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## Stem cell czar: UM researcher leads alternative effort



BY FRED TASKER  
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Dr. Joshua Hare believes medicine is close to a goal long thought to be impossible: healing the human heart.

The way to get there? Stem cells.

"These could be as big as antibiotics were in the last century," says Hare, the researcher heading up the University of Miami's new Stem Cell Institute. "Stem cells have the potential to have that kind of impact. Diseases like heart attacks, strokes, kidney failure, liver failure -- we will be able to transition them into things you live with."

Hare spends his days peering through powerful microscopes, recruiting scientists from top

universities and attending to patients betting on improving their conditions through his clinical trials.

Stem cells, only one-thousandth the size of a grain of sand, are the master cells of the body -- the source from which all other cells are created.

The most basic are embryonic stem cells, which are "totipotent," meaning they can divide into any other type of cell -- heart tissue, brain tissue, kidney tissue -- all 220 cells that exist in the human body. They're controversial because when they are harvested, the embryo is destroyed, ending potential life.

But coming into view are new kinds of stem cells -- immature adult stem cells that can be extracted from bone marrow, from organs such as the heart or kidney or even from the skin. These can be taken without destroying embryos.

While researchers until recently believed adult stem cells were limited because they could develop only into cells similar to them -- bone marrow cells only into blood cells, for example -- evidence is growing that they, too, may become the tissue for hearts, brains, kidneys and other organs.

Here are the three sources of adult stem cells and their varying potentials:

- **Bone marrow stem cells:** These are considered "multipotent." Most researchers believe they can become heart tissue. Some feel they also can change themselves into kidney, brain or other organ cells -- although perhaps not all organs.
- **Organ stem cells:** These cells are taken from tissue in hearts, kidneys and other organs. Some researchers believe they are also "multipotent," meaning that a heart stem cell can turn into a brain or kidney or other cell, although not all 220 of the body's cells.
- **Skin cells:** Stem cells taken from the skin, with genetic modification, may also be "totipotent" -- just as able as embryonic stem cells to turn into all 220 types of cells in the human body, new research indicates.

Dr. Hare expounds on these developments:

**Q.** You've said that the basic idea behind your stem cell work is that a healthy human body is creating stem cells all the time to keep its organs healthy, and you're trying to tap into this ability to expand its

powers?

**A:** That's the theory. It does sound fantastic. Actually, it happens in the body all the time, in tiny amounts. In our blood, to survive, we have red blood cells that carry oxygen, white cells that regulate the immune system and platelets, which are tiny cells that seal off cuts. They come from stem cells in the bone marrow. [The marrow is the source for all red blood cells, platelets and some white blood cells.]

The cells circulate in the blood all the time. Unless there's a signal that says, 'Come here and do this,' they will just keep circulating. If you get a cut, the cells will be recruited to that area to do what they do.

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