

A 3D cell culture technology for high quality, high throughput iPSC culture and differentiation



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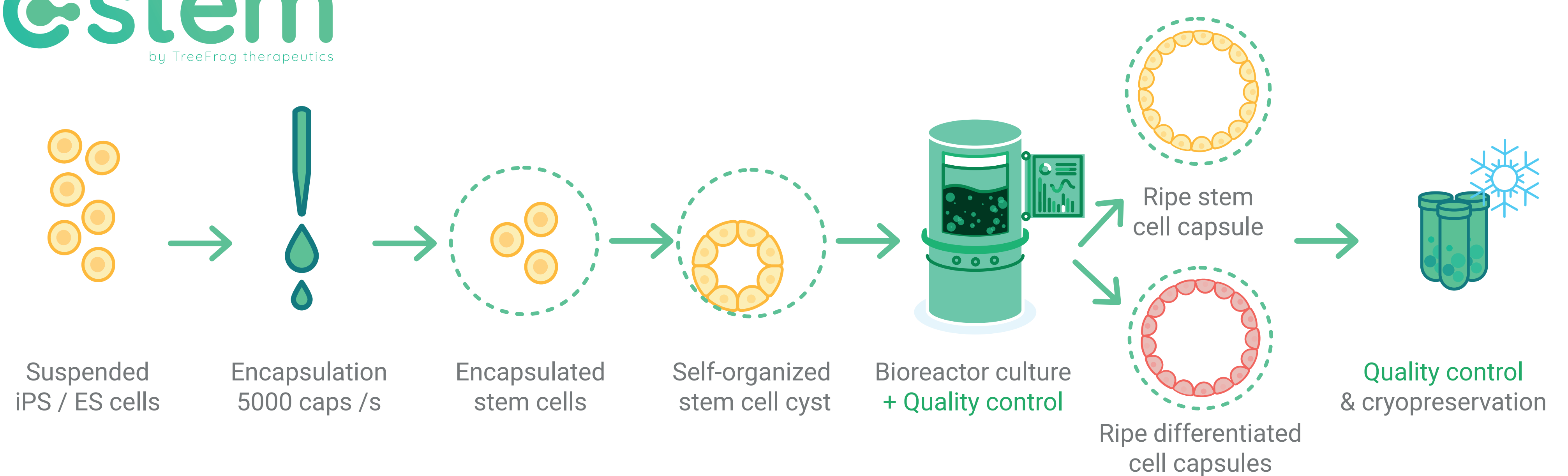
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Overview

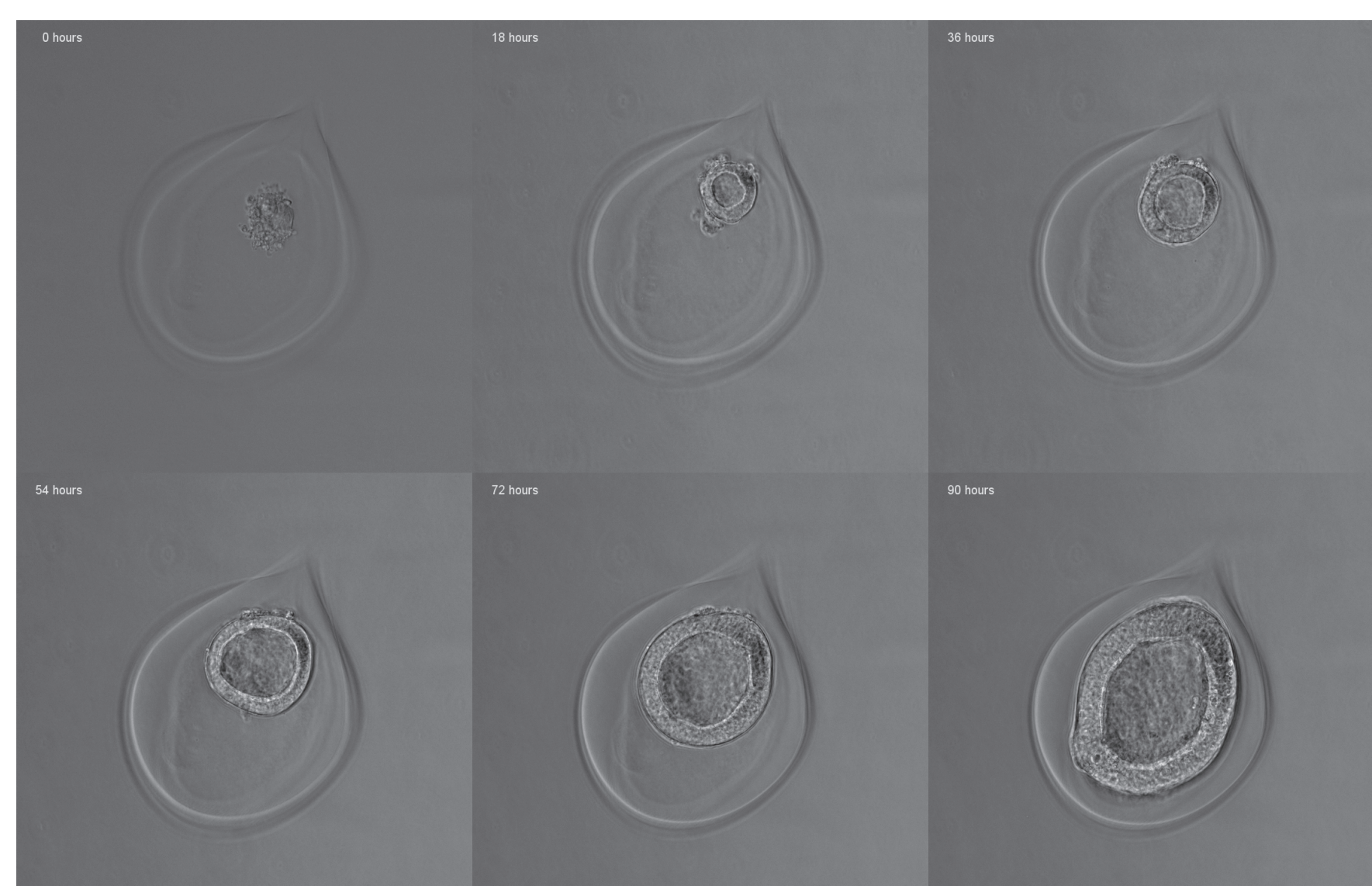
Treefrog's goal is to allow access to cell therapy for all. To reach this goal, Treefrog is aiming to increase both the quality and production efficiency of cell therapies by better reproducing the cellular niche* under high throughput conditions. Better control over the cell microenvironment allows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

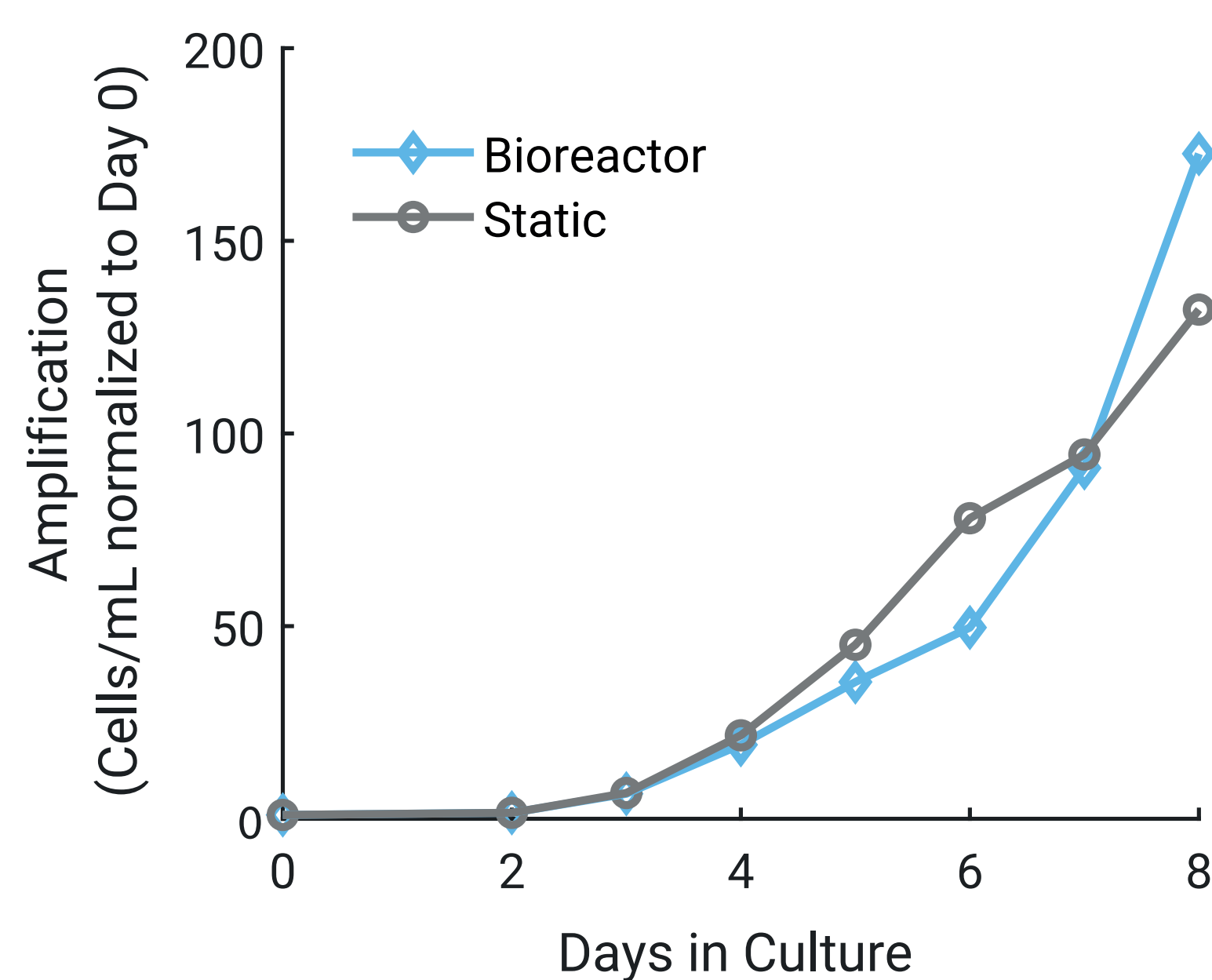


iPCS Amplification

x100 per week



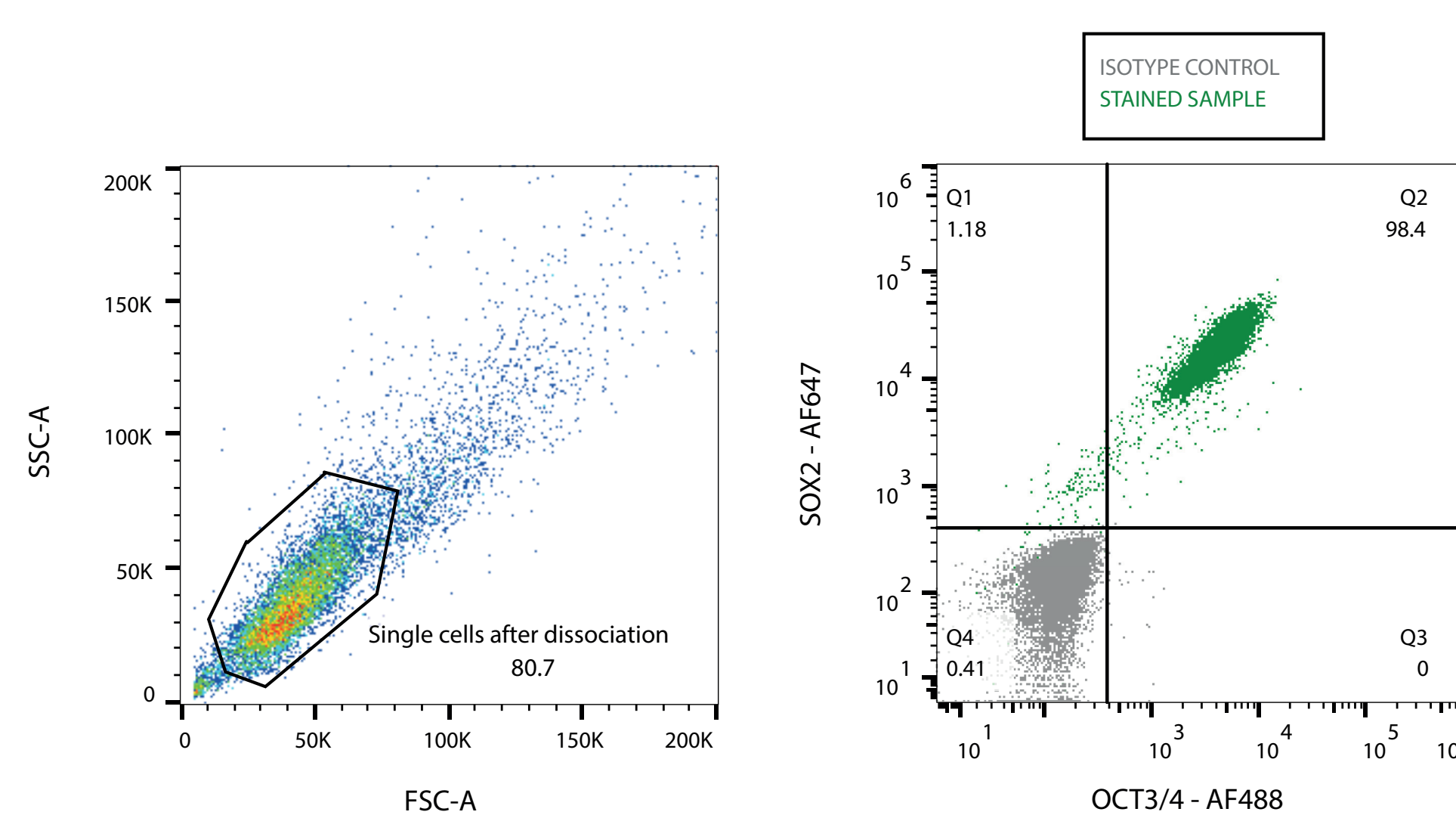
Phase contrast images showing growth of human induced pluripotent stem cell (hiPSC) stem cell cyst within capsule.



Encapsulated hiPSC amplification during 8 continuous days, both in static culture (grey) and in stirred bioreactor (blue).

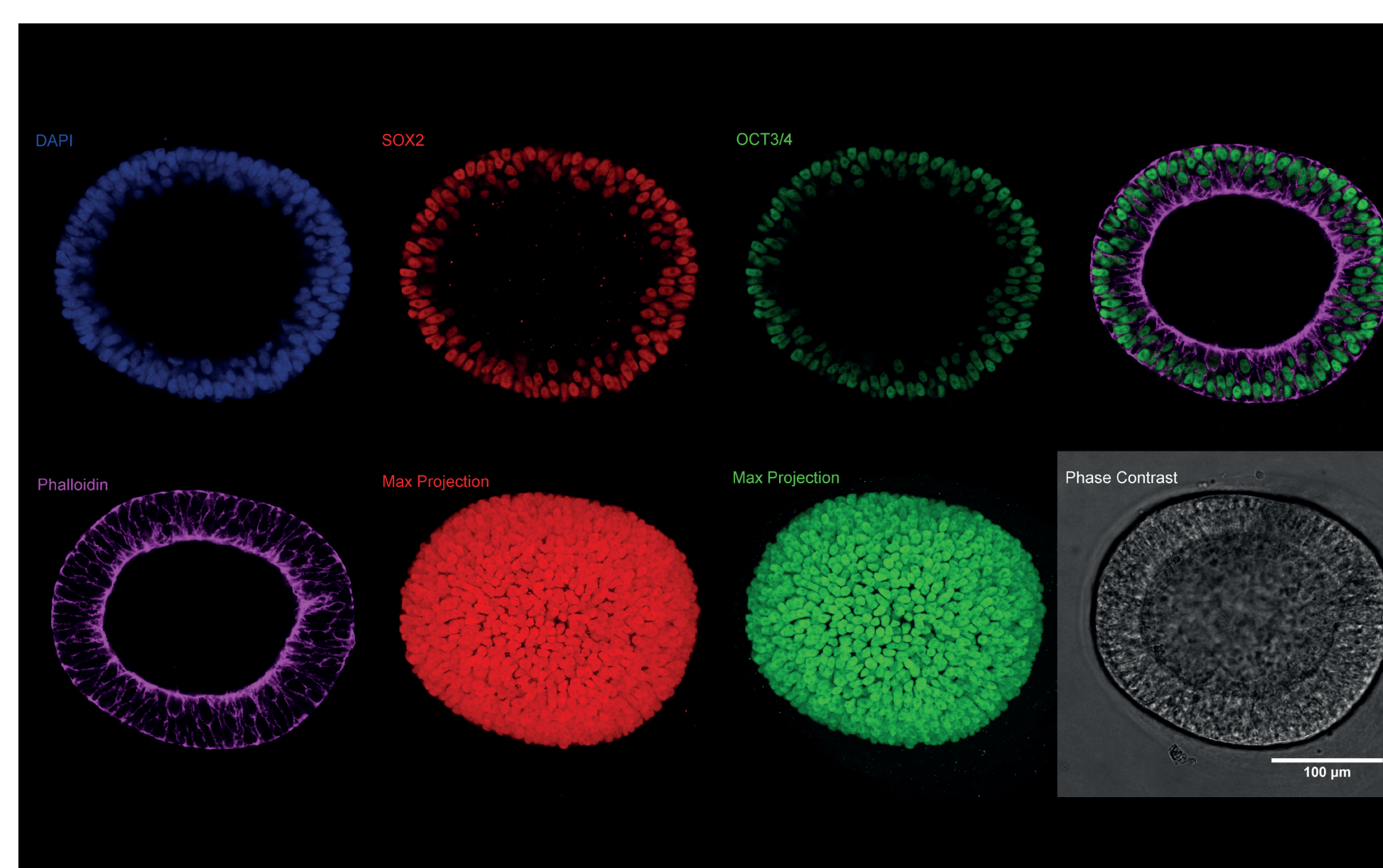
Pluripotency

Flow cytometry



hiPSCs that were decapsulated, dissociated, fixed and stained for pluripotency markers after 7 days in culture.

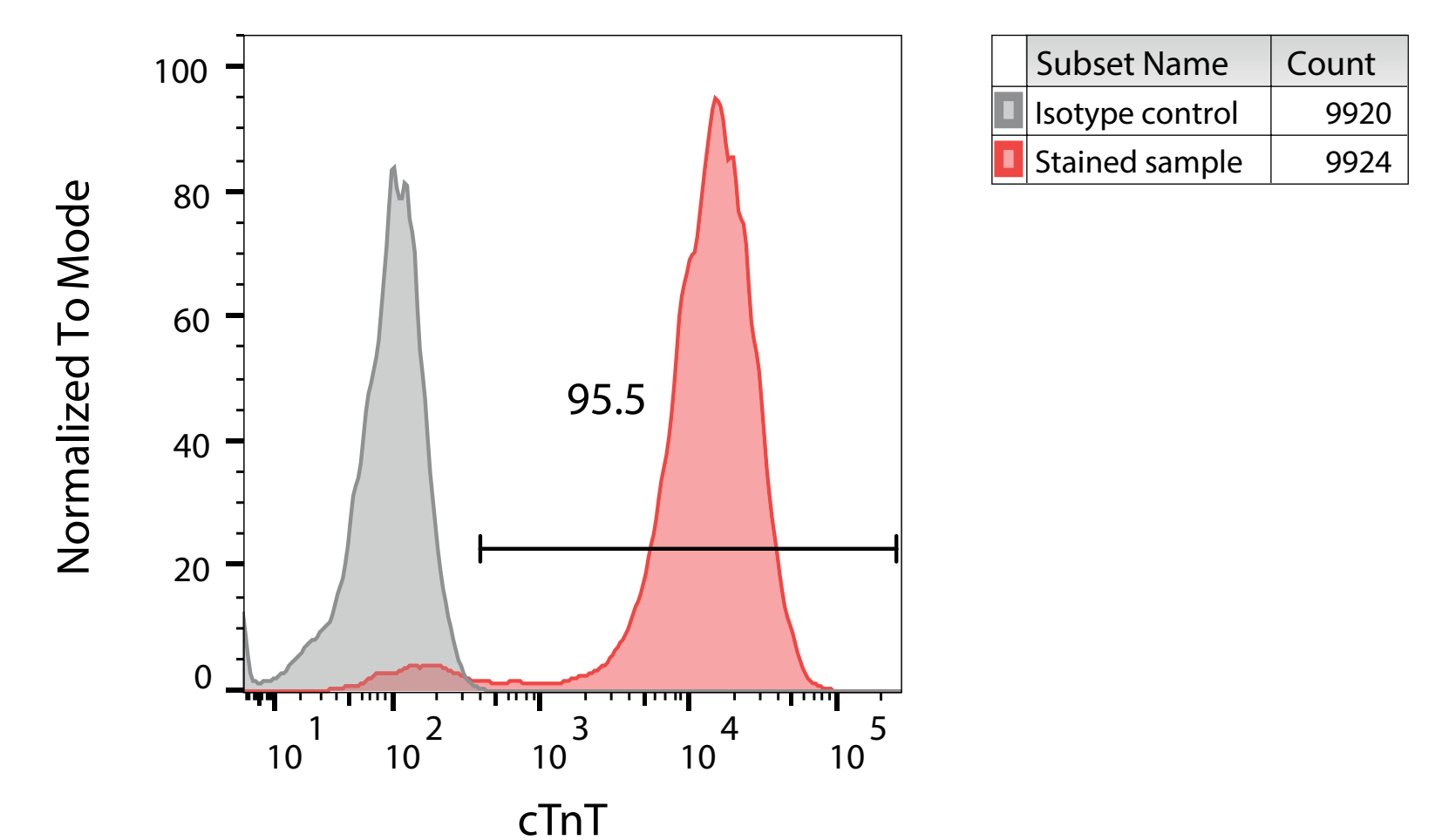
Immunohistochemistry



Images of 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.

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 micro-tissue end-product optimized for delivery at the preclinical stage. C-stem™ is projected to reach cGMP compliance within 2 years 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] Burrige, 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).

TreeFrog
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