

Darting from plate to plate



Dart NeuroScience specializes in the development of novel therapeutics targeting neurological disorders, with an emphasis on impairment of cognitive functions such as memory. The company generates over a thousand new compounds every week to feed into its active drug discovery pipeline, creating a significant challenge for the compound management team.

Medical advances over the last century have dramatically increased life expectancies in developed countries, placing ever-greater importance on geriatric care. The aging process, together with cognitive disorders such as Alzheimer's disease and Parkinson's disease, can lead to significant loss of memory function, creating a niche for therapeutic agents specifically targeting memory disorders. Dart NeuroScience – which recently moved to a new headquarters at Scripps Ranch in San Diego, California – is one of the few companies globally to be addressing this largely unmet medical need, aiming to discover new technologies and develop novel therapies to help maintain cognitive vitality throughout life.

The company's multidisciplinary strategy includes the identification of new therapeutic targets, the generation of closely-related compound libraries and the creation of novel functional assays, as well as the development of specialized clinical therapies. This multi-faceted approach requires a large number of compound plates to be generated for high throughput screening, as Joe Zer, a

scientist at Dart NeuroScience, explained: "Like any drug discovery company, we need the ability to test large numbers of compounds quickly and effectively. The advent of high density microplate formats – particularly 1,536-well plates – has considerably increased our ability to screen many compounds in parallel, but this has created a number of logistical challenges for compound management."



Joe Zer, Research Scientist

"Our synthesis group produces over 1,000 new compounds every week which need to be transferred to compound plates for screening and profiling. We also periodically buy in compound libraries from commercial manufacturers – sometimes up to 30,000 compounds at a time – which need to be accurately aliquoted and diluted

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without introducing manual handling errors that could affect downstream processes. As a result, automated liquid handling has become an essential part of our workflow, enabling us to achieve the

throughput necessary to keep pace with our various drug development programs, generating hundreds of precisely filled assay plates a day."

"We have been using Tecan liquid handling workstations since the company was founded in 2007, and have over half a dozen Freedom EVO® workstations performing a range of activities," added Jose Quiroz, Manager of Laboratory Systems. "As the company has grown, the number of projects we have running at any one time has obviously increased, and so we were keen to purchase a new platform to increase the throughput of assay plate generation. We evaluated several solution providers and decided to partner with Tecan, using the company's Fluent™ platform. The huge on-deck capacity offered by this system, combined with its high speed pipetting capabilities, was very appealing to us."

Joe continued: "The only potential drawback was that we use a unique 1,536-well microplate format. Although these plates conform to ANSI/SLAS standards, they have rounded flat-bottom wells to allow use of a pin tool in downstream operations. Our local Tecan representative was confident that this wouldn't be an issue, so took one of our plates to run on a demo system. He simply loaded the plate onto the system, and it ran perfectly first time using the standard 1,536-well microplate definitions pre-installed in the FluentControl™

software! Following that demonstration, we ordered our system straight away, and it was installed in June 2015. After a few weeks of familiarizing myself with the new instrument, I went on the Tecan

training course in North Carolina, and we have had the platform in routine operation since August.”

“The increased throughput the Fluent platform has already given us is fantastic. Where we could previously generate 16 compound plates at a time, we can now produce 32 in parallel, and in a short time frame. And it’s even better for dilutions; where we could previously create about 20 single dilutions in parallel, we can now do 56 in duplicate. It’s basically tripled the speed of most of our protocols. We are also considering installing a bulk dispense module for DMSO below the workdeck to further increase throughput, as the system’s Robotic Gripper Arm can easily access this below-deck area without too much compromise in the instrument’s overall capacity.”

“Although our workstation is very simple in automation terms, the Fluent platform’s high definition liquid handling capabilities are still very impressive. The Multiple Channel Arm moves very quickly compared to most pipetting robots on the market, and the Path Finder™ feature means that it always takes the optimal route between plates. The Active Stop and Resume function – introduced with the latest software update – is also fantastic; if you see something wrong with the set-up on the workdeck, you can just open the door and it stops. Once you’ve dealt with the problem, you just press ‘Retry’ and it picks up where it left off, avoiding the need for laborious resetting or reprogramming of the instrument. The software is also both powerful and very convenient to use; the Zero G teaching capability makes it extremely quick and easy to define plate positions, and almost every aspect of instrument control can be adjusted to make operations faster and more robust.”

“We are still in the process of learning the Fluent platform’s full capabilities and transferring existing protocols to the new system, but we are already very impressed with its performance. Once more of our staff have been trained on this instrument, we plan to consolidate as many of our standard compound management functions as possible onto the system, providing a single ‘go to’ solution for plate generation,” Joe concluded.

To find out more about Tecan’s Fluent laboratory automation solutions, visit www.tecan.com/fluent

To learn more about Dart NeuroScience, go to www.dartneuroscience.com