Miltenyi Biotec

PSC-derived Cardiomyocyte Isolation Kit, human

Gentle and fast purification of hPSC-derived cardiomyocytes

Pure and well-characterized cardiomyocytes (CMs) derived from human pluripotent stem cells (hPSCs) are of high interest for cardiovascular disease modeling, drug safety studies, and regenerative medicine. However, technical limitations have hampered the use of hPSC-derived CMs until now. The new hPSC-derived Cardiomyocyte Isolation Kit, human, employs a novel technique, making it possible to efficiently enrich hPSC-derived CMs.

- **Efficient: purities of up to 97%**
- **Fast: 45 – 90 minutes**
- **Gentle: yields highly viable, functional cardiomyocytes**

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Gentle, fast, efficient – a unique CM purification method

Purification of hPSC-derived CMs

Based on novel, highly specific surface markers, a unique magnetic cell separation procedure for hPSC-derived CMs was developed. This exclusive protocol consistently delivers pure CM populations of up to 97%, independent of the differentiation protocol, hPSC line used, time point or efficacy of differentiation. Two separation strategies may be employed, as depicted in figure 1.

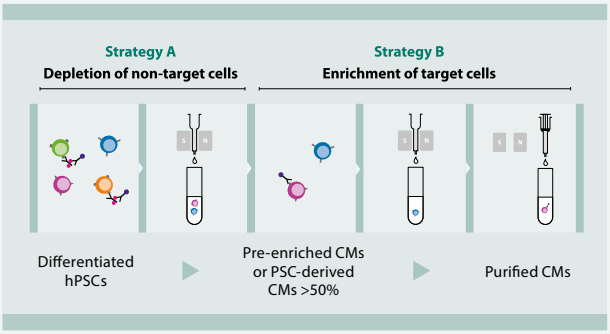

Figure 1: Schematic of purification protocols – for low efficiency differentiations, i.e. CM ratios of <50%, strategy A (depletion of non-myocytes) should be combined with strategy B (CM enrichment). For samples showing a high differentiation efficiency strategy A alone is sufficient.

Morphology and functionality of purified CMs

Regardless of the strategy chosen, magnetically enriched CMs can be efficiently plated and show a typical morphology and phenotype as indicated by the expression of cardiac Troponin T. Most importantly, CMs were able to initiate contractions and functionally induce Ca^{2+} fluxes (fig. 2).

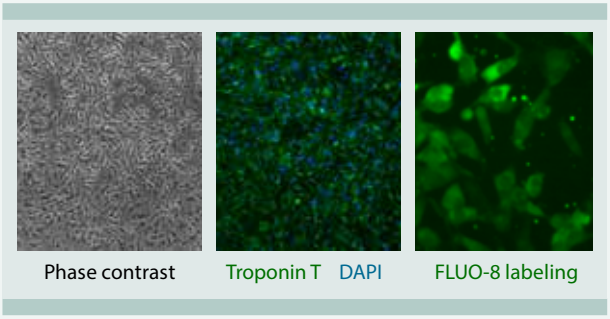

Figure 2: Magnetically purified CMs were plated on Human Fibronectin (Fragment) in the presence of StemMACS Thiazovivin. Immunofluorescent labeling demonstrated characteristic Troponin T staining. FLUO-8® fluorescence indicated the presence of Ca^{2+} fluxes.

Flow cytometry analysis of CMs using newly developed antibodies

Magnetically purified CMs express the characteristic markers MLC2a, MLC2v, MHC, and α-Actinin (fig. 3), indicating efficient enrichment of CMs and respective subtypes. Purified CMs can be cryopreserved in StemMACS™ Cryo-Brew medium and thawed with good viability.

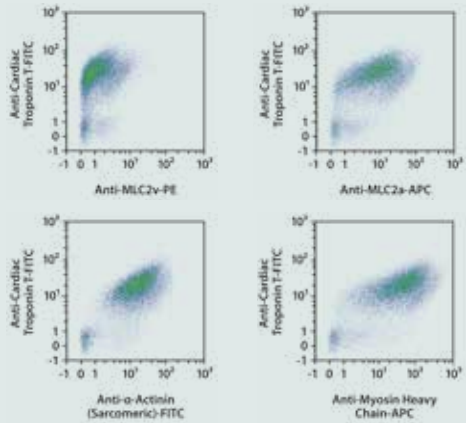

Figure 3: Flow cytometry analysis of CM markers using newly developed antibodies confirmed the phenotypic morphology of purified CMs.

Product	Order no.
Multi Tissue Dissociation Kit 3	130-110-204
PSC-derived Cardiomyocyte Isolation Kit, human	130-110-188
StemMACS Cryo-Brew	130-109-558
StemMACS iPS-Brew XF, human	130-104-368
StemMACS Thiazovivin	130-104-461
Human Fibronectin (Fragment)	130-109-393
StemMACS CHIR99021	130-103-926
Anti-Cardiac Troponin T-FITC, human, mouse, rat	130-106-687
Anti-α-Actinin (Sarcomeric)-FITC, human, mouse, rat	130-106-936
Anti-Myosin Heavy Chain-APC, human, mouse, rat	130-106-215
Anti-MLC2a-APC, human, mouse, rat	130-106-143
Anti-MLC2v-PE, human, mouse, rat	130-106-133
MACSQuant® Analyzer 10	130-096-343

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