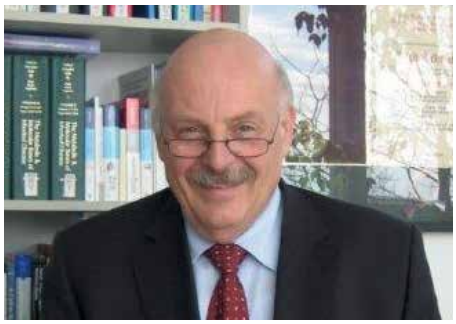
A new kind of biobanking

University Hospital Regensburg has taken advantage of the open architecture of the Freedom EVO® workstation, creating a seamless connection between its routine diagnostics and biobanking activities. Working in partnership with the hospital's Institute for Laboratory Medicine and Transfusion Medicine and diagnostic instruments provider, the Tecan Integration Group has developed a bespoke solution which offers fully automated preparation of samples for both biobanking and offline secondary testing.

Universitätsklinikum Regensburg



Professor Gerd Schmitz, formerly Director of the Institute for Laboratory Medicine and Transfusion Medicine at University Hospital Regensburg

The Institute for Laboratory Medicine and Transfusion Medicine at University Hospital Regensburg combines routine diagnostic testing with basic research, evidence-based medicine and clinical studies. In addition, the institute maintains an on-site biobank for both therapeutic and diagnostic applications. Professor Gerd Schmitz, the former director of the institute, explained: "We first decided to invest in biobanking about 10 years ago; we were already cryopreserving materials for transfusions and scientific applications, and were getting more and more requests to store residual patient samples for clinical studies. Instead of developing a separate biobanking facility, we chose to create what we have termed a 'healthcare-integrated biobank', with the cryopreservation activities occurring side-by-side with daily testing."

A customized workdeck allows access to both the automation track and the LiCONiC storage unit

The institute processes and cryopreserves a wide range of samples – including stem cells, blood/plasma preparations and blood cell isolates – on behalf of the clinical disciplines associated to the University Hospital in Regensburg. As materials from the biobank can be used in both diagnostic research and therapeutic applications, the biobank must adhere to strict clinical and industrial standards, making automation a logical step. Gerd continued: "We needed a highly sophisticated control system, with stringent quality controls, that could be integrated into the laboratory workflow. This required a sampling workstation that could be connected directly to our existing automated laboratory system, the ADVIA® LabCell Automation Solution from Siemens. We discussed our needs with both our biobanking collaborators and Siemens, and selected the Freedom EVO 200 workstation as the best fit for our existing set-up."

"The open architecture of this platform made it very straightforward to develop the sample reformatting and preparation protocols, but we required a custom solution in terms of both the hardware and software to allow it to interface with the Siemens system and our automated biobank project. Based on our requirements, the Tecan Integration Group (TIG) shortened

The TIG solution needed to integrate with the laboratory's existing automated track system

the workdeck, allowing the instrument's four-channel Liquid Handling (LiHa) Arm to pipette samples directly from Vacutainers® on the LabCell's sample track. The TIG team also integrated a LiCONiC STR44 cooled storage unit below the workdeck – which can be accessed by one of the workstation's Robotic Manipulator Arms via a cut-out for a 'periscope' lift – and an XSD-96 PRO high speed whole rack tube capper (FluidX)."

"The software integration was more complex, as the Freedom EVO needed to interface directly with the hospital LIMS, the LabCell system, the FluidX decapper, the LiCONiC unit and, ultimately, the ASKION C-line® HS200 cryostore. Using Pegasus software, Tecan's engineers were able to create a bespoke interface enabling the two-way transfer of sample IDs and plate layout data between the various systems, allowing us to not only aliquot samples for cryostorage, but also to produce daughter tubes for offline secondary and specialist testing."

"Incoming patient samples now undergo routine clinical analysis, then the remainder of each sample is aliquoted by the Freedom EVO platform. Samples are transferred to either 700 µl tubes with 1D barcodes for cryostorage, or 2D-barcoded 1 ml tubes for offline testing according to data from the LIMS systems. Samples for secondary assays are then manually removed from the dedicated unloading area, while biobank samples are transferred to the LiCONiC storage unit. The entire LiCONiC system can then simply be wheeled across and docked with the ASKION cryostore. This can be for short-term storage of up to one year for in-house therapeutic regimen testing, medium-term storage of two to five years for clinical trials, or long-term storage for up to 10 years for clinical research studies."

"Before getting the Tecan solution, we were doing all of the aliquoting for biobanking and secondary testing by hand, including carrying trays from the automated store to the workbench and sorting samples manually. Now both the biobank samples and secondary workbench analyses can be pipetted automatically, eliminating erroneous sampling and manual handling errors. We can even create worklists for other laboratories and biobanks, helping to improve planning and communication and making the whole process more efficient," Gerd concluded.

> "It was easy to connect the Freedom EVO platform to our other laboratory automation systems."

To read more about University Hospital Regensberg, go to **www.uniklinikum-regensburg.de**

To learn more about the Tecan Integration Group, visit **www.tecan.com/tig**

The LiHa Arm can pipette samples directly from tubes on the sample track