Fibroblasts reprogrammed into functioning heart cells in mice

April 23 2012

(HealthDay) -- Cells that normally form scar tissue after a heart attack can be reprogrammed into functional heart cells in mice, according to an experimental study published online April 18 in *Nature*.

Noting that cardiac fibroblasts can be reprogrammed in vitro to become adult cardiomyocyte-like cells through the addition of the Gata4, Mef2c, and Tbx5 (GMT) genes, Li Qian, Ph.D., from the University of California in San Francisco, and colleagues examined whether this could also be done in vivo by adding these genes to cardiac non-myocytes (mostly fibroblasts) in the hearts of mice after coronary ligation.

The researchers found that, within a month, the induced cells resembled cardiomyocytes: they became binucleate, assembled sarcomeres, and had gene-expression similar to cardiomyocytes. On single-cell analysis, ventricular action potentials like those of cardiomyocytes were noted, as were beating after electrical stimulation and evidence of electrical coupling. Up to three months after coronary ligation, infarct size was reduced and cardiac function improved following in vivo delivery of GMT. Delivery of thymosin beta-4, a pro-angiogenic and fibroblast-activating peptide, led to further improvements in scar area and cardiac function.

"These findings demonstrate that cardiac fibroblasts can be reprogrammed into cardiomyocyte-like cells in their native environment for potential regenerative purposes," Qian and colleagues conclude.

One author is a member of the scientific advisory boards for iPierian Inc. and RegeneRx Biopharmaceuticals.

More information: Abstract
Full Text (subscription or payment may be required)