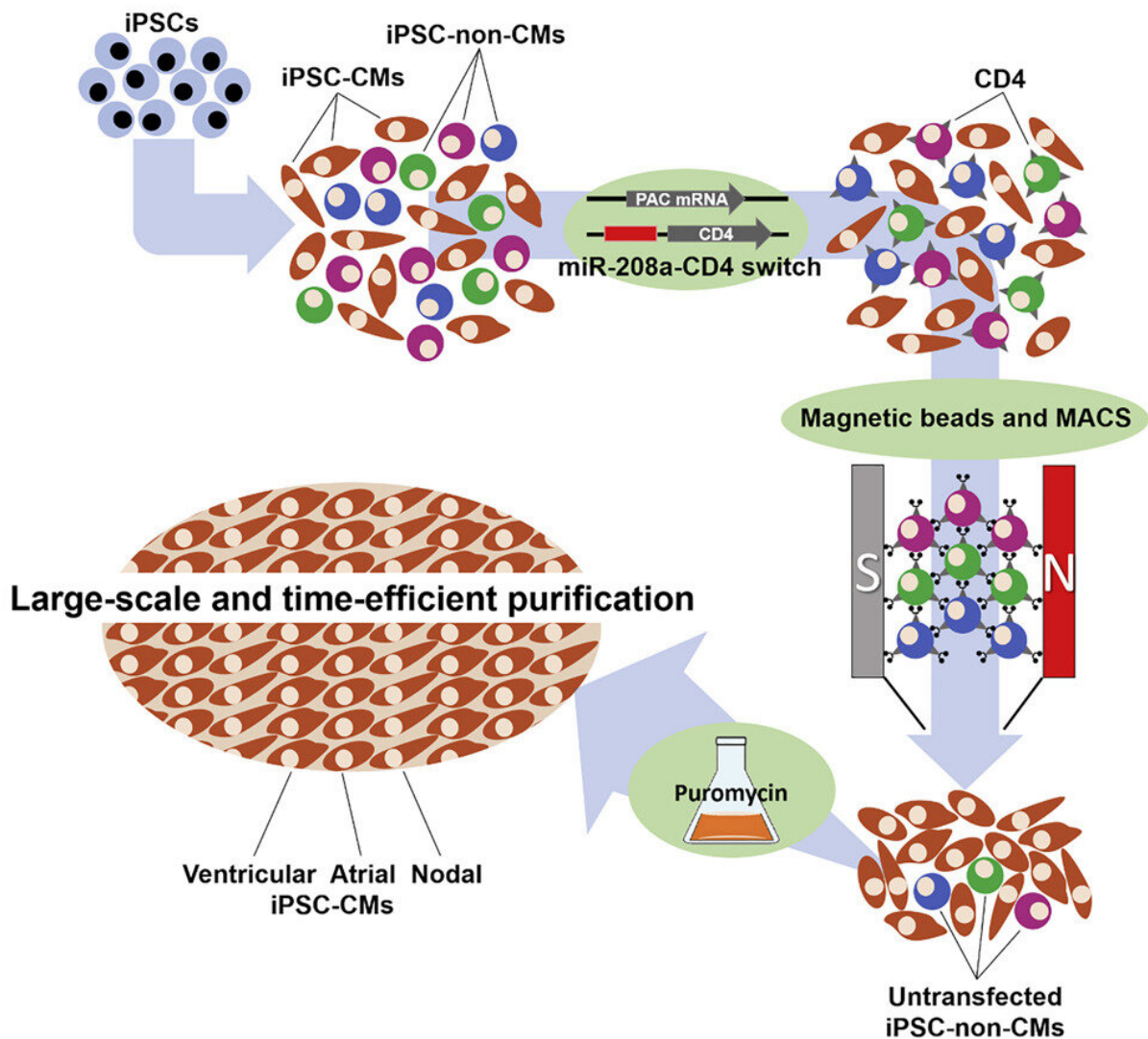


New method for cell sorting utilizing microRNA switch and magnetic microbeads

June 14 2022



Graphical abstract. Credit: *Stem Cell Reports* (2022). DOI: 10.1016/j.stemcr.2022.05.003

The group led by Drs. Yoshinori Yoshida and Hirohide Saito succeeded in collecting and purifying large amounts of iPS cell-derived cardiomyocytes rapidly with the technology they newly developed by combining a cell sorting method using microRNA and magnetic microbeads—the miR-switch-MACS.

The research group previously developed a technology, the microRNA (miRNA) switch, which is designed to suppress the expression of proteins encoded by artificial messenger RNA (mRNA) in response to miRNA in cells. (CiRA News: May 22, 2015). This technology made it possible to detect and sort [cardiomyocytes](#) and other cells not by surface receptors but by miRNAs. It is also a highly safe technique because there is no risk of damaging the genome, and the miRNA switches introduced into the cell only exist for a short period of time.

In this study, by combining the miRNA switch with a cell sorting method using magnetic microbeads (Magnetic-activated cell sorting; MACS), the research group succeeded in collecting and purifying large amounts of iPS cell-derived cardiomyocytes in the order of hundreds of millions in a short time and with high purity (>97%). When the cardiomyocytes collected using the new technology, the miR-switch-MACS, were transplanted into [laboratory mice](#) with [acute myocardial infarction](#), the researchers found that the cells were engrafted in mouse hearts effectively, and their cardiac functions were improved.

Furthermore, the group also succeeded in purifying and collecting insulin-producing cells using the miR-switch-MACS. This method can be applied to a variety of cell types and is expected to supply large

amounts of highly purified [target cells](#) in a short period of time for cell transplantation therapy.

The results of this study were published online in *Stem Cell Reports* on June 10, 2022.

More information: Yuta Tsujisaka et al, Purification of human iPSC-derived cells at large scale using microRNA switch and magnetic-activated cell sorting, *Stem Cell Reports* (2022). [DOI: 10.1016/j.stemcr.2022.05.003](#)

Provided by Kyoto University

Citation: New method for cell sorting utilizing microRNA switch and magnetic microbeads (2022, June 14) retrieved 6 May 2024 from <https://phys.org/news/2022-06-method-cell-micrna-magnetic-microbeads.html>

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