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## From Stem Cells to Heart Cells



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ATLANTA (Ivanhoe Newswire) — Stem cells have gotten a lot of attention recently with the announcement that no new lines of embryonic stem cells will get government funding. Doctors in Atlanta may have a way to continue their research — by using mice stem cells. Their first goal is to turn stem cells into heart cells.

Cynthia Bradley and her daughter, Laura, share quality time at the lake. They also share a heart problem called Long QT syndrome.

Cynthia says, "I had lost a brother to it so it was frightening to me to have it myself, and then know my child had it. It was very difficult for

me."

With Long QT, the heart can race so fast the patient appears to have a seizure and suddenly dies.

To help them understand and treat the disease, cardiologist Sam Dudley, M.D., Ph.D., and his team from Emory University/VA Hospital are studying stem cells from mice.

"In 20 days, I can take an embryonic stem cell and turn it into a heart cell, and if I genetically manipulate that, now I have a model of Long QT syndrome," says Dr. Dudley.

Dr. Dudley says it's quicker than tracing generations within a family. It's also safer than putting them at risk for sudden death so they can be studied. The research may also shed light on abnormal heartbeats that result from heart attack.



"Is a mouse cell exactly comparable to the human condition? Maybe, maybe not. We're working on determining that now. But I think there'll be some general lessons that we'll learn that will be very helpful," he says.

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Cynthia welcomes the research, she says, "because I know that this is something that will plague my family forever."

In the meantime, she and Laura take medication and Cynthia has a pacemaker. Her hopes are for her future grandchildren — that they may avoid all that she has been through.

Researchers predict stem cells may also some day be used to repair organ damage.

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## From Stem Cells to Heart Cells — Research Summary

**BACKGROUND:** On Sept. 10, 2001, President George W. Bush announced that federal money will continue to go towards the 60 embryonic stem cell lines already in existence worldwide, but the government will fund no additional stem cell retrieval. This was a blow for many researchers who were hoping to use embryos to develop more lines for research purposes. Now, researchers are looking to other places for stem cells that will satisfy their research needs. At Emory University, stem cells from mice may fill the need for research by cardiologists.

**HEART HELP NEEDED:** Long QT and Brugada's syndromes are relatively uncommon heart diseases that may model the more commonly acquired heart diseases. This is why they are being studied in the Cellular Therapy Center at the Atlanta Veteran's Administration Medical Center. Emory University researcher Sam Dudley, M.D., Ph.D., and his team are working to unlock intracellular secrets of heart function. They use gene targeting to manipulate mice stem cells into replicas of human cell mutations linked to arrhythmias (rapid heart rhythms). The result may be a new model for the study of cardiovascular disease. Understanding the diseases offers new hope for treatment and possible cures.

"We don't know exactly how this works yet and what all the triggers are. But if we can understand how heart cells develop then we may be able to understand congenital heart defects," says Dr. Dudley.

**PAST STUDIES:** Historically, families with genetic heart disease would have to be studied for generations and a potentially deadly cardiac event would have to occur. In the lab now, researchers can see how heart cells with certain mutations behave within three weeks. Triggering events are studied in an attempt to find out what might interrupt those changes in order to prevent people from having future bouts of fibrillation. They've already learned that drugs have different effects depending on the mutation. The cultures last up to 60 days giving researchers time to study the changes.

**OTHER POSSIBILITIES:** Dr. Dudley's team is studying the genetic manipulation of stem cells with the possibility in the future of adding cardiac therapies, such as growing replacement tissue for damaged hearts. Cell therapy may also prove useful in preventing the re-clogging of vessels after they've been opened through angioplasty.

"It isn't entirely clear whether we can use mouse cells in humans or if we have to use human cells in humans, or we have to use that same person's stem cells in that person. That's something we have to work out."

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