

The last decade's culture wars drove some states to fund stem cell research

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It wasn't what President George W. Bush had in mind. In 2001, Bush restricted the use of federal funding for embryonic stem cell research, giving conservatives what looked like a major victory in the nation's culture wars.

Three years later California thumbed its nose at the ban by starting its own multibillion-dollar stem cell program, and several states followed suit. Even though the restrictions were lifted in 2009, the insurgent movement survived and grew. Today at least seven states offer [stem cell research](#) funding or other incentives to local scientists and industry.

These initiatives have not yet produced the eagerly anticipated "cures" for conditions such as melanoma or Parkinson's disease. But early public disappointment has yielded to the realization that years of research lie ahead before treatments can routinely enter the marketplace.

Still, as an engine for generating economic development and jobs, and as a mechanism for enhancing local scientific prestige, stem cell research for many states appears to be worth the investment.

"We want to show what we have," said Dan Gincel, executive director of the Maryland Stem Cell Research Fund. He pointed to a sophisticated science community and easy access to the National Institutes of Health and the Food and Drug Administration.

The Maryland fund during the past eight years has used between \$9

million and \$12 million annually in state-appropriated funds to write grants to "incentivize the industry," Gincel said. The money must be spent in Maryland, and grantees must be Maryland-based researchers, institutions or firms. "We're still in the early stages of the technology - mostly basic research," Gincel said.

And although the political and social tumult that retarded embryonic stem cell research early in the century still smolders, as the current debate over funding for Planned Parenthood can attest, the use of [stem cells](#) from adults has blunted much of the controversy.

"There was no extreme pushback," said pediatrician Jakub Tolar, head of the University of Minnesota's Stem Cell Institute and co-chairman of Regenerative Medicine Minnesota, a \$50 million stem cell research program created last year by the state's Republican-controlled legislature and signed into law by its Democratic governor. "My experience is that most parents or people with a particular condition could not care less about the politics."

Stem cells are unspecialized cells that develop and grow into the tissue- or organ-specific cells that make up the body of a living organism, everything from muscle and bone, to lungs and brain. Stem cells have many uses, but public attention for several years has focused on "cell-based therapies," also known as "[regenerative medicine](#)," in which stem cells are induced to form a particular type of adult cell to rebuild damaged or diseased parts of the body: a heart wall scarred by heart attacks; an injured spinal cord; burn damage; the effects of diabetes or Parkinson's disease.

Controversy arose early in the century over the use of [embryonic stem cells](#), which can differentiate into any cells in the body, but which are obtained by destroying unneeded human embryos created through in vitro fertilization. Anti-abortion groups and religious conservatives

opposed embryonic stem cell research, and Bush in 2001 barred the use of federal funds to finance research with lines of embryonic cells created after his order because of concerns over the sanctity of life.

Three years later California voters approved ballot Proposition 71, creating the California Institute of Regenerative Medicine (CIRM) to make grants and loans for stem cell research, funding it with a \$3 billion bond issue - which is generating a total of \$6 billion with interest and is expected to last until 2020.

"Without George Bush, this agency would not exist," said David Jensen, publisher of California Stem Cell Report, a blog focused on the California institute. "The campaign raised expectations that therapies were right around the corner. The federal government wasn't funding it, and the voters said that since we want to save lives, we'll fund it."

The institute in the past decade has become one of the most important and perhaps the biggest nonfederal entity dedicated stem cell research center in the world, spending about \$180 million per year. Different parts of the National Institutes of Health spent a combined \$1.4 billion on stem cell research in 2014.

Over the years the California institute has endured sharp criticism for failing to deliver cures and spending around 90 percent of its funds on basic research while ignoring drug development.

An Institute of Medicine study in 2012 also warned of cronyism, noting that the vast majority of CIRM grants were going to academic institutions whose members sat on the board of directors. Early critics also questioned whether usurping a federal research agenda was the best use of California's tax dollars.

Much of this was dictated by Proposition 71 itself. The law mandates

who sits on the board. It also provides the money, and the institute must spend it. In a California-centric program, supporters say, conflicts of interest are endemic, and board members frequently recuse themselves during the grant process.

C. Randal Mills, chosen in 2014 as the institute's new president and chief executive officer, said the organization is adjusting to "a world that has changed significantly" since 2004 by moving away from simply funding good ideas in isolation to what he describes as a "system-based agency."

Last year the institute had 10 programs in clinical trials, but expects to have 20 by the end of this year.

"We're setting up continuous paths to move basic research to clinical trials," he added. "It's like a train moving down a track, where each grant is the link to the next step down the line."

In 2009, President Barack Obama lifted the ban on embryonic stem cell research, but by that time researchers were already using adult stem cells extensively and had learned to genetically reprogram [adult stem cells](#) into embryonic-like induced [pluripotent stem cells](#).

Despite the improved national climate, states - both for economic and scientific reasons - have continued to fund their own programs. NIH lists initiatives in six states, not counting Minnesota, and other reports have suggested that as many as 15 states either have dedicated programs or fund stem cell research or did so in the past.

Yet in a discipline that is just beginning to enter a translational phase, it is hard to evaluate the effectiveness of individual programs: "It's a huge field, and it's still early," said Heather Rooke, scientific director for the International Society for Stem Cell Research. "States will continue to do [basic research](#), and California has certainly already had important

influence driving the research to the clinic."

Results will take time, agreed Minnesota's Tolar, but it is worth the trouble: "We started on drugs a hundred years ago. Then we went to monoclonal antibodies - biologicals," he said. "We are now getting ready to use cells as a third way of doing medicine. We are at a historical sweet spot."

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