

A winning combination for nephrology research



In the last edition of the Tecan Journal we announced the winner of the Tecan Award 2011, Svenja Kristina Holle from the University Hospital of Münster, whose team has developed an *ex vivo* method for investigating the dynamics of organic cation transport in proximal tubules of the kidney, using an Infinite® 200 PRO microplate reader.



Svenja Holle

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Siegfried Sasshofer presents Svenja with the Tecan Award 2011

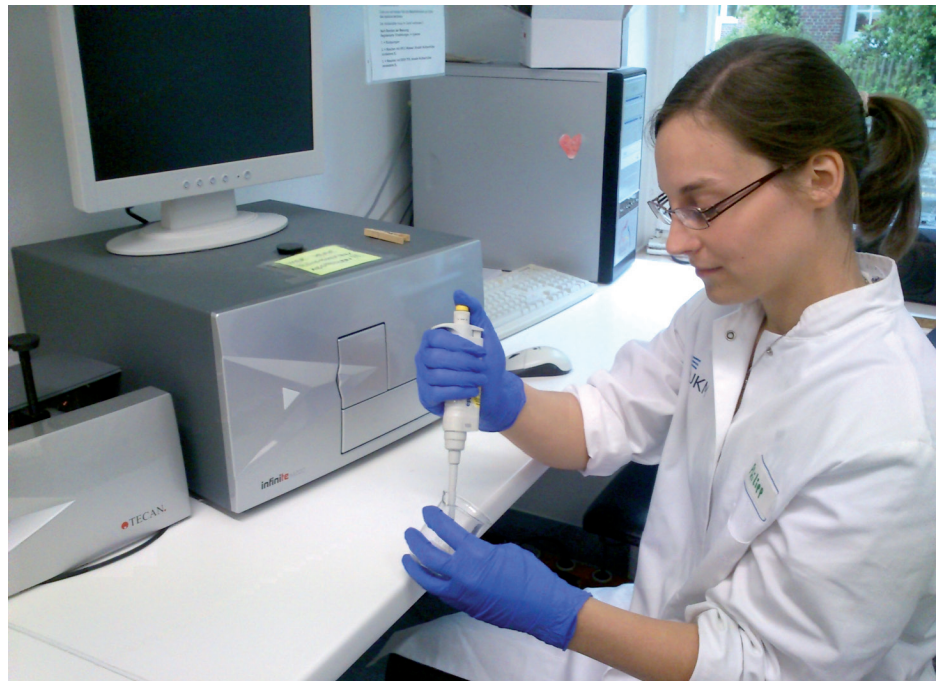
The Experimental Nephrology laboratory of the Department of Internal Medicine D at the University Hospital of Münster (Universitäts Krankenhaus Münster – UKM), Germany, has used Tecan's Infinite 200 PRO microplate readers to further develop its cell-based techniques for the investigation of cell membrane transport in the proximal tubules of the kidney. The team has established a novel *ex vivo* fluorescence technique which enables parallel analysis of numerous samples in a 384-well microplate format, making this type of study far easier to perform, while significantly increasing the number of experiments which can be carried out with a limited amount of biological material. Svenja, a medical student at UKM, explained: “Organic cation transporters (OCTs) are crucial for the renal excretion of endogenous organic cations such as the monoamine neurotransmitters dopamine and noradrenaline, as well as the 40-50% of pharmaceutical drugs that are positively charged. Until now, organic cation transporters could only be examined using time-consuming fluorescence or radiotracer methods; the technique and set-up procedures were very tedious. We have successfully used our Infinite 200 PRO readers – we have both an Infinite M200 PRO and an Infinite F200 PRO – to develop a microplate reader-based method that can be adapted to almost any kind of freshly isolated biological material and transport system by using a suitable fluorescent substrate. The method enables us to study OCTs in freshly isolated proximal tubules of mouse kidneys, an *ex vivo* environment, and has significantly increased

our throughput, as we can now place three proximal tubules in each well of a 384-well plate, depending only on the isolation capacity.”

The properties and regulatory mechanisms of organic cation transport in proximal tubules of mouse kidneys are of particular interest with regard to the emerging role of transgenic mouse models in pharmacological, physiological or pathophysiological studies. Svenja continued: “We investigated the dynamics of organic cation transport by flux experiments with a fluorescent transporter substrate, ASP+, which undergoes a shift in the emission spectrum from 550 nm to 590 nm when it is transported into cells. Each individual well of a 384-well microplate accommodates three segments of freshly isolated mouse proximal tubules, each approximately 200 µm long. ASP+ is added to each well, and the increase in cellular fluorescence is recorded. By making fluorescence measurements, we can quantify cellular accumulation of ASP+, which is proportional to the extent of organic cation transport. We can also take advantage of the Infinite 200 PRO's dual injection module to study the properties of OCTs to determine the affinities of known or unknown substrates; substrates with high affinities to organic cation transporters will inhibit the uptake of ASP+. The method also allows us to screen for substrates and drugs which interfere with OCTs, which may open new therapeutic approaches to reducing drug-induced damage of the kidney by nephrotoxic drugs.”



Previously, UKM's Experimental Nephrology laboratory analyzed the dynamics of OCT processes using an inverted fluorescent microscope imaging system, but this restricted measurement to a very small number of isolated tubule segments per kidney and animal, due to tedious and time-consuming set-up procedures for each segment. "The new method is far easier to use, and does not require a lengthy training period. Before, we could only examine one tubule at a time using the inverted microscope, but the new microplate reader-based technique allows us to perform several assays in parallel. We can now study up to 300 assays at one time, which has increased the number of experiments that can be carried out with one animal enormously; this is a huge advantage and has significantly reduced both the time and cost of experiments," concluded Svenja.



Svenja prepares to analyze samples in the Infinite 200 PRO

To find out more on Tecan's Infinite 200 PRO series, visit www.tecan.com/infinite200pro

To find out more about UKM's Experimental Nephrology laboratory, visit www.campus.uni-muenster.de/892.html?&L=1



As the 2011 winner of the Tecan Award, Svenja's prize was a weekend in the romantic city of Salzburg, which included a tour of Tecan's Detection Headquarters in Grödig, Austria. Svenja described her visit to Austria: "Our trip to Salzburg began with a short visit to Tecan's production site on Friday morning. It was really interesting for me to see the inside of the microplate reader that I've worked with for such a long time, and to hear about other promising developments at Tecan. I gave a presentation about my research, and I really appreciated everybody's interest in my work; we had a valuable discussion and I received some really good suggestions for improving our technique even further."



Hohensalzburg Castle, one of the largest medieval castles in Europe

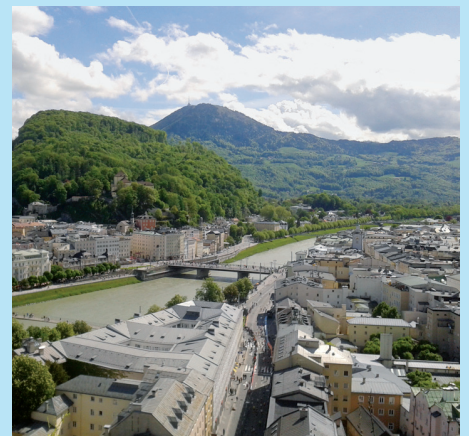


Svenja enjoying an informative tour of Tecan's production site

"Afterwards, it was a great honor for me to receive the Tecan Award. The rest of the weekend was spent enjoying the sights of Salzburg. Of course, we took the hard climb up to Hohensalzburg Castle, where we were rewarded with an amazing view over the city and the panorama of the Alps. We also loved having the delicious breakfast in our fantastic hotel right beside the Salzach, the river which parts Salzburg into its historic city centre and the new town. All in all, we will always remember our great weekend trip to Salzburg with a smile!"



Svenja and Richard enjoying the magnificent view across Salzburg



The Salzach river in Salzburg