

Step-by-step automation

Antibody discovery and development company MorphoSys has a wealth of experience in designing novel assays for the screening and characterization of therapeutic antibodies. With active programs in oncology, inflammatory and autoimmune diseases, the company's Discovery, Alliances and Technologies Department relies on a variety of automated solutions to provide the throughput necessary to support its pipeline.



Antibody technologies have a host of potential applications throughout medicine, from biomarker discovery and disease characterization in fundamental research to diagnostic devices and biological therapeutic agents in a clinical setting. Identifying and validating antibodies with specificity for the epitope of interest is a laborious and time-consuming process, requiring the screening of libraries consisting of thousands or hundreds of thousands of antibodies to select suitable candidates for further investigation. These candidates then need to be thoroughly characterized to establish their specificities and binding efficiencies, as well as to identify any potential off target effects.

MorphoSys AG, based in Munich, Germany, combines an in-depth understanding of disease biology with its in-house antibody technology platforms – HuCAL®, Ylanthia® and Slonomics® – to provide high quality antibody generation and optimization. Stephanie Patzelt, Principal Technical Assistant in the Discovery, Alliances and Technologies Department, explained: “We work across a range of disease areas – including oncology (both hematological malignancies and solid

tumors), inflammatory and autoimmune diseases – and have a very active research program designed to exploit our in-house technologies. For example, our Ylanthia platform is the industry’s largest known antibody Fab (fragment antigen-binding) library – comprising over 100 billion distinct, fully human antibodies – and our HuCAL (Human Combinatorial Antibody Library) platform contains several billion distinct fully human antibodies. This allows us

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to perform rapid selection of antibodies targeting even the most difficult disease-related epitopes.”

The department has invested heavily in laboratory automation in order to achieve a high throughput and make the most of these technologies. As there are over 100 personnel working on a wide range of different projects and diseases, a ‘modular’ approach to automation has been

adopted, with a large number of small devices which perform individual steps of the overall workflow. This minimizes the amount of time each system is occupied for any given experiment, virtually eliminating the need for instruments to sit idle during incubation steps and maximizing productivity.

Until recently, generating antibody predilutions for screening has been a bottleneck in the workflow, as this has always been performed manually. Each antibody is diluted in 96-well plates – usually creating between 8 and 16 different dilutions – then transferred to 384-well plates for testing, generally in duplicate or triplicate. This is obviously prone to errors and very time consuming, so the team was

looking for ways to automate this step. Stephanie continued: “We already had a large number of Tecan devices in the lab, including a Freedom EVO® workstation for automated hit picking, plus various readers and washers, so we were keen to see what the company could do to help us with this aspect of our workflow.”

She added: “Direct digital dispensing was a very appealing option – allowing

direct dispensing of the antibodies into the assay plates – but was originally only available for use with small molecules in DMSO. When Tecan advised us that the updated system capable of dispensing aqueous solutions was being launched, we immediately looked into this. As soon as we began testing the D300e in house, it was clear that this instrument was ideal for our needs, eliminating the cost and wastage associated with predilutions.” Using the D300e has significantly reduced the amount of material required for each experiment, as well as minimizing the cost of consumables, and has proved very popular within the lab. It has also extended the experimental window for many investigations, as the increased dispensing accuracy – particularly at very low volumes – has improved data quality.

“In just a few months since its introduction, the D300e really has become part of our routine workflow, with most project teams using it whenever possible. The system’s licence-free software is a real advantage for this, meaning that everyone can create their experimental designs on their own computer, without occupying the D300e’s dedicated workstation, and simply transfer the complete protocol to the device for processing. This is very important in such a busy lab, allowing numerous projects to use the device virtually in parallel,” Stephanie concluded.



Members of the MorphoSys Discovery, Alliances and Technologies Department

**To find out more about
Tecan’s D300e, visit
www.tecan.com/digitaltitration**

**To learn more about MorphoSys,
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