

## **DEVELOPMENT OF A COST EFFICIENT PLATFORM FOR THE INDUSTRIAL MANUFACTURING OF PLURIPOTENT STEM CELL-DERIVED PRODUCTS FOR CELL THERAPY: CELL EXPANSION IS THE STARTING POINT**

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The development of stem cell-derived allogeneic therapeutics requires manufacturing processes able to generate high-density cultures of pluripotent stem cells (PSCs) to be further differentiated to target somatic cells. The Cell Plasticity platform of The Cell and Gene Therapy Catapult (CGT) is a core program that focuses on the cost efficient development of bioprocesses for the industrial manufacture of PSC-derived products in 2D and 3D culture systems. We started this program by establishing banks of PSCs adapted to defined culture systems and used conventional analytical techniques to characterise the cells to industry standards. Defined media were evaluated for the expansion of induced pluripotent stem cells (iPSC) in adherent culture. Scale-down high-throughput tools along with Design of Experiment methodology have been employed to establish a baseline process for the expansion of PSC as cellular aggregates in stirred-suspension culture and targeting cell yield > 5x10<sup>6</sup> viable cells/mL. We are currently investigating bioengineering parameters for scale-up and evaluating cell retention devices for the dissociation of PSC aggregates in a closed and automated fashion. In parallel, a framework of analytical assays comprising imaging, flow-cytometry and gene expression is under development for process monitor and control using a proprietary multi-parametric analysis approach.