

STEM CELLS

## Hearts Tough to Mend

Proteins and stem cells, not bone marrow, offer hope.

One in three people around the world die each year from heart disease and stroke. In the United States, where more than 71 million people suffer from one or more cardiovascular complications, the cost of care is \$400 billion.

Last week, the results of three significant clinical trials using cells derived from bone marrow to treat damaged hearts were published in the September 21 issue of the *New England Journal of Medicine*. One of the trials demonstrated no benefit to patients while the other two showed only modest improvement in left-ventricular function.

Dr. Thomas Okarma, presi-

dent and CEO of Menlo Park, California-based Geron Corporation, wasn't surprised. "There is not one shred of bona fide evidence that bone marrow cells can turn into heart muscle cells. There is, however, an overwhelming amount of evidence that they cannot under any circumstance do that," he says.

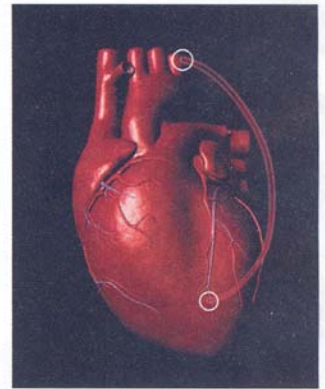
Geron takes advantage of the fact that embryonic stem cells can, in theory, change into any other kind of cell in the body. The company has figured out how to do that in a scalable fashion with eight different cell types, including heart cells. The company plans to test its cells in large animals by the end of the

year—and move into humans as early as 2008 if all goes well.

Las Vegas-based CardioVascular BioTherapeutics has a different approach to treating heart disease. The company's founder and chief clinical officer, Dr. Thomas Stegmann, formulated a proprietary therapeutic protein that stimulates the creation of new blood vessels in a process called angiogenesis. He first tested the protein in humans 12 years ago in Germany, with great success. Forty "no-option" heart patients who participated were rewarded with many more years of life.

The company has now completed early-stage trials in the U.S., achieving similar success.

"We found statistically increased working capacity for these patients three months after the treatments," Dr. Stegmann reports. "The angina symptoms in all patients were at least reduced and in many of them the symptoms are vanishing. Some



of the patients who were not able to do anything before the treatments have returned to work."

Because CardioVascular BioTherapeutic's compound is a human protein, it is well tolerated and patients do not have to embark on a lifelong regimen of warfarin, according to Dr. Stegmann. "The patient just lives his or her life while the heart muscle creates the new vessels." ■