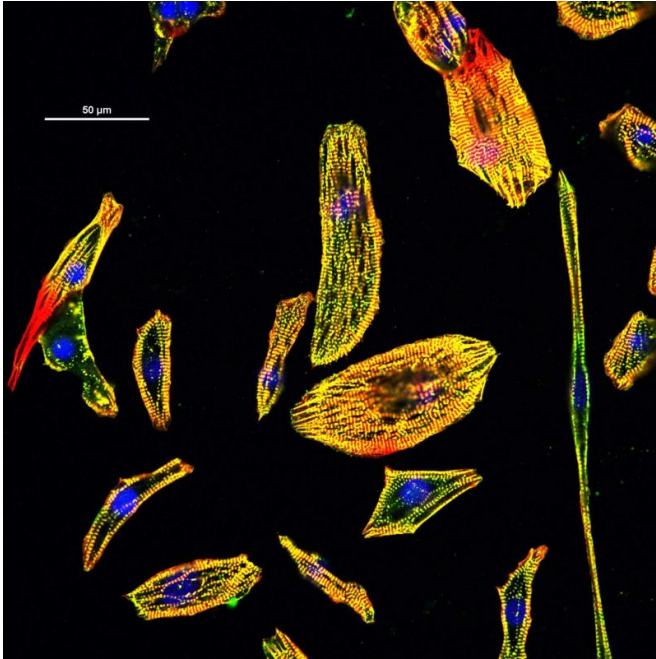


Cardiac muscle cells as good as progenitors for heart repair

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Microscopy image of human cardiomyocytes. Credit: Courtesy of Dr. Charles Murry

Stem cell therapies for post-heart attack tissue repair have had modest success at best. Clinical trials have primarily used bone marrow cells, which can promote the growth of new blood vessels, but many studies have shown no benefit. A better alternative may be to use human heart muscle cells (cardiomyocytes), suggests a study published October 22 in *Stem Cell Reports*.

The authors compared how well human embryonic stem cell-derived cardiomyocytes, embryonic stem cell-derived cardiovascular progenitors, and [bone marrow cells](#) worked to repair tissue damage post-heart attack in a rat. The verdict is that both cardiomyocytes and [progenitor cells](#) surpassed the healing power of bone marrow cells. And despite the progenitors' abilities to differentiate into more cell types, they demonstrated no statistically

significant improvement in heart tissue function, which means the more mature and stable [heart muscle cells](#) are a viable option for future therapies.

"There's no reason to go back to more primitive cells, because they don't seem to have a practical advantage over more definitive cell types in which the risk for tumor formation is lower," says senior study author Charles Murry of the University of Washington, Seattle. "The other important finding is that both of these populations are far superior to bone marrow cells. This work is a go signal that tells us to keep moving on to more promising and more powerful [cell types](#) in human trials."

The experiments, led by first authors Sarah Fernandes and James J.H. Chong, involved injecting the cells in the walls of the heart and measuring how well [heart muscle tissue](#) contracted in follow-up tests 4 weeks later. About ten animals receiving each of the three treatment variables and ten controls receiving a non-therapeutic cell population were included in the study. Injections were given 4 days after heart attacks occurred in the rats, as interventions that are given later don't have as much impact.

James Chong, now an interventional cardiologist at the University of Sydney, added: "We have recently had success in regenerating hearts of monkeys using a similar approach of transplanting stem cell-derived cardiomyocytes. The next goals will be to determine if these large animal experiments show similar improvements in cardiac function, and if so, to begin testing these cells in human patients."

More information: *Stem Cell Reports*, Fernandes and Chong et al.: "Comparison of Human Embryonic Stem Cell-Derived Cardiomyocytes, Cardiovascular Progenitors, and Bone Marrow Mononuclear Cells for Cardiac Repair" [dx.doi.org/10.1016/j.stemcr.2015.09.011](https://doi.org/10.1016/j.stemcr.2015.09.011)

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