



Sample Preparation

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RNA, DNA, and Protein Sample Preparation

RNA Kits and Reagents

Bio-Rad offers a broad range of sample preparation products for RNA isolation. Scalable and high throughput products are available.

See Also

Amplification reagents: pages 305–310.
Real-time PCR detection systems: pages 300–302.
Experion automated electrophoresis system: pages 112–116.

RNA Isolation Product Selection Guide

	Aurum™ Total RNA Kits			PureZOL™ RNA Isolation Reagent
	Mini	Fatty and Fibrous Tissue	96	
Format	Mini column Filtration (vacuum or spin)	Mini column Filtration (vacuum or spin)	96-well plate Filtration (vacuum or spin)	Single solution organic extraction
Maximum starting material amounts				
Cultured cells	2 x 10 ⁶	1 x 10 ⁷	1 x 10 ⁶	1 x 10 ⁷
Bacterial cells	2.4 x 10 ⁹	2.4 x 10 ⁹	8 x 10 ⁸	2.4 x 10 ⁹
Yeast cells	3 x 10 ⁷	3 x 10 ⁷	2 x 10 ⁷	3 x 10 ⁷
Hard animal tissue	20 mg	100 mg	—	100 mg
Soft to moderately hard animal tissue	40 mg	100 mg	—	100 mg
Plant tissue	40 mg	100 mg	—	100 mg
Isolation method	Silica membrane	Lysis with PureZOL reagent, purification on silica membrane	Silica membrane	Organic extraction
Number of preps	50	50	192 (2 x 96-well plate)	50 or 100 (1 ml/prep)
Number of washes	3	3	3	—
DNase I included*	Yes	Yes	Yes	No
DNase I digest time	15 min (animal tissue, 25 min)	15 min	10 min	—
Total preparation time**	<50–80 min (with DNase I digest)	<50–80 min (with DNase I digest)	<60 min (with DNase I digest)	<60 min
Binding capacity	>100 µg	>100 µg	>40 µg	—
Maximum elution volume	80 µl (2 x 40 µl elutions)	2 x 40 µl	80 µl	30–100 µl
Yield***	20–30 µg/2 x 10 ⁶ NIH 3T3 cells 20–40 µg/2 x 10 ⁶ HeLa cells 15–20 µg/40 mg brain 30–55 µg/20 mg thymus 15–30 µg/40 mg spleen 8–15 µg/40 mg liver 15–20 µg/40 mg kidney 8–15 µg/40 mg lung 15–30 µg/40 mg potato 20–30 µg/3 x 10 ⁷ <i>S. cerevisiae</i> cells 35–55 µg/2.4 x 10 ⁹ <i>E. coli</i> cells 35–55 µg/2.4 x 10 ⁹ <i>B. cereus</i> cells	140–150 µg/1 x 10 ⁷ 293H cells 90–100 µg/100 mg brain 50–60 µg/100 mg breast 80–90 µg/100 mg heart 60–70 µg/100 mg skin 50–60 µg/100 mg cartilage 20–30 µg/2.4 x 10 ⁹ <i>E. coli</i> cells 60–65 µg/3 x 10 ⁷ <i>S. cerevisiae</i> cells 90–100 µg/100 mg potato 5–10 µg/100 mg <i>Arabidopsis</i> 10–15 µg/50 mg <i>A. niger</i>	10 µg/1 x 10 ⁶ NIH 3T3 cells 17 µg/1 x 10 ⁶ HeLa cells 11 µg/2 x 10 ⁷ <i>S. cerevisiae</i> cells 5 µg/8 x 10 ⁸ <i>E. coli</i> cells 5 µg/8 x 10 ⁸ <i>B. cereus</i> cells	1.37 µg/1 x 10 ⁵ 293H cells 1.15 µg/mg brain 1.37 µg/mg fat 1.2 µg/mg heart 0.66 µg/mg cartilage 1.2 µg/mg skin 1.0 µg/mg potato 0.1 µg/mg <i>Arabidopsis</i> 0.38 µg/mg <i>A. niger</i> 0.63 µg/2.4 x 10 ⁷ <i>E. coli</i> cells 0.31 µg/3 x 10 ⁵ <i>S. cerevisiae</i> cells
Purity	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1

* Removal not required.

** Total preparation time will vary depending on the tissue or cell type and on which format is used (vacuum or spin).

***Yields will vary depending on the developmental stage, tissue type or cell line, and growth conditions used.

Aurum™ Total RNA Kits

Order Info: Pg 13

See AlsoPureZOL reagent:
page 4.Transfection reagents:
pages 283–284.Nucleic acid
amplification:
pages 296–319.

Aurum total RNA kits are designed and formulated to assist in the isolation of highly pure and intact RNA from a variety of starting materials. Isolated RNA is compatible with downstream applications including real-time qPCR, northern blotting, microarray analysis, and cDNA library construction.

- Isolate high yields of RNA from a wide range of sample types in less than 60 min
- DNase treatment ensures genomic DNA removal
- Produce ready-to-use RNA suitable for the most demanding downstream applications

Aurum total RNA kits offer streamlined processing using a choice of vacuum- or spin-mediated protocols. If vacuum-mediated purification is preferred, the protocol may be carried out on the Aurum vacuum manifold.

For More InformationWeb: www.bio-rad.com/rna-isolation

Request or download bulletins: 2920, 5282, and 2919

Aurum Total RNA Mini Kit

The Aurum total RNA mini kit produces DNA-free total RNA from a wide range of starting materials, including cultured cells, bacteria, and yeast, as well as animal and plant tissues. The kit utilizes a stringent reagent composed of guanidine isothiocyanate and β -mercaptoethanol for efficient sample lysis and quick RNase inactivation, followed by purification on silica membrane in a spin-column format using a spin- or vacuum-mediated protocol. The kit can also be used for RNA cleanup and desalting.

Aurum Total RNA Fatty and Fibrous Tissue Kit

The Aurum total RNA fatty and fibrous tissue kit produces total RNA from samples that are difficult to disrupt. The kit is effective for purifications involving fatty and fibrous tissues or samples, such as fungi, that are rich in RNases. The kit utilizes PureZOL™ RNA reagent, a potent phenol-based reagent, which effectively lyses tissues and cells. The kit includes spin columns that can be processed using a choice of vacuum- or spin-mediated protocols.

Aurum Total RNA 96 Kit

The Aurum total RNA 96 kit reproducibly isolates DNA-free total RNA from cultured cells, bacteria, and yeast in under 60 min in a 96-well format for high-throughput total RNA isolation. The total RNA binding plate is designed for use on the Aurum vacuum manifold.



Aurum Vacuum Manifold



Aurum Total RNA Fatty and Fibrous Tissue Kit

Aurum Vacuum Manifold

Vacuum-mediated RNA purifications can be carried out in the Aurum vacuum manifold. The manifold serves as a vacuum purification platform for either 96-well plates or individual spin columns. Benefits include:

- Processing of up to 18 spin columns at one time
- Universal manifold that converts from plate to column format by inserting the column adaptor plate

Consumables and Accessories

The reagents and plasticware used in the Aurum RNA kits are available as refill orders. These products can be ordered separately from the Aurum total RNA kits.

See Also

Aurum total RNA kits:
page 3.

PureZOL™ RNA Isolation Reagent

Order Info: Pg 13

The PureZOL RNA isolation reagent protocol is an improvement over the rapid, widely used, and proven method of RNA isolation developed by Chomczynski and Sacchi (1987). PureZOL RNA isolation reagent is a potent monophasic combination of phenol and the chaotropic agent guanidine isothiocyanate, which effectively lyses cells and tissues, deproteinates RNA, and inactivates endogenous nucleases in a single step. DNA and protein are efficiently removed from the RNA following phase separation.



The ready-to-use PureZOL RNA isolation reagent is a versatile and efficient means of isolating high yields of RNA from a variety of sources including cultured cells, animal and plant tissue, yeast, virus, and bacteria samples. The single-solution format permits recovery of RNA from small quantities of tissues or cells, making it ideally suited for gene expression analysis or whenever sample quantities are limited. Total RNA isolated using PureZOL RNA isolation reagent is free of

DNA and protein and can be used for northern blot analysis, in vitro translation, poly(A)⁺ selection, RNase protection assays, RT-PCR, and molecular cloning. Since no spin columns are used in the protocol, the protocol is scalable to accommodate a wide range of sample sizes.

For More Information
Web: www.bio-rad.com/rna-isolation

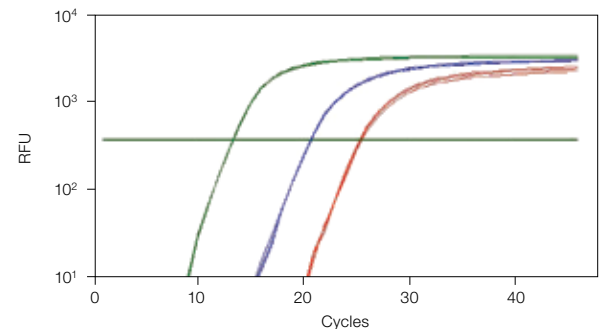
iScript™ RT-qPCR Sample Preparation Reagent

Order Info: Pg 13

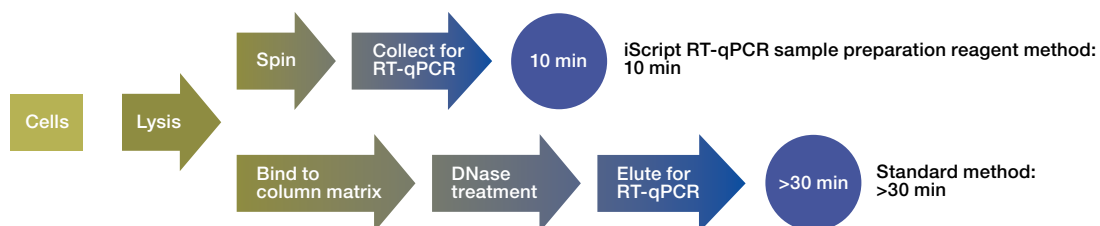
iScript RT-qPCR sample preparation reagent enables efficient cell lysis, RNA stabilization, and removal of genomic DNA for sensitive quantitative gene expression analysis without RNA purification. This unique reagent accelerates and streamlines RT-qPCR analysis of cultured cells by eliminating the need to purify RNA. Reverse transcription and real-time PCR can be performed directly from cell lysates. This reagent is ideal for rapid, high-throughput gene expression analysis, such as validation of siRNA-mediated gene knockdown.

- Rapid protocol (5–10 min) efficiently stabilizes RNA
- Sensitive detection of high-, medium-, and low-copy number gene targets directly from cell lysates
- Reagent enables multiplex real-time PCR detection of up to 4 targets from as few as 10 cells

For More Information
Web: www.bio-rad.com/iscript-rt-qpcr
Request or download bulletin: 5736






iScript RT-qPCR sample preparation reagent provides rapid, yet sensitive gene expression results for high-, medium-, and low-copy number gene targets. HeLa cells were treated with iScript RT-qPCR sample preparation reagent at 125 cells/μl and the expression levels of three different genes were assessed. 18S rRNA (→), β-tubulin (→), and CMYC (→) expression levels were determined by performing reverse transcription (iScript cDNA synthesis kit) and qPCR (iQ™ SYBR® Green supermix) directly from cell lysate preparations. RFU, relative fluorescence units.



DNA Kits and Reagents

DNA Isolation Kit Selection Guide

Kit	DNA Yield	Preparation Time	Bacterial Culture Density or Volume	Purification Format	Binding Matrix	Growth Media
Aurum plasmid mini 	≤20 µg	<10 min	Up to 12 OD • ml*	Vacuum** and spin	Silica membrane	Standard
Quantum Prep plasmid miniprep 	≤40 µg	<15 min	1–10 ml	Spin	Diatomaceous earth	Enriched or standard
Quantum Prep plasmid midiprep 	≤400 µg	45 min	20–40 ml	Spin	Diatomaceous earth	Enriched or standard

* (OD₆₀₀ of undiluted culture) x (culture volume in ml) = # of OD • ml; 1 OD₆₀₀ is equivalent to approximately 8 x 10⁸ cells/ml.

** Using the Aurum vacuum manifold.

Aurum™ Plasmid Mini Kit

Order Info: Pg 13

The easy-to-use Aurum plasmid mini kit improves the efficiency and throughput of plasmid purifications with a simple bind-wash-elute protocol using silica membranes, all in less than 10 minutes. Spin- and vacuum-mediated protocols are available. The purified plasmid DNA can be immediately used in any downstream molecular biology application.

The Aurum plasmid mini kit delivers high yields of reproducible plasmid DNA preparations for:

- Automated fluorescence-based sequencing
- Restriction digestion
- Ligation and transformation
- Transfection
- PCR

For More Information

Web: www.bio-rad.com/dna-isolation

Request or download bulletin: 2664



See Also

Transfection reagents:
pages 283–284.

Nucleic acid
amplification:
pages 296–319.

Quantum Prep® Plasmid Kits

Order Info: Pg 13

Quantum Prep Plasmid Miniprep Kit

The Quantum Prep miniprep kit offers high quality and yield in an easy spin-based procedure that takes less than 15 minutes from cell culture to purified plasmid. Plasmid DNA is recovered in water or TE for immediate use in all downstream molecular biology applications.



Quantum Prep Plasmid Miniprep Kit

Quantum Prep Plasmid Midiprep Kit

The Quantum Prep plasmid midiprep kit uses a simple spin-column procedure that significantly reduces the time required to generate the large quantities of plasmid DNA needed to support applications such as transfection, subcloning, and other enzymatic manipulations.

Quantum Prep Plasmid Midiprep Kit



For More Information

Web: www.bio-rad.com/dna-isolation

Request or download bulletin: 2325

See Also

Molecular biology and biotechnology grade resins: page 36.

Chelex®-Based Resins

Order Info: Pg 13

The two Chelex-based resins available are composed of paired iminodiacetate ions coupled to a styrene divinylbenzene matrix, providing highly selective removal of polyvalent cations that may inhibit PCR.

Chelex 100 Molecular Biology Grade Resin

Nuclease- and ligase inhibitor-free, this pipettable, small-scale resin is certified not to inhibit PCR and ensures complete removal of PCR inhibitors and metal ions.

InstaGene™ Matrix

InstaGene matrix is designed for rapid isolation of small amounts of genomic DNA of sufficient purity for PCR in under an hour. The specially formulated 6% w/v Chelex resin adsorbs cell lysis products that interfere with PCR, leaving genomic DNA template in the supernatant where it is immediately available for PCR reactions.

For More Information

Web: www.bio-rad.com/dna-isolation

Request or download bulletin: 2074

Sample Cleanup and Purification

Bio-Rad offers a variety of sample preparation and cleanup columns; many are also suitable for DNA fragment purification.

See Also

Agarose gel system: page 217.

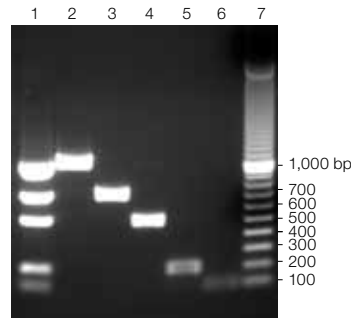
Nucleic acid standards: pages 137–138.

Freeze 'N Squeeze™ DNA Gel Extraction Spin Columns

Order Info: Pg 13

Freeze 'N Squeeze spin columns offer a filtration-based purification method, which provides a quick and effective alternative to chemical extraction and electroelution methods. The Freeze 'N Squeeze method uses centrifugation to draw 50–23,000 bp DNA out of agarose gel slices that have been quickly frozen and thawed. Features include:

- No solutions to prepare — save time and avoid using toxic chaotropic materials
- DNA immediately available for PCR, subcloning, ligations, and sequencing reactions
- Less than 1 minute of hands-on time



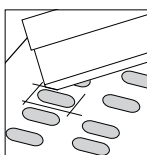
Recovery of DNA fragments using Freeze 'N Squeeze spin columns.

Extracted fragments were rerun on a ReadyAgarose™ 1% TAE gel. Lane 1, precision molecular mass ruler; lane 7, EZ Load™ 100 bp PCR molecular ruler.

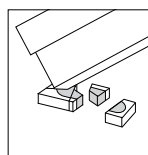
For More Information

Web: www.bio-rad.com/dna-cleanup

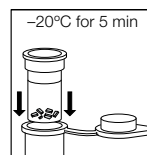
Freeze 'N Squeeze Method



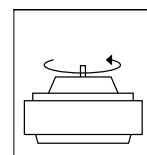
Cut out gel slice.



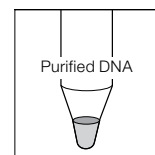
Chop into pieces.



Transfer to spin column and freeze for 5 min.



Spin for 3 min.



Recover purified DNA.

Prepacked Spin Columns

Order Info: Pg 13

Prepacked size exclusion spin columns allow easy cleanup and purification of DNA and proteins from lower MW contaminants. Bio-Spin®, Micro Bio-Spin™, and PCR Kleen™ columns clean up DNA or protein samples quickly and easily using size exclusion chromatography. These

columns are available in multiple sizes and offer multiple MW exclusion limits to accommodate a variety of needs. Use the chart below to choose the column that best meets your needs.

Prepacked Spin Column Selection Guide

	Bio-Spin 6	Micro Bio-Spin 6	Bio-Spin 30	Micro Bio-Spin 30	PCR Kleen
Packed support	Special grade Bio-Gel® P-6 gel	Special grade Bio-Gel P-6 gel	Special grade Bio-Gel P-30 gel	Special grade Bio-Gel P-30 gel	Special grade size exclusion gel
Equilibration buffer	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, 1 mM EDTA, pH 7.0
Applications					
Desalting of oligonucleotides >20 bases	•	•	—	—	—
Labeling reactions: removal of unincorporated nucleotides >20 bases or bp from DNA	—	—	•	•	—
Removal of primers and primer-dimers from PCR products >200 bp	—	—	—	—	•
Buffer exchange (restriction fragments, PCR products, enzyme reactions, sequencing templates)	•	•	—	•	—
DNA sequencing reaction mixture cleanup**	—	—	•	•	—
Riboprobe cleanup***	—	—	—	•	—
Desalting of antibody, enzyme, and protein solutions	•	•	—	•	—
Purification of proteins of molecular weight >6,000	•	•	—	—	—
Purification of proteins of molecular weight >40,000	—	—	•	•	—
Bed volume	1.1 ml	0.7 ml	1.1 ml	0.7 ml	0.6 ml
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs	85% recovery of ≥700 bp, 95% retention of primers and primer-dimers
Molecular weight exclusion limit, globular proteins	6,000	6,000	40,000	40,000	8,000,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl	25–100 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge	Microcentrifuge
Autoclavability	Yes	Yes	Yes	Yes	Yes

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0.

** In Tris buffer.

*** In RNase-free Tris buffer.

See Also

Empty columns:
pages 66–69.

Bio-Gel P media:
page 47.

Bio-Spin,
Micro Bio-Spin, and
Mini Bio-Spin columns:
page 63.

Prepacked Bio-Spin® and Micro Bio-Spin™ Columns

Bio-Spin and Micro Bio-Spin columns clean up and remove salts, nucleotides, dye terminators, and small molecules from DNA, RNA, and protein samples in 10 minutes. Filled with specially sized Bio-Gel® P gels, these columns are shipped fully hydrated in Tris or SSC buffer. They yield 95% recovery of DNA >22 bp and allow sample loads of 10–100 µl. For safe riboprobe preparation use RNase-free Micro Bio-Spin P-30 Tris spin columns.

For More Information

Web: www.bio-rad.com/dna-cleanup

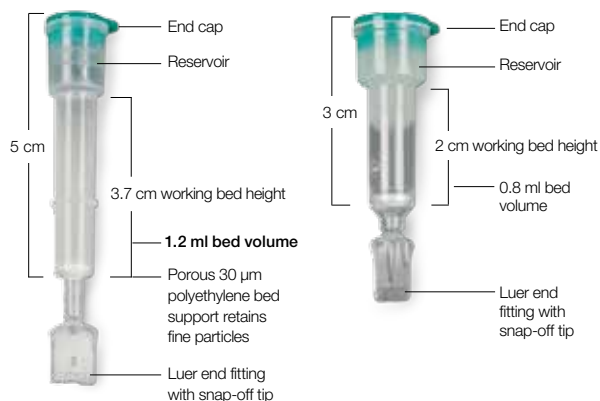
PCR Kleen™ Spin Columns

PCR Kleen columns are prepacked spin columns for purifying PCR products and other DNA molecules >200 bp directly from reaction mixtures. A simple 4-minute spin effectively removes salts, nucleotides, enzymes, primers, and primer-dimers. Purified DNA fragments are immediately available for secondary PCR, subcloning, restriction digests, ligations, sequencing, and other enzymatic manipulations.

For More Information

Web: www.bio-rad.com/dna-cleanup

Request or download bulletin: 2311



Prepacked Bio-Spin and Micro Bio-Spin Columns



PCR Kleen Spin Columns

Protein Extraction

Protein extraction tools such as cell lysis and extraction kits as well as mini grinders are available for extracting proteins from cultured cells and tissues.

See Also

MicroRotor cell:
page 205.

Kits for Cell Lysis

Order Info: Pg 14

MicroRotor™ Lysis Kits

These kits are suitable for sample preparation for analytical (IPG strips) or preparative (Rotor® and MicroRotor cells) IEF. The kits are based on a chaotropic protein solubilization buffer (PSB), which contains nondetergent sulfobetaine 201 (NDSB 201) along with urea, thiourea, and CHAPS for particularly effective solubilization (Vuillard et al. 1995). Resulting samples can be used directly for IEF. Cell lysis and extraction protocols are tailored for mammalian, plant, yeast, or bacterial samples.

ReadyPrep™ Mini Grinders

For grinding small biological samples for high recovery of proteins (and nucleic acids), each mini grinder includes a 1.5 ml grinding tube containing a grinding resin and a matching pestle. The grinding resin is a neutral abrasive material made of high tensile-strength microparticles that do not bind proteins or nucleic acids. ReadyPrep mini grinders are disposable and are nuclease- and protease-free. They are a component of the MicroRotor lysis kit (mammal) and are also sold separately as a pack of 20. The mini grinder tubes fit conveniently in most benchtop centrifuges.



For More Information

Web: www.bio-rad.com/proteinextraction

Bio-Plex® Cell Lysis Kit

The Bio-Plex cell lysis kit has been developed specifically to prepare cell culture and tissue lysate samples for analysis with Bio-Plex phosphoprotein and total target assays. This cell lysis kit can also be used to prepare cell lysates for western blot analysis. Its protein extraction procedure yields western blotting results similar to those generated by routine cell lysis and protein extraction protocols.



For More Information

Web: www.bio-rad.com/bioplexcelllysis

Request or download bulletins: 3033 and 3034

ReadyPrep™ Protein Extraction Kit

Order Info: Pg 14

The ReadyPrep protein extraction kit (total protein) provides a simple, rapid, and reproducible method for preparation of total cellular protein extracts from a wide variety of biological samples. Use of this kit generates protein samples that can be applied directly to a variety of applications, including IEF and 2-D gel electrophoresis.



For More Information

Web: www.bio-rad.com/proteinextraction

Request or download bulletins: 3033 and 3034

Protein Sample Cleanup, Reduction, and Alkylation

General purpose cleanup kits and columns are available for the removal of salts and other contaminants.

Protein Sample Cleanup Kit Selection Guide

Kit Type and Catalog Number	Applications	Procedure	Preparation Time	Acceptable Sample Sources	Number of Preps
Salt Removal					
ReadyPrep™ 2-D cleanup kit (#163-2130, #163-2140)	Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	▲ ▲ ▲ ▲	50
Micro Bio-Spin™ 6 columns (see page 63)	Removal of salts and other contaminants	Size exclusion chromatography	5 min	—	25, 100, 1,000
Removal of Other Contaminants					
ReadyPrep 2-D cleanup kits (#163-2130, #163-2140)	Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	▲ ▲ ▲ ▲	50
Reduction and Alkylation					
ReadyPrep reduction-alkylation kit (#163-2090)	Reduction of streaking on 2-D gels Improved resolution of basic proteins	Reduction, then alkylation of sample to remove disulfide bonds and prevent their re-formation	<2 hr	▲ ▲ ▲ ▲	100

▲ Mammalian tissue or cells. ▲ Plant leaves. ▲ *E. coli*. ▲ Yeast.

For More Information

Web: www.bio-rad.com/proteincleanup

Request or download bulletins: 2934 and 2961

Protein Fractionation

Fractionation kits reduce sample complexity, helping to identify low-abundance proteins. Fractionation kits can be subdivided into three groups that fractionate based on cellular location of the proteins of interest, differential solubility, and protein charge. Instruments are available to separate proteins by size and charge.

Protein Extraction by Cellular Location

Order Info: Pg 15

Fractionation by Cellular Location

ReadyPrep™ protein extraction kits facilitate fractionation of proteins from different cellular locations such as the membrane, nucleus, or cytoplasm.

- **ReadyPrep protein extraction kit (cytoplasmic/nuclear)** — prepares fractions enriched in cytoplasmic or nuclear proteins from eukaryotic samples
- **ReadyPrep protein extraction kit (membrane I)** — offers a quick and effective protocol for isolating most membrane proteins. It does not require ultracentrifugation or preparation of density gradients
- **ReadyPrep protein extraction kit (membrane II)** — offers a protocol for isolating more complex membrane proteins
- **ReadyPrep protein extraction kit (signal)** — for isolating proteins involved in intracellular membrane trafficking and signaling pathways. These include proteins such as GPI-anchored proteins, caveolin and associated proteins, acylated tyrosine kinases, and G proteins

Fractionation Using Differential Protein Solubility

The ReadyPrep sequential extraction kit and the ReadyPrep protein extraction kit (soluble/insoluble) both reduce sample complexity using differential solubilization. The two kits can be used independently, or the rehydration/sample buffer from the soluble/insoluble kit can be used with the sequential extraction kit to create a fourth fraction for even better resolution.

- **ReadyPrep sequential extraction kit** — enables the isolation of three different fractions of increasing solubility. These fractions are isolated sequentially, allowing the visualization of proteins that might not otherwise be seen. Increasing solubilization strength is provided through the use of stronger detergents for each subsequent fraction
- **ReadyPrep protein extraction kit (soluble/insoluble)** — uses a single fractionation step

ReadyPrep Kit Components and Related Products

Individual ReadyPrep kit components and related products such as reducing agents are also available. See ordering information on page 15.

For More Information

Web: www.bio-rad.com/proteinfractionation
Request or download bulletins: 2934 and 2961

Aurum™ Ion Exchange Kits

Order Info: Pg 15

Aurum ion exchange (AEX or CEX) mini columns allow selective purification of acidic or basic proteins, respectively. These easy-to-use kits selectively enrich either acidic or basic proteins and can be used with a variety of starting samples.

For More Information

Web: www.bio-rad.com/proteinfractionation
Request or download bulletin: 2928



Protein Sample Depletion

Complex samples often require depletion of high-abundance proteins to allow the detection of the low-abundance ones. Bio-Rad offers two different methodologies for protein depletion — the ProteoMiner™ protein enrichment system (which utilizes hexapeptide libraries) and Aurum™ serum and Affi-Gel® Blue products (which utilize resins).

ProteoMiner™ Protein Enrichment System

Order Info: Pg 15

The ProteoMiner protein enrichment system is a novel sample preparation tool for reducing the dynamic range of protein concentrations in complex biological samples. The ProteoMiner system:

- Enriches and concentrates low-abundance proteins that cannot be detected through traditional methods
- Works with a variety of sample types (serum, plasma, urine, bile, cell lysates, tissues, and platelets) and is not limited by the species' origin
- Utilizes a combinatorial library of hexapeptides rather than immunodepletion, minimizing the dependence on available antibodies and preventing the codepletion of low-abundance proteins

ProteoMiner Protein Enrichment Kits — these kits can be used with a variety of biological samples and are compatible with all major downstream proteomics applications. Small- and large-capacity kits are available for processing 2 or 10 samples.

ProteoMiner Sequential Elution Kits — these kits utilize multiple elution reagents to sequentially elute proteins based on different properties.



ProteoMiner Small- and Large-Capacity Kits

ProteoMiner kits for protein enrichment are now offered in formats optimized for varying starting amounts of sample protein.

- **Small-capacity kits** — optimized for use with limited sample material (minimum 10 mg of protein is recommended)
- **Large-capacity kits** — optimized for use with samples in which at least 50 mg of protein is available

For More Information

Web: www.bio-rad.com/proteominer

Request or download bulletins: 5632, 5635, and 5841

Aurum™ Kits and Columns

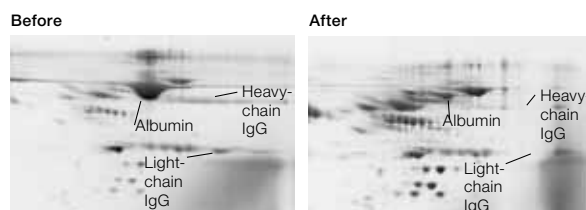
Order Info: Pg 15

The Aurum™ Affi-Gel® Blue and Aurum serum kits and columns use affinity chromatography to reduce albumin and IgG, which improves analysis of lower abundance proteins. These products utilize a quick and easy spin-column format and provide eluted proteins ready for analysis.

For More Information

Web: www.bio-rad.com/proteindepletion

Request or download bulletin: 2823



Removal of albumin and IgG from serum using the Aurum serum protein mini kit. Total protein (1.32 mg) was purified on an Aurum serum protein mini column. **Left**, untreated serum; **right**, serum treated with the Aurum kit.

Surface-Enhanced Laser Desorption/Ionization

The biomarker discovery process requires the analysis of large numbers of samples. The ProteinChip® SELDI system's high throughput profiling technology allows you to easily acquire sufficient data for statistical significance, making the biomarker discovery process more efficient.

ProteinChip® SELDI System

Order Info: Pg 16

SELDI combines the separation power of two techniques, chromatography and high-sensitivity mass spectrometry, which allows large numbers of proteins and peptides to be detected and profiled. The ProteinChip SELDI system provides the arrays, reagents, kits, and software to rapidly generate a list of candidate disease biomarkers from large numbers of samples.

ProteinChip Arrays and Array Preparation

ProteinChip arrays utilize selective capture strategies to reduce sample complexity, allowing detection of low-abundance proteins for a number of applications, such as protein profiling and biomarker discovery.

ProteinChip Kits

ProteinChip kits contain all the reagents, consumables, and protocols necessary to perform SELDI applications ranging from qualification of the ProteinChip SELDI reader through protein profiling and antibody capture.

ProteinChip Software

Software applications tailored for the ProteinChip SELDI system enable fast, effective organization and analysis of the large amounts of data generated during biomarker discovery.

For More Information

Web: www.bio-rad.com/proteinchip

Request or download bulletins: 5524 and 5526



RNA, DNA, and Protein Sample Preparation

RNA Kits and Reagents

Catalog # Description

Aurum Total RNA Kits Pg 3

732-6820	Aurum Total RNA Mini Kit , 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 vial lyophilized DNase I, RNase-free reagents
732-6830	Aurum Total RNA Fatty and Fibrous Tissue Kit , 50 preps, includes 732-6870, 50 ml PureZOL RNA isolation reagent
732-6870*	Aurum Total RNA Fatty and Fibrous Tissue Module , 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 ml of lyophilized DNase I, RNase-free reagents and plasticware
732-6800	Aurum Total RNA 96 Kit , 2 x 96-well preps, includes 2 grow blocks, sealing tape, 2 RNA binding plates, 2 collection microplates, 2 vials lyophilized DNase I, RNase-free reagents

Aurum Vacuum Manifold

732-6470	Aurum Vacuum Manifold , for spin columns or 96-well plates, includes column adaptor plate, 4 replacement luer caps, stage, vacuum regulator and gauge, tubing
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Aurum Consumables and Accessories

732-6828	DNase I , RNase-free, lyophilized, 1 vial
732-6801	Aurum Total RNA Elution Solution , RNase-free, 20 ml
732-6802	Aurum Total RNA Lysis Solution , RNase-free, 85 ml
732-6803	Aurum Total RNA Wash High-Stringency Solution , RNase-free, 150 ml
732-6804	Aurum Total RNA Wash Low-Stringency Solution , 60 ml
732-6805	Aurum DNase Dilution Solution , 20 ml
732-6826	Aurum RNA Binding Mini Columns , 50

PureZOL RNA Isolation Reagent Pg 4

732-6880	PureZOL RNA Isolation Reagent , 50 ml
732-6890	PureZOL RNA Isolation Reagent , 100 ml

iScript RT-qPCR Sample Preparation Reagent Pg 4

170-8898	iScript RT-qPCR Sample Preparation Reagent , 100 reactions, 10 ml, contains RNase inhibitors and RNA stabilizers
170-8899	iScript RT-qPCR Sample Preparation Reagent , 500 reactions, 5 x 10 ml

DNA Kits and Reagents

Aurum Plasmid Mini Kits Pg 5

732-6400	Aurum Plasmid Mini Kit , 100 preps, includes plasmid-binding mini columns, 100 capless collection tubes, reagents, protocol overview
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Quantum Prep Plasmid Kits Pg 5

732-6100	Quantum Prep Plasmid Miniprep Kit , 100 preps, includes 25 ml cell resuspension solution, 25 ml cell lysis solution, 25 ml neutralization solution, 20 ml Quantum Prep matrix, 63 ml wash solution, 100 spin columns
732-6120	Quantum Prep Plasmid Midiprep Kit , 20 preps, includes 110 ml cell resuspension solution, 110 ml cell lysis solution, 110 ml neutralization solution, 20 ml Quantum Prep matrix, 125 ml wash solution, 20 midi spin columns

Chelex-Based Resins Pg 6

142-1253	Chelex 100 Resin , molecular biology grade, 50 g, sodium, 200–400 dry mesh, 75–150 µm wet bead
732-6030	InstaGene Matrix , 20 ml, sufficient for 100 extractions

Sample Cleanup and Purification

Freeze 'N Squeeze DNA Gel Extraction Spin Columns Pg 6

732-6165	Freeze 'N Squeeze DNA Gel Extraction Spin Columns , 25
732-6166	Freeze 'N Squeeze DNA Gel Extraction Spin Columns , 100

Prepacked Spin Columns Pg 7

Micro Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer

732-6221	Micro Bio-Spin 6 Columns , includes 25 columns in Tris buffer, 50 collection tubes
732-6222	Micro Bio-Spin 6 Columns , includes 100 columns in Tris buffer, 200 collection tubes
732-6225	Micro Bio-Spin 6 Columns , includes 1,000 columns in Tris buffer, 2,000 collection tubes

* Not provided with PureZOL RNA isolation reagent (see catalog #732-6890 or #732-6880 to order separately).

Ordering Information

RNA, DNA, and Protein Sample Preparation

www.bio-rad.com

Catalog #	Description
Micro Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
732-6223	Micro Bio-Spin 30 Columns , includes 25 columns in Tris buffer, 50 collection tubes
732-6224	Micro Bio-Spin 30 Columns , includes 100 columns in Tris buffer, 200 collection tubes
732-6226	Micro Bio-Spin 30 Columns , includes 1,000 columns in Tris buffer, 2,000 collection tubes
732-6250	Micro Bio-Spin 30 Columns , includes 25 columns in Tris buffer, 50 collection tubes, RNase-free
732-6251	Micro Bio-Spin 30 Columns , includes 100 columns in Tris buffer, 200 collection tubes, RNase-free
Micro Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
732-6200	Micro Bio-Spin 6 Columns , includes 25 columns in SSC buffer, 50 collection tubes
732-6201	Micro Bio-Spin 6 Columns , includes 100 columns in SSC buffer, 200 collection tubes
732-6205	Micro Bio-Spin 6 Columns , includes 1,000 columns in SSC buffer, 2,000 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
732-6202	Micro Bio-Spin 30 Columns , includes 25 columns in SSC buffer, 50 collection tubes
732-6203	Micro Bio-Spin 30 Columns , includes 100 columns in SSC buffer, 200 collection tubes
732-6206	Micro Bio-Spin 30 Columns , includes 1,000 columns in SSC buffer, 2,000 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
732-6227	Bio-Spin 6 Columns , includes 25 columns in Tris buffer, 50 collection tubes
732-6228	Bio-Spin 6 Columns , includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
732-6231	Bio-Spin 30 Columns , includes 25 columns in Tris buffer, 50 collection tubes
732-6232	Bio-Spin 30 Columns , includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
732-6002	Bio-Spin 6 Columns , includes 25 columns in SSC buffer, 50 collection tubes
732-6213	Bio-Spin 6 Columns , includes 1,000 columns in SSC buffer, 2,000 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
732-6006	Bio-Spin 30 Columns , includes 25 columns in SSC buffer, 50 collection tubes
PCR Kleen Spin Columns	
732-6300	PCR Kleen Spin Columns , 25

Protein Extraction

Kits for Cell Lysis

Pg 8

MicroRotorfor Lysis Kits

163-2141	MicroRotorfor Cell Lysis Kit (Mammal) , 15 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep mini grinders (2 packs of 10 each)
163-2142	MicroRotorfor Cell Lysis Kit (Plant) , 10 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep 2-D cleanup kit (50 reaction size)
163-2143	MicroRotorfor Cell Lysis Kit (Yeast) , 15 preps, includes 50 ml protein solubilization buffer (PSB), 15 ml yeast suspension buffer, 2 x 0.5 ml lyticase (1.5 U/ μ l)
163-2144	MicroRotorfor Cell Lysis Kit (Bacteria) , 15 preps, includes 50 ml protein solubilization buffer (PSB), 25 ml bacteria suspension buffer, 1 ml lysozyme (1,500 U/ μ l)

MicroRotorfor Lysis Kit Components

163-2146	ReadyPrep Mini Grinders , includes 20 mini grinders, sufficient for twenty 100 mg extractions
163-2145	Protein Solubilization Buffer (PSB) , makes 50 ml of solution

Bio-Plex Cell Lysis Kit

171-304011	Bio-Plex Cell Lysis Kit , 1 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2
171-304012	Bio-Plex Cell Lysis Kit , 10 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2

ReadyPrep Protein Extraction Kit

Pg 9

163-2086	ReadyPrep Protein Extraction Kit (Total Protein) , 20 preps
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Protein Sample Cleanup, Reduction, and Alkylation

Sample Cleanup Kits and Columns*

Pg 9

ReadyPrep Kits

163-2130	ReadyPrep 2-D Cleanup Kit , 50 preps
163-2140	ReadyPrep 2-D Cleanup Kit , 5 preps
163-2105	ReadyPrep 2-D Starter Kit , includes protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels or six 17 cm, ten 11 cm, or sixteen 7 cm ReadyStrip IPG strips (ReadyStrip IPG strips* and precast SDS-PAGE gels and gel stains not included in kit)

* See the prepacked Bio-Spin and Micro Bio-Spin gel filtration column on page 63.

Catalog #	Description
163-2090	ReadyPrep Reduction-Alkylation Kit , 100 preps
ReadyPrep Kit Components and Related Products	
163-2091	ReadyPrep Proteomics Grade Water , 500 ml
163-2083	ReadyPrep 2-D Rehydration/Sample Buffer 1 , 10 ml, 7 M urea, 2 M thiourea, 1% ASB-14, 40 mM Tris, 0.001% bromophenol blue
163-2106	ReadyPrep 2-D Starter Kit Rehydration/Sample Buffer , 10 ml, 8 M urea, 2% CHAPS, 50 mM DTT, 0.2% Bio-Lyte 3/10 ampholyte, 0.001% bromophenol blue
Reducing and Alkylating Agents	
161-0611	Dithiothreitol (DTT) , 5 g
163-2101	Tributylphosphine (TBP) , 200 mM, 0.6 ml
163-2109	Iodoacetamide , 30 g

Protein Fractionation

Protein Extraction by Cellular Location Pg 10

ReadyPrep Protein Extraction Kits	
163-2100	ReadyPrep Sequential Extraction Kit , 15 preps
163-2083	ReadyPrep 2-D Rehydration/Sample Buffer I
163-2085	ReadyPrep Protein Extraction Kit (Soluble/Insoluble) , 20 preps
163-2089	ReadyPrep Protein Extraction Kit (Cytoplasmic/Nuclear) , 50 preps
163-2088	ReadyPrep Protein Extraction Kit (Membrane I) , 50 preps
163-2084	ReadyPrep Protein Extraction Kit (Membrane II) , 10 preps
163-2087	ReadyPrep Protein Extraction Kit (Signal) , 50 preps
ReadyPrep Kit Components and Related Products	
163-2102	ReadyPrep Sequential Extraction Kit Reagent 1 , 50 ml, 40 mM Tris base
163-2103	ReadyPrep Sequential Extraction Kit Reagent 2 , 10 ml, 8 M urea, 4% CHAPS, 40 mM Tris, 0.2% Bio-Lyte 3/10 ampholyte
163-2104	ReadyPrep Sequential Extraction Kit Reagent 3 , 10 ml, 5 M urea, 2 M thiourea, 2% CHAPS, 2% SB 3–10, 40 mM Tris, 0.2% Bio-Lyte 3/10 ampholyte

Aurum Ion Exchange Kits Pg 10

732-6711	Aurum CEX Mini Kit , 2 pack, includes columns and buffers
732-6703	Aurum CEX Mini Columns , 25 pack
732-6710	Aurum AEX Mini Kit , 2 pack, includes columns and buffers
732-6706	Aurum AEX Mini Columns , 25 pack

Protein Sample Depletion

ProteoMiner Protein Enrichment System Pg 11

163-3006	ProteoMiner Protein Enrichment Small-Capacity Kit , 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
163-3007	ProteoMiner Protein Enrichment Large-Capacity Kit , 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
163-3008	ProteoMiner Protein Enrichment Introductory Small-Capacity Kit , 2 preps, for processing 10 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes
163-3009	ProteoMiner Protein Enrichment Introductory Large-Capacity Kit , 2 preps, for processing 50 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes
ProteoMiner Sequential Elution Kits	
163-3010	ProteoMiner Sequential Elution Small-Capacity Kit , 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes
163-3011	ProteoMiner Sequential Elution Large-Capacity Kit , 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes
ProteoMiner Kit Accessories	
163-3003	ProteoMiner Sequential Elution Reagents , 10 preps, includes reagents only (columns not included), to be used with 163-3006 or 163-3007
163-3012	ProteoMiner Dry Bulk Beads , 0.525 g
732-6207	Mini Bio-Spin Chromatography Columns , empty, 100

Aurum Kits and Columns Pg 11

732-6701	Aurum Serum Protein Mini Kit , 10 pack, includes columns and buffers
732-6712	Aurum Affi-Gel Blue Mini Kit , 2 preps, includes columns and buffers
732-6708	Aurum Affi-Gel Blue Mini Columns , 25 pack

Surface-Enhanced Laser Desorption/Ionization

Catalog # Description

ProteinChip SELDI System

Pg 12

Arrays and Array Preparation

LPS-0030	Lucid System Qualification Kit , includes detector calibration array, mass calibration array, system qualification arrays
C57-30080	ProteinChip Q10 Arrays , A–H format, 12
C57-30075	ProteinChip CM10 Arrays , A–H format, 12
C57-30078	ProteinChip IMAC30 Arrays , A–H format, 12
C57-30065	ProteinChip H50 Arrays , A–H format, 12
C57-30028	ProteinChip H4 Arrays , A–H format, 12
C57-30081	ProteinChip SEND ID Arrays , A–H format, 12
C57-30043	ProteinChip NP20 Arrays , A–H format, 12
C55-30058	ProteinChip PG20 Array , A–H format
C55-30044	ProteinChip PS10 Arrays , A–H format, 12
C57-30045	ProteinChip PS20 Arrays , A–H format, 12
C55-30082	ProteinChip RS100 Arrays , A–H format, 6
C55-30033	ProteinChip Gold Array , A–H format
C70-00069	ProteinChip Array Assortment Pack , includes 3 each of H50, CM10, IMAC30, and Q10 ProteinChip arrays
C20-10001	ProteinChip Array Reaction Tubes , 50
C50-30011	ProteinChip Cassette–Compatible Bioprocessor , includes cassette hold-down frame, 12 blank ProteinChip arrays
C50-30012	ProteinChip Cassette–Compatible Bioprocessor Reservoirs , 5
C50-30013	ProteinChip Cassettes , empty, hold 12 ProteinChip arrays, 5
A30-00010	Bar Code Scanner , handheld
K20-00001	ProteinChip H50 Buffer , 200 ml
K20-00005	ProteinChip H50 Buffer , 1 L
K20-00003	ProteinChip CM Low-Stringency Buffer , 200 ml
K20-00007	ProteinChip CM Low-Stringency Buffer , 1 L
K20-00004	ProteinChip CM High-Stringency Buffer , 200 ml
K20-00002	ProteinChip IMAC Buffer Set , includes 30 ml IMAC charging solution, 30 ml IMAC neutralizing solution, 200 ml IMAC binding buffer
K20-00008	ProteinChip IMAC Charging Solution , 200 ml
K20-00009	ProteinChip IMAC Neutralizing Solution , 200 ml
K20-00006	ProteinChip IMAC Binding Buffer , 1 L
C30-00001	ProteinChip CHCA Matrix , 5 mg/vial, 20
C30-00002	ProteinChip SPA Matrix , 5 mg/vial, 20
C30-00003	ProteinChip EAM-1 Matrix , 5 mg/vial, 20
C30-00004	ProteinChip Matrix Kit , includes 6 vials each CHCA, SPA, and EAM-1 matrix
C10-00005	ProteinChip All-In-One Peptide Standard , lyophilized, 100 spots
C10-00007	ProteinChip All-In-One Protein Standard II , lyophilized, 100 spots
C10-00002	ProteinChip Peptide Calibrant Kit , includes peptide MW standards (2 sets of 7 standards)
C10-00001	ProteinChip Protein Calibrant Kit , includes protein MW standards (2 sets of 10 standards)
C54-00018	ProteinChip Q Filtration Plate , 1 x 96-well
C54-00017	ProteinChip Q Spin Columns , 20

Protein Chip Kits

C70-00080	ProteinChip OQ Kit , includes 2 detector calibration arrays, 6 detector qualification arrays, 2 peptide standard arrays, CD with protocols
C70-00081	ProteinChip System Check Kit , includes 1 detector calibration array, 1 detector qualification array, 1 peptide standard array, CD with protocols
C70-00082	ProteinChip Detector Calibration Kit , includes 1 detector calibration array
C70-00070	ProteinChip Peptide Mass Calibration Kit , sufficient for up to 160 calibrations, includes 1 ProteinChip peptide standard array, CD-ROM with video tutorial and protocol
K20-30001	ProteinChip H50 Kit , includes 12 ProteinChip H50 arrays, ProteinChip H50 buffer
K20-30002	ProteinChip IMAC Kit , includes 12 ProteinChip IMAC30 arrays, ProteinChip IMAC buffer set
K20-30003	ProteinChip CM Kit , includes 12 ProteinChip CM10 arrays, ProteinChip CM low-stringency buffer
C55-30058	ProteinChip PG20 Array , A–H format
K10-00005	ProteinChip Antibody Capture Kit , includes antibody, antigen, reagents, controls, 6 ProteinChip PG20 arrays, ProteinChip SPA matrix
K10-00007	ProteinChip Serum Fractionation Kit , includes 1 x 96-well ProteinChip Q filtration plate packed with Q ceramic sorbent, buffers, sealing strips
K10-00008	ProteinChip Serum Fractionation Kit Replacement Buffers , includes wash buffers 1–6
K10-00010	ProteinChip U9 Buffer , for serum fractionation kit, 20 ml
C70-00065	ProteinChip Serum Fractionation Starter Kit , includes ProteinChip serum fractionation kit, 4 each of CM10, IMAC30, and H50 ProteinChip arrays, ProteinChip CM low-stringency buffer, ProteinChip IMAC buffer set, ProteinChip H50 buffer

Protein Chip SELDI System Software

SW3-040050	ProteinChip Data Manager Software 4, Desktop Edition , includes 1-user network license, no instrument control
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