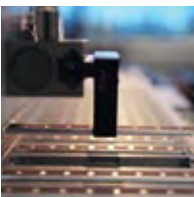
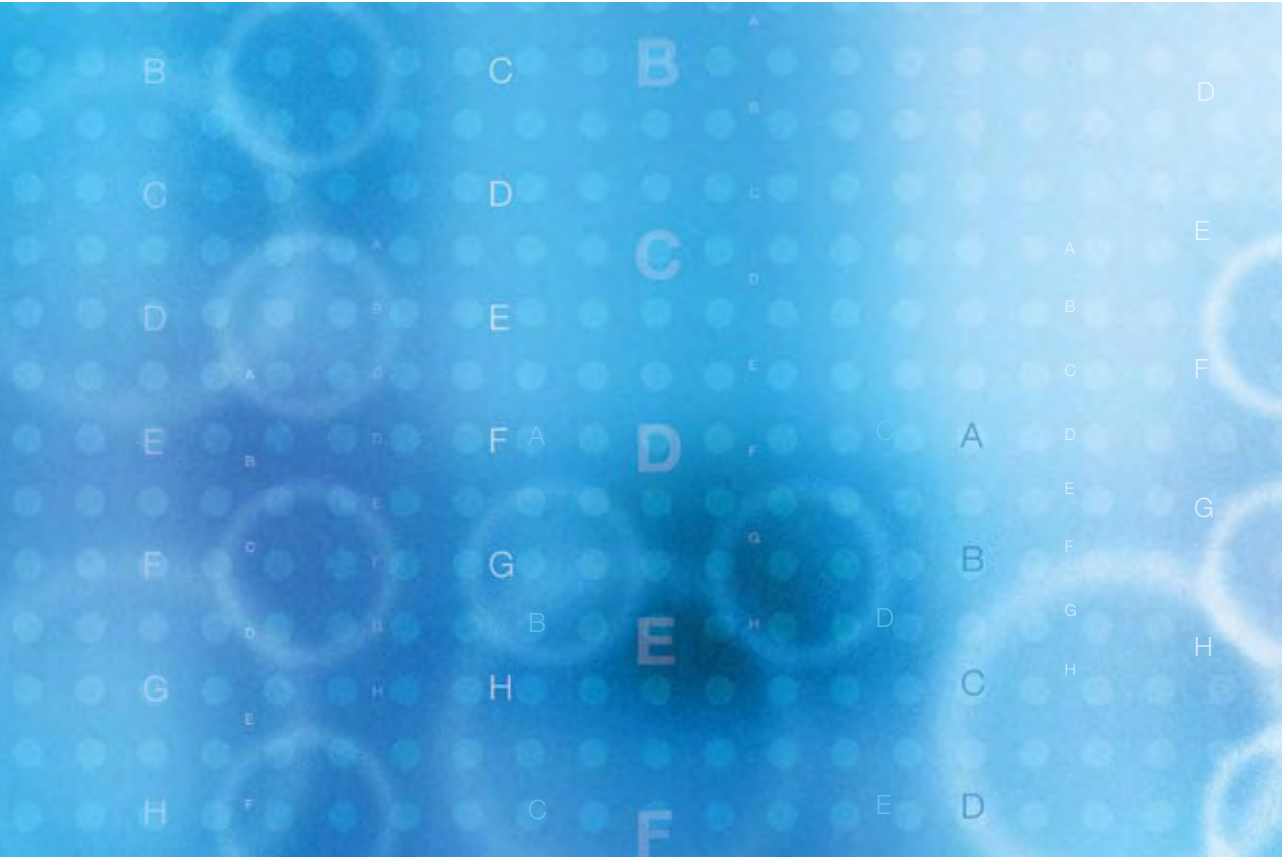
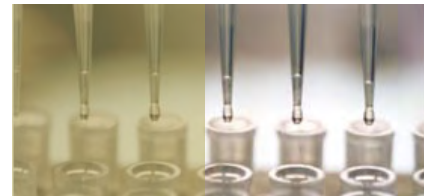


SELDI Technology



ProteinChip® SELDI System
High-Throughput Protein Profiling



Faster Biomarker Discovery

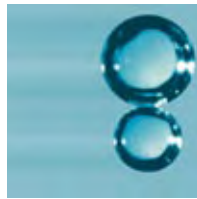
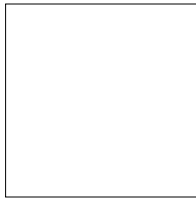
Differential expression profiling — the comparison of protein expression levels across different disease or treatment states — helps identify proteins involved in disease and provides a direct method for monitoring disease progression and the therapeutic effects of drugs. The ProteinChip surface-enhanced laser desorption/ionization (SELDI) system's high resolving ability combines the separation power of two techniques — chromatography and high-sensitivity mass spectrometry. This allows large numbers of proteins and peptides to be detected and profiled, so you can rapidly generate a list of candidate disease biomarkers. The ProteinChip SELDI system's high throughput allows you to easily acquire sufficient data for statistical significance, making the biomarker discovery process more efficient.



- A ProteinChip SELDI system, Enterprise Edition reader
- B Array autoloader
- C Single-array loading door
- D ProteinChip data manager software
- E ProteinChip buffers
- F ProteinChip cassette-compatible bioprocessor
- G ProteinChip arrays
- H ProteinChip reagents

Key Features

- **Systematic profiling of proteins** — chromatographically active ProteinChip array surfaces selectively bind proteins for greater proteome coverage
- **On-spot separation** — sample binding, cleanup, and analysis all occur on-chip, eliminating the need for additional removal of detergents, salts, or denaturing agents
- **Increased dimension of analysis** — combining upstream fractionation methods with the ProteinChip SELDI system's chromatographic and mass separation dimensions further improves resolution and enriches low-abundance proteins
- **Attomole sensitivity** — many low-abundance peptides and proteins can be detected
- **Scalable throughput** — run one array at a time using the Personal Edition reader or up to 168 arrays without intervention using the Enterprise Edition reader
- **Easy-to-use readers** — minimal tuning and optimization is required per run
- **Powerful, intuitive software** — 2 software packages allow you to organize, display, and process thousands of spectra, as well as to discover patterns within multiple biomarkers to achieve superior predictive value



The ProteinChip SELDI Process

The ProteinChip SELDI system integrates a ProteinChip SELDI reader with data analysis software to analyze proteins selectively captured on ProteinChip arrays. ProteinChip arrays selectively bind and retain whole classes of proteins from complex samples. The mass profile of the bound proteins is read by the ProteinChip SELDI reader, creating high-resolution protein maps. The unique surface chemistries of ProteinChip arrays allow on-chip profiling — the selective capture and analysis of peptides and proteins on a single platform.

SELDI Process

Separation >>>> Detection >>>> Analysis

- > Sample Preparation
- > Sample Binding to Arrays

Separation — ProteinChip Arrays and Consumables

ProteinChip Arrays

ProteinChip arrays consist of a metal base with either a chemically treated surface (cationic, anionic, metal affinity, hydrophobic, or hydrophilic) or a reactive surface that can be coupled with biologically relevant molecules (such as antibodies or receptors) for specific interaction with proteins of interest. With this wide variety of surfaces, you can analyze samples on several different surfaces under different conditions. Because molecules bind through specific chemical interaction with ProteinChip array surfaces, it is often possible to learn about a protein's chemical properties simply by using the arrays.

Each ProteinChip array resembles a column of a standard microplate, with eight chemically active spots where sample binding occurs. This design facilitates simultaneous analysis of multiple samples. Spots are 2 mm in diameter, labeled A–H, and spaced to meet Society for Biomolecular Sciences (SBS) standard 96-well plate formats, making them compatible with robotics systems and multichannel pipetting devices.



Actual size.

Kits, Buffers, and Reagents

A complete line of optimally formulated consumables is available for use with the ProteinChip SELDI system, including:

- ProteinChip kits — designed to guide you through the discovery and profiling process
- ProteinChip buffers — premixed and optimized for use with a variety of ProteinChip arrays
- ProteinChip energy absorbing molecules (EAMs) — essential components of successful experiments
- ProteinChip standards, calibrants, and controls — validated mixes that help ensure accurate profiling and quantitation



ProteinChip buffers, kits, and reagents help you obtain optimal results from your SELDI experiments.

- > Laser Desorption and Ionization
- > Mass Measurement by Time-of-Flight (TOF)

Detection — ProteinChip SELDI Readers

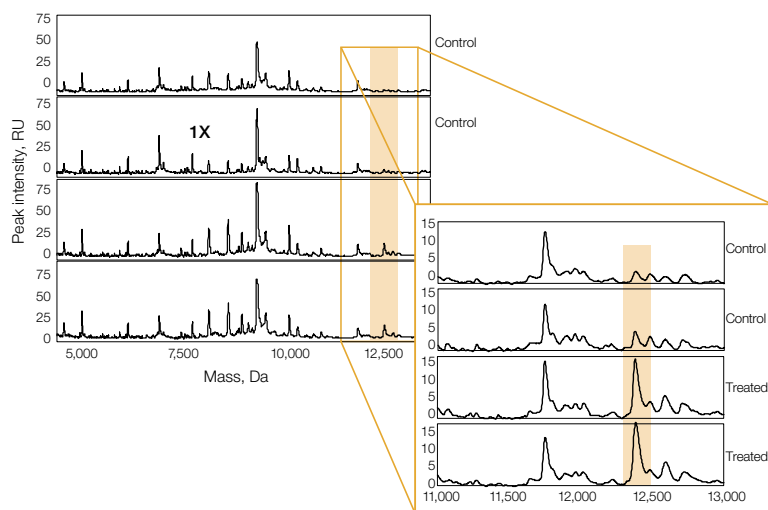
ProteinChip SELDI readers detect and calculate the mass of proteins and peptides from complex biological samples. Two ProteinChip SELDI readers that provide different levels of system automation and throughput are available: The Personal Edition reader offers manual loading of ProteinChip arrays, one array at a time, while the Enterprise Edition reader offers useful features for large-scale studies requiring higher throughput, including an autoloader and a built-in bar code scanner.

ProteinChip SELDI readers are the most sensitive laser desorption/ionization TOF mass spectrometers available for protein and peptide analysis and have been engineered to give reproducible results over an extensive dynamic range. Combined with ProteinChip arrays, the readers provide high-attomole sensitivity for many peptides and proteins.

Critical design features include:

- Autoloader — loads up to 14 ProteinChip cassettes, each holding 12 ProteinChip arrays, into an Enterprise Edition reader, without intervention
- Conical ion source shape (CISS) — efficiently directs desorbed peptides and proteins to the detector, so the lowest signals can be detected
- Synchronized optical laser extraction (SOLE) — a raster scanning laser design that ensures sampling of a statistically representative portion of the ProteinChip array spot for uniform desorption of the sample and more accurate average peak intensities
- Patented* detector blanking mechanism — reduces noise and eliminates detector saturation from off-scale signals, such as from matrix (EAMs)
- Calibrations for laser focus and attenuation and other electronics — ensure consistent high performance

* U.S. patent 6,841,936.



SELDI protein profiles showing representative peaks of control and treated samples. Inset shows reproducible detection of a difference in relative expression for a low-abundance protein.

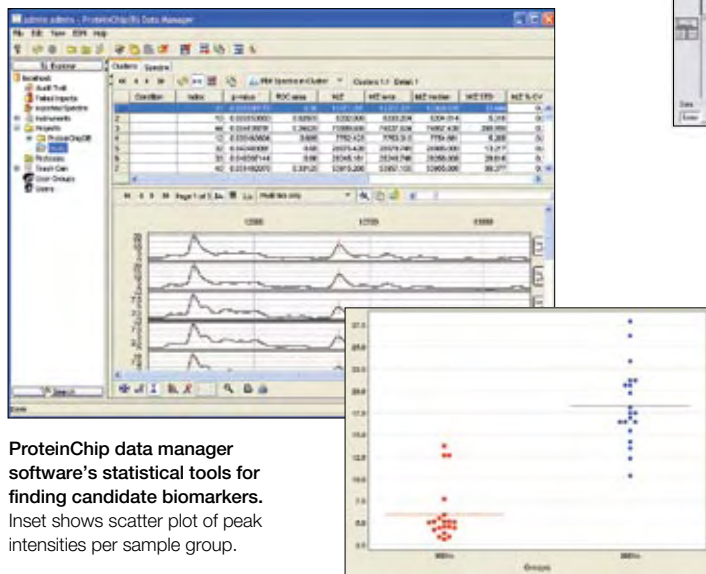
- > Spectra Processing
- > Univariate and Multivariate Analyses

Analysis — ProteinChip SELDI System Software

Two powerful software packages are available for the ProteinChip SELDI system. ProteinChip data manager software comes with the system and provides the basic tools required for collecting, organizing, and analyzing SELDI data. ProteinChip pattern analysis software provides additional sophisticated analysis tools for more experienced users conducting large-scale studies. Both packages provide a fast, effective means for organizing the large amount of data generated during biomarker studies, as well as custom-designed tools for up-front sample- and data-tracking integrated with biostatistical analysis.

ProteinChip Data Manager Software

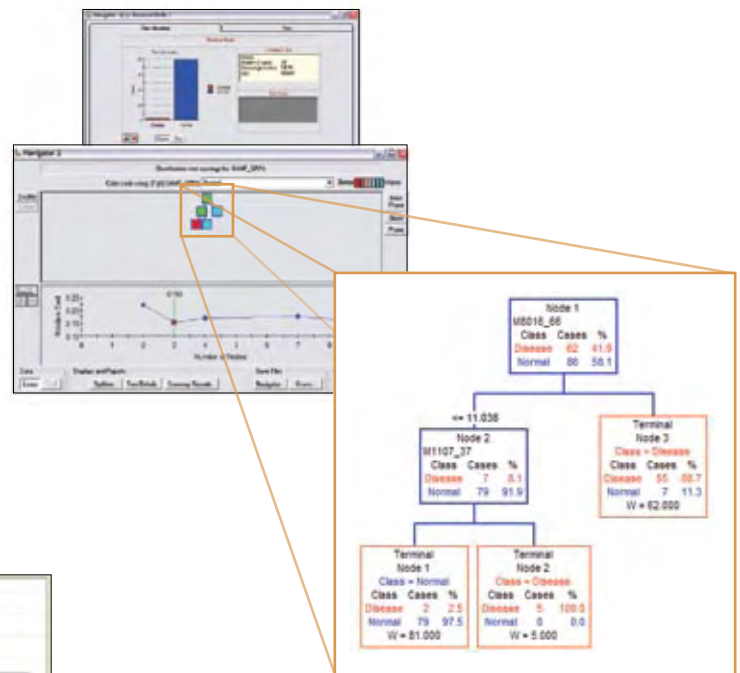
ProteinChip data manager software includes a robust client-server relational database system for managing and tracking SELDI data. Powerful data mining and analysis capabilities provide rapid automated analysis of multiple experiments over multiple conditions in large project groups for delineation of potential biomarkers.



ProteinChip data manager software's statistical tools for finding candidate biomarkers. Inset shows scatter plot of peak intensities per sample group.

ProteinChip Pattern Analysis Software

ProteinChip pattern analysis software quickly unveils hidden patterns in sets of SELDI data to reveal complex relationships. Using classification and regression trees (CART), a biostatistical procedure, multiple biomarkers are correlated with specific phenotypes to improve sensitivity and specificity of prediction. The output is an easy-to-interpret decision tree, incorporating a small panel of biomarkers with defined splitting rules. The software translates the discovery of multiple markers into highly predictive biomarker assays.



ProteinChip pattern analysis software analysis visualizations. Inset shows distribution of spectra from each example sample group based on expression level of candidate markers.

ProteinChip SELDI System Configuration Guide

Applications and Features	Personal Edition	Enterprise Edition
Automated ProteinChip array loading	—	Up to 168 ProteinChip arrays
Number of spots read automatically	Up to 8 spots	Up to 1,344 spots
Integrated bar code reader	—	•
ProteinChip data manager user licenses	1	5
Virtual Notebook for sample tracking and experimental design	—	•
Audit trail for automatically logging changes to spectrum processing parameters	—	•
Easy integration of robotic liquid handling	•	•
ProteinChip SELDI system starter kit included	•	•
ProteinChip serum fractionation starter kit included	•	•

Minimum System Requirements*

- Windows 2000, Windows XP, or Windows Server 2003 operating system
- 1 GHz processor (2GHz Intel processor recommended)
- 50 GB free disk space** (100 GB or greater recommended)
- 1 GB RAM (2 GB or greater recommended)
- MySQL 4.0 (included) or Oracle 9i database software
- CD-ROM for program installation
- Network connectivity

* To run the ProteinChip SELDI system using ProteinChip data manager software.

** For server computer only.

Ordering Information

Catalog #	Description	Catalog #	Description
Z50-00011	ProteinChip SELDI System, Enterprise Edition, 115 V	C10-00002	ProteinChip Peptide Calibrant Kit , includes peptide MW standards (2 sets of 7 standards)
Z50-00015	ProteinChip SELDI System, Enterprise Edition, 115 V, with computer and monitor	C10-00005	ProteinChip All-in-One Peptide Standard , lyophilized, 100 spots
Z50-00021	ProteinChip SELDI System, Enterprise Edition, 230 V	C10-00007	ProteinChip All-in-One Protein Standard II , lyophilized, 100 spots
Z50-00025	ProteinChip SELDI System, Enterprise Edition, 230 V, with computer and monitor	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
Z50-00013	ProteinChip SELDI System, Personal Edition, 115 V	C70-00067	ProteinChip SELDI System Starter Kit , includes 2 each of Q10, CM10, NP20, SEND ID, PS20, H50, and IMAC30 ProteinChip arrays, 6 vials each of CHCA, EAM-1, and SPA energy absorbing molecules (EAMs), ProteinChip all-in-one peptide standard, ProteinChip all-in-one protein standard II, ProteinChip cassette-compatible bioprocessor, 2 ProteinChip cassettes, 2 ProteinChip cassette-compatible bioprocessor reservoirs
Z50-00016	ProteinChip SELDI System, Personal Edition, 115 V, with computer and monitor	K20-30001	ProteinChip H50 Kit , includes 12 ProteinChip H50 arrays, ProteinChip H50 buffer, instructions
Z50-00023	ProteinChip SELDI System, Personal Edition, 230 V	K20-30002	ProteinChip IMAC Kit , includes 12 ProteinChip IMAC30 arrays, ProteinChip IMAC buffer set, instructions
Z50-00026	ProteinChip SELDI System, Personal Edition, 230 V, with computer and monitor	K20-30003	ProteinChip CM Kit , includes 12 ProteinChip CM10 arrays, ProteinChip CM low-stringency buffer, instructions
C70-00069	ProteinChip Array Assortment Pack , includes 3 each of H50, CM10, IMAC30, and Q10 ProteinChip arrays	SW3-040010	ProteinChip Data Manager Software 3.0, Personal Edition , includes 1-user license
C50-30011	ProteinChip Cassette-Compatible Bioprocessor , includes ProteinChip array forceps, cassette hold-down frame, 12 blank ProteinChip arrays	SW3-040030	ProteinChip Data Manager Software 3.0, Enterprise Edition , includes 5-user network license
C50-30013	ProteinChip Cassettes , empty, hold 12 ProteinChip arrays, 5	SW2-000010	ProteinChip Pattern Analysis Software 5.0 , includes 5-user network license
C30-00004	ProteinChip Energy Absorbing Molecule (EAM) Kit , includes 6 vials each CHCA, EAM-1, and SPA EAMs		
C10-00001	ProteinChip Protein Calibrant Kit , includes protein MW standards (2 sets of 10 standards)		

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The SELDI process is covered by U.S. patents 5,719,060, 6,225,047, 6,579,719, and 6,818,411 and other issued patents and pending applications in the U.S. and other jurisdictions.



**Bio-Rad
Laboratories, Inc.**

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