

Gene transfer shows promise for treating heart failure

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Use of intracoronary gene transfer among heart failure patients resulted in increased left ventricular function beyond standard heart failure therapy, according to a study published online by *JAMA Cardiology*.

Heart failure affects more than 28 million patients worldwide and is the only cardiovascular disease that is increasing in prevalence. Despite improvement in drug and device therapy, hospitalization rates and mortality have changed little in the past decade; new therapies are needed. The use of [gene transfer](#) for [heart failure](#) has rarely been tested in [randomized clinical trials](#).

Gene transfer is a process by which genes are introduced into cells and the cells then produce the specific protein that the gene directs, in the case for this study, a protein known as adenylyl cyclase type 6 (AC6). The gene is carried into the heart cells by a modified virus (adenovirus [Ad5]). Preclinical studies have shown benefits of increased cardiac AC6 content on [heart muscle cells](#). The amount and function of AC6 are reduced in failing hearts.

H. Kirk Hammond, M.D., of the Veterans Affairs San Diego Healthcare System, San Diego, and colleagues randomly assigned 56 patients with symptomatic heart failure and an ejection fraction (EF; a measure of how well the left ventricle of the heart pumps with each contraction) of 40 percent or less to receive 1 of 5 doses of intracoronary (via the coronary artery) adenovirus 5 encoding [adenylyl cyclase](#) 6 (Ad5.hAC6) or placebo, and were monitored for up to 1 year.

The researchers found that AC6 gene transfer provided a dose-related beneficial effect on cardiac function. Among the results, two end points showed significant between-group differences: (1) AC6 gene transfer increased left ventricular (LV) peak pressure decline; and (2) AC6 gene transfer increased EF in participants with nonischemic heart failure.

Heart failure admission rate was 9.5 percent in participants who received AC6 and 29 percent in those who received placebo. The rates of serious adverse events were similar in both groups.

"AC6 gene transfer safely increased LV function beyond optimal heart failure therapy through a single administration. Larger trials are warranted to assess the safety and efficacy of AC6 gene transfer for patients with heart failure," the authors write.

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