



Miltenyi Biotec

Cardiovascular research solutions

Conveniently groundbreaking



The easy workflow to pure cardiac cell types

Easily dissociate rodent neonatal hearts for the recovery of all major cardiac cell types

- Gentle yet effective dissociation of cardiac tissue with no hands-on time
- Conserved cell surface epitopes
- Process 1 to 160 neonatal hearts per hour using optimized protocols

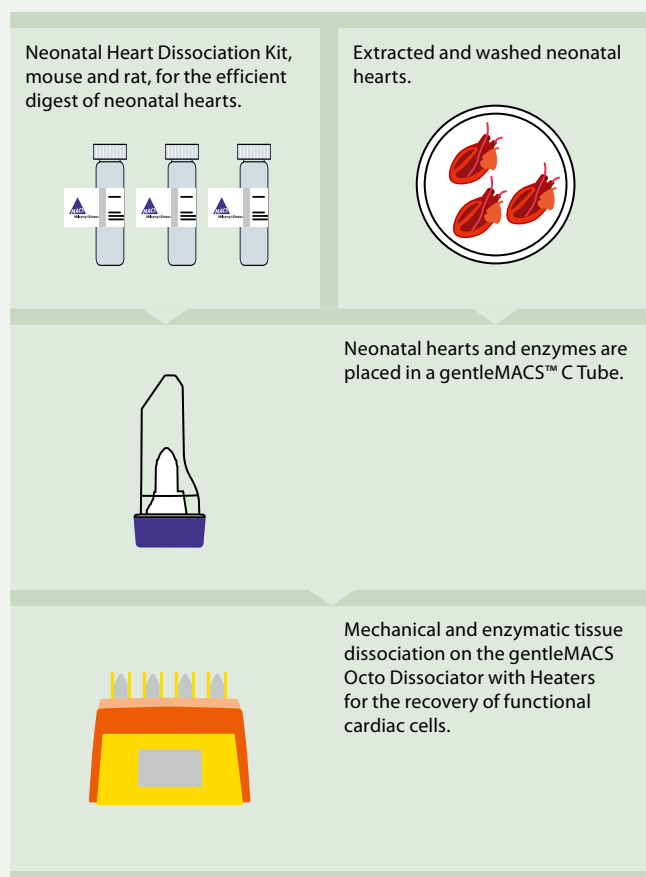


Figure 1: Dissociation of rodent neonatal hearts with Neonatal Heart Dissociation Kit and gentleMACS Octo Dissociator with Heaters.

Miltenyi Biotec offers further solutions for each step of your cardiac research, including research on adult heart tissue and ES/iPS cell-derived cardiac cells. See for yourself at

www.miltenyibiotec.com/cardiac

Get pure neonatal cardiac cell populations using MACS® Technology

- Premium recovery of cell populations
- Gentle isolation of viable and functional cells
- Most-cited cell separation technology

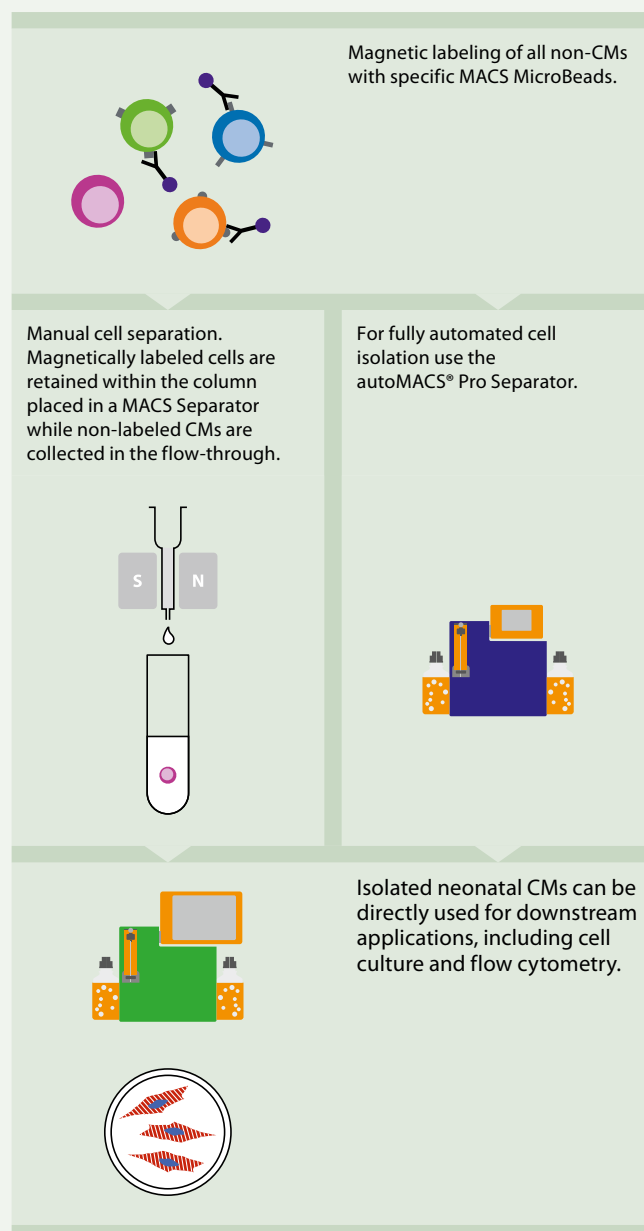


Figure 2: Principle of cell isolation by depletion of non-target cells based on MACS® Technology, exemplified with cardiomyocytes (CMs).

From tissue to pure cells with MACS® Solutions

Walkaway neonatal heart dissociation – set it and forget it

Neonatal Heart Dissociation Kit

Process your neonatal heart specimens quickly, easily, and above all, gently. Get excellent yields of viable, single-cell suspensions in just one hour.

- Obtain functional cardiomyocytes (CMs), cardiac fibroblasts, cardiac endothelial cells, and cardiac progenitor cells
- Conserve cell surface markers for subsequent cell isolation
- Combine with the gentleMACS™ Dissociator family for a walkaway, standardized solution

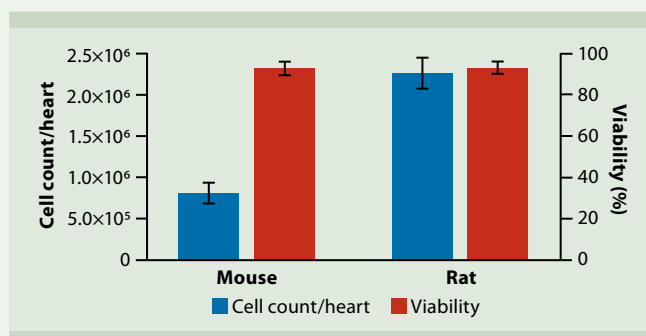


Figure 3: Neonatal hearts from mice and rat (P0-P3) were dissociated using the gentleMACS Octo Dissociator with Heaters and the Neonatal Heart Dissociation Kit, resulting in high yields of single cells with excellent viability.

Easy cell isolation with neonatal cardiac cell isolation kits

Follow gentle heart dissociation with gentle cell isolation. Based on proven MACS® Technology, these kits enable efficient isolation of cardiac cells, including CMs (figs. 4 and 5), cardiac fibroblasts (figs. 4 and 6), and cardiac endothelial cells (figs. 4 and 7) from single-cell suspensions generated on the gentleMACS Dissociators.

- Isolate cardiac cell populations with up to 98% purity in under an hour
- Get CMs, cardiac fibroblasts, cardiac endothelial cells, and cardiac progenitor cells
- Increase your output with automated isolation protocols

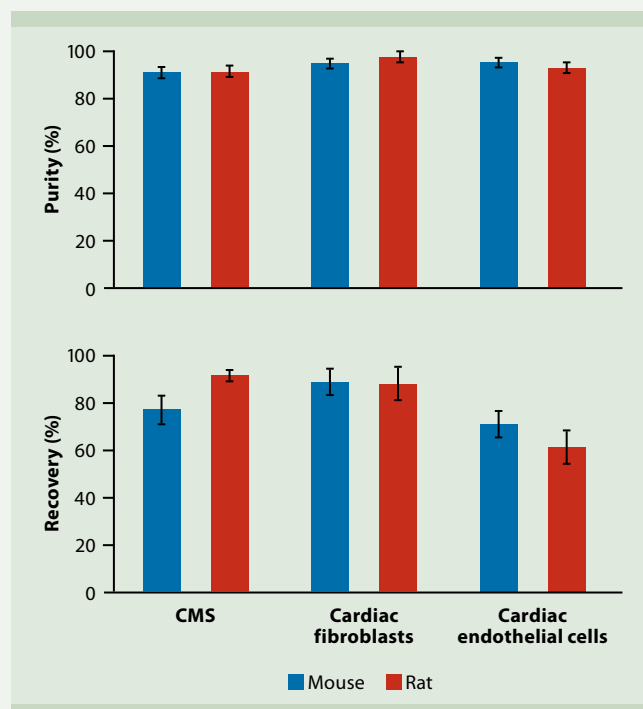


Figure 4: CMs, cardiac fibroblasts, and cardiac endothelial cells were isolated from dissociated neonatal mouse and rat hearts (P0-P3) using the respective Neonatal Cardiomyocyte Isolation Kit, Neonatal Cardiac Fibroblast Isolation Kit, and Neonatal Cardiac Endothelial Cell Isolation Kit. Purities (upper chart) and recoveries (lower chart) after immunomagnetic isolation were determined by flow cytometry. Purities of viable cells amounted to up to 98%, 96%, and 97%, respectively.

Pure cardiac cell populations in a heartbeat

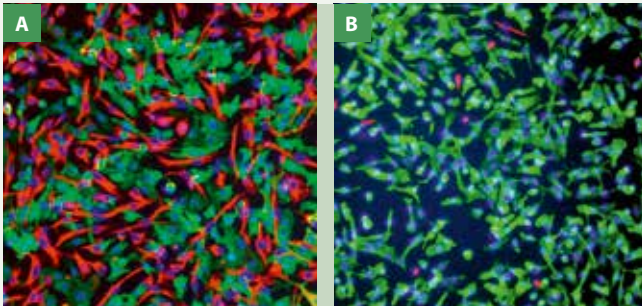


Figure 5: CMs were successfully enriched using the Neonatal Cardiomyocyte Isolation Kit, as shown by immunofluorescent staining of mouse cells before (A) and after isolation (B). Cells were stained for α -actinin (green) and vimentin (red). The blue stain (DAPI) denotes the nuclei.

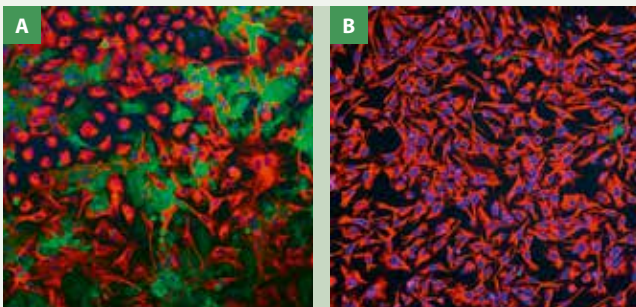


Figure 6: Immunofluorescent stainings of mouse fibroblasts isolated with the Neonatal Cardiac Fibroblast Isolation Kit were performed before (A) and after (B) isolation. Cells were stained for α -actinin (green) and vimentin (red). The blue stain (DAPI) denotes the nuclei.

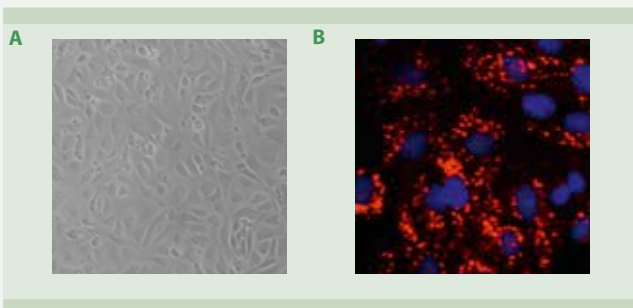


Figure 7: Mouse endothelial cells isolated with the Neonatal Cardiac Endothelial Cell Isolation Kit showed their characteristic morphology in cell culture (A). Moreover, the functionality of the enriched mouse endothelial cells was proven by the endocytosis of Dil-Ac-LDL (B).

Gentle, fast, efficient – a unique CM purification method

Purification of hPSC-derived CMs

Pure and well-characterized CMs derived from human pluripotent stem cells (hPSCs) are of high interest for numerous applications. However, technical limitations have hampered the use of hPSC-derived CMs until now. Based on novel, highly specific surface markers, a unique magnetic cell separation procedure for hPSC-derived CMs was developed. CM purification takes only 45–90 minutes.

- Highly viable CM populations with purities of up to 97% and high yields.
- Independent of differentiation protocol, hPSC line used, time point or efficacy of differentiation.
- Enriched CMs can be efficiently plated and show a typical morphology and phenotype.
- Cultured CMs are able to initiate contractions and functionally induce Ca^{2+} fluxes.

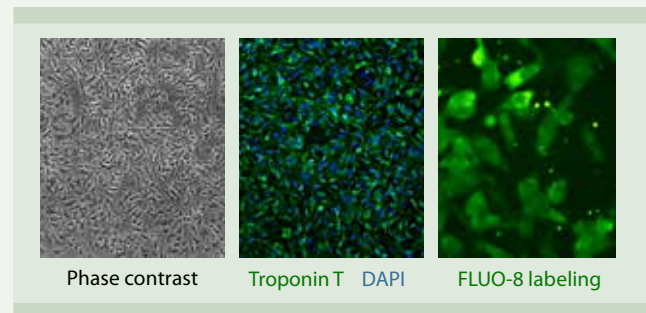


Figure 8: Magnetically purified CMs were plated on Human Fibronectin (Fragment) in the presence of StemMACS™ Thiazovivin. Immunofluorescent labeling demonstrated characteristic Troponin T staining. FLUO-8® fluorescence indicated the presence of Ca^{2+} fluxes.

Product list

Flow cytometry analysis of CMs using newly developed antibodies

Magnetically purified CMs express the characteristic markers Troponin T, MLC2a, MLC2v, myosin heavy chain, and α -Actinin (fig. 9), indicating efficient enrichment of CMs and respective subtypes.

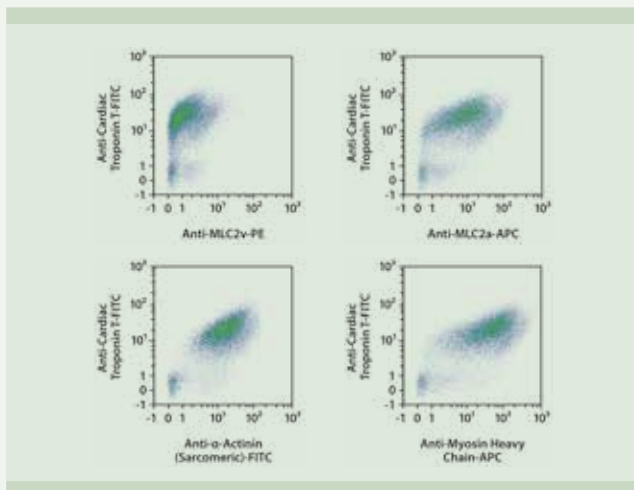


Figure 9: Flow cytometry analysis of CM markers using newly developed antibodies confirmed the phenotypic morphology of purified CMs.

Product	Order no.
Sample preparation	
gentleMACS™ Octo Dissociator with Heaters	130-096-427
Neonatal Heart Dissociation Kit, mouse and rat	130-098-373
Embryoid Body Dissociation Kit, human and mouse	130-096-348
Multi Tissue Dissociation Kit 3	130-110-204
MACS® Tissue Storage Solution	130-100-008
Cell separation	
Neonatal Cardiomyocyte Isolation Kit, mouse	130-100-825
Neonatal Cardiomyocyte Isolation Kit, rat	130-105-420
Neonatal Cardiac Fibroblast Isolation Kit, mouse	130-101-372
Neonatal Cardiac Fibroblast Isolation Kit, rat	130-105-422
Neonatal Cardiac Endothelial Cell Isolation Kit, mouse	130-104-183
Neonatal Cardiac Endothelial Cell Isolation Kit, rat	130-106-768
Cardiac Progenitor Cell Isolation Kit (Sca-1), mouse	130-098-374
PSC-Derived Cardiomyocyte Isolation Kit, human	130-110-188
Cell culture	
StemMACS™ iPS-Brew XF, human	130-104-368
StemMACS Thiazovivin	130-104-461
Human Fibronectin (Fragment)	130-109-393
StemMACS CHIR99021	130-103-926
StemMACS Cryo-Brew XF	130-109-558
Flow cytometry	
Anti-Cardiac Troponin T-FITC, human, mouse, rat (clone REA400)	*130-106-687
Anti- α -Actinin (Sarcomeric)-FITC, human, mouse, rat (clone REA402)	*130-106-936
Anti-Myosin Heavy Chain-APC, human, mouse, rat (clone REA399)	*130-106-215
Anti-MLC2a-APC, human, mouse, rat (clone REA398)	*130-106-143
Anti-MLC2v-PE, human, mouse, rat (clone REA401)	*130-106-133
MACSQuant® Analyzer 10	130-096-343

* For additional conjugates visit www.miltenyibiotec.com/antibodies



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