

New tools for drug discovery

Cellular Dynamics in Wisconsin, USA, is using its Cellerity™ workstation for reliable culturing and differentiation of pluripotent stem cells, helping to provide the pharmaceutical industry with advanced tools for drug discovery and toxicology testing.



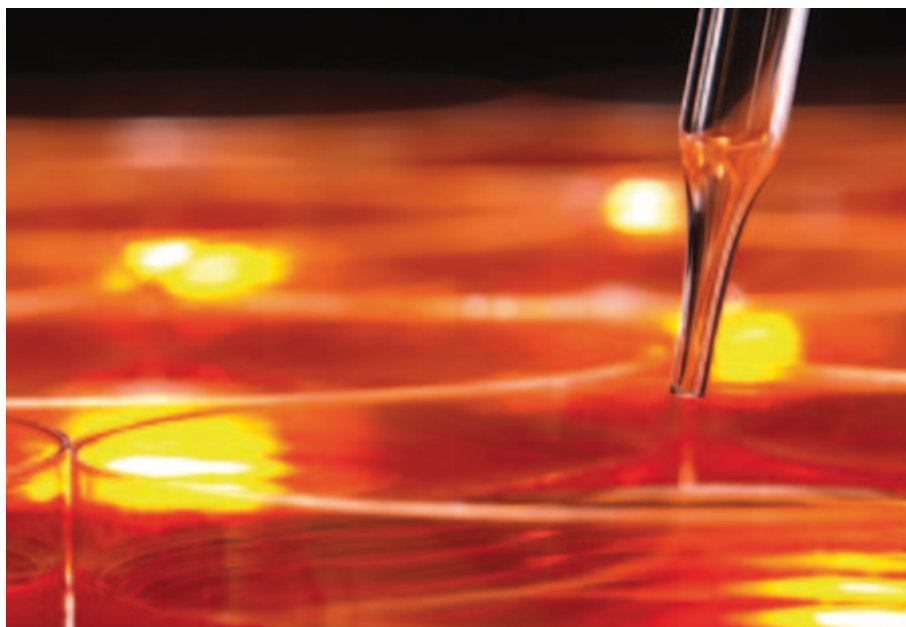
CDI's Chief Technology Officer, Nick Seay.

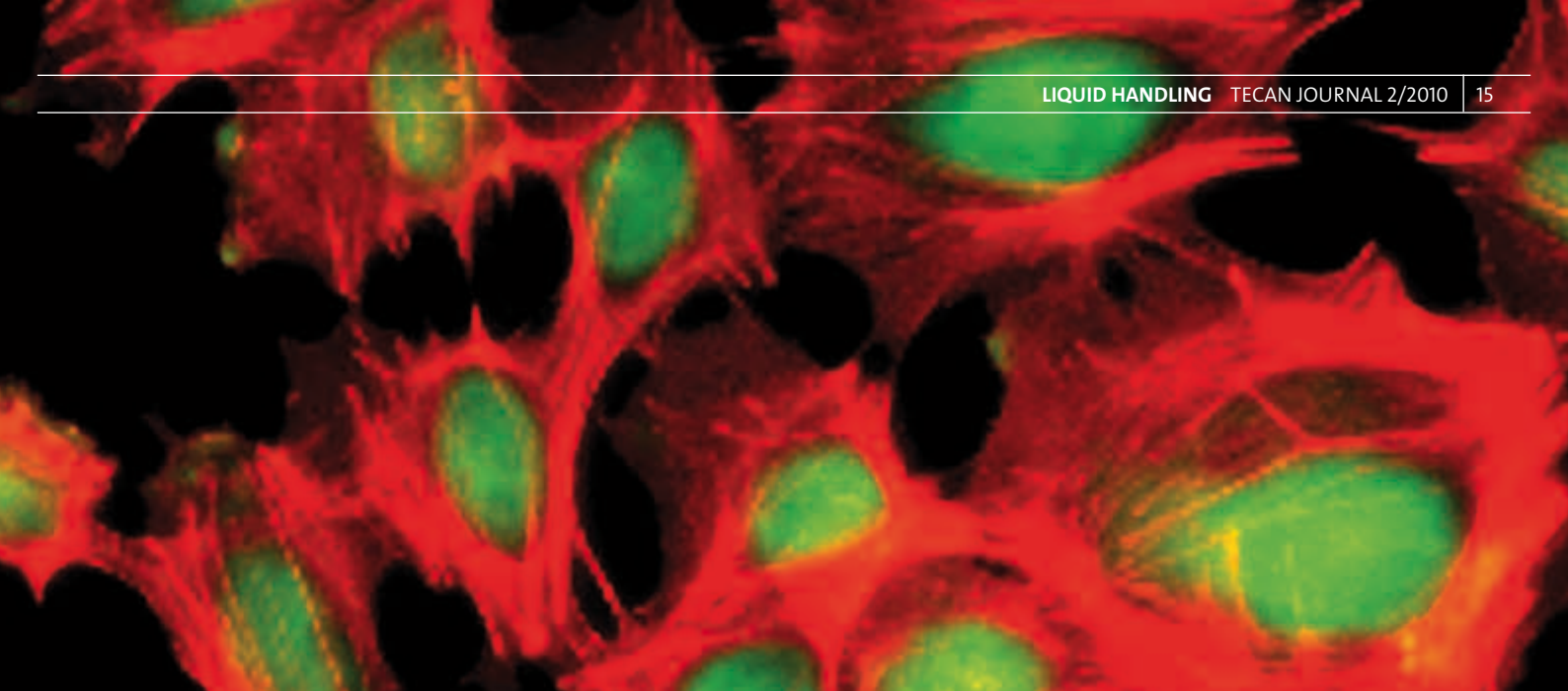
Cellular Dynamics International, Inc. (CDI) is a young biotechnology company based in Madison, WI, USA, developing stem cell-based technologies for the pharmaceutical industry. The Company provides terminally differentiated human cells to improve *in vitro* investigation of drug function and metabolism, and to accelerate drug discovery pipelines. CDI's Chief Commercial Officer, Chris Parker, explained the Company's approach: "Our primary focus is on inducible pluripotent stem (iPS) cells for toxicology testing and drug discovery. We develop a range of technologies based on iPS cells, including production of terminally differentiated human cells. These cellular systems are superior to current cellular models for *in vitro* toxicology testing, because they feature the full functionality and metabolism of *in vivo* cells and provide more representative data

for *in vitro* toxicology testing of drugs.

Our first product from iPS cells is human cardiomyocytes. Our iCell™ Cardiomyocytes have the same electrophysiological and biological properties as if they were *in situ* in the heart, including 'spontaneous' myogenic contraction."

Chris continued: "Having high quality iPS cells as the starting material is crucial to the outcome and optimization of our differentiation protocols and screens, and we are testing a Cellerity cell culture workstation from Tecan to help in this effort. Automation has the potential to remove human error and stabilize the culturing process, improving yield and uniformity of cells for further investigation. Having a large quantity of uniform cells is particularly important for differentiation protocols, as many of these methods are very inefficient





Cardiomyocytes.

in terms of cell yield, producing only a few fully differentiated cells. The predictability automation provides is very advantageous from a manufacturing viewpoint, especially as we are studying various differentiation pathways and cell types.”

Nick Seay, Chief Technology Officer, explained: “Our Cellerity platform allows us to combine reproducible cell culturing with both differentiation and screening processes on a single instrument. We use a 96-well microplate format, which provides higher throughput compared with the 6-well plates that are typically used for manual stem cell differentiation. We are still in the process of optimizing the many biological parameters of the process on the workstation, and so have not yet tested the capacity limits of our system. In addition to cardiomyocytes, we are now working on various other cell types of interest to toxicologists and drug discovery – such as neural and endothelial cells and hepatocytes – and automation fits perfectly with this, allowing parallel differentiation of numerous cell types. We are also adding new iPS cell lines to our catalogue, starting with blood samples from individuals or distinct population groups to create stem cells. This will allow research into the differing cell biology between individuals and the efficacy of drugs across diverse populations, in tissues such as heart, blood vessels or liver.”

Chris added: “We are currently working on an ethnic diversity panel for cardiomyocytes, allowing the study of inter-ethnic variation in heart biology that could affect response to drugs. This kind of study could help to

improve treatment of patients in the future, individually tailoring therapy to improve efficacy and patient safety.”

“In addition to improving the quality and consistency of our stem cell cultures, automation may give us new capabilities, allowing us to approach problems that would otherwise be impossible,” Nick continued. “We believe that the study of stem cell differentiation provides novel opportunities for drug discovery, and so we are very interested in having the ability to screen libraries of small molecules for their effects on cell differentiation processes. Our Cellerity system gives us this capability, allowing us to passage iPS cells through multiple generations, then differentiate them to become specialized cell types. We are now using this approach to explore the ways that small molecules may affect the differentiation process, and look forward to a time when these screens are performed entirely automatically.”

For further information on Cellular Dynamics International, Inc., visit www.cellulardynamics.com

To find out more on Tecan’s Cellerity workstations, visit www.tecan.com/cellerity
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