Cardiovascular: Reaching for a Cure

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Cardiovascular: Reaching for a Cure

The heart cannot adequately regenerate damaged tissue after a heart attack. But could stem cells help it along that path? "That's the question we're all trying to work toward together, working to see whether stem cell therapies might pump some regenerative power into the heart.

Working within a so-called pipeline designed to move basic research discoveries into studies in animals and, eventually, into patients, scientists and physicians at the University of California, San Francisco, are hoping to apply their knowledge quickly and efficiently across a broad spectrum of research. It extends to working with all sorts of patients, and on all rungs of the research ladder, in the hope of reaching a cure faster.

The effort starts in early-stage labs like those of developmental biologist Deepak Srivastava, MD, and cell biologist Larry Bernstein, PhD. Srivastava, director of the Gladstone Institute of Cardiovascular Disease, brings expertise as a pediatric cardiologist and Srivastava's lab looks at the way a stem cell can differentiate and become a cardiac muscle cell. Bernstein, a senior investigator at the Gladstone Institute and associate professor of pediatrics at UCSF, focuses on how the heart develops from its earliest stages to its functional form.

The other leader, Yerem Yeghiazarians, MD, co-director of the Adult Cardiac Catheterization Laboratory at UCSF, works with adults. "We are always looking for areas of synergy where expertise from one group can be leveraged by the other groups," Srivastava says.

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For instance, both Srivastava and Bernstein are interested in how molecular tools known as microRNAs regulate the development of the heart. Srivastava's lab developed a way to form cardiac cells from human embryonic stem cells, and Srivastava's lab examined how microRNAs formed in those cells.

"The work of Dr. Bernstein — finding new ways to identify these cardiac cells that are derived from stem cells — has been helpful to us," Srivastava says.

Bernstein returns the compliment. "We were able to do pretty significant work together," he says.

Once Bernstein and Srivastava figure things out on a cellular level, Yeghiazarians figures out the best way to get them to work in the body to help patients. "It's a beautiful pipeline that's been set up because you can go from A to Z entirely within UCSF. We have the ability and the expertise to do all of these types of studies together," he says.

Yeghiazarians, who also directs the UCSF Translational Cardiac Stem Cell Program, has the clinical expertise to tackle the question of how to get the cells safely into the heart and how to get them to stay there once they're implanted — and ultimately do the job they're assigned.

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