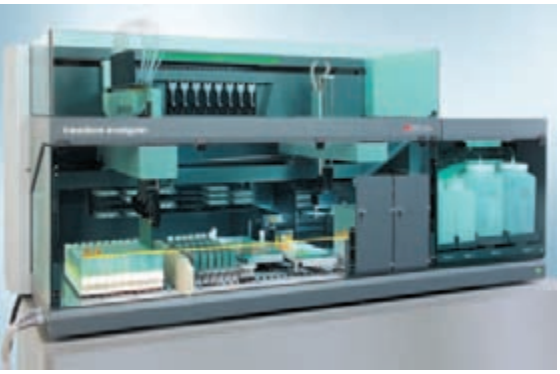
Tecan's Freedom EVOlyzer®

successful ELISA automation at Swiss Reference Lab

As the largest hospital-based clinical laboratory in north-east Switzerland, the Institute for Clinical Chemistry and Hematology (IKCH) in St Gallen serves an area of 450,000 inhabitants in all fields of laboratory medicine, including clinical chemistry, hematology, coagulation, immunology and molecular genetics. The Institute's clients include public and private hospitals, general practitioners and private laboratories, as well as the pharmaceutical industry. Although the laboratory already used a number of automated analyzers, these systems did not cover the complete range of the laboratory's assays and therefore the IKCH had been looking for ways to expand their automation.

Sample and reagent loading is guided and monitored by the loading interface



A Freedom EVOlyzer 150 with 8 standard tips, the configuration used at IKCH in St Gallen

The team at IKCH looked at several ELISA automation platforms available on the market, but found that most were one or two needle systems, not suitable for the majority of their assays. Professor Walter Riesen, Head of IKCH, explained that they had a difficult time to find an instrument that could meet their special needs: "Firstly, it had to be an open platform that could manage our constantly growing and changing panel of tests. It also had to be able to simultaneously process multiple assays and, very importantly, it had to be able to handle assays with short room temperature incubation times."

This last requirement proved a particular problem for many of the automated ELISA systems that the IKCH tested. Most one or two needle instruments were unable to handle short room temperature incubation times required for some target assays, which meant having to divide 96-well plates, actually increasing rather than decreasing hands-on time for those assays. "Simultaneous performance of multiple assays with short incubation times was a big problem," explained Dr Wolfgang Korte, senior staff member and project leader at IKCH. "But, when we found that Tecan's Freedom EVOlyzer® 150 could be equipped with up to eight needles, we gave it a try. We tested the system on a Chromogenix "COALIZA® Protein S – Free" assay, which involves some tricky predilution of the calibrators and a ten minute room temperature incubation step at the end of the process. We realised that the Freedom EVOlyzer could handle the assay to our full satisfaction."

Freedom EVOlyzer – a new generation of ELISA analyzers

The Freedom EVOlyzer is Tecan's new generation of IVD-D (98/79/EC) compliant ELISA analyzers that replaces and builds on 15 years' experience of the successful RMP™ and Minilyse™/MiniSwift™ systems. Like its predecessors, the instrument is available in several worktable sizes (100, 150 and 200 cm). The instrument can be equipped with two, four or eight needles, using either steel or disposable tips. The liquid handling includes single and multipipetting, parallel sample pipetting over several plates, complete flexibility in predilution and high safety using liquid level and clot detection. The independent robotic manipulator (RoMa) arm for plate transport allows simultaneous use of the system's different devices, including up to 12 chambers for heated incubation as well as 12 chambers for room temperature incubation. The Freedom EVOlyzer relies on the well known, reliable Columbus™ plate washer and Sunrise™ absorption reader, and the integrated Positive Identification (PosID™) barcode reader identifies samples, plates and reagents.

The highest possible levels of throughput, safety and flexibility have been target objectives during the development of the system. Factors including continuous loading, parallel sample pipetting on up to six plates, as well as configurable worktable layouts all add to its appeal. Enhanced safety features include extensive use of safety panels, door locks, sensors, lights and acoustics to enable close monitoring of all user and instrument actions. The wizard-driven, touch screen compatible easy-to-use Run Control Software guides the user through the daily operation. Powerful editing programs extend the flexibility even further, allowing skilled users to leverage maximal performance from the new software.

And the overall flexibility that the Freedom EVOlyzer offered was a major priority, as Dr Wolfgang Korte explained: "We were not particularly aiming to run high throughput assays on the instrument, but instead, will be running a large number of tests in parallel with only a moderate number of samples. We very much wanted to automate as many of our applications as possible to a microtiter plate format and needed a system that is flexible enough to handle these different assays."

"One of our main objectives was to reduce our hands-on time and running multiple assays in parallel leaves our employees free for more qualified tasks. We needed an instrument that is easy to operate, that provides us with clear instructions and that, once started, we can confidently leave alone to get on with the assays unattended. After all, reliability and walk-away capability is the key to automation. The Freedom EVOlyzer should allow us to reach these goals. The system's ability to run multiple assays in parallel clearly allows us to shorten our turnaround time on our assays."

IKCH and Tecan have now embarked on a close collaboration that will continue the development of the Freedom EVOlyzer system. Dr Korte concluded,

Dr Korte and Mrs Aichele at the IKCH with their Freedom EVOlyzer

Chromogenix – COALIZA®
Protein S - Free assay

Summary of procedure

Serial predilution of Calibration Plasma

Cal1 1.0	IU/mL free PS	10 µl of Cal Plasma	1000 µl of diluent
Cal2 0.5	IU/mL free PS	500 µl of Cal1	500 µl of diluent
Cal3 0.25	IU/mL free PS	500 µl of Cal2	500 µl of diluent
Cal4 0.125	IU/mL free PS	500 µl of Cal3	500 µl of diluent

Predilution of samples 1:101

Add diluted sample, control and calibrators 100 µl/well

Add conjugate 100 µl/well

Incubate: 45 min at RT

Wash 4 x 300 µl

Load freshly prepared substrate-chromogen TMP dilution

Add substrate 200 µl/well

Incubate: 10 min at RT

Add Stopping Solution 100 µl/well

Read at 450 nm

COALIZA®

"We are confident that we have made the right choice and we look forward to the future collaboration with Tecan."