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UR researchers split on promise of stem cells culled from skin

Justina Wang
Staff writer

STORYCHAT: Post Comment

(December 8, 2007) — Upon hearing the news that scientists had discovered a way to reprogram human skin cells to act like embryonic stem cells, Dr. Steve Goldman immediately began trying to replicate the method in his own lab.

The University of Rochester neurologist and his fellow stem cell researchers had spent the last 15 years searching for cures for myelin diseases, such as multiple sclerosis and Tay-Sachs. The work has been promising but impractical: The treatments they developed required drawing from the limited supply of aborted-fetus cells that met stringent federal guidelines and could never be plentiful enough to be used in physicians' offices.

But the newfound possibility of using skin cells, Goldman believes, could put their approach into clinic within a year or two.

"It's very possible that we'll be able to make very rapid progress," he said.

Some of his University of Rochester colleagues, however, are more skeptical.

"Skin cells are far from being suitable," said Mark Noble, a professor of genetics who uses stem cell research to study such problems as inherited diseases and the adverse effects of chemotherapy. "We're not going to jump on a highly successful research program to do something that really will add very little at the moment."

Stem cell researchers all over the world watched closely last month as two teams of scientists, from the University of Japan and the University of Wisconsin-Madison, revealed ways to genetically alter skin cells that almost exactly mimic embryonic stem cells.

Since that research was published in *Cell* and *Science* magazines, experimenters in local laboratories weighed how the discoveries will affect their work, while everyone from scientists to religious conser



enlarge+

SHAWN DOWD sta
Lab technician Janna Bates of Fairport sep
samples into cultures in Dr. Steve Goldma
lab at the University of Rochester Medical
Goldman says using skin cells could speed
efforts to find cures.

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President Bush have heralded the research as promise that diseased cells could one day be replace raising ethical questions.

Questions, controversy

"This is breathtaking news," said Dr. Joseph DiPoala Sr., a Henrietta general internist who has been against the use of embryonic stem cells. "The people that are against embryonic stem cells are very of this. We're promoting this." Stem cell research has long sparked controversy as religious leaders opponents argue that harvesting cells from embryos destroys human life. Scientists and other supp the research could produce powerful treatments and cures for such debilitating diseases as Parkins Alzheimer's.

In addition to quelling ethical and political debates, reprogrammed skin cells may also solve the mor problems researchers have run into when using embryonic cells, which are often rejected by the hos system. Skin cells that come directly from the person who needs them could transfer more smoothly

For Goldman, that means the possibility of an "almost ridiculously easy" way to give practical applica years of laboratory research.

Though the reprogramming approach comes with several complications — for one, viruses used to c cells can cause mutations that can give rise to cancerous tumors — Goldman believes the concerns "surmountable."

"The technology is already out there for addressing most of these issues," he said.

Continuing research

In other laboratories, though, scientists aren't as gung-ho about bringing skin cells into their studies.

Noble said he would "have a look" at the new methods but believes the obstacles are far from being Embryonic stem cell research, meanwhile, holds much more immediate promise, he said.

"This is years and years away from standing in for the existing tools that we have, many of which are yielding discoveries ranging from drug therapies suited for rapid clinical translation to cell-based thei moving toward clinical trials."

At the State University of New York at Buffalo, stem-cell researcher Manolis Tzanakakis, whose wor diabetes therapies, said he was not planning any changes because of the new method. "It's too ear! skin cells converted to (embryonic stem)-like cells is the way to go," he responded in an e-mail.

Dr. Rudolf Jaenisch, a founding member of the Massachusetts-based Whitehead Institute for Biome Research who earlier this year announced that his team of researchers had similarly reprogrammed cells, also warned against viewing the latest breakthrough as a replacement for embryonic stem cell

Eventually, he believes, skin cells could completely eliminate the need to use human embryos to de treatments, but "not for a long time," he said.

The bigger picture

While some scientists are split on how quickly to begin exploring the newly reported reprogramming there's little debate over its significance. The larger goal of all stem cell researchers, said Dr. Bradfo University of Rochester Medical Center CEO, is finding ways to cure diseases, and most view the la as another tool that could one day revolutionize the field.

At URMC, nearly 40 researchers work with all types of stem cells, derived from human embryos to a and now, those reprogrammed from the skin.

Incorporating the latest discoveries into some of the laboratories will help broaden the university's sc programs, Berk said, and may bring in more of the limited stem cell research funding that's often chc and political debates.

"But it is not a cure-all."

JUWANG@DemocratandChronicle.com**STORYCHAT** [Post a Comment](#) [View A](#)

"The cost of the Iraq war is 2 billion dollars a week, approximately quadruple the NIH budget. Think of how much we could do with that money in terms of medical research, rebuilding our infrastructure, and many other worthy causes that depend on federal funding. "

And yet there would still be hundreds of things left unfunded and you still ignore that we're \$ in debt. We need to curb spending all over the place, not constantly advocate for more. Once debt, not just the deficit, our debt, under control, we can think about adding funding to appropriate programs. We spend twice as much on interest as we do on Iraq. Also, singling out Iraq as the end is pretty shortsighted and it will end up costing us even more in the long run (much like not finishing the job way back in 1991). When we pulled out of Vietnam, we weren't risking our security, just our pride. Like it or not, our national security is directly tied to the stability of the East (or else you won't have the energy to run your lab, much less drive the 60 miles to get to

"No one is crying about pet issues. There are legitimate needs that are not being met due to irresponsibility at the federal level. There would be much more money available to a variety of causes, if only the money were put to better use."

Everyone's issues are legitimate needs in their own eyes. If you want more funding for your research, explain why it's justified to go further into debt or to end something like the school lunch program for it (unlike Iraq, there is no Constitutionality for the program). Taxpayers aren't a limitless font of cash and treating us like we are is exactly why western NY is in the situation it is in.

phantomlord

Posted: Sun Dec 09, 2007 11:48 pm

Phantomlord: "Also, don't jump on the Iraq war bandwagon... it's a total strawman issue and as a scientist, you should be more objective in your blame for the lack of science funding. We could defund the military completely, allowing us to be marched over by Luxembourg, and there would still be plenty of people crying that their pet issue didn't get funded the way they want."

My response: No one is suggesting that we defund the military. That is itself a strawman argument. The fact is that our federal resources are limited and that we are not making the most of them by pouring our tax dollars on foreign occupation. The cost of the Iraq war is 2 billion dollars a week, approximately quadruple the NIH budget per week. Think of how much we could do with that money in terms of medical research, rebuilding our own infrastructure, and many other worthy causes that depend on federal funding.

No one is crying about pet issues. There are legitimate needs that are not being met due to irresponsibility at the federal level. There would be much more money available to a variety of causes, if only the money were put to better use.

eyedoc333

Posted: Sun Dec 09, 2007 10:54 pm

A decision needs to be made to fund something and not fund other things. As I said, we can't fund everything. The best you can do is plead your case that yours is the thing that deserves it but remember that, in doing so, someone else will not get their funding.

Also, don't jump on the Iraq war bandwagon... it's a total strawman issue and as a scientist, you should be more objective in your blame for the lack of science funding. We could defund the military completely, allowing us to be marched over by Luxembourg, and there would still be plenty of people crying that their pet issue didn't get funded the way they want. Don't forget the \$9.2 trillion (approximately 10% of GDP) hanging over our kids' heads before we advocate more spending on anything too. They don't even mention the trillion in empty IOUs in the Social Security Trust Fund that was gutted for spending starting in 1965*. It's entirely a myth that military funding ever created the nation. The way we're going, we'll pay \$246 billion in interest on our current debt just this year. Imagine what we could have done with that if those who came before us didn't spend us into a hole.

*The Social Security Act of 1965 changed the accounting for the Social Security Trust Fund, a fund to be borrowed by the general fund of the United States with IOUs backed by the full faith and credit of the US to be left in the money's place. This was required because federal spending was growing too rapidly, creating debt, due to the initial programs of the Great Society. The deficit grew from \$92 billion in 1960 to \$196 billion in 1970. From 1971 through today, social spending always exceeded military spending. Science funding has gone from \$599 million in 1960 to at least \$26 billion this year. Numbers taken from GAO budget report from 1940+.

phantomlord

Posted: Sun Dec 09, 2007 10:38 pm

One final thought then...

Phantomlord: "Ultimately, my point comes down to the fact that we simply can't afford to fund research that scientists would like to do with taxpayer money. You have obvious reasons why to see more government funding for your particular field, but every other field has scientists who say the same thing about their own field."

My response: The current success rate for federal funding from NIH (the National Institutes of Health) has hovered around 10-15% this past year. This represents all areas of medical research, not just stem cell research. Just a few years ago, the success rate for NIH grants was 20-30%. Laboratories were shut down all over the country now because the federal budget is strapped by the cost of the war while medical research of all kinds is suffering from lack of federal support. I am currently running a stem cell lab as a volunteer because my NIH grant scored in the top 15%, but was not funded. I have no money to pay my own salary. I continue to run my lab on a volunteer basis because the point is so important to stop now. My response to the assertion that we're all after more money is that I'm free!

eyedoc333

Posted: Sun Dec 09, 2007 9:48 pm

As I said, I'm not an expert in the field, so I'm glad to defer to you on the scientific points of

Ultimately, my point comes down to the fact that we simply can't afford to fund all the research that scientists would like to do with taxpayer money. You have obvious reasons why you'd like to see more government funding for your particular field, but every other field has scientists who say the same thing about their own field.

I personally like the NSF, DARPA, etc, but we can't just give them unlimited budgets and allow them to come claim a piece without guidelines. By all means, feel free to dispute the guidelines and/or the amount of funding they receive... but don't feel that your field is unique in its desires. Also, stop griping that there are too many lawyers sitting in legislatures and not enough scientists, teachers, artists, doctors, homemakers, etc. It's hard to make an informed decision when the only thing that is understood is law and not the actual subject of the law they're writing/voting on.

phantomlord

Posted: Sun Dec 09, 2007 9:06 pm

OK, a few more points to address---

Phantomlord: "A scientist? Maybe, maybe not. The business employing the scientist? Maybe not. A cost-benefit analysis and say "well, developing this drug is likely to cost \$500 million and take 5 years. Money is being poured into stem cell research and they're actively seeking a treatment. Is it worth investing \$500 million if the stem cell treatment will be better and we can't recoup our costs for 5 years?"

My response: Business decisions like that are made routinely every day. There is no guarantee that stem cell treatments will work. There is also no scientific reason not to try. The beauty of science is that we can try alternative approaches to get at the same question. Should we not try a potentially better treatment because a company may be put off in pursuing its own approach? Since we don't know the outcome, neither do the companies. It's a calculated risk, no matter who decides to go forward with an approach.

Phantomlord: "And yet they have been produced from chord and adult stem cells in that time

My response: Human embryonic stem cells were first isolated in 1998. The other stem cells (hematopoietic, etc.) have been around much longer. With fewer restrictions and a longer time stands to reason that there would be more progress with non-embryonic stem cells.

Phantomlord: "I'm more familiar with computer technology than medical technology, but isn't research being done by academia, promptly being patented by the university and sold off to a bidder anyway?"

My response: Sometimes, but not always. If the work is federally-funded in an academic setting there is more oversight and an expectation to share reagents, publish papers, etc. I've developed and sold cell lines to over 100 academic laboratories worldwide (without patenting them), for only the shipping charges.

Phantomlord: "Should we have no restrictions on research (not just stem cell research) because it might drive scientists out of the country? If a scientist wants to study the effects of submerging a person underwater (giving them a respirator and intravenous fluids) for weeks at a time? What if the scientist uses a prisoner? Should we ok it then? "

My response: There are already restrictions on human subjects research that would prevent the scenarios you mention from happening in any academic laboratory. I have to fill out 15 pages to get committee approval in order to obtain human pathology specimens from unidentified patients for research. The scenarios you mention would never be allowed in any bona fide University. Research in the US and other countries follow the tenets of the Declaration of Helsinki:

http://en.wikipedia.org/wiki/Declaration_of_Helsinki

<http://www.wma.net/e/policy/b3.htm>

I hope that helps explain things a bit more.

eyedoc333

Posted: Sun Dec 09, 2007 8:50 pm

"I don't know of a scientist who would ever say this. In science, we must prove our hypotheses with experiments that can be repeated and results that can be proven in multiple ways. We often use more than one approach to reach the same goals. No one would ever claim that stem cells are a cure for all ills or that we shouldn't pursue other avenues because stem cells are a cure-all. It just isn't true. I see it."

A scientist? Maybe, maybe not. The business employing the scientist? Maybe they look at a cost-benefit analysis and say "well, developing this drug is likely to cost \$500 million and take 10 years. Money is being poured into stem cell research and they're actively seeking a treatment for the same thing worth investing \$500 million if the stem cell treatment will be better and we may only recoup for 5 years?"

"I am not aware of any other area of research that received approval for federal funding from the Houses of Congress, only to be vetoed by Bush twice. We need more funding for all medical research and human embryonic stem cells included. Funding from private foundations is wonderful, but not enough. "

As I said, everyone always wants more funding for their research, be it stem cells, anti-matter, astrophysics or optics. Someone has to draw the line on funding somewhere. You might disagree with that line, I might disagree with it, but someone has to draw it. If everything that passed both Houses of Congress were to be absolute, the President wouldn't have been given veto power.

"Do you know how many years it takes for a potential treatment of any kind to develop from laboratory experiment, through animal studies, then Phase I, II, III human clinical trials? It takes years under the best of circumstances. The field of human embryonic stem cell research began in 1998 in less than 10 years of research time, coupled with federal restrictions in place since 2001, it is surprising that progress has been hampered."

And yet they have been produced from chord and adult stem cells in that time. Aren't the primary factors holding back embryonic stem cells difficulty in controlling the differentiation (creating ethical issues in addition to histocompatibility (rejection) issues? Adult progenitor cells aren't pluripotent, reduced ability to mutate and grow in unexpected ways, and if they're donated by the patient recipient they don't reject.

"Companies jump on board in later stages of research, where academia has established the ground when there is money to be made."

I'm more familiar with computer technology than medical technology, but isn't a lot of research done by academia, promptly being patented by the university and sold off to the highest bidder? Yeah, I understand there's a better chance of a university making the research open, but more, there seems to be a trend of locking it down to generate more money for the university.

If Merck weren't paying the University of Florida (and other entities) for patents relating to Gardasil, wouldn't GlaxoSmithKline and others not be using the same research to market a product as well?

"US federal restrictions on human embryonic stem cell research have: 1) driven some excellent scientists out of the country in order to pursue their research, 2) discouraged some young scientists from entering the field in the first place, 3) create an environment where US patients will need to go out of the country for stem cell treatments that will likely be developed elsewhere. The US is at the forefront in many areas of research, why not this too?"

Should we have no restrictions on research (not just stem cell research) because they might drive scientists out of the country? If a scientist wants to study the effects of submerging humans in water (giving them a respirator and intravenous fluids) for weeks at a time? What if China allows it and a scientist uses a prisoner? Should we ok it then?

As for discouraging scientists from getting into the field, science (and math) is down across the board in the US. The fields aren't glamorous nor easy enough. Not to mention that, today, most kids in the US don't know a quadratic equation from an isosceles triangle nor a pipette from a beaker. Last year, I only required 2 years of math and science to graduate. That's an absolute abomination, IMO.

phantomlord

Posted: Sat Dec 08, 2007 10:43 pm

I see some interesting points brought up here.

Let's clarify a few things--

Phantomlord: "...scientists will go 'well, I'm going to avoid working on this cure or treatment X because it'll be solved by stem cells anyway.'"

My response: I don't know of a scientist who would ever say this. In science, we must prove hypotheses based on experiments that can be repeated and results that can be proven in multiple ways. We often try more than one approach to reach the same goals. No one would ever claim that stem cells are a panacea for all ills or that we shouldn't pursue other avenues because stem cells are a cure. It just isn't reality as I see it.

Phantomlord: "It is commonly believed in any research department in any field that their research has been delayed compared to where they would be at if they had more funding. Pick ANY field and the researchers will tell you that."

My response: I am not aware of any other area of research that received approval for federal funding from both Houses of Congress, only to be vetoed by Bush twice. We need more funding for a research program that includes human embryonic stem cells. Funding from private foundations is wonderful, but it's not nearly enough.

Phantomlord: "...none of the current stem cell treatments approved by the FDA have come from embryonic lines."

My response: Do you know how many years it takes for a potential treatment of any kind to go from a laboratory experiment, through animal studies, then Phase I, II, III human clinical trials? It takes years under the best of circumstances. The field of human embryonic stem cell research began in the late 1990s. With less than 10 years of research time, coupled with federal restrictions in place since 2001, it's surprising that progress has been hampered.

Phantomlord: "The fact that the private money is mostly going to non-embryonic stem cell research should be indicative of where the real promises currently are. Nothing stops individual people or corporations, etc from investing in embryonic research if they really think that is the winning strategy."

My response: Be careful what you wish for. Companies jump on board in later stages of research, when academia has established the groundwork, when there is money to be made. Since we are at that stage, with severe restrictions, it is not surprising that there is not more corporate money invested in this field, or any field, to be controlled by big pharmaceutical companies? Their trade secrets, not available to academic researchers for independent corroboration, etc. Companies would have a monopoly on these treatments, without the federal oversight that we would have at a funded lab.

Phantomlord: "Some people are working on it, especially outside of the US."

My response: US federal restrictions on human embryonic stem cell research have: 1) driven excellent scientists out of the country in order to pursue their research, 2) discouraged some scientists from getting into the field in the first place, 3) create an environment where US patients need to go outside the country for stem cell treatments that will likely be developed elsewhere. Since the US is at the forefront in so many areas of research, why not this too?

That's all I have time to address for now.....

eyedoc333

Posted: Sat Dec 08, 2007 9:44 pm

"They hold promise but are false hopes? I don't understand what you're trying to say."

Stem cells, as sold, are very similar to the snake oil of the 1800s. Step right up. One person here. Get this miracle drug that will cure Parkinsons, end diabetes, regrow a new liver for you, cure the common cold.

We have gotten some treatments out of it for some maladies... but at this point, stem cells are all. They hold hope of a cure, not necessarily THE cure and not necessarily in any of our lifetimes.

On one hand, you'll have people get excited that their family member will finally be better but treatments may never develop into something viable. We dangle this miracle in front of them that we haven't even started working on it all in an effort to get the support for funding so it worked on, even if it will ultimately never pan out. Maybe a treatment is found but it comes with a chance to create an uncontrollable cancer. Cure Parkinsons but get a brain tumor that will kill anyway.

On the other hand, scientists will go "well, I'm going to avoid working on this cure or treatment for disease X because it'll be solved by stem cells anyway." After 10 years, the stem cell scientists find that the treatment just cannot be achieved with our current knowledge and technology, so that won't be coming and the original treatment that held hope was abandoned because stem cell was going to do it better. So, we're left without a treatment at all.

"It is very commonly accepted in the research community that the Bush administration's policy delayed this research a number of years."

It is commonly believed in any research department in any field that their research has been compared to where they would be at if they had more funding. Pick ANY field and the researchers will tell you that. Aerospace, anthropology, sociology, advanced composites, geology, astronomy, etc. It's easier to find a field that doesn't need more funding than to list all of them that say they don't need it.

"If the cures, as you say, are as close as a few years away, would we already be there if it were this policy?"

I'm not an expert in the field of stem cells, but the last time I knew (and correct me if I'm wrong), none of the current stem cell treatments approved by the FDA have come from embryonic lines. Instead, they're all derived from adult and/or chord stem cells. Embryonic lines are too generic and have too many slight mutations, which cause various forms of cancer, because they're too generic and hard to control.

The fact that the private money is mostly going to non-embryonic stem cell research should tell you where the real promises currently are. Nothing stops individual people, corporations, etc from investing in embryonic research if they really think that is the winning bet.

"I believe it would be the rare case where anyone wouldn't agree with this. However, that's a

slope and there is no evidence that stem cell research, embryonic or otherwise, would lead u

Some people are working on it, especially outside of the US. The same countries that you car
market organs in would love to be able to grow a new set of kidneys with your DNA (so they
reject) in a pig so they could sell them to you for even more money. We're seeing them put a
into plants (and that they are doing in the US). If nobody says "hey, wait a minute" there are
scientists who would go full steam ahead to wherever their work took them without consideri
consequences.

phantomlord
Posted: Sat Dec 08, 2007 8:56 pm

"Another thing I think is often missing from articles on stem cells is the false hope they're pro

I don't think it's a false hope. There are promising advances all the time with all types of ster
further research will tell us when they become real or false hopes.

Then you say:

"Yes, there are some treatments available right now, but they are few and far between. Stem
wonderful thing and I think they hold much promise, but we have to temper our hopes with r

They hold promise but are false hopes? I don't understand what you're trying to say.

It is very commonly accepted in the research community that the Bush administration's polic
delayed this research a number of years. If the cures, as you say, are as close as a few years
would we already be there if it weren't for this policy?

"I also think we need to highly consider the ethics of experimenting with certain things (say,
animal/human chimera/hybrid, full human cloning (versus cloning a body part), etc)."

I believe it would be the rare case where anyone wouldn't agree with this. However, that's a
slope and there is no evidence that stem cell research, embryonic or otherwise, would lead u

jth
Posted: Sat Dec 08, 2007 7:41 pm

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