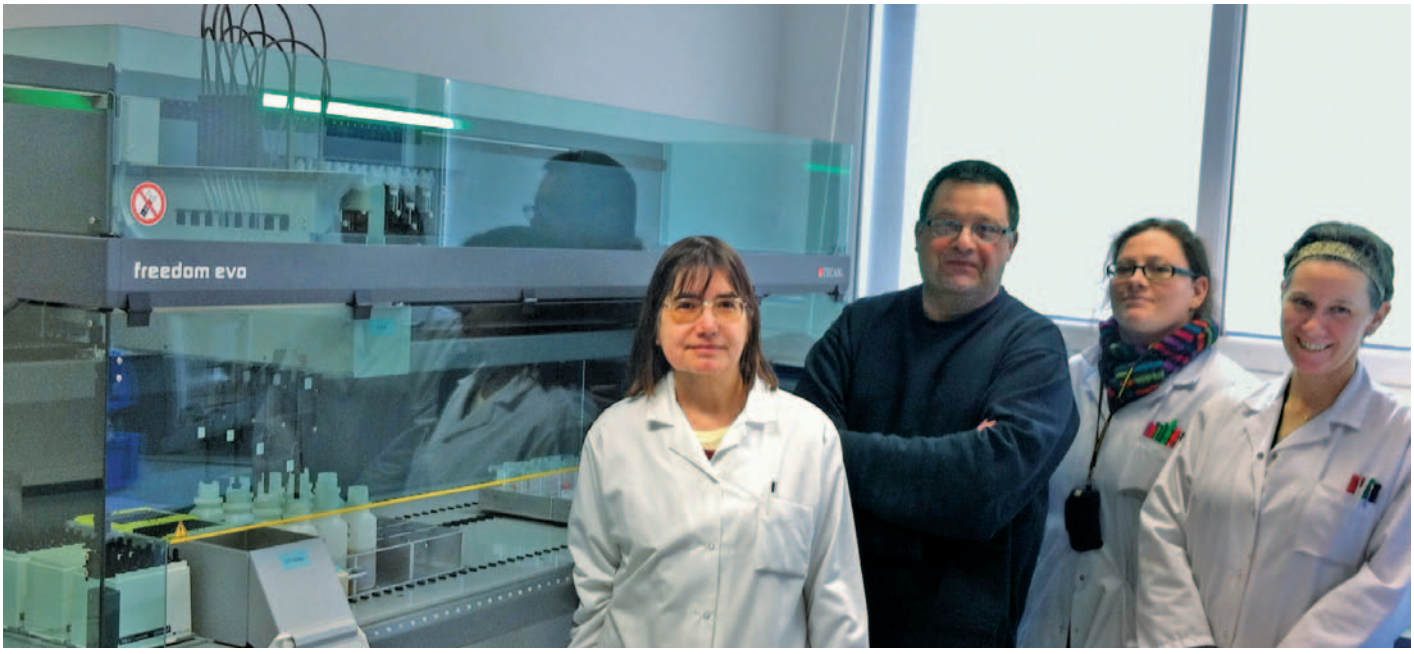
# High stakes laboratory automation

Horse racing is an immensely popular sport worldwide and, with huge sums of money riding on the results, maintaining the integrity of racing is crucial for jockeys, trainers, owners and racegoers alike, as is protecting the health of the sport's valuable thoroughbred horses. In France, the Laboratoire des Courses Hippiques is taking advantage of Tecan's Freedom EVO® platform to prepare samples for analysis by mass spectrometry in the battle to keep racing clean.

The Fédération Nationale des Courses Françaises oversees the fight against doping in French horse racing through the Laboratoire des Courses Hippiques (LCH), based in the Paris suburb of Verrières-le-Buisson. The laboratory analyzes around 45,000 blood and urine samples annually, two thirds of which are from France, with the remainder from countries as far afield as Qatar, United Arab Emirates (UAE) and India, as well as from European racing authorities such as Holland, Belgium, Switzerland and Spain. In addition to routine drug screening, the laboratory provides counter analysis of 'B' bottles for other racing laboratories, is a reference laboratory for the Fédération Equestre International (FEI), and analyzes competition horse feeds for contaminants. The laboratory also analyzes a small number of human samples alongside the equine samples – about 500 a year – plus samples from dog races and, more unusually, from camel races in the UAE and Qatar. This is backed by an active research program which helps to continually advance anti-doping control methods and keep LCH one step ahead of potential cheats.

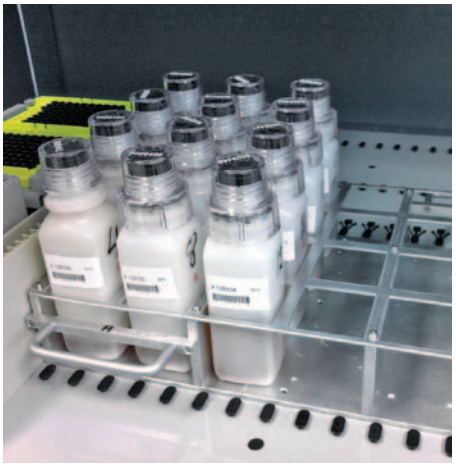
During a race meeting, the race commissioner selects horses for drug screening. These include all race winners, as well as horses which may be exhibiting unusual behavior, underperforming or performing unusually well. The course vet verifies the identity of a horse from its microchip and the barcode on its passport, and records its sex, age and the discipline – trot or gallop – in which it has competed. Blood and urine samples – divided into two bottles, the 'A' and 'B' samples – are then assigned barcodes, sealed and dispatched to the laboratory. Patrick Cuvier, IT Manager at LCH, described the sample reception process: "Urine samples arrive at the laboratory in 200 ml bottles and blood samples in 10 ml tubes. We scan the barcode and record the information provided by the vet, along with the number of vials per horse and the approximate sample volume. Each sample is then allocated a unique laboratory number to enable full sample tracking."

LCH is constantly seeking to improve its analytical methods, and has recently invested in a Freedom EVO 200 workstation equipped with an eight-channel Liquid Handling (LiHa) Arm and custom-made carriers to enhance sample preparation for mass spectrometry (MS) analysis, complementing the laboratory's existing Freedom EVO 75 system for PCR set-up and Freedom EVO 150 for ELISA processing. The new platform's LiHa Arm – which uses Tecan's recently released




The LCH team with the Freedom EVO 200

Aliquoting urine samples from 200 ml bottles using the LiHa Arm with 5 ml disposable tips



Sample bottles are loaded into custom-made carriers on the Freedom EVO

5 ml disposable tips – enables efficient transfer of large sample volumes, and the laboratory can process up to 144 urines and 192 bloods a day in batches of 24 samples. Patrick commented: "Manually pipetting 45,000 samples per year is an enormous undertaking that is both tedious and time-consuming. Using the Freedom EVO allows us to decrease the time spent on repetitive pipetting, freeing staff to perform other tasks and enabling us to increase our sample throughput."

Dr Ludovic Bailly-Chouriberry, Assistant Laboratory Manager, explained the process: "Samples are analyzed using one of seven different drug screens, each focusing on the detection of a particular type of compound. We use the Freedom EVO 200 to transfer sample aliquots into appropriate tubes and vials, which are then taken for analysis. Blood samples for ELISA are transferred directly to the Freedom EVO 150, which is equipped with four-channel LiHa and Robotic Manipulator (RoMa) Arms, a HydroFlex™ washer, a four-slot MIO™ incubator/shaker and a Sunrise™ plate reader, enabling full automation of the assay and generating results in just a few hours."

"One of the biggest challenges in this process is the difficult nature of urine and plasma samples," continued Ludovic. "Blood samples must be allowed to settle naturally in a cold room before plasma can be extracted for analysis, and horse urine has a wide viscosity range. To cope with these issues, we needed a system that would provide accurate and precise pipetting while avoiding the risk of cross-contamination, as our analytical methods are extremely sensitive. The Freedom EVO's liquid level detection function is an important aspect of this process security, enabling the system to quickly determine the amount of usable sample, which can vary from a few milliliters to 200 ml. The safe pathways feature in Freedom EVOware® also helps to virtually eliminate the risk of cross-contamination by ensuring that the LiHa never travels over a sample or another piece of labware; it's impressive and very convenient."

And in the future? Ludovic imagines a system that has evolved to encompass the laboratory's entire workflow, from sample reception and extraction through to analysis by mass spectrometry. "We could adapt our Freedom EVO platforms to provide sample preparation for all generations of MS systems, and would no longer need to keep sample preparation and analysis separate. It would really be a beautiful challenge," concluded Ludovic.

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To find out more about LCH, visit **www.fncf.fr**