

Tecan automation streamlines veterinary diagnostics processes

In order to increase reliability, efficacy and throughput of its diagnostic services, the Landeslabor Berlin-Brandenburg (LLBB) in Frankfurt (Oder), Germany, has chosen Tecan's liquid handling workstations to automate the process flow of serological sample analysis.



The team at LLBB (l to r): Sabine Thalheim, veterinarian specialized in virology, Elena Herner, biology laboratory assistant, Chris Flegel, technical assistant in veterinary medicine

The LLBB is an accredited institution for independent public investigations, dedicated to the protection of human and animal safety, health and welfare, as well as the preservation of the environment. The organization was launched in January 2009 to combine the laboratory resources of the counties of Berlin and Brandenburg, creating the first cross-state investigation facility in Germany.

An extensive testing program for the eradication of Bovine Herpesvirus 1 (BHV-1), which causes infectious bovine rhinotracheitis, plus the monitoring of other

diseases of cattle, like mucosal disease, bluetongue disease, brucellosis and bovine leucosis, in the large catchment area, have increased the demand for efficient high throughput automation procedures. Sample archiving, preparation and ELISA testing steps have been automated using Tecan liquid handling workstations, together with operating software that ensures process security by tracking each sample through the workflow.

When the samples arrive in the Department of Infectious Disease Testing at the LLBB, the primary tubes are registered in the LIMS and

sorted according to testing requirements and urgency of the planned tests for each sample. Sample identification is performed using PosID™ positive identification system units or fixed barcode readers to read the individual barcodes on the primary tubes and plates. Sorting is helped by the customer specific software tool DisCo Tool 2 software, which relays information of each sample's worklist. This software manages the testing procedures within the serology department and communicates the results back to the LIMS.





Sample loading area

After registration, the samples are aliquoted into deep-well plates for archiving. This is performed by two Tecan Genesis RSP™ platforms with either 4-channel or 8-channel fixed tips. Creating archive plates greatly reduces storage space requirements and increases traceability of the samples. All scheduled tests, as well as any additional tests that may be required, need to be performed within two weeks, and the DisCo Tool 2 software and the LIMS help to ensure that the worklist of each sample is fulfilled within this period by assessing test results and open tests for each sample. This practice further reduces the storage space requirements within the laboratory, because old archive plates can be regularly disposed of.



The Freedom EVO 200 configuration

Following archiving, the deep-well plates are loaded onto a Freedom EVO® 200 platform equipped with 8-channel fixed tips to prepare the required number of ELISA test plates. ELISA testing is performed on a second Freedom EVO 200 workstation including an 8-channel liquid handling arm with fixed tips and a robotic manipulator arm. The ELISA test that is most often performed at LLBB is BHV-1 testing using the IDEXX HerdChek* IBR gE Antibody ELISA test kit to detect BHV-1 gE, which can distinguish naturally infected animals from cattle vaccinated with gE-deleted vaccine. The ELISA workstation has been specifically configured to meet the laboratory's high throughput needs; a throughput of 35 to 45 plates per day is common, with maximum throughputs of 70 ELISA plates per day. Five hotels provide loading capacity for 45 plates in one run, and a barcode reader installed on the first hotel reads plate barcodes in order to track the samples. A Sunrise™ microplate absorbance reader and a Power Washer 384™ with 96-well head allow for fully automated ELISA processing.

The required ELISA reagents have designated loading areas on the deck of the workstation. One trough holds LVL 'System Clean' Set Up Clean solution (Laborbedarf von Lüder), which is used for decontamination washes between pipetting of different reagents, a method which has been validated by the LLBB to effectively prevent carry-over. Liquid waste is pumped from the waste container directly to the drainage system to offer additional convenience.

"By using Tecan's process automation solutions for sample processing and high throughput ELISA, our laboratory is able to process close to 7,000 samples per day for BHV-1 testing at peak times, and has greatly enhanced the efficacy and reliability of the LLBB's diagnostic service," concluded Sabine Thalheim at LLBB's Department of Infectious Disease Testing.

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