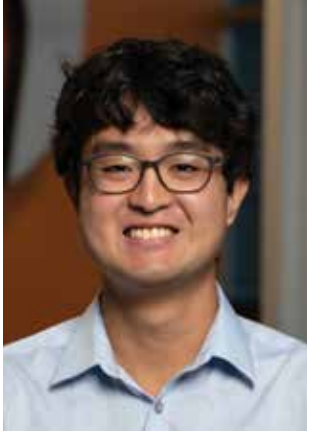
Thought Leadership

Mimicking the Physiological Environment to Create Uniform Spheroids

A UNIQUELY DESIGNED 3D CELL CULTURE PLATE SUPPORTS THE FORMATION OF UNIFORM AND STANDARDIZED SPHEROIDS WITH HIGHER YIELD

by Michelle Dotzert, PhD

▲Patrick Kugelmeier, MD



▲Nicholas Hong

***Patrick Kugelmeier**, MD, is the co-founder and medical director of Kugelmeiers Ltd. His research focused on islet cell transplantation and early stem cell differentiation, and his clinical training includes visceral, transplant, and trauma surgery.*

***Nicholas Hong** is a product specialist at Heidolph North America. He holds a bachelor of science degree in molecular and cellular biology from the University of Illinois at Urbana-Champaign, and has previously worked as an assistant scientist at PPD Inc.*

Q: What led you to develop the SP5D cell culture plates?

PK: A major problem we encountered in our islet cell transplantation research was spheroid size. The larger the spheroid, the more likely it was to die because there was no supporting vasculature to supply oxygen to its center. We needed to make these spheroids smaller and needed a plate that would standardize the process.

Q: What types of cells can be cultured in these plates?

NH: Numerous cell lines have been used successfully with our plates, including islet cells, cancer cell lines, and stem cell lines, among others. Some of the feedback we have received is that users believe the plates' ability to distribute cells more uniformly allows cells to aggregate equally into perfect spheroids.

Q: Why is uniformity an important factor to consider when designing 3D cell culture plates?

NH: We noticed that many 3D cell culture plates compromise on either the number or the uniformity of spheroids that can be produced. The SP5D plates were designed to yield a large number of uniform spheroids—up to 9,000 on a single plate. Standardization also plays a huge role in the field of "-omics," in which research is standardized with respect to the original material used.

Q: What differentiates the plates you developed from other cell culture plates?

PK: The plates were created with an emphasis on safety. We wanted to create something that can be FDA approved and CE certified. What is unique about the plates is that the microwells are designed with a particular cavity angulation and round tip at the bottom. This provides the cells even exposure to morphogens which is a prerequisite to avoid uncontrolled cell differentiation—a huge danger in any stem cell therapy.

Q: What applications do you think benefit most from these plates?

PK: Some of the most promising applications for the plates are *in vivo* applications and translational research. The plates would give scientists enormous opportunity for discovery, and unlike other platforms, they would be adapted for downstream regulatory processes. They are also a promising platform for cancer research and diagnostics. For example, many solid cancers originate from stem cells, and the platform could be used to recreate the cancer cell environment—including cell signaling and physiology—to compare chemotherapy agents and determine which may be the most effective treatment for the patient.

Q: Do users require any additional products or training to use SP5D plates?

NH: The plates were designed for use right out of the box, with a proprietary coating pre-applied to each plate. This eliminates variability associated with applying coating, and allows cells to distribute evenly into microwells through gravity without additional centrifugation steps.

Michelle Dotzert, PhD, is the creative services manager at Lab Manager.

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