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Cut strings on stem cells

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Should the Legislature not act first, Floridians may have a chance to vote in 2008 for a constitutional amendment that would provide \$20 million per year for stem-cell research. Of all states, Florida needs this research more than most.

With almost 3 million residents over the age of 65, the state has a disproportionate number of citizens with chronic, degenerative diseases and conditions that could prove amenable to a stem cell-based cure. These include cancer, diabetes, Alzheimer's disease, Parkinson's, heart failure, macular degeneration, osteoporosis, osteoarthritis and a host of other age-related afflictions.

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In addition to the older population, others suffer from diseases and injuries that can strike at any age — muscular dystrophy, multiple sclerosis, Lou Gehrig's disease, spinal cord injury, AIDS and other cell-based conditions with possible stem-cell applications.

According to the Census Bureau, almost 2.4 million Floridians are officially disabled, and this doesn't reflect the many people who don't qualify for disability status but who struggle to live with conditions that rob them of their quality of life.



The burden of human suffering is the most important reason for Florida to provide state money for stem-cell research, but it is only one of many reasons. Financing such research would be an intelligent and compassionate response to Florida's large patient population. It would help to compensate for an inadequate federal policy that, for the past five years, has been starving this critical field of public money. While more than 100 million Americans await for cures that medicine cannot provide, the Bush administration's unconscionable stem-cell policy has created obstacles to research that could help them.

On the national level, not all types of stem-cell research are languishing in a state of neglect. The government provides substantial money for adult stem-cell research and for stem-cell research in animals, but only a relative trickle goes to human embryonic stem-cell research. This is the research that many scientists believe to be the most promising, and one that almost all scientists feel should be on the same footing as other types of research, such as that using adult stem cells like bone-marrow cells or the stem cells found in umbilical-cord blood.

Adult stem cells, while very promising, have been proven to give rise to only a limited number of cell types, whereas embryonic stem cells, taken from a microscopic 4- to 7-day-old embryo, hold the entire blueprint for the human body. Not only are they versatile enough to create replacement cells for any cell type, they contain a mother lode of information about human developmental biology, genetics and disease pathology — information that is expected to lay the foundation for a second revolution in biology and to transform medicine. The bill being introduced by state Sen. Ron Klein, D-Delray Beach, and Rep. Franklin Sands, D-Weston, includes money for all types of stem-cell research, while Florida's proposed constitutional amendment takes care not to duplicate financing by the federal government and focuses instead on the more neglected area of human embryonic stem-cell research.

Almost all stem-cell scientists believe that, without initially studying human embryos, even adult stem cells never will reach their full potential. For scientists to learn how to "reprogram" adult cells and make them behave like embryonic stem cells, for example, they first need to learn what properties exist in embryonic cells during their brief existence. Only then will scientists be able to "switch on or off" the genes, chemicals and other factors that would turn an adult cell into a far more versatile embryonic state. It's possible, if not probable, that at some point we will know enough to manipulate adult stem cells into any cell type that's needed, but embryonic stem cells will provide the road map to get us there.

Restrictions on federal support of embryonic stem-cell research have hindered the science from almost every angle. Federal grants can be applied to scientists studying only 22 several-year-old lines — a "line" means batches of cultivated cells that were obtained from a single embryo — of human embryonic stem cells. These cell lines, by the government's own admission, never will be suitable

for human transplantation because they were grown atop a layer of mouse "feeder" cells and pose the risk of contagion with rodent diseases. Even if the cells were transplantable, they fall far short of providing the vast genetic diversity needed to create immune-matches for patients in a genetically diverse population such as ours.

The problem of patients rejecting genetically unmatched cells is a potentially deadly one, and scientists will have to overcome it if stem-cell transplants are to become common practice. Today, the only sure-fire way to overcome the danger of rejection is to take the cells from the patient himself. For all but a very few of the body's cell types, this means creating custom-made, genetically matched stem cells using somatic cell nuclear transfer, otherwise known as therapeutic cloning. Current law forbids the use of federal money for therapeutic cloning.

Another limitation is that federally financed cell lines are subject to patents that provide a built-in disincentive for scientists who want to use them to develop clinical treatments. Most of the available cell lines, according to the Geron Corp. and the WiCell Institute, which own the patents, can be used only for basic research and teaching purposes. Their originators retain the commercial rights to any therapies that arise from them, discouraging scientists from pursuing their discoveries all the way to the treatment stage. Also, as the cells eke out the years dividing in lab dishes, they accumulate genetic mistakes, or mutations. Genetic anomalies are a recipe for cancer and many other diseases, so this suggests that embryonic cells, which researchers first thought could divide indefinitely with their DNA intact, may have a shelf life.

Cures are being postponed year after year, as long as these restrictions stay in place. Meanwhile, scientists in South Korea, England, Israel, Sweden and several other countries are leaving American scientists in the dust. That is another reason why Florida should follow California, Connecticut, Massachusetts, New York and New Jersey: global competitiveness. If the U.S. as a nation is not willing or able to remain competitive in the coming medical revolution, at least individual states can.

One of the last areas in which the U.S. arguably leads the world is in science and technology. But biomedical research can be conducted anywhere, which is why less affluent countries such as South Korea, Singapore and India are pumping billions into all types of stem-cell research. Pharmaceutical and biotech companies are almost certain to follow where public money is priming the pump for new discoveries.


Whether it happens through legislation or through the constitutional amendment process, there will be clear economic advantages for the state if Florida does provide money for stem-cell research. Private biotech and pharmaceutical companies tend to cluster around universities where exciting research is going on, so that they can partner with the scientists making the most cutting-edge discoveries. This is how basic research gets translated into actual therapies for patients — government-financed scientists lay the groundwork by unlocking the basic mechanisms of disease, and private companies find ways to commercialize their discoveries. The end result is new drugs, technologies and treatments that you and I can get from our doctors.

As long as the U.S. government doesn't interfere, the states making a significant investment in stem-cell research will remain first-world societies in terms of medical technologies and treatments, while those that ban or radically restrict it will fall behind. This is unfair to the vast majority of Americans, but it is especially unfair to Floridians. While some parts of the U.S. can ignore the country's impending "aging boom" for a few more years, Florida is experiencing it. In this respect, Florida is the future.

Some may argue that it is the role of the federal government to pay for basic research, and this is true. But what do Americans do when our government fails us? Until the federal government enacts policies that address the needs of the many rather than cater to the desires of a narrow ideological minority, it falls to the states to fill the void. Let's hope that Florida is among the first to rise to the challenge.

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