

Supporting Zika virus drug screening in Brazil

Several outbreaks of the Zika virus have been reported around the world since its discovery in 1947, but a commercially available treatment for the disease is still not available, and scientists continue to search for the best antiviral agent. Professor Martin Würtele and his colleagues in the Department of Science and Technology at the Federal University of São Paulo recently published a study identifying several natural substances that showed potent antiviral activity against the Zika virus protease.

The Federal University of São Paulo (UNIFESP) is a well-ranked, government-led academic institution in the vibrant financial center of Brazil. Its Department of Science and Technology (DCT), located on the outskirts of São Paulo state, carries out drug development for various infectious diseases, including the Zika virus and COVID-19, performing large-scale screening and forming important collaborations with other national and international universities. Professor Martin Würtele from the DCT explained: “The core of our research here is drug design, structural biological and molecular modeling, with the overarching aim of finding lead compounds for the development of new antiviral drugs.”

“Recently, our research has focused on finding novel antiviral agents to treat the Zika virus, which currently has no commercially available treatment,” Martin elaborated. “We carried out high throughput screening on a library consisting of 2,400 approved drugs, drug-like molecules and natural products in a bid to identify potent Zika virus protease inhibitors.¹ Zika virus protease is a well-established and essential target for antiviral agents, so we began by purifying recombinantly-expressed protease from the virus, before screening libraries of compounds against the enzyme using biochemical assays. Our study showed that several of the natural compounds – most of which were flavonoids – could successfully inhibit the activity of this



Professor Martin Würtele and his team use a Freedom EVO workstation to automate library screening for new antivirals

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protease, even at nanomolar levels, making them promising starting points for the development of future antivirals.”

“In our line of research, establishing a good biochemical assay and purifying high grade recombinant proteins – proteases in this instance – sets the stage for obtaining accurate results,” Martin continued. “That’s why we decided to automate all of our production and screening protocol with a Freedom EVO® 150 to guarantee pipetting accuracy. This instrument is coupled with the Infinite® M200 PRO multimode microplate reader, which offers accurate readings for the fluorescent marker peptides used in our assays, giving us a good indication of reaction kinetics, even at below micromolar affinity.”

“We opted for this set-up because many members of our team had enjoyed working with Tecan instruments in the past, and in much larger diagnostic or drug development laboratories, which we believe is always the best reference when buying new equipment. Once you start working with a company that meets all of your needs, there is very little reason to change! Crucially for us, Tecan is also one of the few leading providers that has a good, local service organization in Brazil – RChisto Soluções LTDA. This was a huge deciding factor for our team, as we were able to work closely alongside the Tecan representatives, who demonstrated how to use the equipment and made model calculations for how accurate our pipetting would be. We had the whole workflow planned before even buying the devices, and the Brazilian representatives made sure that we had everything we needed. Since then, they have continued to be fantastic, training all of our team members on the

equipment and answering any questions that we may have. I cannot express how helpful this was.”

“Introducing these instruments has been really great for the whole team, but especially for the students. Learning to work with automation is crucial for their career progression in drug discovery, as this is where the whole industry is headed. Equally, we can attract more students by offering them the chance to work with top-of-the-range equipment. Prior to this, the team was having to pipette 384-well plates manually, which was tedious and really took the enjoyment and precision out of our work. These systems have truly revolutionized our individual assay productivity, and the rate at which we can produce research papers. The open nature of the Freedom EVO platform, and resulting potential for upgrades, also unlocks further possibilities for us in the future, which is very exciting for academia.”

1) Coelho, C *et al.* Biochemical Screening of Potent Zika Virus Protease Inhibitors. *Chem Med Chem*, 2022, **17**(8), e202100695.

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For more information about the Department of Science and Technology at the Federal University of São Paulo, visit www.unifesp.br/campus/sjc/dct

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