Don't miss a beat with live cell imaging

US-based company zPREDICTA™ has created a novel 3D technology that reconstructs physiologically-relevant and organ-specific human microenvironments for drug discovery and development. High throughput cell imaging and real-time cytometry of these 3D cultures can give a day-by-day account of cellular behavior and modulations of various immune cell populations to evaluate the efficacy of anticancer drugs.

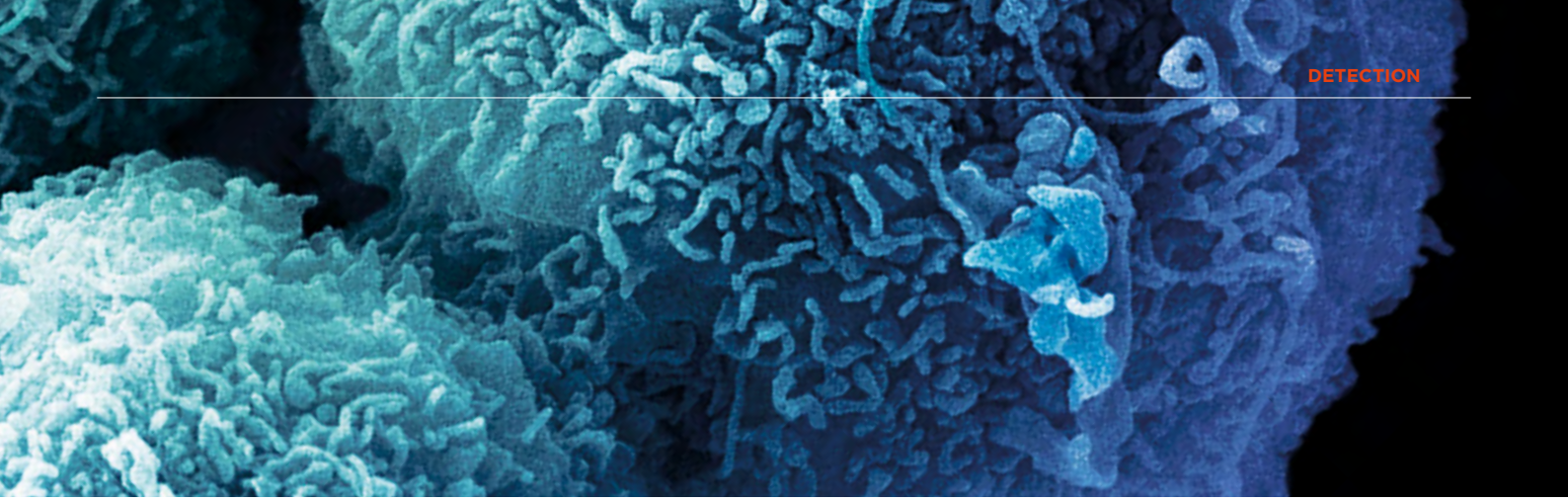
zPREDICTA
Biology Reconstructed

Too often, drugs that are tested in preclinical trials later fail in human clinical trials due to their lack of efficacy. This is largely because drug discovery tends to rely on either non-physiological 2D cell culture or physiologically-irrelevant mouse models that can only go so far in representing human diseases or the complex landscape of the human tissue immune response. Tissue specialist zPREDICTA, based in California, USA, has developed a novel 3D culture technology for the recapitulation of physiologically-relevant and organ-specific human microenvironments. This platform mimics the native architecture and behavior of human cells of the tissue of interest, and is available for various organ-specific research focal areas, including reconstructed bone marrow (r-*Bone*™), breast (r-*Breast*™), lung (r-*Lung*™) and stomach (r-*Stomach*™). This comprehensive 3D culture approach conserves many cellular and extracellular elements, and is the closest drug developers can get to human tissues in preclinical trials.

Dr Julia Kirshner, founder and CEO of zPREDICTA, explained: "Our company was established with the goal of creating more accurate and predictive model systems for drug developers to test new compounds, so that they are actually effective in clinic. In oncology – or any disease field for that matter – drugs need to be tested against models that match the conditions found in human microenvironments, so that they behave in the same way as they do in patients. We began by developing tumor-specific models to simulate the complex human organ environment for testing various anticancer drug types – including small molecules, antibodies, antibody drug conjugates and CAR-T cells – and have since branched out into other organ-specific models."

Julia continued: "Our work really focuses on immune oncology applications, looking at the interaction between different cell populations to determine how various types of drugs can trigger immune cell responses. We routinely perform large-scale drug testing studies and acquire data from different doses and at various time points, which can be tedious and extremely difficult to do manually without making mistakes or transfer errors. We wanted to increase our throughput and accuracy with automation and, in 2016, invested in a D300e Digital Dispenser from Tecan, which made a tremendous difference to our workflows."

"Our success with the D300e has helped us build a trusting working relationship with Tecan, and we have since collaborated on more projects," Julia added. "Recently, we've been optimizing the Spark® Cyto plate reader for high throughput cell imaging and real-time cytometry in our 3D cultures. The conventionally static method of examining cells under a microscope is



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labor intensive and time consuming, often taking days and requiring constant refocusing and plate movement to capture the right shot. Instead, we wanted to invest in a high throughput imager, but the lower-end systems were not of a high enough quality, and we couldn’t risk trading off image resolution for throughput. We needed something more sophisticated that could give us good quality images – especially from 3D cultures – and the Spark Cyto does just that.”

“The system saves us a huge amount of time by capturing good quality, fast and dynamic images of our 3D cultures, and automatically indexing the image to the same spot each time. It also overlays each fluorescent channel for easy comparison and to avoid lengthy post-processing. The images can be captured in real time, thanks to the flexible temperature and carbon dioxide controls, giving us a clear picture of the step-by-step cell response to drug treatment. The fluorescence capability of the Spark Cyto allows us to follow the behavior of different labeled cell types within the extracellular matrix, which would be very difficult to achieve otherwise. This is a real added bonus for our customers too, as they often want to know whether immune cells are capable of reaching a target area unaided, and this allows us to give them a concrete answer and day-by-day account.”

“The versatile Spark Cyto multimode reader is also a valuable tool for multiplexing analyses. Physiologically-relevant 3D cultures are far superior to other modeling methods for predicting clinical outcomes, however, they are often more expensive and time consuming to build than 2D cultures. By multiplexing assays, we can gather more readouts and information from each experiment, saving time and resources. For example, with the Spark Cyto, we have been able to develop a multiplexed, sequential protocol of LIVE/DEAD cell staining followed by CellTiter-Glo® analysis, all with just one compact instrument.”

“Both the D300e and the Spark Cyto have been really beneficial for our regular workflows, and are routinely applied to all internal and most customer projects. The systems are easy to maintain, and the software has been updated remotely by Tecan, so that we could continue operating throughout the COVID-19 pandemic. We have established a great relationship with Tecan that I feel we can both benefit from, and I look forward to this continuing in the future,” Julia concluded.

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Tecan D300e Digital Dispenser is a product of HP Inc. CA, USA.

To find out more about Tecan’s Spark Cyto, visit
www.tecan.com/sparkcyto

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