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
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.

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).

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.