. Figure 4 shows that the purification runs on Protein A Mag Sepharose Xtra and Protein G Mag Sepharose Xtra were highly repeatable with a relative standard deviation (RSD) of < 2%.

Table 1. Experimental conditions for Protein A Mag Sepharose Xtra and Protein G Mag Sepharose Xtra

Sample	Human IgG spiked in *E. coli* lysate
Sample volume	300 µl
Binding/wash buffer	PBS (140 mM NaCl, 2.7 mM KCl, 10 mM phosphate, pH 7.4)
Elution buffer	100 mM glycine, pH 2.8
Medium slurry volume	100 µl

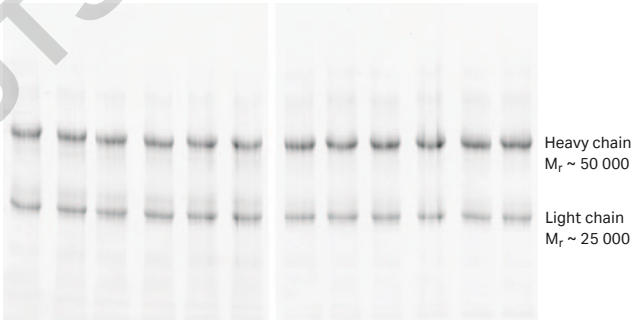


Fig 4. Purification of six samples in parallel with MagRack 6. The SDS gel (reducing conditions) was stained with Deep Purple Total Protein Stain and analyzed with ImageQuant™ TL software. The purity obtained for six replicate runs was above 90% (RSD < 2%).

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Flexible scale-up

We used MagRack Maxi to scale up a MagRack 6 purification run and this produced large amounts of the target protein in a single run. The 10-fold scale-up was from 200 µl (MagRack 6) to 2000 µl (MagRack Maxi) of His Mag Sepharose Ni. The sample volume was 1 ml and 10 ml, respectively (Table 2). The load was 80% of the total binding capacity of His Mag Sepharose Ni. The yield of the target protein was 0.42 mg using 200 µl medium slurry and 4.3 mg using 2000 µl medium slurry. SDS gel electrophoresis (Fig 5) of the products showed product purity was equally high for both purifications.

Table 2. Experimental conditions for His Mag Sepharose Ni

Sample	GFP-$(His)_6$ in *E. coli* lysate
Sample volume	1 ml or 10 ml
Binding/wash buffer	20 mM sodium phosphate, 500 mM NaCl, 20 mM imidazole, pH 7.4
Elution buffer	20 mM sodium phosphate, 500 mM NaCl, 500 mM imidazole, pH 7.4
Medium slurry volume	200 µl or 2000 µl

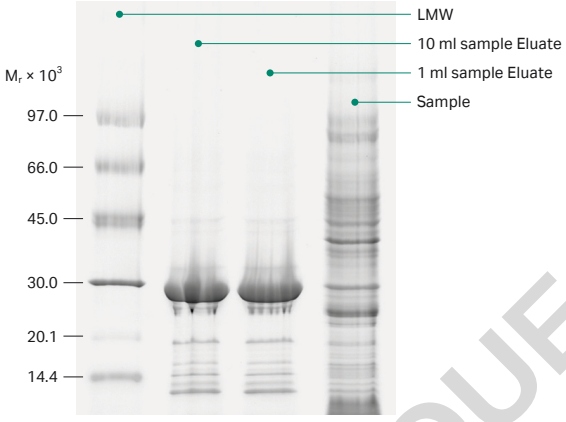


Fig 5. SDS-PAGE stained with Deep Purple Total Protein Stain. The purity obtained was equally high when scaling up the purification ten times. LMW = Low molecular weight protein markers.

Purification of low expression mouse IgG_{2b} from a large sample volume

MagRack Maxi is particularly effective at capturing lowly expressed target proteins in large sample volumes. In this study, we purified lowly expressed monoclonal mouse IgG_{2b} in 50 ml diluted cell supernatant (0.07 mg Ab/ml) and concentrated the product with 1.75 ml Protein A Mag Sepharose Xtra. The sample load was 3.5 mg and the experiment was performed in duplicate (Table 3). The results show high specificity according to SDS gel electrophoresis (Fig 6) and recoveries of ~ 70%. The purified mouse IgG_{2b} was concentrated from 50 ml to 3.5 ml.

Table 3. Experimental conditions for Protein A Mag Sepharose Xtra

Sample	Mouse IgG_{2b} from hybridoma cells
Sample volume	50 ml (25 ml cell supernatant diluted with 25 ml binding buffer)
Medium slurry volume	1.75 ml
Binding/wash buffer	PBS (140 mM NaCl, 2.7 mM KCl, 10 mM phosphate, pH 7.4)
Elution buffer	100 mM glycine, pH 2.8

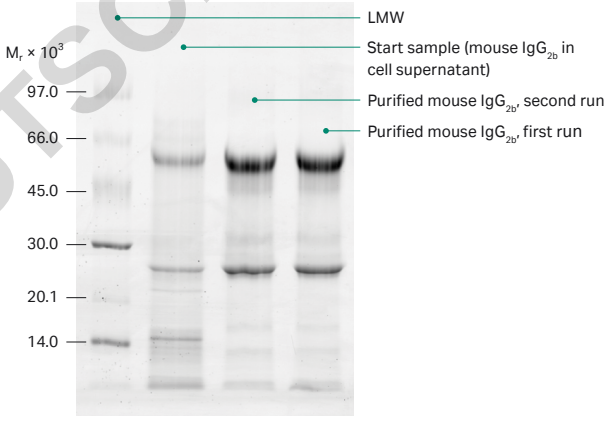


Fig 6. SDS-PAGE (reducing conditions) stained with Deep Purple Total Protein Stain. The purification of 50 ml of low expression mouse IgG_{2b} in a cell supernatant produced highly pure (> 90%) IgG_{2b}. LMW = Low molecular weight protein markers.

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Ordering Information

Products	Quantity	Code No.
MagRack Maxi	1	28-9864-41
MagRack 6	1	28-9489-64

Related products	Quantity	Code No.
Protein A Mag Sepharose	1 × 500 µl 20% medium slurry	28-9440-06
Protein A Mag Sepharose	4 × 500 µl 20% medium slurry	28-9513-78
Protein G Mag Sepharose	1 × 500 µl 20% medium slurry	28-9440-08
Protein G Mag Sepharose	4 × 500 µl 20% medium slurry	28-9513-79
NHS Mag Sepharose	1 × 500 µl 20% medium slurry	28-9440-09
NHS Mag Sepharose	4 × 500 µl 20% medium slurry	28-9513-80
TiO_2 Mag Sepharose	1 × 500 µl 20% medium slurry	28-9440-10
TiO_2 Mag Sepharose	4 × 500 µl 20% medium slurry	28-9513-77
Protein A Mag Sepharose Xtra	2 × 1 ml 10% medium slurry	28-9670-56
Protein A Mag Sepharose Xtra	5 × 1 ml 10% medium slurry	28-9670-62
Protein G Mag Sepharose Xtra	2 × 1 ml 10% medium slurry	28-9670-66
Protein G Mag Sepharose Xtra	2 × 1 ml 10% medium slurry	28-9670-70
His Mag Sepharose Ni	2 × 1 ml 5% medium slurry	28-9673-88
His Mag Sepharose Ni	5 × 1 ml 5% medium slurry	28-9673-90
His Mag Sepharose Ni	10 × 1 ml 5% medium slurry	28-9799-17
Streptavidin Mag Sepharose	2 × 1 ml 10% medium slurry	28-9857-38
Streptavidin Mag Sepharose	5 × 1 ml 10% medium slurry	28-9857-99

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CY14435-19Oct20-DF

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