

C-Stem™, a new technology to scale-up cell therapy manufacturing

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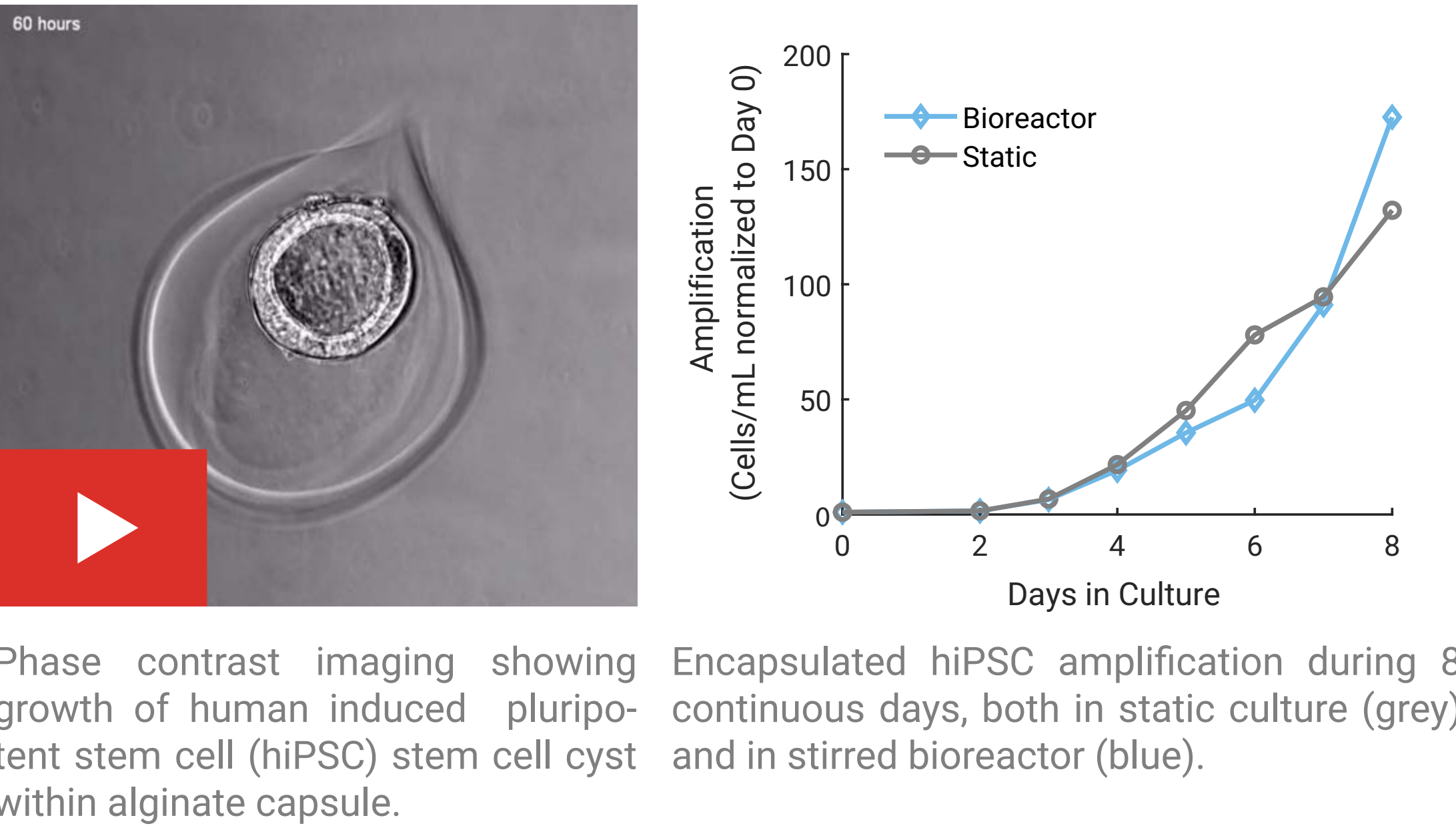
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Overview

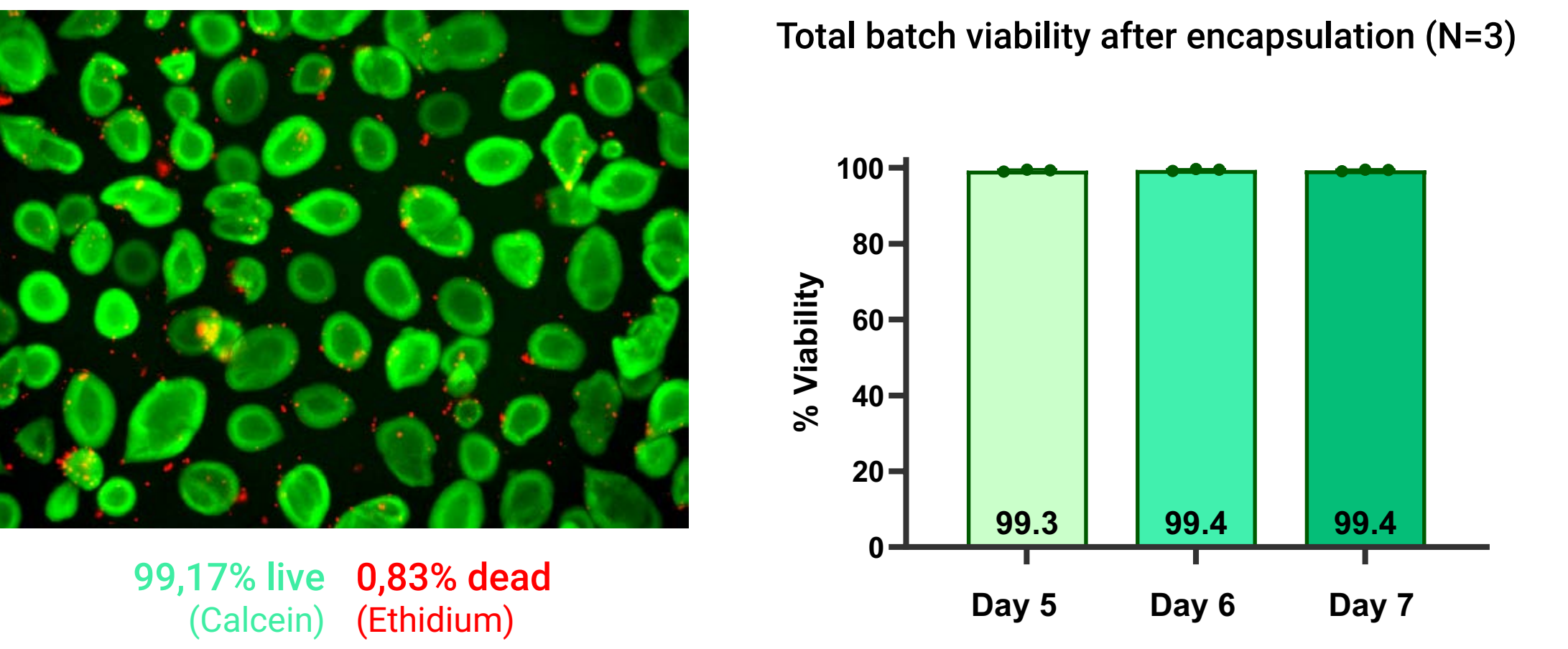
Treefrog’s goal is to allow access to cell therapy for all. To reach this goal, Treefrog is aiming to increase both the quality and production efficiency of cell therapies by better reproducing the cellular niche* under high throughput conditions. Better control over the cell microenvironment allows to both increase the quality and decrease the production cost of cell therapies.

*Luminogenesis is an intrinsic property of human pluripotent stem cell (hPSC)^[1].

hiPSC Amplification (x100/week)

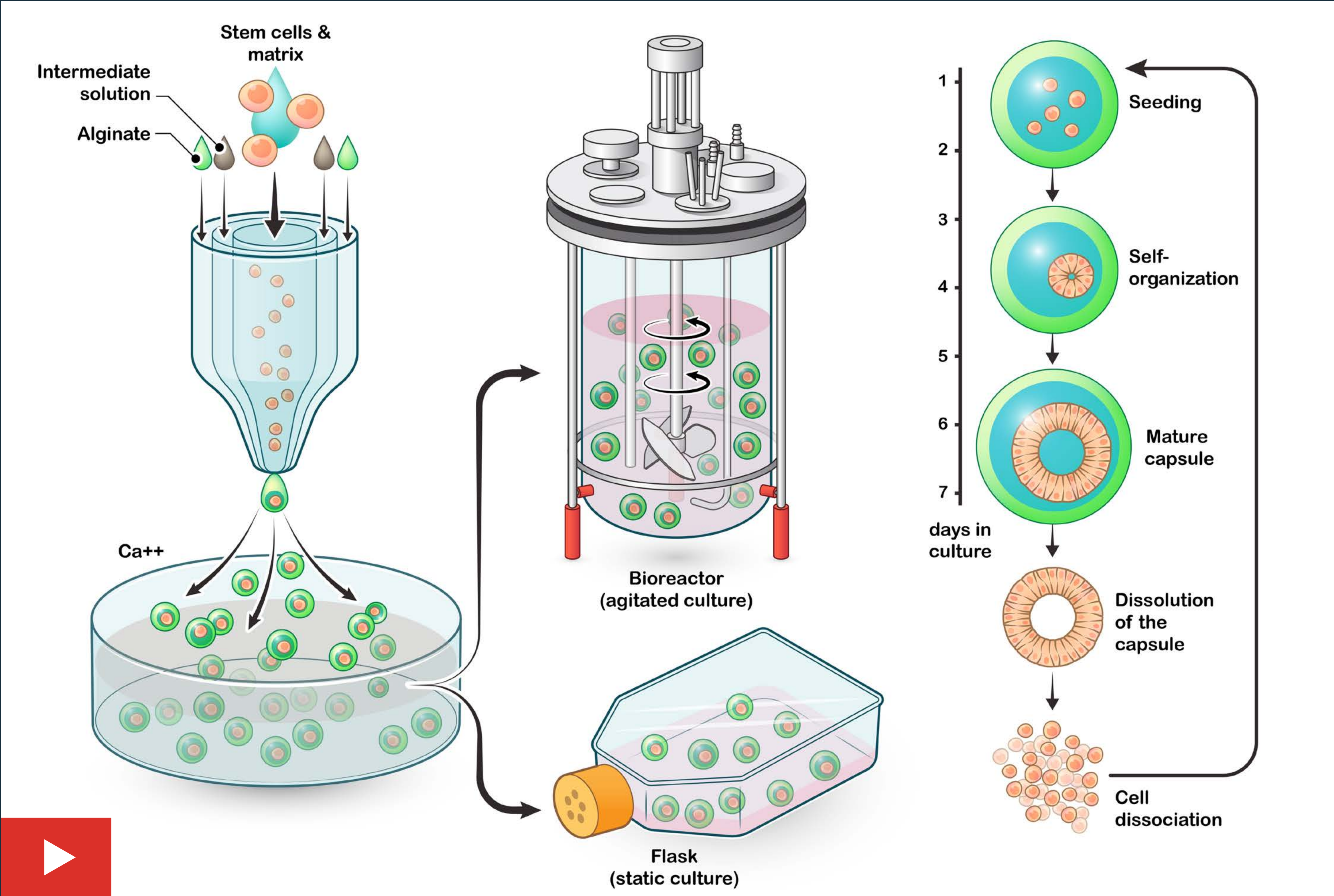


hiPSC Viability (>95%)



Viability of hiPSCs assessed by NucleoCounter NC-3000

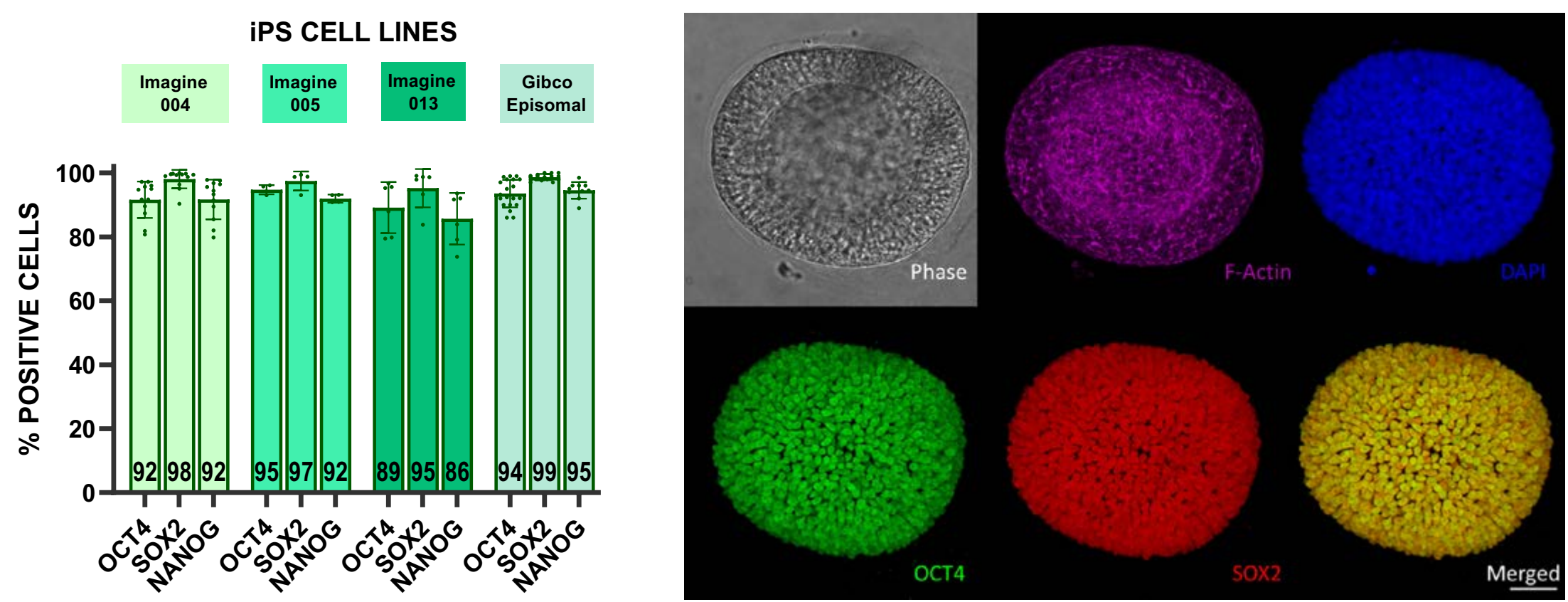
High-throughput cell encapsulation technology enables large-scale and high quality hiPSC culture & differentiation in bioreactors



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hiPSC Pluripotency (>95%)

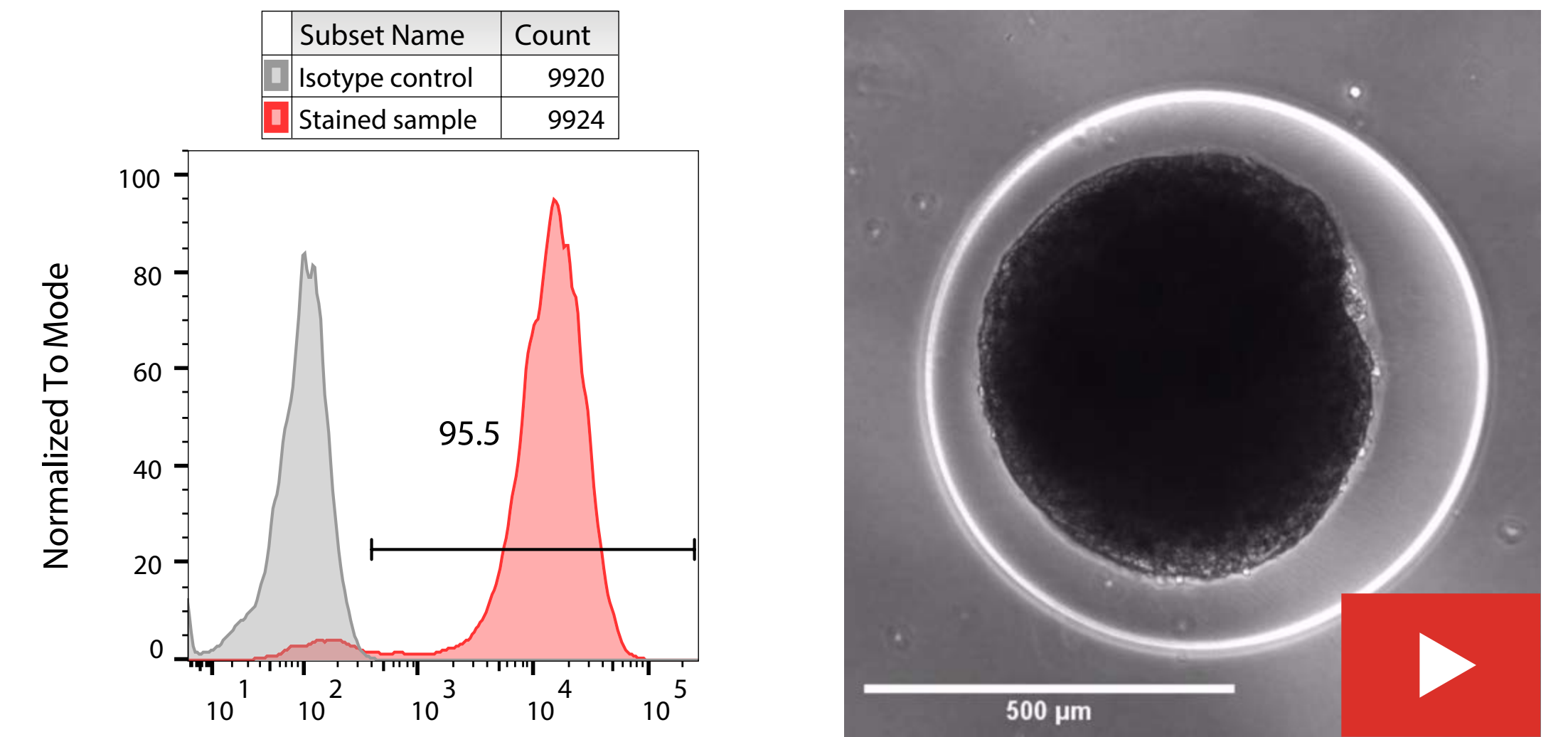


Pluripotency 7 days after encapsulation (4 hiPS lines) assessed by flow cytometry

Primed (epiblast-like)^[2] hiPSC cysts, fixed and stained for various markers of pluripotency

Directed Differentiation

Demonstrated ability to differentiate cells grown in capsules into cardiomyocytes using established protocols^[3]



Flow cytometry showing purity of cardiomyocytes, as indicated by positive cardiac troponin T (cTnT) staining.

Encapsulated cardiac cells differentiated from hPSC cells beating.

Impact

C-stem™ allows for bioreactor culture and differentiation of hPSC, with applications ranging from scale up and banking of pluripotent stem cells to neurodegenerative disease cell therapy^[4], with a microtissue end-product optimized for delivery at the preclinical stage. C-stem™ is projected to reach cGMP compliance in 2021 and is compatible with the culture of over 20 cell types.

References

[1] Taniguchi, K., et. Al. Stem Cell Reports. Lumen Formation Is an Intrinsic Property of Isolated Human Pluripotent Stem Cells. (2015).

[2] Shahbazi, M.N., et al. Nature. Pluripotent state transitions coordinate morphogenesis in mouse and human embryos. (2017).

[3] Burridge, P.W., et al. Nature Methods. Chemically defined generation of human cardiomyocytes. (2014).

[4] Alessandri, K., et al. Lab on a Chip. A 3D printed microfluidic device for production of functionalized hydrogel microcapsules for culture and differentiation of human Neuronal Stem Cells (hNSC). (2016).