

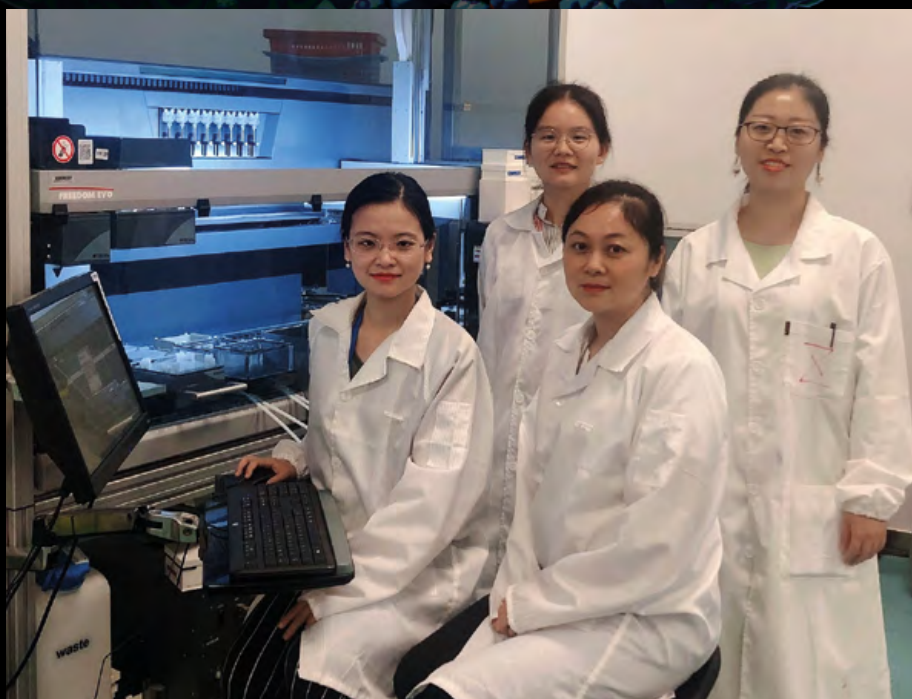
# Customized solution supports automated compound management in core facility

**G-protein coupled receptors (GPCRs) have an integral role in the development of various diseases, and are therefore a key focus for many researchers investigating novel drug targets or attempting to understand more about human health. Scientists at ShanghaiTech University have implemented Tecan Labwerx™ customized laboratory solutions for compound management in their busy core facility, and are using these automated systems to process high throughput assays, ultimately resolving important GPCR structures.**

Researchers at the iHuman Institute of ShanghaiTech University, China, are working to resolve various protein tissue structures. This data will help scientists to understand more about the body as a whole, as well as on a molecular and cellular basis, in order to develop treatments for a range of diseases and improve human health. Dr Yueming Xu, Director of the Assay Development Core at the university, explained the workflow of the lab: “Our group works on high throughput screening processes, mainly focusing on the structure and function of GPCRs. This requires screening for ligands that bind to G-proteins and activate signaling pathways in the human body. We have worked on many different GPCRs, and have publications looking into cannabinoid, serotonin and dopamine receptors, to name a few. Our expertise is in resolving the molecular

structure of these proteins, and we work closely with a very skilled imaging group that can determine the finer detail of protein and cell structures, offering a wealth of information.”

“As a core facility, we help other scientists at the university prepare samples for high throughput assays, so if they are studying a particular GPCR and want to screen for ligands which can bind to it, that’s where we step in. We manage a large biobank – a compound library that covers all 826 GPCRs in the human body – where we have at least three sets of different constructs for each of the receptors, so over 2,000 plasmids in total. These samples are stored in an automated freezer, and we use a customized Tecan liquid handling workstation – based on a Freedom EVO® 200 platform – to



Yueming Xu and the team at the iHuman Institute of ShanghaiTech

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prepare the plasmids and manage the compound library, as well as occasionally helping us to prepare the screening assays.”

The Assay Development Core first decided to explore automated systems for its DNA preparation workflow in 2015, looking at the various off-the-shelf options available before choosing a Tecan Labwerx customized solution. Yueming continued: “I joined the iHuman Institute in 2014, and a year later we started to consider automation options. We needed a solution that could be used to prepare and back up our biobank library, and we also wanted to see if we could automate the plasmid extraction process. We had an outline of the kind of system that we were planning to build, and talked to a few different companies to discuss our requirements, as we were not quite sure what kind of integration we could have. Each company gave us an integration proposal and, after discussing our experimental plan with various experts, it was Tecan that stood out from the crowd, offering us a very detailed plan of exactly how everything would work – it was a full solution. This made me confident that Tecan understood the lab’s needs, that the set-up would be customized exactly to our application,

and that we would have a fully operational system up and running as quickly as possible.”

The Assay Development Core now has a tailored solution that fits all of its requirements. “We take the compound plates out of the freezer and load them into the automated Cytomat™ 10 Hotel. The system spins them down in the integrated centrifuge and replicates them, performing serial dilutions as required to generate the assay plates. These plates are then automatically sealed and returned to the hotel, ready for us to take out and run our experiments. Running the workflow is easy and reliable; as the instrument is automated, we know that there is no chance of human error in the process. We actually have two workflows that run perfectly using the same platform, as we use the system to both prepare the compound libraries and process the plasmids. We initially thought that if we wanted to switch the process, then we’d need to rearrange the layout on the workstation, but the two different set-ups can actually be run on different days without making any changes.”

“It’s fantastic to have one compact system that has an integrated

centrifuge, stacker, sealer/peeler and capper/decapper. This level of automation has now taken over a huge portion of our workflow. We originally set up our experiments with a semi-automated desktop liquid handler; each plate took around 20 to 30 minutes for two people to prepare, and we needed to manually label them ourselves. On the Tecan system, we only need one member of staff to monitor it from time-to-time, and we can prepare 12 to 16 plates a day. Last year, this allowed us to process 40,000 compounds into three different formats – 2D barcoded tubes, 384-well plates for acoustic dispensers, and regular 96-well plates – for different applications.”

“Implementing the Tecan Labwerx solution has really helped us to manage our workload, which is important for a large lab in a core facility that is shared between various institutions and departments across the university. I have shared my positive experiences with Tecan with other researchers at the university and now, within our core facility, there are three other groups using Tecan instruments for various projects – such as phage display, PCR set-ups and cell-based assays,” Yueming concluded.

To find out more about Tecan’s Labwerx solutions, visit [www.tecan.com/labwerx](http://www.tecan.com/labwerx)

To learn more about the iHuman Institute, go to [ihuman.shanghaitech.edu.cn](http://ihuman.shanghaitech.edu.cn)