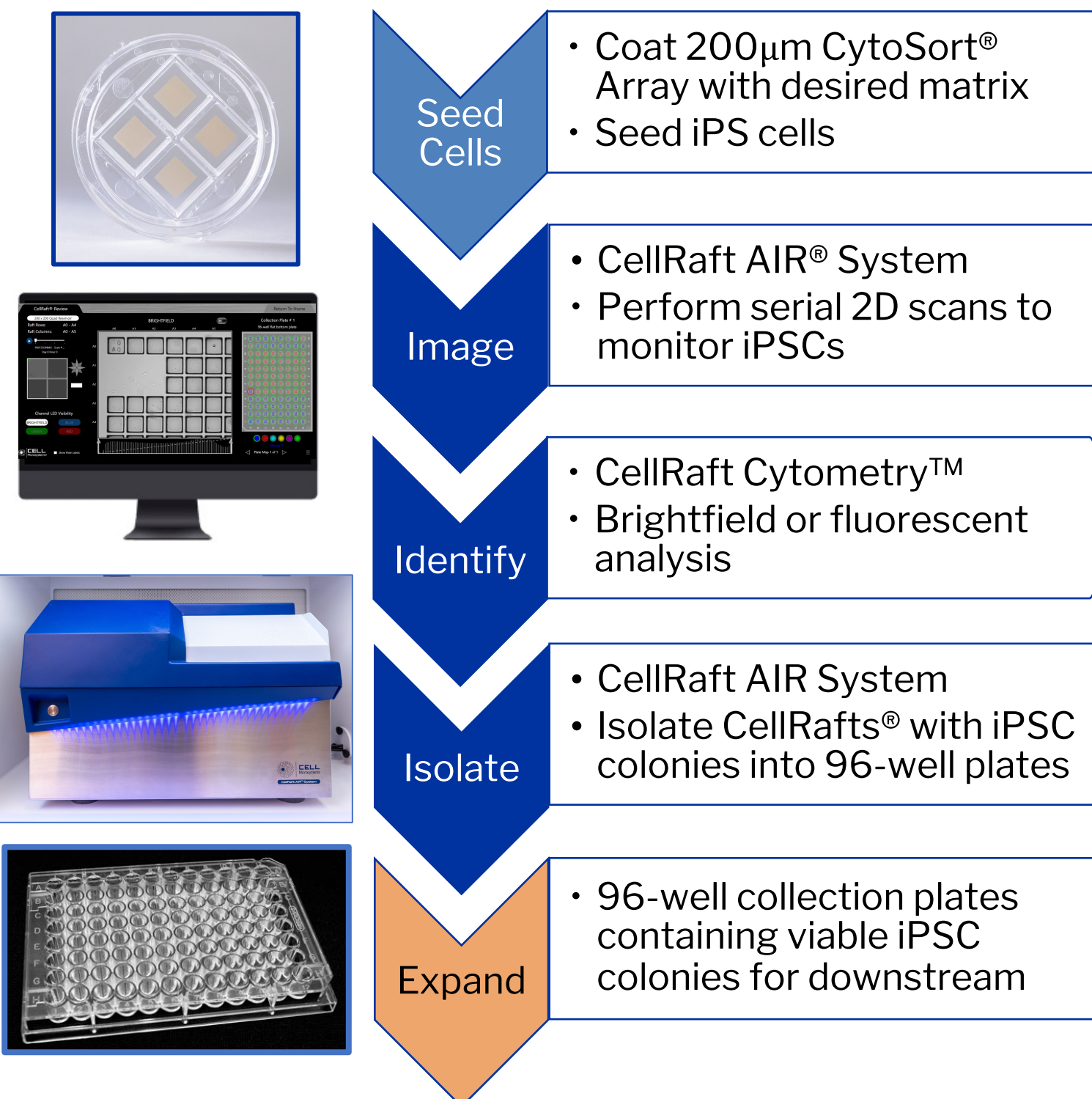




ACCELERATING THE USE OF iPSCs IN PERSONALIZED MEDICINE AND DRUG DISCOVERY

Lexi Land, Allysa Stern, Jessica Hartman
Cell Microsystems, Inc. Durham, NC USA

METHOD



RESULTS

- Using the CytoSort Array, thousands of human iPSCs can be screened for **monoclonality** and **pluripotency**.
- CellRafts containing single-cell derived iPSC clones were **isolated** with the AIR System (**>90% efficiency**) and the clones maintained pluripotency off array.
- hiPSCs cultured in ECM on the CytoSort Array formed hundreds of individually segregated 3D **organoids** that were isolated intact into 96 well plates with **>90% efficiency** and no loss of 3D structure or viability.
- iPSC-derived organoids were **differentiated** on-array into multiple organoid types, including choroid plexus and kidney.

- Generate 100s of monoclonal iPSC lines
- Grow iPSCs in 2D or 3D culture
- Fully automate gentle isolation of viable, validated iPSC cell lines
- Enable all iPSC workflows from reprogramming to differentiation

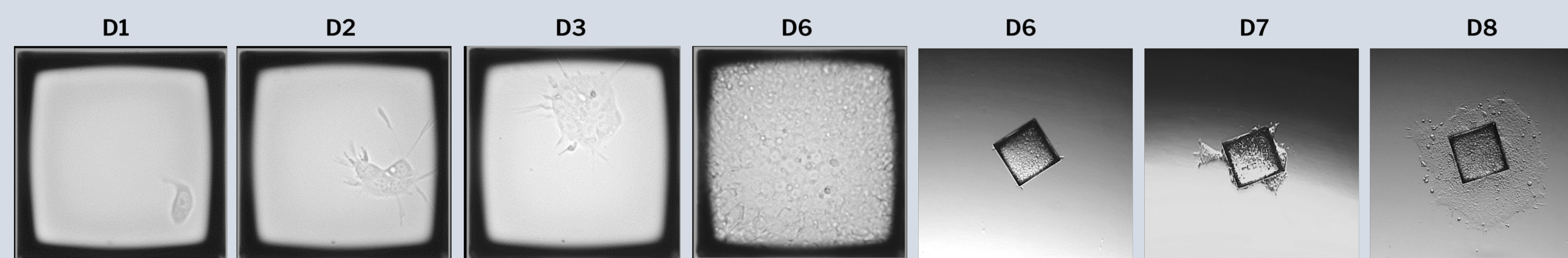


Take a picture to learn more



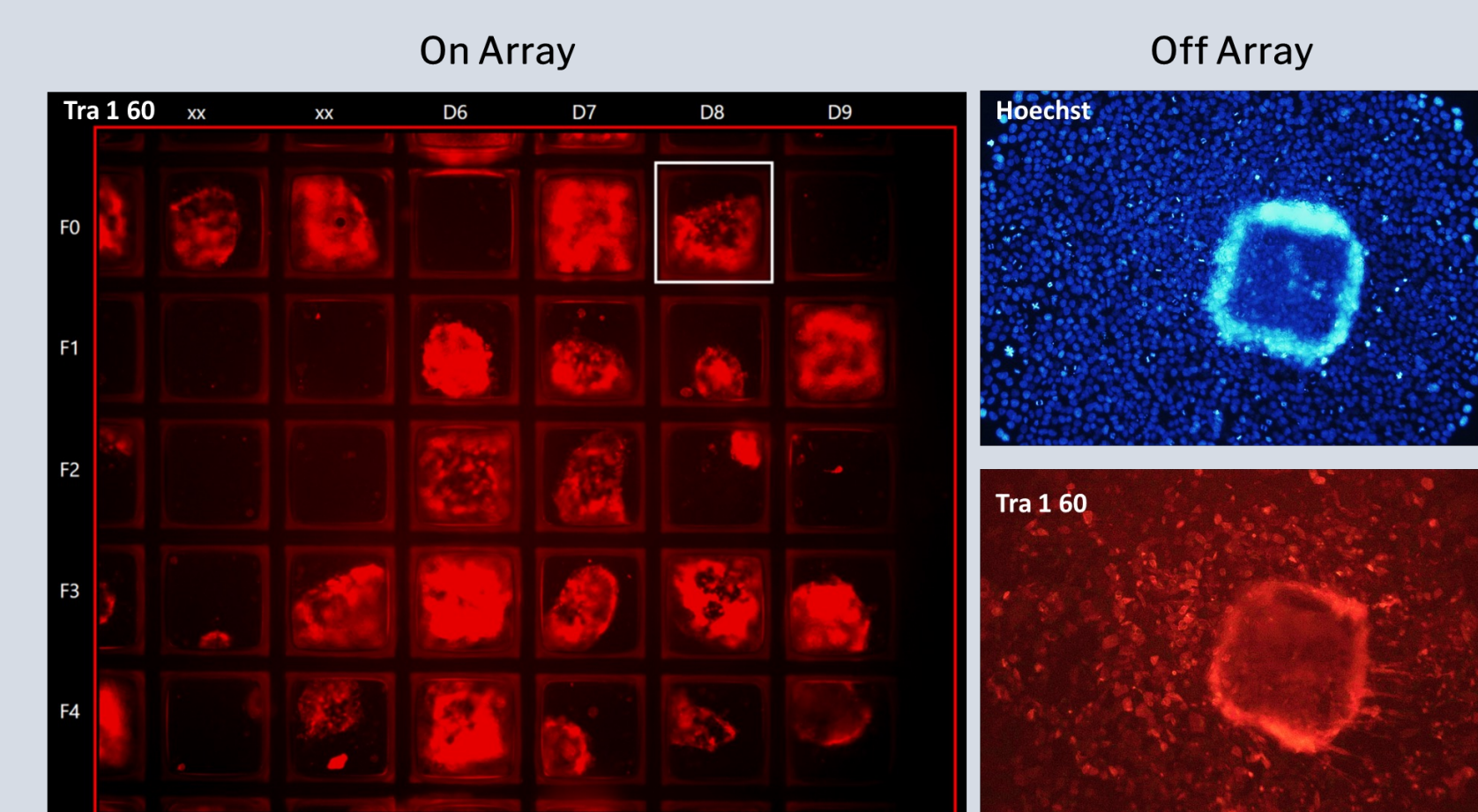
iPSCs on CytoSort Arrays

Track-and-Trace Monoclonality



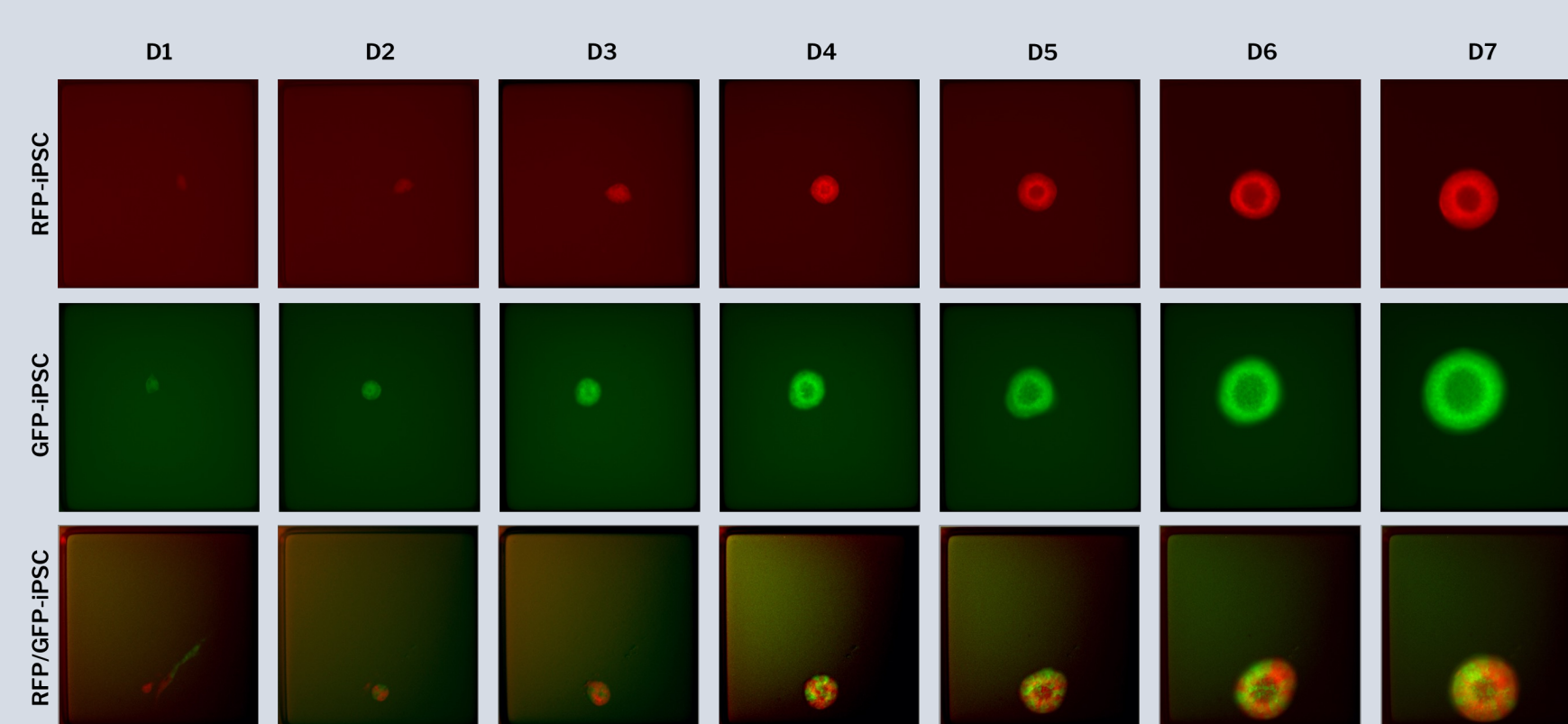
hiPSCs were seeded onto a 200Q array in dilute iMatrix-511. Four hours post-seeding, array was imaged on the CellRaft AIR System to identify single cells. The arrays were serially scanned every day for 6 days to follow single-cell derived clone formation. On day 6, monoclonal colonies were isolated using the AIR System and transferred into 96 well plates containing dilute iMatrix-511 and clonal outgrowth was observed.

Live Tra-1-60 Staining for Pluripotency



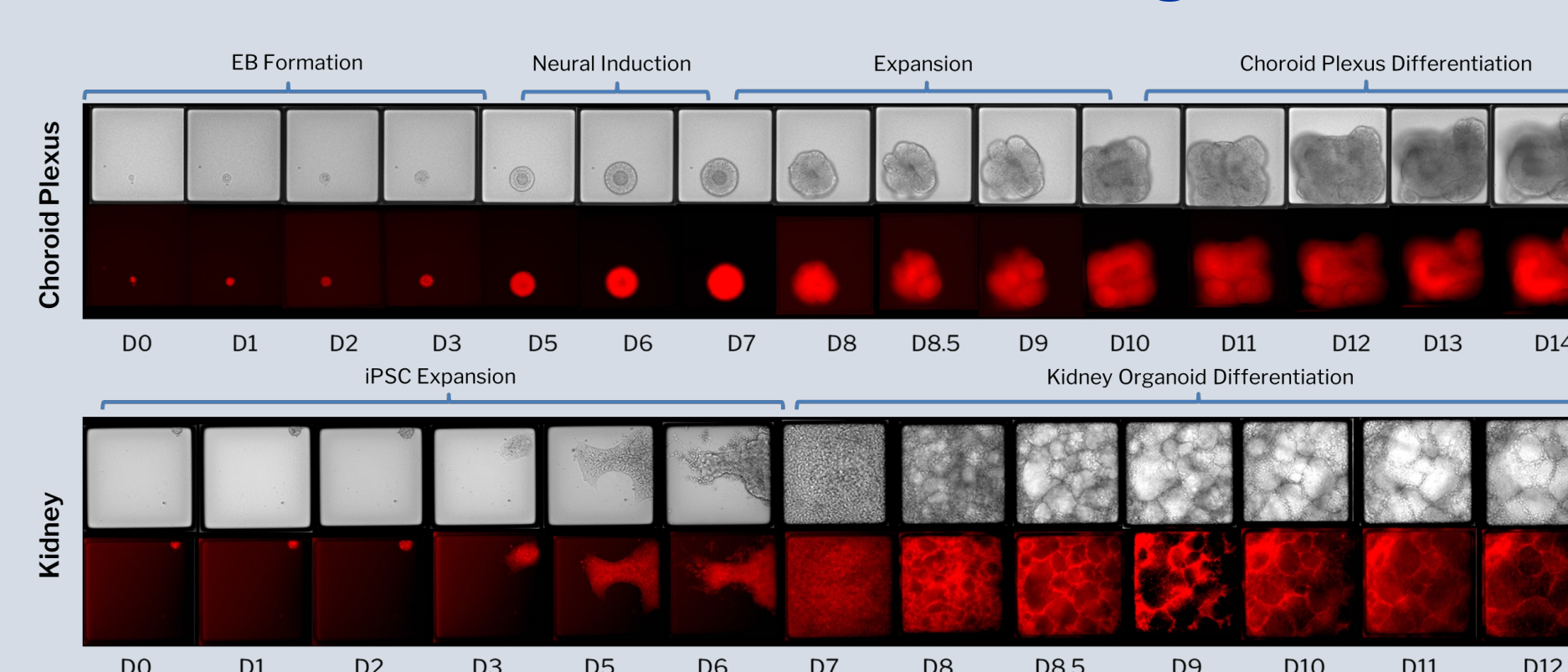
To confirm pluripotency of hiPSC clones, the cells were live stained on-array prior to isolation and off-array after clonal outgrowth for Tra-1-60.

3D Culture of Edited iPSCs



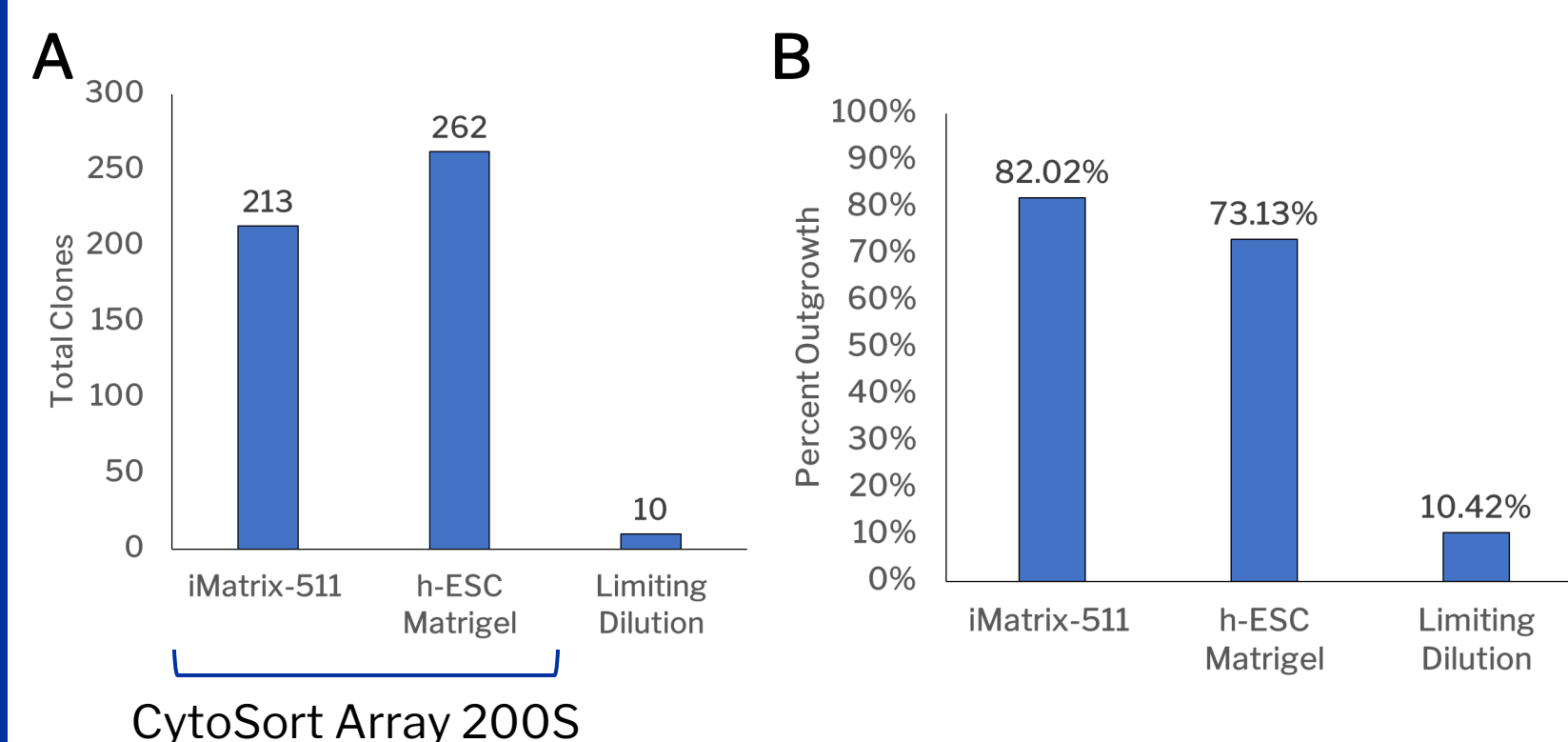
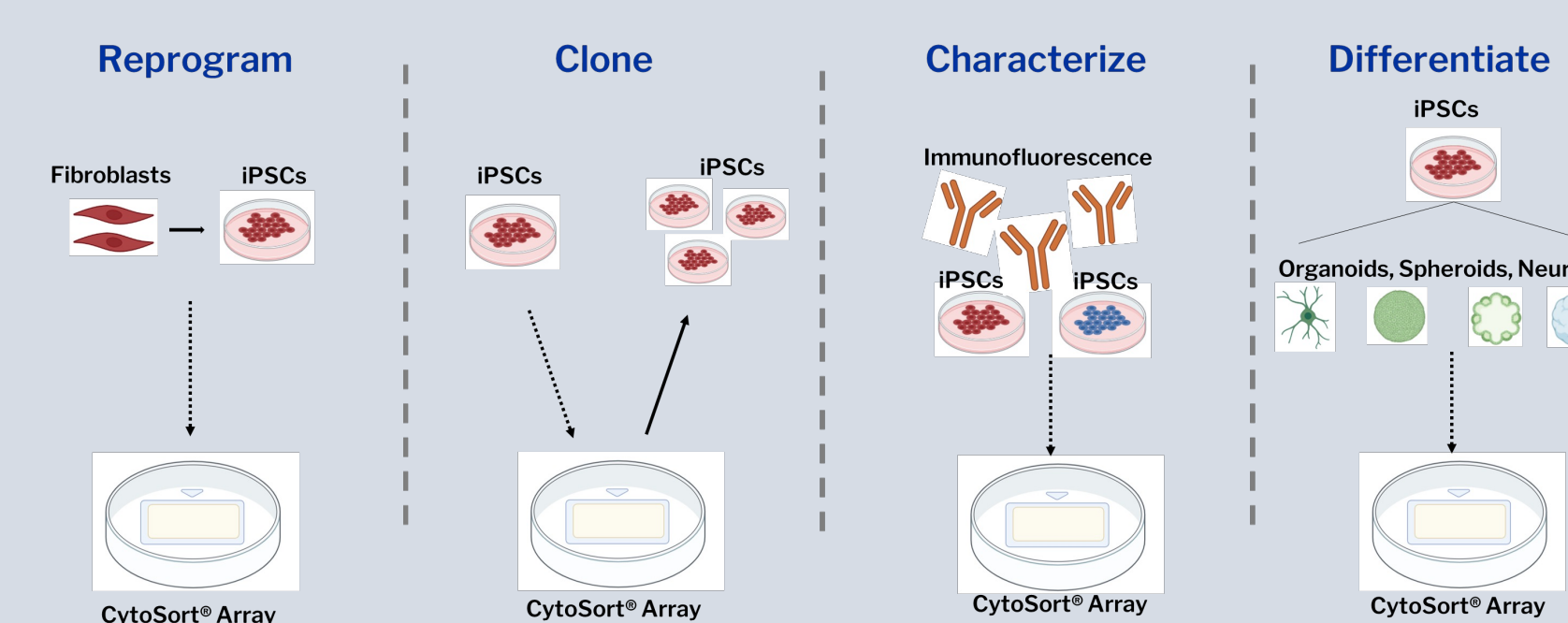
Edited single iPSCs are differentiated on the 3D CytoSort Array to form mono- and dual-fluorescent choroid plexus organoids. RFP- and GFP-edited iPSCs were co-cultured on the 3D CytoSort Array in dilute ECM and imaged every 24 hours for 7 days during embryoid body formation and neural induction for choroid plexus organoid differentiation.

iPSC-Derived Differentiated Organoids



Time-course imaging of human iPSC-derived organoids on the 3D CytoSort Array. RFP-positive iPSCs were seeded on the 3D CytoSort Array in dilute ECM and imaged throughout the process of choroid plexus and kidney organoid differentiation.

iPSC Workflows



Single human-iPSCs were seeded as follows: a) directly onto an uncoated 200S CytoSort Array in dilute iMatrix-511 (Matrixome), b) onto a 200S CytoSort Array pre-coated overnight with h-ESC Matrigel (Corning), or c) at a density of 1 cell/well in n=5 96 well plates pre-coated with h-ESC Matrigel. The number of single-cell derived iPSC clones per plate is shown (A), as well as the percent outgrowth of clones isolated from the array or in the limiting dilution plates (B).