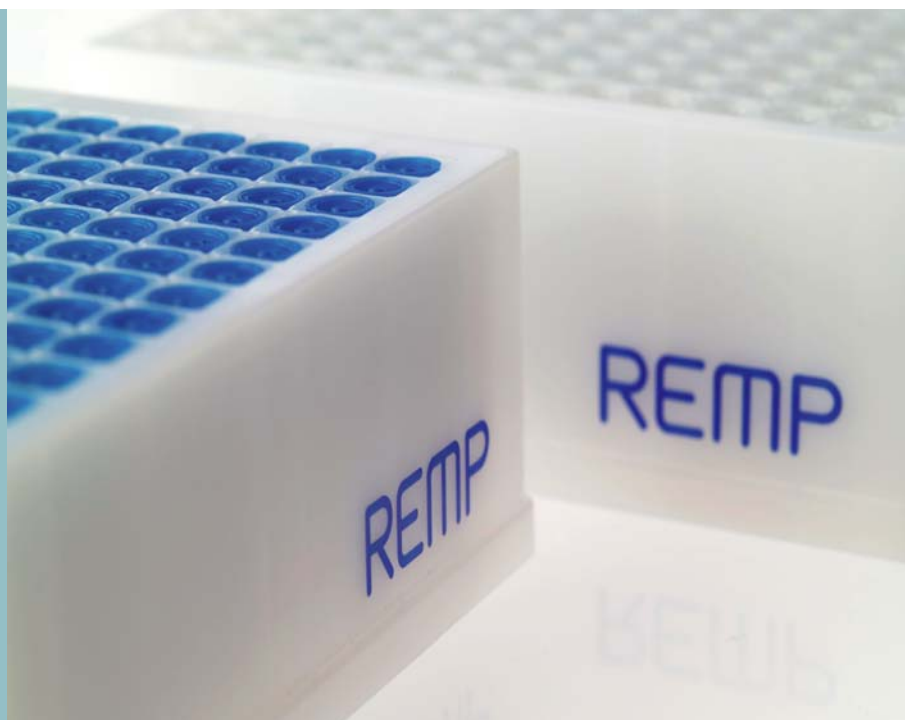


Managing lead optimization compounds with REMP technology



Dr Claude Dufresne

The Rahway Facility for Automation and Screening Technologies, which is based in New Jersey, USA, and is part of Merck Research Laboratories, is using a REMP Small-Size Store™ (SSS) to manage its thousands of samples needed for drug discovery investigations.



The central automation facility was created in 2005 to provide, in part, an integrated compound management service for the Merck Rahway Site. A robust and efficient sample storage and retrieval system is a vital part of the service.

“Our automation laboratory serves principally the lead optimization stage of drug discovery, so we receive several hundred samples per week from medicinal chemistry labs,” said Dr Claude Dufresne, Senior Investigator, who has been working at the Merck site since 1988 and has been developing automation methods and systems for most of the past ten years. “From those samples, we prepare serial dilution plates for distribution to various biological assay laboratories and for our own uses. We also store the samples in order to supply biology labs with samples for retesting and secondary assays; that’s why we needed the SSS.”

The samples are usually chemical compounds that have been synthesized as part of particular research programs and are based on lead compounds that may have come out of a high throughput screening campaign. The samples might be part of a chemical series based on these structures and evolved through traditional medicinal chemistry processes.

“We receive compounds from most of the research programs at our site, so the samples relate to a range of different drug discovery programs,” Dr Dufresne explained. “Some of our principal research interests include diabetes, obesity and atherosclerosis, for example.



REMP Small-Size Store

We collaborate with scientists in specific therapeutic areas not only by providing the sample management service, but also by assisting with assay development, optimization and implementation on automated systems. In this function, we also carry out some of the primary assays in support of medicinal chemistry.”

The automation laboratory manages its compound storage entirely through REMP technologies, including the SSS with its in-built Tube Punching Technology, the REMP 96 Tube Technology™ consumables, the 2D Code Scanner, and the eight position manual capper/decapper (REMP MCD8™), which the scientists have also automated using their own engineering and software.

“Initially it was the 96 Tube Technology that really attracted us, and then adding the SSS to make use of this technology was a real bonus,” Dr Dufresne said. “The REMP mini-tube and Tube Punching Technology is really a breakthrough for sample storage. Traditionally, compounds would be stored in deep-well plates, meaning that if you needed to cherry pick samples, then you would need to use liquid handling to aspirate samples from individual wells. By using the SSS with its in-built Tube Punching Technology we don’t need this step, we can just punch out the tubes that we want straight into a delivery rack, meaning that in one

system we can physically retrieve individual samples, as opposed to retrieving whole plates of samples.”

Using the SSS means that cherry picking occurs within the environmentally controlled storage system, so there are no freeze/thaw cycles on samples, and storage temperatures ranging from -20°C, +4°C or even more ambient temperatures, such as the 18°C used at Rahway, can be used.

“When samples are stored in vials, in boxes or racks, and placed in fridges or freezers, the management of that sample collection is a significant time drain,” continued Dr Dufresne. “It can easily take hours a day for someone to go through the activities of maintaining and retrieving individual samples, just for the daily work - but this all goes away with automated storage!”

REMP Tube Technology Consumables consist of individually sealed or capped tubes secured within their own Tube Rack. The tube transfer technology greatly improves the reliability of tube handling and the unique punching technique greatly reduces handling error rates, because the transfer is performed by a single axis movement. This technique is faster and more reliable compared to conventional pick and place methods, and also eliminates potential cross-contamination, exposure to air or dilution effects, which are often seen with samples undergoing traditional liquid transfer. The tubes virtually eliminate the risk of sample degradation and can be either individually sealed, for single use, or capped in an automated or manual fashion for multiaccess.

The scalability of the SSS means that up to two extension units can be added to the SSS, tripling the storage capacity and this is also important for the Rahway automation laboratory, as Dr Dufresne explained: “Another big attraction of the REMP technology for us was size; we needed a really small store, because we did not have much spare lab space at the time, and our needs in supporting the lead optimization could be met with just one or two of these units. Our current level of storage is only a few thousand samples, although it is now growing quite rapidly as we are beginning to store multiple concentrations and multiple copies of each sample. We use these units for short term storage of samples involved in active projects as, at the end of a project, all of the samples relating to that project will go to the main sample repository where millions of compounds are stored. Since it is very difficult to predict usage levels down the road as we continue to transform our research operations, it is comforting to know that doubling or tripling our local storage capacity would be an easy upgrade.”

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