

Automating hybridization of protein biochips improves biomarker discovery

Protagen AG, based in Dortmund, Germany, provides protein analysis, proteomics and bioinformatics tools and services to pharmaceutical and biotech companies. The company develops and produces special protein arrays for both antibody characterization (the UNlchip®) and biomarker discovery, and depends on two Tecan HS 4800™ Pro Hybridization Stations for automated processing of these biochips.



The HS 4800 Pro Hybridization Station

Protagen AG was originally founded by a clinical proteomics group at the Ruhr University of Dortmund in 1997, where it began performing high quality proteomic analysis for biomarker identification. It now provides a variety of tools and services for 2D gel- or mass spectrometry-based research and drug development, including GMP-compliant protein analysis services for pharmaceutical and biotech companies; software tools for mass spectrometry, such as for detecting post-translational protein modifications; and protein array-based products for biomarker discovery and antibody development. The company focuses on identifying biomarkers for its own business development, such as specific diagnostic markers for multiple sclerosis, rheumatoid arthritis, juvenile idiopathic arthritis and cancer indications. The biomarker discovery program has recently been made available to interested pharma and biotech companies.

Protagen uses its proprietary UNlclone® technology platform for biomarker discovery; this high throughput protein array technology was originally developed by Prof Dolores Cahill and her colleagues when working at the Max Planck Institute of Molecular Genetics in Berlin. Scientists at Protagen have built this platform into a program called UNlarray®, which handles everything from study design to systematic discovery and evaluation, to delivery of a prototype biochip suitable for clinical use. Sets of putative markers on quantitative protein biochips are now being developed for use by researchers in the pharmaceutical and biotech industry. Protagen depends on two HS 4800™ Pro Hybridization Stations for automated processing of its protein biochips during the manufacturing and testing processes.

“After we have found a set of putative biomarkers, the crucial step forward is to test them in quantitative terms in larger

patient cohorts, and this requires a highly reproducible chip processing procedure,” explained Dr Jens Beator, Director of the Protein Biochips business unit at Protagen. “Each chip usually includes a few hundred biomarkers that need to be quantified in a single assay, so careful standardization is extremely important for reproducible analysis. Processing the chips manually is subject to human variability so we always process all of our chips under identical conditions using the HS 4800 Pro Hybridization Stations.”

“It was relatively straightforward to optimize the assay for automation on the HS 4800 Pro and develop standard operating procedures,” Jens continued. “Fortunately, we were able to use an application note from another Tecan customer that provided good starting conditions that we could optimize from, and we also had support from an application specialist at Tecan. Pre-



The Protagen UNIchip®, showing the nitrocellulose coating



Scientists at the Protein Biochips unit (from l to r): Dr Jens Beator, Angelika Lueking, Claudia Gutjahr, Kirsten Schulte and Verena Trappe

customized HS 4800 Pro platforms that are suitable for our biochips were already available. Each of the HS Pro stations has 24 chip slots so we can process 48 samples with each run, which takes around three hours. In the past we had to perform the assays manually, which required many man hours from our technicians but now those staff are free to do other work."

On 5 November 2007, Protagen celebrated its tenth anniversary with a day of special events that began with the company receiving Germany's Land of Ideas 2007 prize for its innovation. The Land of Ideas initiative awards a prize to 365 landmarks of all kinds; cultural, social and industrial. Only nine places related to biotech have been selected in 2007. One landmark is active on each day of the year, as part of a joint program between the Federal Government and German industry, supported by Germany's president.

"The anniversary day began with a press conference, including representatives from the state government, our founders, investors and press officials," Jens explained. "After the prize was awarded, we gave guided tours of our facilities to members of the public and demonstrated some of the key technologies within our laboratories. In parallel, we held a very well-received scientific symposium during the afternoon, with talks from Prof Hans Lehrach and Dolores Cahill, as well as Prof Helmut Meyer, the main founder of Protagen and one of our key medical proteomics collaborators."

The system and application described here are for research use only in the USA

UNIchip® is a registered trademark of Protagen AG