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iPS-derived cardiomyocytes and keratinocytes for drug screening and cytotoxicity assays

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Induced pluripotent stem cells (iPSC) are promising tool for disease modeling, regenerative medicine and drug screening. Pluricell Biotech is a Brazilian startup that develops *in vitro* iPS-derived models. Currently, we have established a highly efficient 2D differentiation protocol to obtain iPSC-derived cardiomyocytes. After 30 days of differentiation, PluriCardio can be replated in 2D monolayers or 3D spheroids. More than 70% of our differentiations have 95% or more of purity seen through positive expression of cardiac specific markers. Different cardiomyocytes subtypes are observed depending on how cells are plated, when in monolayer, 75% of the cells have a ventricular phenotype after 15 days of culture, and 97% have ventricular phenotype in 3D plating. We show electrophysiological response to classical drugs as expected, we checked responses to beta-adrenergic, calcium, sodium, potassium receptors including the verification of the well know hERG/IK potassium receptor. These cardiomyocytes were also used to evaluate doxorubicin toxicity, we show they are affected by this drug. Taken together, these data suggest that our cardiomyocytes are a good and reliable tool for cardiac research and drug screening. Our future direction is to develop a platform with iPS-derived cardiomyocytes is to create a score of cardiotoxicity based and combined evaluation of different cardiotoxicity assays. We also established an efficient keratinocyte differentiation protocol. To date, we obtained 90% of K14-positive cells. iPS-derived keratinocytes expressed some keratinocyte markers as K14, K5, ITGa6, ITGb4, deltaNp63. After 7 days, exposed to a high concentration of calcium medium some cells expressed K10 and involucrin. Our future direction with iPS-derived keratinocytes is to evaluate their potential to grown in 3D model and evaluated their answers in cytotoxicity analyses.

Biography

Estela M Cruvinel has her expertise in cell culture and human genetics. She is Researcher at Pluricell Biotech, a Brazilian startup that develops *in vitro* iPS-derived models. She believes that iPS-derived cells are powerful tools for basic science and clinical applications. iPS-derived cells can be important for disease modeling. She has worked with these cells in her PhD to study genomic imprinting in Prader-Willi and Angelman syndromes. Moreover, their use in drug screening and cytotoxicity assays are valuable because they are able to replace or reduce the use of some animal models or animal cells. Currently, she coordinates the project that establishes iPS cells differentiation into keratinocytes.

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