

Cutting Edge Proteomics Techno

Shimadzu is contributing to the Post Genome research efforts through the development and supply of cutting-edge mass spectrometer in the analysis of proteins.

Two strategic alliances with leading proteomics enterprises have allowed the latest developments by Shimadzu on the global stage in the field of high technology.

Protein analysis centers in Sydney, Boston and Kyoto

Proteomics Partnership

Shimadzu launched a proteomics enterprise in December 2000, with the establishment of major protein analysis centers in Sydney, Australia, and Boston, USA, as a joint venture with an Australian biotechnology company, Proteome Systems, Ltd., (PSL; headquarters: Sydney; <http://www.proteomesystems.com>).

The core elements of these centers are the leading-edge AXIMA-CFR¹⁾ MALDI-TOF mass spectrometer for protein analysis developed by Shimadzu's UK subsidiary, Kratos Group PLC. (headquarters: Manchester; <http://www.kratos.com>), sample pre-treatment technology jointly developed by Shimadzu and PSL based on PSL's gel extraction technology, and a further development of their Chemical Printer²⁾ technology.

Our technologies will allow pharmaceutical companies and food manufacturers to handle proteomics analysis while simultaneously creating effective protein analysis informatics for drug manufacture.

Shimadzu Genomic Research Center

In spring, 2001, a similar protein analysis center will be established

in Shimadzu's Genomic Research Center (Kyoto) that currently conducts gene analysis. This center offers gene analysis on demand to external customers using the RISA384, the world's fastest capillary DNA sequencer. Proteomics will be added to the center's portfolio to obtain new, more effective methods to combat various diseases.

Initially, seven AXIMA-CFR mass spectrometers will be installed in Shimadzu's Kyoto analysis center, six at PSL in Sydney, and three in Boston. Shimadzu and PSL will jointly devote 50 staff members to these analysis centers. In the future, the number of AXIMA-CFR instruments in Sydney and Boston will be increased to 30 units.

Future Evolution

Shimadzu and PSL have formed their business partnership for protein analysis, to develop the following technologies:

- a fully automatic analysis system for rapid and efficient proteomics (commercialization planned for August 2001);
- the Chemical Printer, a revolutionary instrument based on a totally new concept (commercial-

ization planned for late 2001); Both parties are planning to reinforce the partnership by expanding from protein-related applications into biotechnology as a whole.

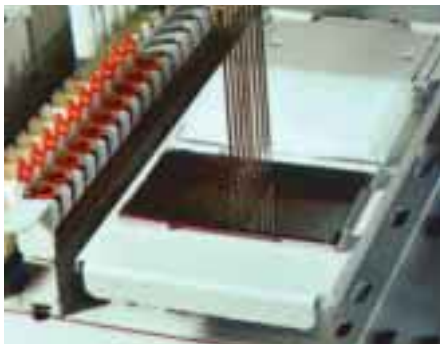


MALDI-TOF Mass Spectrometer - AXIMA-CFR

logy by MALDI-TOF Mass Spectrometer

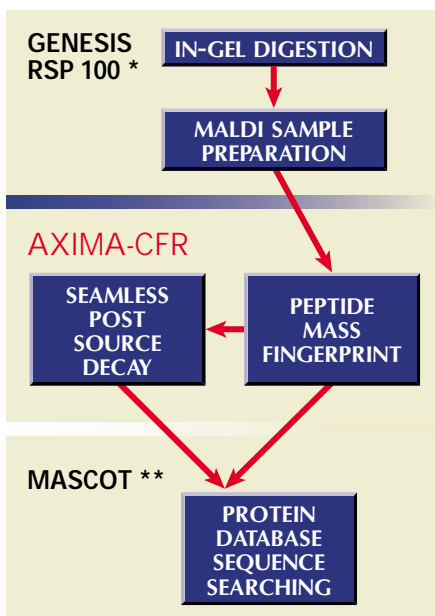
More than 105 AXIMA-CFR mass spectrometry systems to be supplied within the next 30 months

Excerpt from the press release of February, 2001:
Kratos will supply LumiCyte (headquarters: Fremont, CA, USA;



Robotic Sample Processor RSP 100

Diagram of AXIMA-CFR High Throughput System



*=Model name of a Robotic Sample Processor
**=Name of Database Search Engine

<http://www.lumicyte.com>) with a minimum of 105 AXIMA-CFR systems within the next 30 months. In addition, Kratos will invest in the development of specialized biochip readers to be used exclusively by LumiCyte to collect proteomics information on an unprecedented scale.

“We are pleased to launch this strategic relationship. We believe the Kratos AXIMA-CFR systems will provide the high sensitivity, analytical capabilities and throughput we need to fully realize the protein mapping and identification capabilities of our latest SELDI[®] biochip arrays,” said T. William Hutchens, CEO of LumiCyte.

Hutchens further stated, “Kratos and LumiCyte will develop specialized, low-cost biochip readers that can be produced in large numbers for global distribution in a variety of markets.”

“We are delighted to be a part of the revolutionary work performed by LumiCyte,” said Katsuhiko Ichimura, Managing Director of Kratos Analytical, Ltd. “This is the world’s largest instrument supply agreement in proteomics and serves to further emphasize our important role in the supply of high performance mass spectrometry technologies for that market.”

“This is an outstanding opportunity to utilize the multiplexed analytical capabilities of a great mass spectrometer for the high-throughput,

informatics needs of LumiCyte’s biochip-based proteomics strategy,” said Robert J. Cotter, a member of LumiCyte’s Scientific Advisory Board whose group at Johns Hopkins University designed the curved-field reflectron (CFR) used in the AXIMA-CFR. A recent President of the American Society for Mass Spectrometry, Professor Cotter has been a leader in transforming mass spectrometry into a widespread technique for biomedical research. “Clearly,” says Cotter, “the SELDI technology is a paradigm shift that first introduced biochip-based sample processing of the type that will now enable rapid, broadband diagnostics.”

Notes

1) AXIMA-CFR

The new MALDI-TOF* Mass Spectrometer AXIMA-CFR provides the user with a combination of high mass accuracy, high resolution and high sensitivity. It includes high throughput sample handling using a 384 spot micro-liter sample format MALDI target.

* MALDI-TOF: Matrix-Assisted Laser Desorption Ionization - Time of Flight

2) Chemical Printer

The Chemical Printer is a radically new method that automates the process. It uses pinpoint reactions (digestion) with minute quantities of a variety of enzymes at individual spots on transcribed proteins. It provides dramatically higher sensitivity, throughput, and ease of operation compared to the conventional method.

3) SELDI

Surface Enhanced Laser Desorption Ionization