Discussion

Using the CellRaft technology, we have demonstrated an efficient, user-friendly workflow for growing and isolating hundreds of single iPSC-derived neuronal organoids. The CellRaft Array provides a unique platform for organoid culture that allows for spatial segregation of cells and reliable imaging over time, enabling clonal organoid propagation that is not possible using standard methodologies. A special feature of the platform is CellRaft Cytometry, which offers software-guided selection of CellRafts containing single organoids based on desired phenotypic, morphologic, and fluorescent properties for isolation using the AIR System. Our data demonstrates that the CellRaft Technology solves several challenges in cerebral organoid workflows, including higher yield and a less manual workflow, the ability to phenotypically characterize a heterogenous organoid population, and automated isolation of individual organoids of interest into 96-well plates
for downstream assays. Altogether, the CellRaft Technology unlocks the potential for generating 96-well plates of custom, edited iPSC-derived organoids that can be used for any downstream application.

Conclusion

To accelerate the utility of iPSC-derived organoids into pre-clinical applications, there are three main challenges that must be addressed- scalability, reproducibility, and automated solutions for streamlining otherwise manual workflows. Using the CellRaft Array, hundreds of organoids can be grown in a single focal plane using less media and ECM reagents, compared to standard culture methodologies. Increasing organoid number, while reducing reagent usage, allows researchers to increase the scalability of generating organoids and ultimately increases the throughput of downstream assays. In addition, using the image-based software-guided selection tools, we have shown that selecting organoids based on size and other phenotypic characteristics improves well-to-well reproducibility for downstream assays and allows for normalization across multiple arrays and experiments. Lastly, the CellRaft AIR System provides an automated solution for isolating individual pre-characterized organoids into 96-well plates for downstream use. This, paired with more streamlined workflows for generating organoids, fills an unmet need for automating the process of generating reproducible 96-well plates for downstream organoid screening assays. Altogether, the CellRaft Technology offers a solution to move these more physiologically relevant organoid models into drug discovery and pre-clinical pipelines in a more efficient, cost-effective, and reproducible way.

To learn more, visit cellmicrosystems.com

801 Capitola Drive, Suite 10
Durham, NC 27713
info@cellmicrosystems.com