

## CUSTOMER PROFILE

## An Urgent Search for Breast Cancer Biomarkers

### FOR GRADUATE STUDENT HEATHER BRAUER, SPEEDING UP SERUM SAMPLE PREPARATION FOR MALDI-MS ANALYSIS WAS AN ABSOLUTE NECESSITY

Working in the laboratory of Paul Lampe, PhD at the Fred Hutchinson Cancer Research Center, Ms. Brauer is searching two human plasma sample collections, and one rat plasma collection, for breast cancer biomarkers. As her sample collections include both pre- and post-diagnostic samples, and rich clinical histories of individuals who developed breast cancer within the collection timeline, it is possible that her study will uncover protein expression changes that will enable better cancer risk prediction, earlier diagnosis, and better clinical outcomes.

Ms. Brauer has cast a wide net, gaining access to approximately ten thousand plasma samples, and using MALDI-MS to seek diagnostically valuable, strongly regulated proteins marking diagnostic and pre-diagnostic changes associated with breast cancer.



Graduate student Heather Brauer's personal interest in fighting cancer energizes her activities inside and outside the lab. Ms. Brauer's cancer research and outdoor fundraising activities have been featured on Seattle television station KOMO's broadcast news programming. Visit <http://heatherannbrauer.blogspot.com> for links to the video clips.

### TOO MANY SAMPLES, NOT ENOUGH TIME

The biomarker study in Dr. Lampe's laboratory was already underway when Ms. Brauer joined it, but it was stalled at a major roadblock. The methods developed to prepare the plasma samples for MALDI-MS were too slow and laborious for the project's timeline and resources. Having found unacceptable variation in the data from ACN precipitation, the researchers had refined a method for batchwise sample preparation using immunodepletion, but they were still struggling with the overwhelming number of samples in the available collections. Adding to the complication, the disappearance of a familiar diet-related biomarker from some sample spectra suggested a problem with depletion specificity. The study's sample preparation method might have been removing the biomarker proteins the researchers were looking for before they had a chance to find them.

### EARLY ADOPTERS

Phil Gafken, PhD, Director of the mass spectrometry core facility at The Hutch, found out about the Passport™ 1200 Sample Prep System while it was still in development at Protein Discovery. Following the Passport 1200 System's commercial introduction, Hutch researchers brought the system into Dr. Lampe's lab to see if its capabilities could match the throughput requirements of the breast cancer biomarker study. What they discovered surprised and delighted the researchers.



PASSPORT 1200  
SAMPLE PREP SYSTEM

PASSPORT RP SAMPLE  
PREP CARTRIDGE



The Passport 1200 Sample Prep System owes its throughput advantage to its 96-well cartridge design. The new cartridges are made of clear material, which allows direct visual reassurance of proper sample and buffer loading.

## RESEARCHER'S IMPRESSIONS

The original objective of increasing plasma sample preparation throughput was met easily by the Passport 1200 System. “The 96-sample format is huge,” said Ms. Brauer. “We can knock out so many samples in a much shorter time.”

The researchers were also delighted to see a great improvement in the signal-to-noise of the spectra. “The Passport System samples appear to be much richer, with more detail and more peaks,” said Ms. Brauer.

The researchers are now in the process of quantifying the reproducibility of spectra from samples prepared using the Passport 1200 System. Based on the appearance of spectra produced so far, they expect a significant reduction to the problematic spectral data variation affecting their previous methods.

## A BETTER WAY TO DO IT

The Passport 1200 Sample Preparation System uses electrophoresis to drive proteins through an acrylamide plug and onto a capture surface. As expected, smaller proteins migrate through the plug more rapidly and are captured first. By simply ending the sample preparation program and shutting off the electrical current before larger proteins migrate through the plug, researchers can enrich their samples for low-molecular weight proteins. Methods such as protein precipitation or immunoaffinity depletion are not necessary. “A problem we faced with our sample preparation method was specificity,” said Ms. Brauer. “We were often removing smaller, low abundance proteins along with the large ones. The gel electrophoresis method that the Passport system uses allows greater size specificity.”

## INCREASING THE LIKELIHOOD OF RESEARCH SUCCESS

“If breast cancer biomarkers were obvious or easy to find, they would have been discovered by now,” notes Ms. Brauer. “With the Passport 1200 System we can do more samples in less time. We think that really increases our chances of finding strong and diagnostically valuable breast cancer biomarkers.”

## ADDITIONAL INFORMATION

Take a tour of the Passport 1200 Sample Prep System at [www.proteindiscovery.com](http://www.proteindiscovery.com) or contact Protein Discovery for pricing and additional information.

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