next 60 minutes under the control of the Republican leader's designee, Senator COLEMAN; the next 60 minutes under the control of the majority leader or his designee; and then the next 60 minutes under the control of Senator BROWNBACK; and continuing in that alternating fashion until 9 p.m. on Tuesday.

The PRESIDING OFFICER. Without objection, it is so ordered.

CONCLUSION OF MORNING BUSINESS

The PRESIDING OFFICER. Morning business is closed.

STEM CELL RESEARCH ENHANCEMENT ACT OF 2007

HOPE OFFERED THROUGH PRINCIPLED AND ETHICAL STEM CELL RESEARCH ACT

The PRESIDING OFFICER. Under the previous order, the Senate will proceed to the consideration en bloc of S. 5 and S. 30, which the clerk will report.

The assistant legislative clerk read as follows:

A bill (S. 5) to amend the Public Health Service Act to provide for human embryonic stem cell research.

A bill (S. 30) to intensify research to derive human pluripotent stem cell lines.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. HARKIN. Mr. President, I noted as the clerk reported the bill, S. 5, she reported it as an amendment to the Public Health Service Act, and that is what this debate is all about and that is what this vote is going to be about. It is going to be about public health of people in this country and around the world and whether they are going to have hope that they will see a future in which modern medical science can actually overcome and cure things such as Parkinson's disease, Alzheimer's, heart disease, spinal cord injuries, and a host of other illnesses. That is what this debate is about. It is about hope. It is about health. So today begins 20 hours of Senate debate on a bill to lift the administration's restrictions on stem cell research and bring hope to millions of people in this country who are suffering from illnesses such as ALS, juvenile diabetes, Parkinson's, spinal cord injuries, and so many other devastating diseases and conditions.

Most Americans probably find it hard to believe we are still arguing about this issue. They want more stem cell research. They have listened to the scientists. They have watched the House and Senate vote overwhelmingly during the last Congress to expand the administration's policy. Then they went to the polls in November and more often than not elected candidates who support stem cell research. So why are we still debating this? The answer, unfortunately, is simple: President Bush used his first—and so far only—veto of his administration to reject last year's stem cell bill and dash the hopes of millions of Americans. So we are back once again.

I thank my colleagues in the Senate who have worked together on this issue, starting, of course, with my colleague Senator ARLEN SPECTER of Pennsylvania. He chaired the very first hearing in Congress on embryonic stem cells in December of 1998. In all, our Labor, Health, and Human Services and Education Appropriations Subcommittee has held 20 hearings on this research since then under the chairmanship of Senator SPECTER. I also thank the other Senate leaders on stem cell research, including Senator HATCH, Senator KENNEDY, Senator SMITH, and Senator FEINSTEIN. So counting Senator SPECTER and me, there are three Republicans and three Democrats on that list, and this has truly been a bipartisan effort all the way. I thank our majority leader Senator REID for scheduling this debate and making sure it is one of the first issues we vote on in the 110th Congress. I also thank our Republican leader Senator MCCONNELL for working with us to schedule this debate and this vote tomorrow.

Most of all, I thank the hundreds of thousands of families and patients who never gave up, who kept up the pressure to bring this bill to the floor and who were so eager to see S. 5 sent to the President's desk. They have kept the faith and now it is our job to see that they are not disappointed.

There is probably one other entity I should thank and that is the House of Representatives, under the able leadership of Speaker PELOSI, which passed this bill earlier this year and sent it over to the Senate. I will talk a little bit later about how our bill differs from theirs, but nonetheless, the bill they passed is a bill that mirrors the same thing we are doing here, and that is to lift the restrictions on embryonic stem cell research.

Under this unanimous consent agreement we have, for information, we will debate and vote on two bills. Make no mistake, however: The only one that matters is S. 5, the Stem Cell Research Enhancement Act. The other bill is S. 30. This is the one bill that at long last will unleash some of the most exciting and promising research of modern times. Think of it this way: S. 5, the bill we will be debating and voting on, will take the handcuffs off of our scientists. It will take the handcuffs off so they can now begin to do the research that will lead to miraculous cures and interventions.

It is a good time to step back and ask: Why is there so much support for S. 5? Well, I have a letter signed by 525 groups endorsing this bill, including patient advocacy groups, health organizations, research universities, scientific societies, religious groups. There are 525 groups in all. They all agree Congress should pass S. 5. Why is that? Because it offers hope. I have a series of charts here which I will point to. S. 5 offers hope. I think this chart illustrates many—not all but many—of the ailments which scientists tell us embryonic stem cells could lead to interventions and cures for, including Lou Gehrig's disease, Alzheimer's, Parkinson's disease, muscular dystrophy, anemias, severe burns, leukemia, lymphoma, bone marrow disorders, diabetes, immune deficiencies, heart disease, and spinal cord injuries. That is just to name a few. There are many more, but my colleagues get the idea of how all encompassing the approach would be if we were to get into embryonic stem cell research. It is not just focused on one thing; it is broader than that. It encompasses so many illnesses and afflictions. All told, more than 100 million Americans have diseases that one day could be treated or cured with embryonic stem cell research.

But it is not just Members of Congress saying that. No one should take our word alone. Three weeks ago Dr. Elias Zerhouni, who is the Director of the National Institutes of Health, appeared before our Appropriations subcommittee. I asked him whether scientists would have a better chance of finding new cures and treatments if the administration's current restrictions on embryonic stem cell research were lifted. Dr. Zerhouni said unequivocally: Yes. Now, Dr. Zerhouni is the Federal Government's top scientist in the area of medical research. President Bush appointed him to be the Director of the National Institutes of Health. So it took great courage on his part to say in public we need to change direction on stem cell research, but he did so because it is the truth.

This is his quote. This is what the Director of the National Institutes of Health said before the subcommittee:

It is clear today that American science would be better served and the Nation would be better served if we let our scientists have access to more cell lines.

It is not only NIH scientists who believe this way. Dr. J. Michael Bishop, who won the Nobel Prize in medicine, wrote recently:

The vast majority of the biomedical research community believes that human embryonic stem cells are likely to be the source of key discoveries related to many debilitating diseases.

Dr. Harold Varmus, the former Director of the National Institutes of Health, who just preceded Dr. Zerhouni and who himself is a Nobel Prize winner, wrote in a letter dated yesterday:

S. 5 represents an important step forward for human embryonic stem cell research, a new field that offers great promise for the replacement of damaged cells, the understanding of the mechanics of disease, and the development and testing of new drugs. Unfortunately, current Federal policy has not kept pace with the speed of scientific discovery and is today of limited value to the scientific community.

I could go on and on. We have a lot of scientists all over this country and the world who agree we should be pursuing embryonic stem cell research because it offers enormous hope for easing

human suffering. Some may ask: I thought the Federal Government already supports embryonic stem cell research. Well, here we have an interesting situation in terms of Federal funding for embryonic stem cell research.

I have to take my colleagues back in time to August 9 of 2001. In an evening address starting at 9 p.m. on August 9 of 2001, the President, in an address to the Nation, said we were going to permit Federal funding for embryonic stem cells only if they were derived prior to 9 p.m. on August 9 of 2001. Any that were derived after that we could not fund research on. Well, at this time it was said there were 78 lines, 78 stem cell lines we could use. We know that is less than 21 now and many of these are in bad shape, and every single one of them contaminated on mouse feeder cells, which I will talk about in a moment. I always thought it was kind of interesting and very curious that we had this hypocrisy—I call it stem cell hypocrisy—that before 9 p.m. on August 9 of 2001, it is morally acceptable to use taxpayers' dollars to fund embryonic stem cell research. So if the stem cells were derived before 9 p.m., it is morally acceptable, but if they were derived after 9 p.m. on August 9, it is morally unacceptable. Well, I ask, what is so significant about 9 p.m. on August 9? Why couldn't it have been 8:30 p.m., 9:15 p.m., midnight, or 10 p.m? Well, I think my colleagues get the point. It is totally arbitrary—totally arbitrary. We have to ask ourselves: Why is it that Federal tax dollars can be used on embryonic stem cells derived before 9 p.m.—that is OK—but after 9 p.m., it is not OK? Please, someone tell me why 9 p.m., August 9 is the moral dividing line. It is totally arbitrary.

Even with that, we had hoped the President's policy would work, but it hasn't. Here is why. As I said earlier, on that date, the President said there were 78 stem cell lines available. We now know only 21 are eligible. It is not nearly enough to reflect the genetic diversity scientists need to develop treatments for everyone in the country. What is more, every single one—every single one of these approved lines—is contaminated by mouse feeder cells. What that means is when you take the stem cells and you propagate them, you get them to grow, you do them in a medium. You grow them in a medium. They were grown on mouse cells, mouse feeder cells, so they are all contaminated. Ask yourself: Would you want to take the possibility that somehow mouse cells are getting into your body because of stem cells? No. Many of the 21 lines are too unhealthy. They have degenerated. They are unhealthy. As a matter of fact, I have been told we are down to about right now only four.

Dr. Elizabeth Nabel, the Director of the NIH Heart, Lung and Blood Institute, said only 4 of the 21 federally approved lines are in common use by NIH-funded scientists. Only four. Dr. Jeremy Berg, another NIH Director, was a little more generous. He said there are six lines in common use. Well, four or six, you get the picture. It is not 78, it is only 4 or 6. Again, they are contaminated with mouse feeder cells. So some stem cell research is taking place, but our top scientists are working with one arm tied behind their backs because of these restrictions. It is having a chilling impact on the scientists who are thinking about entering the field.

According to Dr. Nora Volkow, Director of the NIH Drug Abuse Institute, the administration's policy is discouraging scientists from applying for NIH funding to conduct stem cell research. In a letter to me last year, she wrote:

> Despite general interest and enthusiasm in the scientific community for embryonic stem cell research, the limited number of available lines has translated into a general lack of research proposals.

So the President's policy, which we have had in effect since August 9, 2001, is not a way forward; it is an absolute dead end for research. It only offers false hope to the millions of people across America and the world who are suffering from diseases that could be cured or treated through embryonic stem cell research. Meanwhile, hundreds of new stem cell lines have been derived since the President's arbitrary time of August 9, 2001. The NIH estimates there are about 400 different stem cell lines worldwide. Many of those lines are uncontaminated and healthy, but they are totally off limits to federally funded scientists.

Scientists in many other countries around the world don't face these kinds of arbitrary restrictions. We have talked to researchers in England, for example. Our policy makes no sense to them. They cannot understand why stem cell lines derived on one date are fine to use, but if they are derived on another date, they are off limits. I don't understand that, either. I have wrestled with that since August 9, 2001.

If you are going to take the position that this is totally morally unacceptable and there should be no Federal funding, then we should have no Federal funding, and there are four or five lines that are now being examined and studied that should not be allowed, either. But I have not seen any amendment from anyone here that would even overturn that policy. It is a shame that we don't open these stem cell lines. Think about it this way. We don't require astronomers to explore the skies with 19th century telescopes. We don't tell our geologists to study the earth with tape measures. If we are serious about realizing the promise of stem cell research, our scientists need access to the best stem cell lines available.

Again, don't take my word for it. Dr. Story Landis runs the Stem Cell Task Force at NIH. In January, she appeared before a joint hearing of the HELP Committee, chaired by Senator KENNEDY, and my subcommittee. Senator KENNEDY asked her whether scientists are missing out on possible breakthroughs under the administration's current policy, and this was her answer:

> Yes, we are missing out on possible breakthroughs. From a purely scientific perspective, Federal funding of additional cell lines is necessary to advance the field.

This is Dr. Landis, head of the Stem Cell Task Force at NIH.

So we need a stem cell policy in this country that offers true, meaningful hope to patients and their loved ones. That is what this bill, S. 5, would do. Under our bill, federally funded researchers could study any stem cell line, regardless of the date a stem cell is derived, as long as strict ethical guidelines are met.

I believe it is important to emphasize this: We have very strict ethical guidelines. First, stem cells must come from embryos that would otherwise be discarded. There are more than 400,000 embryos right now in the United States left over from fertility treatments that are currently sitting frozen in liquid nitrogen. If the contributors of those embryos—the parents, the moms and dads—have had all the children they want and they no longer need the embryos, what happens to them? Under the policy we have now, there are only two things: You can keep them frozen for the next 10,000 or 20,000 or 50,000 years, or however long, or you can discard them. That is what is happening every day at in vitro fertilization clinics across the country. Embryos are being discarded as hospital waste.

Now, you might be a couple who says: We have had all our children, and we don't want any more. We don't want to keep paying forever and ever to have the embryos frozen. We would like to donate them to stem cell research to maybe help a young person with juvenile diabetes or someone with a spinal cord injury. We would like to contribute those embryos for that research. They cannot do it. It seems to me that at least we ought to be able to allow the couples to donate them if they wish. So the real question is, Do we throw them away or use them to ease suffering? Do we throw them away or allow them to be used with these strict ethical guidelines? I think it is the second choice that is truly moral and respectful of human life.

You might even think about it this way. Embryos will be destroyed, people say. The embryo itself—about which, by the way, I will point out there is a lot of misconception. I didn't listen to it, but I read the debate in the House last year. One of the speakers—I think the former minority leader, Mr. Delay, talked about fetuses and about the protection of fetuses. A lot of people think we are talking about fetuses. We are not. We are talking about embryos. I often put a dot on a piece of paper and I say: Can anybody see what I put there? That is just how big an embryo is, which is a few dozen cells.

Well, you have to get over this idea that somehow it is a fully formed fetus

existing in a womb. That is not it at all. You might say it is alive, it has life—yes, it does—and you should not destroy that life. Well, you might destroy the embryo itself, but in taking the stem cells from it—the cells in the embryo give the embryo life. If you take the cells out and you propagate them and examine them and then maybe use those lines for curing diseases in the future, it seems to me that you are really propagating life, saving lives, and enhancing life by doing that. That is why giving people the choice of voluntarily contributing the cells is truly moral and respectful of human life.

The second ethical requirement is that couples must provide written, informed consent. Now, I might point out that some of the 21 federally approved lines that are now in existence—especially the ones from other countries—don't meet that requirement. So we need to pass S. 5 to tighten the ethical guidelines of stem cell research, so there is no question that the embryos were donated properly. Think of it this way. We have Federal money right now that could be going—and probably is—for research on some stem cells that were provided without written informed consent. So we need to tighten down on that. S. 5 does that.

I read the debates of last year on the floor of the Senate and in the House. There was a lot of talk about setting up ''embryo farms,'' that there is going to be embryo farming so that women will take their eggs, or create embryos, and there will be embryo farms. I heard that a number of times. Well, S. 5 prohibits women from being paid to donate their embryos. There is no chance under this bill that women could be exploited to go through the donation process against their will. Under our bill, couples cannot receive money or other inducements to donate embryos. Under the present guidelines that now exist from the White House, it just says you cannot receive money. Well, there might be other inducements that may be provided to you to get you to donate. We want to cut that off and say it has to be purely voluntary. So you cannot receive money or any other inducements; you must have written, informed consent; it can only come from embryos that would otherwise be discarded; and there are very strict ethical guidelines.

So, again, this year's bill, S. 5, has one significant change from last year's bill that we passed. We passed that overwhelmingly, with 63 votes. But this bill has one difference. It includes the text of last year's Specter-Santorum bill, which passed the Senate unanimously but got tied up in the House and died at the end of the 109th Congress. That bill, which President Bush strongly endorsed, encouraged NIH to pursue alternative ways of deriving stem cells, in addition to our current method.

As I have made clear, going back to December of 1998, I support any ethical means to improve the lives of human beings who are suffering. I believe we should open every door we can in the pursuit of cures. So what we have done in the new version of S. 5 is combine the two bills the Senate passed overwhelmingly last year but did not become law. That was H.R. 810 and the Specter-Santorum bill. By voting for S. 5, the bill before us now, Senators can show they support all forms of stem cell research. Again, the Specter-Santorum bill says open it up and find out all other forms of stem cell research. That was amniotic, placental stem cells, adult stem cells, whatever. I have no problem with that. I think we ought to pursue all of them. But that is the key difference between S. 5 and S. 30—that is the other bill we will vote on tomorrow night, S. 30. That bill puts all its hopes in theories, alternative ways of deriving stem cells that might or might not work. At this point, nobody knows. We do know how to derive embryonic stem cells and how to propagate them. Some research in other countries and private research has already led to stem cells developing into nerve cells and things like that.

We don't know about what S. 30 does. S. 30 says to scientists—that is the other bill before us—don't use any of the 400 existing stem cell lines already derived. Instead, put all of your effort into figuring out some new way of deriving stem cells that might take 10 or more years to pan out, or maybe not at all. For example, the proponents of S. 30 will talk a lot over today and tomorrow about stem cells that could allegedly be derived from ''dead embryos''—embryos that are not healthy and have stopped growing. I have to tell you, the idea that we can cure juvenile diabetes, ALS, and Parkinson's with something called ''dead embryos'' doesn't exactly inspire me with a lot of confidence. Think about it. If you were treating somebody with embryonic stem cells, would you rather use stem cells that came from an embryo that is healthy, vibrant, and growing or would you rather have them coming from a dead embryo? Ask yourself that simple question. The dead embryo died for a reason: there was something wrong with it. Chances are that the stem cells which come from that embryo are not so great, either. So why does anyone think a dead embryo holds the secret to curing ALS or juvenile diabetes? S. 5, our bill, by contrast, would immediately make those hundreds of new lines eligible for Federal research, again, as long as they were derived under the strict ethical guidelines we have in our bill. So S. 30, the other bill, might not do any harm, but I don't think it does any good, either. Again, that is why we ought to keep our focus on S. 5.

If this year's debate goes like last year's, then we will expect opponents of S. 5 to make a lot of unfounded claims about adult stem cells. I will listen closely and try to correct those mistakes people might make. There is a lot of stuff out there. Our committee looked at this, and we have had a lot of testimony from scientists at NIH. So there will be a lot of unfounded claims about adult stem cells.

As I have said for the last several years, I am all for adult stem cell research and use. Adult stem cells are already being used successfully in treating several blood-related diseases, and that is great. I am all for it. Let's continue this area of research. But as we now know, and as scientists tell us, adult stem cells have limits. They can't do everything that embryonic stem cells can do. Again, don't take my word for it. Listen to what Dr. Zerhouni, the Nation's highest ranking medical researcher, has to say about adult stem cells. This is what he said before our committee:

> The presentations about adult stem cells having as much or more potential than embryonic stem cells, in my view, do not hold scientific water. . . . I think they are overstated. . . . My point of view is that all angles in stem cell research should be pursued.

That is what S. 5 will allow us to do. Most people could care less what cells are used to develop a cure. They just want a cure. So I say let's examine them all.

By the way, S. 30, the other bill we will be debating that focuses on deriving stem cells from naturally dead embryos, can be done under S. 5 also or under the Specter-Santorum bill. There are no restrictions on that issue. It is just that S. 30 says that is all we will do. S. 5, our bill, says we will open the 400 lines as long as they meet the ethical guidelines we have established. We will open those 400 lines to federally funded research and everything else, too. They can look at stem cells from naturally dead embryos. They can look at them from adult stem cells, placental, amniotic fluid, umbilical cord—whatever. They can look at them all as long as they meet ethical guidelines.

Lastly, we talk all about research, about science, about stem cells, using all the quotes from scientists and others. What it is really about is giving hope to people. It is about helping people who have devastating—devastating—illnesses.

This is a picture of Karli Borcherding of Ankeny, IA. Karli is one of the millions of Americans whose hopes depend on stem cell research. I met Karli for the first time last fall with her mother and her sisters. She just celebrated her 12th birthday. She has type 1 diabetes, also called juvenile diabetes. When people have this disease, their body stops making insulin, so they have to inject it either through needles or a pump.

Here is a picture of Karli Borcherding, age 12, from Ankeny, IA, with 1 month's worth of needles. Look at that picture. There are 120 needles, 1 month. Ask yourself: How would you like to give yourself four shots a day at age 12? Imagine that, four times a day. As Karli says, she never gets a vacation from juvenile diabetes. It is with her wherever she goes—at school, at

home, on field trips, on holidays. She told me:

My dream is that one day we will find a cure for juvenile diabetes, and I can just go back to being just a normal kid.

If adult stem cells could bring Karli a cure, she would gladly take it. But scientists have known about adult stem cells for 40 years, and they still haven't provided the answer for juvenile diabetes. We can't keep telling people such as Karli that embryonic stem cells might bring them a cure but, sorry, the Federal Government is not interested. Our premier institution of NIH can't be involved.

We can't keep telling the millions of Americans who have Parkinson's, ALS, cancer, or spinal cord injuries: Sorry, we know that embryonic stem cell research might ease your suffering, but we would rather do nothing about it.

Now is our chance to change that situation. I urge Senators to think about Karli Borcherding and all the people in their lives who could benefit from stem cell research and vote yes emphatically on S. 5 tomorrow.

Mr. President, I yield the floor to my good friend, and I say again, the person who started all of our hearings on this issue in December of 1998. Under the chairmanship of Senator SPECTER, our subcommittee had the first hearing on stem cell research 1 month after they were derived. Under his chairmanship, we have had 20 hearings. I mentioned that earlier. There hasn't been a more stalwart, informed person in either body, or on the Hill, about embryonic stem cell research than Senator SPECTER.

The PRESIDING OFFICER. The Chair recognizes the Senator from Pennsylvania, Mr. SPECTER.

Mr. SPECTER. Mr. President, parliamentary inquiry: Is it correct that I have 20 minutes allocated at this time?

Mr. HARKIN. Yes.

Mr. SPECTER. Mr. President, I thank my distinguished colleague, Senator HARKIN, for his leadership on this very important issue. I thank him for his very generous comments. It is true that he and I have worked together on the Subcommittee on Labor, Health, and Human Services, Education, and Related Agencies for more than 20 years. He now chairs the subcommittee, and I am the ranking member.

In the past, I have chaired the committee, and he has been the ranking member. We have had very close bipartisan cooperation. As we frequently say, there has been a seamless transfer of the gavel, looking out for the interests of the American people.

Senator HARKIN accurately notes that when stem cells first burst upon the American scene in November of 1998, our subcommittee moved immediately. It was actually December 2 of 1998. We have since had a total of 20 hearings on this important subject.

Today I am speaking for 110 million Americans who suffer directly or indirectly, personally or through their families and loved ones, from debilitating diseases such as Parkinson's, Alzheimer's, heart disease, cancer, diabetes, and I also speak for myself.

In 1970, President Nixon declared war on cancer. Had that war been prosecuted with the same diligence as other wars, my former chief of staff, Carey Lackman, a beautiful young lady of 48, would not have died of breast cancer. One of my very best friends, a very distinguished Federal judge, Chief Judge Edward R. Becker, would not have died of prostate cancer. All of us know people who have been stricken by cancer, who have been incapacitated with Parkinson's or Alzheimer's, who have been victims of heart disease, or many other maladies.

We now have an opportunity, with the breakthrough on stem cell research, to have the potential of curing these maladies.

I sustained an episode with Hodgkin's lymphoma cancer 2 years ago. That trauma, that illness, I think, could have been prevented had that war on cancer declared by the President of the United States in 1970 been prosecuted with sufficient intensity.

We now know about stem cells. We now know from the leading scientists of the United States and the leading scientists of the world the potential of stem cells to deal with these dreaded maladies. The leader of the National Institutes of Health, Dr. Zerhouni, has said:

Embryonic stem cell research holds great promise for treating, curing, and improving our understanding of disease, as well as revealing important basic mechanisms involved in stem cell differentiation and development.

I ask unanimous consent, Mr. President, to print in the RECORD at the conclusion of my remarks the testimonials from the Directors of the National Institutes of Health who have spoken out vigorously in support of embryonic stem cell research.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See Exhibit 1.)

Mr. SPECTER. Mr. President, there are some 400,000 of those embryos which have been frozen and which will either be used potentially to cure disease or will be discarded. Embryos are created for in vitro fertilization. A few of them are used and the others are frozen. If any of these embryos could be used to produce life, none of us would advocate the research. But they will not be used to produce life.

Our subcommittee took the lead in providing $2 million for embryonic stem cell adoption. As of April 5 of this year, the Night Life Christian Adoption Service reports that embryo adoption resulted in the birth of some 135 so-called snowflake children, and 20 babies are currently due. It is obvious by these statistics that we have enormous wasted resources available for scientific research.

I have in my hand an hourglass. This hourglass was referenced by one of my constituents, a man named Jim Cordy, from Pittsburgh, PA, who suffers from Parkinson's. When I was in Pittsburgh years ago, Jim Cordy approached me with an hourglass. He said: Senator, the sands are slipping through this hourglass like my life is slipping away. There is the potential for curing Parkinson's, and you ought to be doing something about it.

We have tried mightily. Senator HARKIN, Senator KENNEDY, Senator HATCH, Senator SMITH, Senator FEINSTEIN—many of us have tried mightily. Last year we passed a bill for stem cell research which would allow the use of Federal funds for research. But I think it is important to note that the Federal funds would not be used to kill embryos but would be used to conduct research on 400 existing lines. That bill, as we all know, was vetoed. The Senate passed the bill by 63 votes. I believe it is accurate to say that there are more than 63 affirmative votes in the Senate today. Whether there are 67 remains to be seen.

I think it is also accurate to say that in the House of Representatives, we are not close to a veto override based on the votes in the House of Representatives last year. But we are not too far away either.

It is my view that if we had sufficient mobilization of public opinion, that public opinion and political pressure, which is the appropriate process in a democracy, could provide enough votes for an override.

As I see it, it is not a matter of whether there will be Federal funding for embryonic stem cell research but when that Federal funding will be present. The longer it is delayed, the more people will suffer and die from these maladies.

I have encouraged the groups which come to Washington in large numbers to stage a massive march on the Mall. If we put a million people on the Mall, they would be within hearing distance of the living quarters of the White House, and with 110 million people who are affected personally or indirectly through their families, there is the potential for sufficient political pressure to provide enough votes to override a veto if, in fact, the President were to veto the bill.

It is my hope the President will relent in light of the reconstructed statute which we are providing.

Mr. President, I ask unanimous consent that the history of the 20 hearings which the subcommittee has held on stem cells, the endorsements of the embryonic stem cell research by the Directors of the National Institutes of Heath, and my full statement on the stem cell bills be printed in the RECORD.

There being no objection, the material was ordered to be printed in the Record, as follows:

STEM CELL HISTORY

Hearings: 20 Labor-HHS Subcommittee hearings have been convened on stem cell issues. 17 hearings have dealt specifically

with stem cells and 3 with cloning. Several additional hearings have focused on diseases, such as Parkinson's and Alzheimer's, that relate to stem cells.

The first hearing, on December 2, 1998, focused on the mechanics of this research and its potential medical benefits.

The second hearing, on January 12, 1999, focused on key intellectual property issues surrounding stem cell research.

The third hearing, on January 26, 1999, discussed the HHS General Counsel's opinion.

The fourth hearing was held on November 4, 1999, to explore the findings of the National Bioethics Advisory Commission and ethical issues surrounding Federal funding for human stem cell research.

The fifth hearing, on April 26, 2000, explored stem cell research and its implications for medical treatment.

The sixth hearing, on September 7, 2000, focused on the final NIH human embryonic guidelines.

The seventh hearing, on September 14, 2000 focused on the promise and potential benefits of research using human embryonic stem cells to treat and cure diseases, and provided a forum about the ethical and right-to-life Issues.

At the eighth hearing, on July 18, 2001, Senators Frist, Hatch, and G. Smith testified in favor of embryonic stem cell research, and a second panel compared adult and embryonic stem cell potential.

The ninth hearing, on August 1, 2001, focused on intellectual property and the ethical dilemmas associated with private embryonic stem cell research.

The tenth hearing, on October 31, 2001, focused on NIH's report outlining the status of the stem cell lines.

The eleventh hearing, on Dec. 4, 2001 was the first hearing on cloning, initiated after the announcement by Advanced Cell Technologies (ACT) that it had cloned a human embryo.

The twelfth hearing, on January 24, 2002, focused on the National Academy of Sciences' Panel on Human Cloning.

The thirteenth hearing on March 12, 2002 focused on prohibiting human cloning and the implications for medical research.

The fourteenth on September 25, 2002 focused on the implementation of the President's stem cell policy.

The fifteenth hearing on May 22, 2003 investigated the recent acknowledgment that 16 stem cell lines in Sweden had not been developed enough to have been exposed to mouse feeder cells.

The sixteenth hearing on July 12, 2005 was the first hearing to investigate alternative methods for obtaining pluripotent stem cells.

The seventeenth hearing on October 18, 2005 explored the potential of embryonic stem cell research and nuclear transplantation in treating several specific diseases and featured Mr. Anthony Herrera.

The eighteenth hearing on June 27, 2006 was the second hearing investigating alternative methods for obtaining pluripotent stem cells and it featured testimony by Senator Rick Santorum.

The nineteenth hearing on September 6, 2006 investigated the claim by Advanced Cell Technology Inc. that it had succeeded in deriving stem cell lines without destroying embryos. This was the third hearing specifically discussing alternative methods for deriving stem cells.

The twentieth hearing on January 19, 2007 is a joint hearing with the HELP Committee that is reviewing the science of stem cell research and asking the question ''Can Congress Help Fulfill the Promise of Stem Cell Research?''

Floor Statement of Senator Arlen Specter

Mr. President, I rise to speak in support of the stem cell bills that are being debated today: S. 5—the ''Stem Cell Research Enhancement Act'' of which I am an original co-sponsor, along with Senators Harkin, Hatch, Kennedy, Feinstein, Smith and Reid and S. 30, the HOPE Act introduced by Senators Coleman and Isakson. S. 5 is a combination of two bills that I introduced in the previous Congress and of which I have been a strong proponent for eight years.

SUPPORT OF BIOMEDICAL RESEARCH

I believe medical research should be pursued with all possible haste to cure the diseases and maladies affecting Americans. In my capacity as Ranking Member and at times—Chairman—of the Labor, Health and Human Services, and Education Appropriations Subcommittee, I have backed up this belief by supporting increases in funding for the National Institutes of Health. I have said many times that the NIH is the crown jewel of the Federal Government—perhaps the only jewel of the Federal government. When I came to the Senate in 1981, NIH spending totaled $3.6 billion. In FY2007, NIH will receive approximately $29 billion to fund its pursuit of life-saving research. The successes realized by this investment in NIH have spawned revolutionary advances in our knowledge and treatment for diseases such as cancer, Alzheimer's disease, Parkinson's disease, mental illnesses, diabetes, osteoporosis, heart disease, ALS and many others. It is clear to me that Congress' commitment to the NIH is paying off. This is the time to seize the scientific opportunities that lie before us, and to ensure that all avenues of research toward cures—including stem cell research—are open for investigation.

STEM CELLS

I first learned of the potential of human embryonic stem cells in November of 1998 upon the announcement of the work by Dr. Jamie Thomson at the University of Wisconsin and Dr. John Gearhart at Johns Hopkins University. I took an immediate interest and held the first Congressional hearing on the subject of stem cells on December 2, 1998. These cells have the ability to become any type of cell in the human body. Another way of saying this is that the cells are pluripotent. The consequences of this unique property of stem cells are far reaching and are key to their potential use in therapies. Scientists and doctors with whom I have spoken—and that have since testified before the Labor-HHS Appropriations Subcommittee at 20 stem cell-related hearings—were excited by this discovery. They believed that these cells could be used to replace damaged or malfunctioning cells in patients with a wide range of diseases. This could lead to cures and treatments for maladies such as Juvenile Diabetes, Parkinson's disease, Alzheimer's disease, cardiovascular diseases, and spinal cord injury. In all, well over 100 million Americans could benefit from stem cell research.

Embryonic stem cells are derived from embryos that would otherwise have been discarded. During the course of in vitro fertilization (IVF) therapies, sperm and several eggs are combined in a laboratory to create 4 to 16 embryos for a couple having difficulty becoming pregnant. The embryos grow in an incubator for 5 to 7 days until they contain approximately 100 cells. To maximize the chances of success, several embryos are implanted into the woman. The remaining embryos are frozen for future use. If the woman becomes pregnant after the first implantation, and does not want to have more pregnancies, the remaining frozen embryos are in excess of clinical need and can be donated for research. Embryonic stem cells are derived from these embryos. The stem cells form what are called ''lines'' and continue to divide indefinitely in a laboratory dish. In this way, the 21 lines currently available for federal researchers were obtained from 21 embryos. The stem cells contained in these lines can then be made into almost any type of cell in the body—with the potential to replace cells damaged by disease or accident. At no point in the derivation process are the embryos or the derived cells implanted in a woman, which would be required for them to develop further. The process of deriving stem cell lines results in the disruption of the embryo and I know that this raises some concerns.

EMBRYO ADOPTIONS

During the course of our hearings in this subject, we have learned that over 400,000 embryos are stored in fertility clinics around the country. If these frozen embryos were going to be used for in vitro fertilization, I would be the first to support it. In fact, I have included $2,000,000 in the HHS budget each year since 2002 to create and continue an embryo adoption awareness campaign. But the truth is that most of these embryos will be discarded. I believe that instead of just throwing these embryos away, they hold the key to curing and treating diseases that cause suffering for millions of people.

THE CURRENT STEM CELL POLICY

The President opened the door to stem cell research on August 9, 2001. His policy statement allowed limited federal funding of human embryonic stem cell research for the first time. There is a real question as to whether the door is open sufficiently.

A key statement by the President related to the existence of approximately 60 eligible stem cell lines—then expanded to 78. In the intervening 5 years, it has become apparent that many of the lines cited are not really viable, robust, or available to federally funded researchers. The fact is there are only 21 lines now available for research. Perhaps, most fundamental is the issue of therapy. It was not addressed in the President's statement, but it came to light in the first weeks after the President's announcement that all of the stem cell lines have had nutrients from mouse feeder cells and bovine serum. Under FDA regulations, these lines will face intense regulatory hurdles before being useful in human therapies. In the intervening years, new technology has been developed so that mouse feeder cells are no longer necessary for the growth of stem cells. It only makes sense that our nation's scientists should have access to the latest technology.

Since August 9, 2001, new facts have come to light and the technology has moved forward to the extent that the policy is holding back our scientists and physicians in their search for cures. I have a friend and constituent in Pittsburgh named Jim Cordy who suffers from Parkinson's. Whenever I see Jim, he carries an hourglass, to remind me that the sands of time are passing and that the days of his life are slipping away. That is a pretty emphatic message from the hourglass. So it seems to me that this is the kind of sense of urgency which ought to motivate Congress and the biomedical research community.

TESTIMONY OF NIH DIRECTOR, DR. ELIAS ZERHOUNI

On March 19, 2007, Dr. Elias Zerhouni, President Bush's appointee to lead the National Institutes of Health, testified before the Senate Labor-HHS-Education Appropriations Subcommittee regarding the NIH budget and stem cells. At that time he stated, ''it

is clear today that American science would be better served and the nation would be better served if we let our scientists have access to more cell lines . . . To sideline NIH in such an issue of importance, in my view, is shortsighted. I think it wouldn't serve the nation well in the long run.'' His testimony clearly shows that the time has come to move forward.

S. 5—THE STEM CELL RESEARCH ENHANCEMENT ACT

S. 5, the Stem Cell Research Enhancement Act, lifts the August 9, 2001 date restriction, thus making stem cell lines eligible for federally funded research regardless of the date on which they were derived. Expanding the number of stem cell lines would accelerate scientific progress towards cures and treatments for a wide range of diseases and debilitating health conditions. The bill puts in place strong ethical requirements on stem cell lines that are funded with Federal dollars. In fact, several stem cell lines currently funded with Federal dollars would not be eligible under the policies put in place by this bill. The requirements include:

(1) embryos used to derive stem cells were originally created for fertility treatment purposes and are in excess of clinical need;

(2) the individuals seeking fertility treatments for whom the embryos were created have determined that the embryos will not be implanted in a woman and will otherwise be discarded;

(3) the individuals for whom the embryos were created have provided written consent for embryo donation; and

(4) the donors can not receive any financial or other inducements to make the donation.

Importantly, the bill does not allow federal funds to be used for the derivation of stem cell lines—the step in the process where the embryo is destroyed.

ALTERNATIVE METHODS FOR DERIVING STEM CELLS

S. 5 further includes authorization for NIH to pursue research toward alternative methods for deriving stem cells that do not result in the destruction of embryos. The approach is identical to that promoted by former Senator Santorum and myself in the last Congress, which passed this body by a vote of 100 to 0. Unfortunately, that legislation did not clear the House of Representatives.

When the President's Council on Bioethics reported on several theoretical methods for deriving stem cells without destroying embryos, I immediately scheduled a hearing to investigate these ideas. On July 12, 2005, the Labor-HHS Subcommittee heard testimony from five witnesses describing several theoretical techniques for deriving stem cells without destroying embryos. The stem cells would theoretically have the key ability to become any type of cell. We discussed these techniques at a second hearing on June 27, 2006. I must emphasize that none of these techniques is a proven technology, and in some cases they are only being pursued because of the restrictions in place.

The legislation, which former Senator Santorum and I introduced, was meant to encourage these alternative methods for deriving stem cells without harming human embryos. That language has now been incorporated into S. 5 making it a stronger bill. Those provisions in S. 5 amend the Public Health Service Act by inserting a section that:

(1) Mandates that the Secretary of Health & Human Services shall support meritorious peer-reviewed research to develop techniques for the derivation of stem cells without creating or destroying human embryos.

(2) Requires the Secretary to issue guidelines within 90 days to implement this research and to identify and prioritize the next research steps.

(3) Includes a 'Rule of Construction' stating: Nothing in this section shall be construed to affect any policy, guideline, or regulation regarding embryonic stem cell research, human cloning by somatic cell nuclear transfer, or any other research not specifically authorized by this section.

THE TWO SECTIONS OF S. 5 ARE COMPLEMENTARY

Understanding that scientists never know exactly which research will lead to the next great cure; I have always supported opening as many avenues of research as possible. Based on that line of reasoning, I have always supported human embryonic, adult, and cord blood stem cell research. My goal is to see cures for the various afflictions that lower the quality of life—or end the lives—of Americans. S. 5 is the only bill under consideration that supports the funding of ALL types of stem cell research.

THE COLEMAN/ISAKSON ''HOPE'' ACT

The Coleman/Isakson HOPE Act focuses attention on only alternative avenues of research. This bill promotes research on alternative ways of deriving stem cells—as does S. 5. It emphasizes a particular alternative using so-called ''dead embryos'' that is unproven and highly speculative. It does not lift the President's restrictions on stem cell research. Unfortunately, it also attempts to codify scientific terms that would be better left to definition by the scientific and medical community. Despite these shortcomings, this bill deserves support because it highlights the need for further research.

I must emphasize that this bill is not a substitute for support of human embryonic stem cell research or support for S. 5. A vote in favor of the HOPE Act and against S. 5 will not advance the search for cures. The two bills are compatible in their scope and together will advance our understanding of biomedical science and bring us another step closer to the cures and treatment that we all desire.

CONCLUSION

The two bills before us are both worthy of passage. S. 5 stands out as it will allow real progress towards cures. I strongly believe that the funding provided by Congress should be invested in the best research to address diseases based on medical need and scientific opportunity. Politics has no place in the equation. Throughout history there are numerous examples of politics stifling science in the name of ideology. Galileo was imprisoned for his theory that the planets revolve around the sun. The Institute of Genetics of the Soviet Academy of Sciences opposed the use of hybrid varieties of wheat because it was based on the science of the West. Instead, they supported a doctrine called ''acquired characteristics,'' which was made the official Soviet position. This resulted in lower yields for Soviet wheat throughout the former Soviet Union in the first half of the twentieth century. These historical examples teach us that we must make these decisions based on sound science, not politics. I urge you to vote in favor of S. 5, so that this Congress does not look as foolish in hindsight as these examples.

EXHIBIT 1

LETTERS TO NIH DIRECTORS

On July 10, 2006, you and Senator Harkin wrote to Dr. Zerhouni and 18 other NIH institute directors asking that they answer questions in preparation for the upcoming stem cell debate. We asked that the responses ''be submitted directly to us without editing, revision, or comment by the Department of Health and Human Services as required by'' the fiscal year 2006 appropriations bill. The questions and a summary of their answers are listed below:

Question 1. Do you believe that embryonic stem cell research holds promise for treating, curing and improving our understanding of diseases? If so, please describe some of the most promising potential applications of this research. Would access to additional and newer stem cell lines hasten progress towards these basic and clinical applications?

Dr. Zerhouni (Director, NIH): ''Yes, embryonic stem cell research holds great promise for treating, curing, and improving our understanding of disease, as well as revealing important basic mechanisms involved in cell differentiation and development.''

''. . . from a purely scientific standpoint, it is clear that more cell lines would be helpful in ensuring expeditious progress in this important field of science.''

Dr. Fauci (Director, Allergy Institute): ''The National Institute of Allergy and Infectious Diseases (NIAID) believes that research on embryonic stem cells could potentially increase scientific understanding of the biology of human diseases and also lead to improvements in the treatment of many human diseases.''

''NIAID believes that embryonic stem cell research could be advanced by the availability of additional cell lines. Individual stem cell lines have unique properties. Thus. we may be limiting our ability to achieve the full range of potential therapeutic applications of embryonic stem cells by restricting research to the relatively small number of lines currently available.''

Dr. Battey (Director, Deafness Institute): The National Institute on Deafness and Other Communications Disorders believes embryonic stem cell research holds promise for increased understanding of an possible treatments for diseases and conditions especially within the research mission areas of the Institute.''

''The more cell lines available for study, the more likely a cell line will be maximally useful for a given research, and potentially clinical, application. . . . the scientific community would be best served by having a greater number of human embryonic stem cell lines available for study.''

Dr. Nabel (Director, Heart, Lung and Blood Institute): ''Embryonic stem cell research has vast potential for addressing critical health needs in a number of areas relevant to the mission of the National Heart, Lung and Blood Institute.''

''. . . we recognize that the limitations of existing cell lines are hindering scientific progress among a community that is very eager to move forward in this promising area. We support the creation and dissemination of newer stem cell lines in the expectation that it will advance this field and hasten progress in basic and clinical research.''

Jeremy Berg (Director, General Medical Sciences Institute (NIGMS): ''The National Institute of General Medical Sciences firmly believes that embryonic stem cell research holds enormous promise for treating, curing and improving our understanding of many diseases.''

''Access to additional and newer cell lines could be beneficial to this basic research endeavor in several ways. . . . a limited number of embryos may restrict the ability to compare fundamental processes that differ as a function of genetic variability.''

Dr. Alexander (Director, Child Health Institute—NICHD): ''The NICHD believes that human embryonic stem cell research holds exceptional promise for treating, curing and improving our understanding of diseases.''

''Access to more and newer stem cell lines would benefit basic and clinical research applications . . . it is necessary to be able to derive new embryonic stem cell lines (ESC) from embryos of high quality in order to know whether those embryonic stem cell

lines would possess any capabilities or behave differently than the ESC from the discarded embryos.''

Dr. Sieving (Director, Eye Institute): ''Yes, it is my professional opinion that human embryonic stem cell research holds considerable promise for treating, curing, and improving our understanding of ocular diseases. . . . better access could hasten progress by increasing the number of investigators willing to work in this area.''

Dr. Schwartz (Director, Environmental Health Institute): ''I believe that human stem cell research represents one of the most exciting opportunities in biomedical research. Embryonic stem cell research holds great promise for improving our understanding of disease etiology, prevention, and therapy.''

Dr. Hodes (Director, Aging Institute): ''Embryonic stem cell research holds promise for helping us find more effective ways to prevent or treat a number of age-related conditions in which cell loss plays a critical role . . . Alzheimer's and Parkinson's diseases, and the damage and cell death related to heart diseases and diabetes.''

Dr. Li (Director, Alcohol Abuse Institute): ''As with other stem cell types, embryonic stem cells may hold great promise for the treatment of certain diseases.''

''It is possible that the ability of researches to access newer human embryonic stem cell lines might serve to enhance our goal to understand cellular processes that govern regeneration which has the long-term potential to clinically translate our research findings.''

Dr. Alving (Acting Director, Center for Research Resources): ''Embryonic stem cell research holds promise for treating, curing, and improving our understanding of diseases . . . From a scientific standpoint, access to additional and new stem cell lines has the potential to advance the field of medical research . . . newer lines can be derived in the absence of animal products . . . genetic background of the current lines is very limited.''

''. . . additional and newer stem cell lines would enable the research enterprise to overcome . . . major limitations . . . spontaneous mutations that can arise after any cell line is maintained long-term . . . the human embryonic stem cell lines in the NIH Registry were derived using animal cell feeder layers . . . and the limited genetic diversity of the current NIH Registry lines.''

Dr. Tabak (Director, Dental Institute): ''The currently available stem cell lines have provided the first step in our understanding of their basic biology. However, due to limitations . . . newer and improved stem cell lines could unleash the full potential of stem cells for clinical utility.''

''. . . unless conditions are determined to better maintain them, the current lines will become exhausted. This instability also leads one to think that the ways in which the currently available human embryonic stem cell lines were derived may not have been optimal.''

Dr. Volkow (Director, National Institute of Drug Abuse): ''Yes, embryonic stem cells are promising research tools that can be used to identify and investigate a variety of therapeutic approaches.''

''Access to a wider array of embryonic stem cell lines would definitely increase scientific opportunity and the chances of breakthrough discoveries, as well as their eventual application in the form of novel therapies for many diseases . . . the translation of any discovery into clinical research and practice can be expected to be severely hindered by the fact that the cells now available for research are likely to be rejected by a patient's immune system.''

Dr. Collins (Director of the Human Genome Institute): ''Stem cell research has tremendous potential for therapeutic advances in diseases affecting many Americans.''

''Access to newer and more varied stem cell lines would benefit researchers not only because modern cultural techniques have increased the utility of stem cell lines, but also because newer lines would provide greater genetic and cellular diversity.''

Dr. Neiderhuber (Director, Cancer Institute): ''Embryonic stem cells are important research tools that may provide important knowledge about key processes in cancer metastasis, new blood vessel development, and the regulation of cell replication and programmed death.''

Dr. Rodgers (Acting Director, Diabetes and Digestive Disease Institute): ''Access to additional and newer stem cell lines is likely to hasten progress towards basic and clinical applications.''

Dr. Landis (Director, Neurology Institute): ''For neurological disorders, embryonic stem cells present considerable promise as an agent of therapy, in the development of therapeutics, and for advancing our understanding of disease.''

''Access to newer lines, however, would hasten progress, particularly as therapies move toward human testing.''

Question 2. Have researchers reported difficulties in obtaining any of the 21 lines currently available to NIH-funded researchers? If so, please provide examples. In practice, how many of the 21 lines are in common use by NIH-funded researchers?

Dr. Zerhouni (Director, NIH): ''. . . all of the human embryonic stem cell (hESC) lines listed on the NIH Human Embryonic Stem Cell Registry are privately owned and many are from foreign sources. The private owners are under no obligation to make their hESC lines widely available for research in other laboratories. Many scientists expressed concern that access to these cell lines was a major obstacle hindering hESC research eligible for Federal funding.''

Dr. Nabel (Director, Heart, Lung and Blood Institute): ''. . . only four cell lines were in common use . . . we believe that the availability of additional cell lines would be of great service to NHLBI-funded researchers.''

Dr. Landis (Director, Neurology Institute): ''The NIH unit that is systematically characterizing the approved lines and making that information available now has 18 of the 21 lines, and the others are on order.''

Jeremy Berg (Director, General Medical Sciences Institute (NIGMS): ''Although NIGMS grantees have purchased 13 of the 21 approved human embryonic stem cell lines, only 6 lines are in common use.''

Dr. Hodes (Director, Aging Institute): ''. . . one National Institute on Aging intramural investigator involved with human embryonic stem cell researching using approved cell lines identified genetic abnormalities and contaminations from mouse feeder cells in the embryonic stem cells that made them unusable for his research. In part because of his inability to continue his research with approved cell lines. he has left the Institute.''

Mr. Volkow (Director, National Institute of Drug Abuse (NIDA): ''. . . obtaining these lines has been procedurally complex and expensive. Despite general interest and enthusiasm in the scientific community for embryonic stem cell research. the limited number of available lines has, the NIDA's case. translated into a general lack of research proposals.''

Mr. SPECTER. Mr. President, how much of my 20 minutes remains?

The PRESIDING OFFICER (Mr. WHITEHOUSE). The Senator has about 11 minutes remaining.

Mr. SPECTER. I thank the Chair.

(The further remarks of Mr. SPECTER are printed in the RECORD under ''Morning Business.'')

The PRESIDING OFFICER. Who yields time?

Mr. HARKIN. Mr. President, how much time do we have remaining on our side?

The PRESIDING OFFICER. The Senator controls 9 minutes.

Mr. HARKIN. Mr. President, we started a little late, so I will yield back the remainder of my time on this segment.

The PRESIDING OFFICER. Under the previous order, the next 60 minutes is under the control of the Senator from Minnesota, Mr. COLEMAN.

Who yields time?

Mr. ISAKSON. Mr. President, we are going to reverse the order for a second.

Mr. President, I wish to commend the distinguished Senators from Iowa and Pennsylvania on their passion for stem cell research, which is shared by virtually all the people whom I know.

I also wish to ask unanimous consent that Senators CHAMBLISS, CORNYN, and BURR be added as cosponsors of S. 30.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. ISAKSON. Mr. President, at the outset of my remarks I thank Tyler Thompson and Brittany Espy for the 2 years she devoted to this issue prior to Tyler taking over and Joan Kirchner and Chris Carr of my staff for their invaluable work and an intern and distinguished scholar from the University of Georgia named Nick Chammoun who introduced me to a man for whom I have the greatest admiration, Dr. Steven Stice, an eminent scholar and eminent stem cell researcher at the University of Georgia.

I have introduced, in concert with Senator COLEMAN, S. 30, which has been referred to by the Senator from Ohio as containing theories—and I know he is getting ready to leave, but I want him to hear one part before he leaves.

Mr. HARKIN. Iowa.

Mr. ISAKSON. The Senator from Iowa, I sincerely apologize. His man just won the Masters in Augusta. I should remember that.

This bill is not about a theory when it comes to naturally dead embryos. Five of the existing 21 lines funded by NIH, grandfathered under the President's directive in August 2001, were derived, and are active today, from naturally dead embryos. So we are not talking about a theory, we are not talking about hope, and we are not talking about speculation. We are talking about a way to address the concern of the ethics of destruction of viable embryos with the promises and the hope of embryonic stem cell research.

Now, I was a real estate broker before I was elected to Congress, and since I have been in Congress, I have been anything but a scientist or anyone knowledgeable of medicine, but I care deeply and compassionately about those who suffer, and I share the concerns of not the question of ''when'' but

the question of ''if'' that was expressed by Senator SPECTER. So I began researching this entire issue to see if there wasn't a way, and that is when I stumbled onto the fact that there were already ways that embryonic stem cells were being derived without the destruction of viable embryos.

I went to the University of Georgia and I met Dr. Stice for the first time and he walked me through that process. For the edification of all those here, as well as those who are concerned about that issue, I wish to talk about it for a second because it is clear and it is precise and it threads the ethical needle and addresses the concern for the furtherance of scientific research.

In the process of in vitro fertilization, there are three principles, known as the Gardner principles, by which physicians and doctors grade embryonic byproducts of the fertilization to determine the embryos that are implantable, the embryos that are freezable, and the embryos that are clinically or naturally dead.

Level I embryos, after in vitro fertilization, are created within the first 3 days. They are viable embryos with a cluster of eight cells ready for implantation and can develop into a human being. After 4 additional days, additional embryos develop that contain the essential eight cells, and they are viable for freezing or for implantation. But after 7 days, the natural process of the cells dividing no longer takes place, and there are level III Gardner principle materials that are left that contain embryonic stem cells but cannot be implanted and cannot become a human being. Five of those lines were in existence in 2001 and were invested in by NIH and are active today.

So it is absolutely possible for further embryonic stem cell research to take place today without destroying a viable embryo and to have a plethora of available stem cells for researchers and for scientists. That, by the way, has been certified by any number of learned doctors and physicians and researchers and I wish to share some of those quotes at this time.

There was an article written, ''A Comparison of National Institute of Health-Approved Human Embryonic Stem Cell Lines,'' by Carol Ware, Angelique Nelson, and Anthony Blau. In that, they compared 15 of the 22 lines that at the time were active under the August 2001 Presidential executive directive, and I quote:

> They compare stem cell markers, and growth characteristics of and ease of genetic manipulation of all lines. Only 10 of the lines were easily tested and our 3 lines again were one of those 10 lines derived from naturally dead embryos. None of the 10 lines were statistically different in any way when 7 different growth and characteristics experiments were conducted. The take home message is that there is no difference between our 3 lines, the 3 lines derived from naturally dead embryos, and the other 7 lines which were derived from donated embryos.

So there you have it clearly and precisely stated that we have active embryonic stem cell lines under research and funded by the NIH derived from a naturally dead embryo that did not involve the destruction of a viable embryo.

With the passage of S. 30, you immediately have the opportunity, and NIH is directed, to develop those guidelines for the furtherance of additional embryonic stem cell research on stem cells derived from those lines.

Now, there are a number of other distinguished and learned people who have written extensively about these lines and their viability, among them Sandii Brimble and Yongquan Luo. Mr. Luo is at the Laboratory of Neuroscience, National Institute of Aging, Department of Health and Human Services, in Baltimore, MD, who wrote:

> Lines BG01, BG02, and BG03, which are the three lines NIH currently is investing in that were derived from naturally dead embryos, are therefore independent, undifferentiated, and pluripotent lines that can be maintained without accumulation of karyotypic abnormalities.

It took me a long time to practice saying those last two words, but I finally got through it. The point being that they are equally as viable as pluripotent and as rich for scientific research as those cells that would have been derived from a destroyed embryo.

In addition, I wish to quote from an article called Embryonic Death and the Creation of Human Embryonic Stem Cells, written by Dr. Donald W. Landry and Howard A. Zucker of Columbia University. I read as follows:

> We propose herein a paradigm for research involving embryos that protects human life, is consistent with Federal policy, and yet advances the interests of biomedical science and therapeutic innovation.

That is precisely quoting the definition of natural death for embryos as the threshold for which that should go forward.

In terms of making ''naturally dead'' a term that is understandable, this bill defines ''natural death'' in regard to embryos as the same acceptable way that death is defined in all 50 States of the United States of America. In my 30 years of public life, I have been through a number of ethical debates—the ''living will'' debates of the 1970s and the ''durable power of attorney,'' where we tried to legislate how you, Mr. President, or I could give an advanced directive of what a doctor could or could not do to me when I came to be in an incapacitated state, and we finally decided that an irreversible cessation of brain waves would be a clinical definition upon which that threshold can take place.

A ''naturally dead'' embryo is an embryo that, after the seventh day, has a cessation of the division of cells. It no longer can be implanted and become an embryo, but the cells that remain are viable, just as my heart, liver, kidneys, or lungs remain alive while I have an irreversible cessation of brain waves. It is that precedent which established all the organ transplants we do in America today—the gift of life that is given after the loss of life and the irreversible cessation of brain waves. This is, clinically, as Dr. Landry and Dr. Zucker have said, precisely the exact way to deal with the ethics and the morality of embryonic stem cell research because it is the same thing for that embryo that cannot become a human being to donate cells to become pluripotent embryonic stem cells as it is for a predirective to determine that organs can be transplanted from someone who has suffered an irreversible cessation of brain waves. It is scientific. It is ethical. And it is precise.

I submit the President of the United States has said he would—actually did last year—veto a bill similar to the one introduced by Senator HARKIN. The President said he will veto it again. Senator SPECTER, in his compassionate remarks and passionate remarks, acknowledged that the number of votes necessary to override a veto did not exist in the U.S. House of Representatives.

If, in fact, it is a matter of not if but when, with the adoption of S. 30, we can make the when now. We can see to it that the promise of embryonic stem cell research goes forward and the ethical lines that cause the dilemma that exists today in the United States of America are not crossed.

There is a human face on the desire to further that research. It is the face like that of a friend of mine, like former Senator Kip Klein, who suffers from Parkinson's and who has been an inspiration to me to find methods like this; and Cindy Donald, a beautiful lady who tragically was injured in an automobile accident and lost her ability to walk. There is hope and promise in centers such as the Shepherd Spinal Center in Atlanta which deals with those terrible injuries to the spinal cord. There is the hope to see to it that those who suffer from diabetes and juvenile diabetes can, in fact, find a cure that is possible and within our reach.

To that end, at the University of Georgia today, which I have already referred to a number of times, that research on embryonic stem cell research for the curing of diabetes is taking place. It is taking place in a laboratory and under the direction of eminent scholars, one of whom is Dr. Steven Stice, one of America's leading scholars today and one of the embryonic researchers who himself introduced to me this method, given his recognition of the ethical considerations and his desire and hope to bring promise and hope to the future of those who suffer.

I submit that the Coleman-Isakson bill, S. 30, is a road for us to walk proudly down, that enhances and advances, immediately, research into embryonic stem cell cures while at the same time respecting the ethical, scientific, and moral concerns that exist in the medical community today. It is not always possible in the body politic for solutions to be win-win, but I submit that S. 30, the Coleman-Isakson

bill, is a win-win. It is a win for hope, it is a win for research, and it is a win for promise.

I am pleased to yield to the distinguished Senator from Minnesota, Mr. NORM COLEMAN.

The PRESIDING OFFICER. The Senator from Minnesota.

Mr. COLEMAN. I thank my colleague from Georgia, who shares the passion of the Senator from Iowa, shares the passion of the Senator from Pennsylvania. We want to see scientific breakthroughs. We want to see cures for those kids who suffer from juvenile diabetes and friends who have ALS. I have a brother-in-law who suffers from Parkinson's.

How do we get there? Senator SPECTER noted that, as he filled an hourglass and said: The clock is ticking—and it is. The question becomes how do we move forward, not just in the debate but action. I am a former mayor. If it snowed in St. Paul and the streets weren't plowed, I heard about it. That is what you do—take action.

If we look at the amount of research going on in stem cell research, human embryonic stem cell research—they are pluripotent. What we are talking about is an ability of stem cells to—they have apparently an incredible elastic ability to be perhaps transformed to a heart or a liver, an incredible capacity—in theory. But clearly, scientists, I think uniformly, believe there is great hope and great opportunity there.

The reality today is that there is a certain amount of Federal dollars. What we are talking about is Federal dollars. We are not talking about the sum of all research but simply, What does the Federal Government do? What do we do with taxpayer dollars? Where do we put them?

In terms of human embryonic, pluripotent, the President said—I think it was in 2001—he talked about a series of lines that would be available, just that. He was drawing the line there in terms of embryonic stem cells. Of those lines, originally there were 60 or 70, and there are now about 20 lines.

There is about $132 million being spent in Federal money in human embryonic stem cell research and over $1 billion in human nonembryonic cord blood stem cell, bone marrow, other kinds of research—all of which is promising. In some areas, there are actually therapies going on.

It is fascinating. Scientists are also very passionate. I am not a scientist, but I have been listening to them. There are those scientists who are advocates of embryonic stem cell, and they are passionate that this is the way. Clearly, in theory, in terms of pluripotency, embryonic stem cells have more pluripotency than adult stem cells, but the critics say you have the process of embryonic stem cells, that they have the rejection because when you have organ transplants, you put another genetic material into somebody, and there are problems of rejection. You have the problem of tumors growing from them. They say we have to support adult stem cell because that is where the work is being done, that is where the breakthroughs are happening. Of course, other scientists come back and say, rightfully so, that adult stem cells do not have the elasticity, the pluripotency of embryonic, and so that is not the way. The question is, Is there a third way? Is there a way to get past the culture wars, to get past the great divide we have?

There are many in this country who believe passionately that Federal dollars should not be used for research which involves the destruction of a human embryo, who believe very passionately about that. There are others who say the cause of science is so great, the size of this embryo is so small, the hope we have to offer is so great, we need to move forward. There is a divide.

The reality today is, with policy as it is, if the Harkin-Specter bill passes—which I presume it will, probably overwhelmingly it will pass—and a similar bill is passed in the House and ultimately we work out the language and the President then vetoes it and, as my colleague from Pennsylvania recognizes, there are not enough votes to override the veto, at the end of the day of January 1, 2008, there will still not be more than $132 million spent on human embryonic pluripotency research.

The question is, Is there another way? Senator ISAKSON has talked about another way. He talked about dead embryos. My colleague from Iowa dismissed it: Dead embryos, what does that mean?

My colleague explained it well, that embryonic stem cells produced by that method have the same pluripotency, the same capacity as other embryonic stem cells, but they do not cross the moral line.

Within S. 30, there is the point of doing other kinds of research that does not cross the moral line. One is called altered nuclear transfer. Later I will, perhaps, put up some charts to show how it works, but very simply, if you think about it, science 101, take an egg and sperm, they come together, create an embryo, become a person—one of the pages here or a Senator or mom and dad sitting somewhere. Then what we do with altered nuclear transfer—actually, by the way, if you relate it to cloning, it is not cloning, but if you think of the concept of cloning, you take an egg, put some genetic material from an adult in there, and it becomes a person. Practically, we had Dolly the sheep, so we know that works. Altered nuclear transfer basically says take that egg, take some genetic material, and before you put it in there, you program the egg so it doesn't create an embryo but creates a tissue mass which has the same pluripotency, the ability to do all the other things any other embryonic stem cell would do.

I have a series of letters from scientists who say this should work. I will quote:

Research results suggest that Altered Nuclear Transfer may be able to produce human pluripotent stem cells—the functional equivalent of embryonic stem cells—in a manner that is simpler and more efficient than current methods.

That is by Hans Schoeler, chairman of the Department of Cell and Developmental Biology at the Max Planck Institute in Germany.

Recently, multiple labs in the United States and around the world have published or reported experiments in which adult cells were converted, not to embryos, but directly to pluripotent ''embryonic-like'' cells. The resulting cells were virtually indistinguishable from embryonic stem cells derived from embryos. The techniques used have included altered nuclear transfer, cell fusion and chemical reprogramming. The results were obtained from the top scientists in the field and published in the best journals.

That is by Markus Grompe, M.D., Oregon Stem Cell Center.

One last quote:

I think that current scientific evidence and reasonable expectations make it likely that altering a donor nucleus to preclude normal organization of any subsequent blastocyst is technically feasible and consistent with the scientific and medical goals of embryonic stem cell research.

That is by Lawrence S.B. Goldstein, Ph.D., Department of Cellular and Molecular Medicine at the University of California, San Diego.

Much of the work is from a doctor, Dr. William B. Hurlbut, over at Stanford, the Neuroscience Institute at Stanford. I worked with him. He has published a lot on this issue. I ask unanimous consent to have printed in the RECORD a presentation by Dr. Hurlbut entitled ''Stem Cells, Embryos and Ethics: Is There a Way Forward?''

There being no objection, the material was ordered to be printed in the RECORD, as follows:

STEM CELLS, EMBRYOS AND ETHICS: IS THERE A WAY FORWARD?

(By William B. Hurlbut, M.D.,University of Notre Dame, Neuroscience Institute at Stanford, Apr. 18, 2006)

We are at a crucial moment in the process of scientific discovery. The dramatic advances in molecular biology throughout the 20th century have culminated in the sequencing of the human genome and increasing knowledge of cell physiology and cytology. These studies were accomplished by breaking down organic systems into their component parts. Now, however, as we move on from genomics and proteomics to discoveries in developmental biology, we have returned to the study of living beings. When applied to human biology, this inquiry reopens the most fundamental questions concerning the relationship between the material form and the moral meaning of developing life.

The current conflict over ES cell research is just the first in a series of difficult controversies that will require us to define with clarity and precision the moral boundaries we seek to defend. Human-animal Chimeras, parthenogenesis, projects involving the laboratory production of organs—and a wide range of other emerging technologies will continue to challenge our definitions of human life. These are not questions for science alone, but for the full breadth of human wisdom and experience.

The scientific arguments for going forward with this research are strong.

—The convergence of these advancing technologies is delivering unprecedented powers for research into the most basic questions in early human development.

—Beyond the obvious benefit of understanding the biological factors behind the estimated 150,000 births with serious congenital defects per year, it is becoming increasingly evident that certain pathologies that are only manifest later in life are influenced or have their origins in early development.

—Furthermore, fundamental developmental processes (including the formation and functioning of stem cells), and their disordered dynamics, seem to be at work in a range of adult pathologies including some forms of cancer.

Yet from the moral and social perspective there are serious concerns. (This is an eight-cell embryo on the sharp tip of a pin.)

It is important to acknowledge the many scientific projects for which human embryos could be used. Beyond their destruction for the procurement of embryonic cells, some fear the industrial scale production of living human embryos for a wide range of research in natural development, toxicology and drug testing.

Lord Alton, a member of the House of Lords in the UK told me that they estimate over 100,000 human embryos have already been used in scientific experimentation in Britain.

Beyond that, there is concern about the commodification and commercialization of eggs and embryos, and worry about the implications of ongoing research to create an artificial endometrium (a kind of artificial womb) that would allow the extracorporeal gestation of cloned embryos to later stages for the production of more advanced cells, tissues and organs.

Furthermore, from a social perspective, do we really want to have red state medicine/blue state medicine? The emerging patchwork of policies on the state level threatens to create a situation in which a large percentage of patients will enter the hospital with moral qualms about the foundations on which their treatments have been developed. What was traditionally the sanctuary of compassionate care at the most vulnerable and sensitive moments of human life is becoming an arena of controversy and conflict.

Clearly, both sides of this difficult debate are defending important human goods—and both of these goods are important for all of us. A purely political solution will leave our country bitterly divided, eroding the social support and sense of noble purpose that is essential for the public funding of biomedical science. While there are currently no federally legislated constraints on the use of private funds for this research, there is a consensus opinion in the scientific community that without NIH support for newly created embryonic stem cell lines, progress in this important realm of research will be severely constrained.

The current conflict in the political arena is damaging to science, to religion and to our larger sense of national unity. The way this debate is proceeding is, in my opinion, completely contrary to the positive pluralism that is the strength of our democracy.

What is needed is to draw back from the polarized positions of political rhetoric and to respectfully reflect on the meaning of the moment we are in.

In the spirit of such a dialogue, and in the hope that it might lead us toward a resolution of our difficult national impasse over embryonic stem cell research, I offer the perspective that follows.

MORAL MEANING OF EMERGING LIFE

Any evaluation of the moral significance of human life must take into account the full procession of continuity and change that is essential for its development. With the act of conception, a new life is initiated with a distinct genetic endowment that organizes and guides the growth of a unique and unrepeatable human being.

The gametes (the sperm and egg), although alive as cells, are not living beings: they are instrumental organic agents of the parents. The joining of the gametes brings into existence an entirely different kind of entity, a living human organism. With regard to fundamental biological meaning (and moral significance), the act of fertilization is a leap from zero to everything.

In both structure and function, the zygote (the one cells embryo) and subsequent embryonic stages differ from all other cells or tissues of the body; they contain within themselves the organizing principle for the full development of a human being. The very word organism implies organization, an overarching principle that binds the parts and processes of life into a harmonious whole. As a living being, an organism is an integrated, self-developing and self-maintaining unity under the governance of an immanent plan.

For an embryonic organism, this implies an inherent potency, an engaged and effective potential with a drive in the direction of the mature form. By its very nature, an embryo is a developing being. Its wholeness is defined by both its manifest expression and its latent potential; it is the phase of human life in which the 'whole' (as the unified organismal principle of growth) precedes and produces its organic parts. The philosopher Robert Joyce explains: ''Living beings come into existence all at once and then gradually unfold to themselves and to the world what they already but only incipiently are.'' To be a human organism is to be a whole living member of the species Homo sapiens, with a human present and a human future evident in the intrinsic potential for the manifestation of the species typical form. Joyce continues: ''No living being can become anything other than what it already essentially is.''

It is this implicit whole, with its inherent potency, that endows the embryo with continuity of human identity from the moment of conception and therefore, from this perspective, inviolable moral status. To interfere in its development is to transgress upon a life in process. The principle of this analysis applies to any entity that has the same potency as a human embryo produced by natural fertilization, regardless of whether it is the product of IVF, cloning, or other processes.

Accrued moral status

The major alternative to the view that an embryo has an inherent moral status is the assertion that moral status is an accrued or accumulated quality related to some dimension of morphology or function.

The three arguments currently given in support of a 14 day limit on embryo research—lack of differentiation, lack of individuation and pre-implantation status—are based on a kind of 'received tradition' that dates back to the 1986 Warnock Commission in the UK. But this commission explicitly acknowledged the continuous nature of embryonic development, stating: ''There is no particular part of the developmental process that is more important than any other.'' In a recent memoir, Mary Warnock discussed the utilitarian grounding of her commission's analysis acknowledging that her committee's task was ''to recommend a policy which might allow the sort of medical and scientific progress which was in the public interest.'' Indeed, recent advances in embryology do not support this commission's conclusions.

The argument on differentiation is based on the idea that before gastrulation (which begins around the 12th to 14th day with the formation of the primitive streak), the embryo is an inchoate clump of cells with no actuated drive in the direction of distinct development.

It is argued that the undifferentiated quality of the blastocyst (the 4–5 day embryo) justifies its disaggregation for the procurement of stem cells, while the evident organization at gastrulation reveals an organismal integrity that endows inviolable moral status to all subsequent stages of embryological development.

Scientific evidence, however, supports the opposing argument—that from conception there is an unbroken continuity in the differentiation and organization of the emerging individual life, the anterior-posterior axis appears to be already established within the zygote (the one-cell stage); the earliest embryonic cell divisions (at least at by the 4 cell stage) exhibit differential gene expression; the unequal cytoplasmic concentrations of cell constituents in the early embryo suggest distinct cellular fates.

All this implies that the changes at gastrulation do not represent a discontinuity of ontological significance (a change in the nature of being), but merely the visibly evident culmination of more subtle developmental processes at the cellular level that are driving in the direction of organismal maturity.

These new scientific perspetives were documented in a July 2002 article in Nature: ''The mammalian body plan starts being laid down from the moment of conception . . . a suprising shift in embryological thinking.''

Twinning

Another argument for accrued moral status is that as long as an embryo is capable of giving rise to a twin it cannot be considered to have the moral standing of an individual.

Yet monozygotic twinning, which occurs in just one in 240 births, does not appear to be either an intrinsic drive or a random process within embryogenesis. Rather, it results from a disruption of normal development by a mechanical or biochemical disturbance of fragile cell relationships. This provokes a compensatory repair, but with the restitution of integrity within two distinct trajectories of embryological development.

In considering the implications of twinning for individuation, one might better ask the question from the opposite perspective. What keeps each of the cells of the early embryo from becoming a full embryo? Clearly, crucial relational dynamics of position and intercellular communication are already at work establishing the unified pattern of the emerging individual.

From this perspective twinning is not evidence of the absence of an individual, but of an extraordinary power of compensatory repair that reflects more fully the potency of the individual drive to fullness of form even in the earliest stages of embryonic human life.

Implantation

Some have argued that the implantation of the embryo within the uterine lining of the mother constitutes a moment of altered moral status.

Fertilization occurs in the fallopian tubes. The embryo floats down into the uterus and begins to implant in the uterine wall around the 6th–7th day. All along this journey the diffusion of essential nutrients and growth factors sustains the life and nourishes the growth of the developing embryo. Implantation and the development of the placenta simply extend this relationship between mother and embryo with an internal circulation as the embryo gets too large to be nourished by direct diffusion.

Implantation, then, must be viewed as just another step in a continuum of ongoing intimate dependence, all occuring along the trajectory of natural development that begins with conception and continues into infancy. This continuity implies no meaningful moral marker at implantation.

Function

Most other arguments relate in some way to the onset of a specific function or capacity. Arguments for a change in moral status based on function are at once the most difficult to refute and to defend.

The first and most obvious problem is that the essential functions (and even their minimal criteria and age of onset) are diverse and arbitrarily assigned. Generally they relate to the onset of sentience, awareness of pain, or some apparently unique human cognitive capability such as consciousness.

This approach raises a number of disturbing ethical questions.

—If human moral worth is based on actual manifest functions, then does more of that function give an individual life a higher moral value?

—And what are we to make of the parallel functional capacities in animals that we routinely sacrifice for food and medical research?

—Furthermore, what becomes of human moral status with the degeneration or disappearance of such functions? While we might argue that our relational obligations change along with changes in function, such as occur with senile dementia, we would not sanction a utilitarian calculus and the purely instrumental use of such persons no matter how promising the medical benefits might be.

More fundamentally, from a scientific perspective, there is no meaningful moment when one can definitively designate the biological origins of a human characteristic such as consciousness. The human being is an inseparable psycho-physical unity. Our thinking is in and through our bodily being, and thus the roots of our consciousness reach deep into our development. The earliest stages of human development serve as the indispensable and enduring foundations for the powers of freedom and self-awareness that reach their fullest expression in the adult form.

With respect to fundamental moral status therefore, the human being is an embodied being whose intrinsic dignity is inseparable from its full procession of life and always present in its varied stages of emergence.

This conclusion is consistent with 2,500 years of medical science—as recently as 1948, the Physicians Oath in the Declaration of Geneva, echoing the enduring traditions of Hippocratic medicine, proclaimed: ''I will maintain the utmost respect for human life from the time of conception.''

As we descend into an instrumental use of human life we destroy the very reason for which we were undertaking our new therapies; we degrade the humanity we were trying to heal.

IN VITRO FERTILIZATION EMBRYOS

This brings us to the dilemma of the moral status of an estimated one million embryos left over from in vitro fertalization (IVF). Created to give life, they are now suspended in time and space and the uncertainty of a conflicted fate.

In this canister in the Assisted Reproduction Technologies clinic at Stanford are 300 embryos. The water in their cells has been replaced with glycerol and they are immersed in liquid nitrogen at a temprature of minus 200 degrees Celsius. (I joke with my friend, the director of the lab, that this must be the densest population in human history.)

But the future of these embryos is a poignant problem. In some cases, such embryos have been implanted as long as twelve and a half years after freezing, including one born seven and a half years after its twin. In other cases, there have been custody battles over the frozen embryos after divorces and even a dispute over inheritance when a wealthy couple died in an airplane crash and left several embryonic hiers with numerous couples stepping forward and offering to adopt them. But most of these one million frozen embryos do not have such privileged prospects. They are castoffs, destined to be discarded or disaggregated in the service of medical science.

And this is a warning to us of how even the best intentions of our science, unconstrained by the forethought of moral consideration, slips slowly along the gradient of utility. Each of these embryos, once the precious promise of a happy baby, is now relegated to the category of mere matter, raw material in a larger program of scientific progress.

However much we may agree or disagree with the process that put them there, we should acknowledge that this is a difficult dilemma. Produced with a healing purpose, the good intentions of overcoming the sorrow of infertility, they are now abandoned to a project of a completely different character. Some say that if there is a moral problem it is upstream, in the process that put them there and that now, since they are destined to die, what further harm can be done? As a pragmatic people, many Americans feel the weight of this argument. And, if we fail to develop a morally acceptable alternative source of embryonic stem cells, I suspect that is where our national policy may settle.

Yet even if use of these embryos becomes accepted policy and practice, we should be aware of something more complicated that is below the surface: there has been a slow but steady shift in our underlying attitude toward human life. As we gain the powers of comprehension and control over our most basic biology, there is a transformation, not just in our physical being, but in our whole sense of who we are, and of our place and purpose within the natural order.

As we take increasing instrumental control over natural life processes our attitude changes and we lose the sense of cautionary reverence and respect. With each step, however benevolent the initial intention, there is a moral danger, a fracturing of matter and meaning that breaks the coherence and natural connections of life. With each step, the original radiance and vitality of the cosmos, its order, beauty and coherent moral meaning, are obscured by the conviction that all of living nature is mere matter and information, to be reshuffled and reassigned for the projects of the human will.

This instrumental use of life reaches its most ominous extension as we relegate the human embryo to the status of a resource, as raw material in the service of our project in the mastery over nature. Such an instrumental use of early human life opens a doorway down a long corridor indeed.

For one thing, many of these embryos are not at the developmental state for harvesting embryonic stem cells and would have to undergo further laboratory culture to the blastocyst stage. Will we not want to use some for experiments to perfect the culture medium? And while we are at it, there are many other studies that could be done on early embryos to help perfect IVF.

Thirty years ago, when IVF first came on the scene there was a difficult debate in congress over support of research that involves the destruction of human life. This debate culminated in 1996 with the passage of the Dickey Amendment that forbids federal funding for projects that endanger or destroy human embryos. As with abortion, IVF, involving the creation and implantation or disposal of embryos, would be a matter of personal choice done with private funds.

Will we now retreat and override this decision—or is only embryonic stem cell research urgent enough to justify an exception to this long-standing federal policy? Furthermore, even if we endorse this course of action, the 14-day limit on the use of human embryos will not hold since it does not stand up to logical argument. As discussed above, the designation of fourteen days as the moral boundary for embryo experimentation is in the category of a 'received tradition,' almost a superstition in the sense that it is a belief in a change of state without a discernible cause. As a moral marker, fourteen days makes no sense, it is arbitrarily set and therefore vulnerable to transgression through the persuasive promise of further scientific benefit.

BEYOND CELLS

And it is becoming increasingly apparent that the promise of stem cells lies beyond simple cell cultures and cell replacement. The technological goal is to produce more advanced cell types and even tissues, organs, and possibly limb primordia. Producing such complex tissues and organs may require the intricate cell interactions and microenvironments now available only through natural gestation.

During embryogenesis, differentiation and organ formation unfold within the fragile spatio-temporal induction of a highly specific sequence of cell signaling—different signals coming from different sides and in a perfect synchrony of process.

Consider the formation of the human hand. It begins as a small bud induced off the trunk of the embryo, then through an extraordinary orchestration of cell interactions it progressively unfolds toward its functional form. But once initiated (after about the 5–6th week of embryogenesis), the limb bud can actually be severed from the embryo and, given the right environment, will continue its momentum of development as an independent unit.

I have seen just such a hand in the bottom of a test tube. The tiny limb bud, snipped from the fetal remains of a 5 week old aborted fetus, was implanted into the abdominal cavity of a SCID mouse (a special kind of mouse that won't reject the tissue), and grown till it was about ¼ inch wide. I looked down on that little hand and I thought to myself—this is fantastic, one day we may grow limbs for people with congenital malformations or injuries and amputations. But at the same time I thought—this was going to be someone's little hand, that tender little newborn hand that lays across his mother's breast while nursing.

But if we might one day grow human limbs, we might even more easily grow other organs—kidneys, livers and hearts. Scientists in Isreal have already established that human kidney primordia taken from 7–8 week old aborted fetuses can be successfully grown in mice—a feat proclaimed as ''a breakthrough that might one day help save thousands of patients waiting for transplants.'' (There are 50,000 people in the U.S. alone on dialysis, waiting for kidney transplants—an estimated 17 deaths a day are due to the inadequate organ supply.) Furthermore, several years ago it was announced that a scientist in China successfully sustained *in vitro* a human heart severed from its source in a 7 week old aborted fetus.

The benefits of implanting embryos in order to employ the developmental dynamics of natural embryogenesis for the production of limb and organ primordia seem self-evident.

The implantation of cloned embryos (either into the natural womb or possibly an artificial endometrium) for the production of

patient specific tissue types to bypass problems of immune rejection would further extend the logic of the instrumental use of developing life.

The public pressure that has already been brought to bear on the politics of stem cells and cloning by patient advocacy groups has provoked such a sense of promise that it may propel the argument for allowing such gestation of cloned human embryos.

Over the past four years, I have talked with hundreds of people, including many scientists, who say that they would find such a practice, (that is, the implantation of a cloned embryo) acceptable to save the life of a dying child.

Different people have different limits to the duration of gestation they find morally acceptable, but in light of the current sanction of abortion up to and beyond the end of the second trimester, it is difficult to argue that creation, gestation and sacrifice of a clone to save an existing life is a large leap in the logic of justification. The argument is made that if abortion is legal, that is, if a developing life can be terminated with no reason given, then why not for a good reason? One must admit there is a certain perverse logic to this argument.

WHITE PAPER

In light of the arguments given above that human moral worth is based on a continuity of embodied form from fertilization to natural death, it would seem that we are at an irresolvable impasse. If embryonic stem cells can be obtained only by the destruction of human embryos this may, in fact, be the case. But last May a White Paper by the President's Council on Bioethics suggested otherwise. This report describes four proposals put forward as possible means of obtaining embryonic stem cells without the creation and destruction of human embryos.

As the author of one of the proposals, Altered Nuclear Transfer, I would like to draw on this to discuss the scientific advances and moral reasoning that may lead us to a technological solution to our national conflict.

ALTERED NUCLEAR TRANSFER

As described above, natural conception signals the activation of the organizing principle for the self-development and self-maintenance of the full human organism. In the language of stem cell biology, this capability is termed ''totipotency,'' the capacity to form the complete organism. A naturally fertilized egg, the one cell embryo, is totipotent.

In contrast, the term ''pluripotency,'' designates the capacity to produce all the cell types of the human body but not the coherent and integrated unity of a living being. Embryonic stem cells are merely pluripotent. This is a difference between the material parts and the living whole.

Altered Nuclear Transfer would draw on the basic technique of SCNT (popularly known as ''therapeutic cloning'') but with an alteration such that pluripotent stem cells are produced without the creation and destruction of totipotent human embryos.

In standard nuclear transfer the cell nucleus is removed from an adult body cell and transferred into an egg cell that first has its own nucleus removed. The egg then has a full set of DNA and, after it is electrically stimulated, starts to divide like a naturally fertilized egg. This is how Dolly the sheep was produced.

Altered Nuclear Transfer uses the technology of nuclear transfer but with a preemptive alteration that assures that no embryo is created. The adult body cell nucleus or the enucleated egg's contents (or both) are first altered before the adult body cell nucleus is transferred into the egg. The alterations cause the adult body cell DNA to function in such a way that no embryo is generated, but pluripotent stem cells are produced.

There is natural precedent for such a project. In normal conception, fertilization signals the activation of the organizing principle for the self-development of the full human organism.

But without all of the essential elements—the necessary complement of chromosomes, proper epigenetic configuration and the cytoplasmic factors for gene expression—there can be no living whole, no organism, and no human embryo. Recent scientific evidence suggests incomplete combinations of the necessary elements—'failures of fertilization'—are the fate of many, perhaps most, of early natural initiations in reproduction.

FAILURES OF FERTILIZATION

It is important to realize that many of these naturally occurring failures of fertilization may still proceed along partial trajectories of organic growth without being actual organisms. For example, certain grossly abnormal karyotypes (including haploid genomes, with only half the natural number of chromosomes) will form blastocyst-like structures but will not implant.

Even an egg without a nucleus, when artificially activated has the developmental power to divide to the eight-cell stage, yet clearly is not an embryo—or an organism at all. The mRNA for the protein synthesis that drives these early cell divisions is generated during the maturation of the egg and then activated after fertilization. Like a spinning top, the cells contain a certain biological momentum that propels a partial trajectory of development, but unlike a normal embryo they are unable to bootstrap themselves into becoming an integrated and self-regulating organism.

Some of these aberrant products of fertilization that lack the qualities and characteristics of an organism, appear to be capable of generating ES cells or their functional equivalent. Mature teratomas are benign tumors that generate all three primary embryonic cell types as well as more advanced cells and tissues, including partial limb and organ primordia—and sometimes hair, fingernails and even fully formed teeth. (The white opacities in this x-ray are adult-size molars.) Yet these chaotic, disorganized, and nonfunctional masses are like a bag of jumbled puzzle parts, lacking entirely the structural and dynamic character of organisms. Neither medical science nor the major religious traditions have ever considered these growths to be 'moral beings' worthy of protection, yet they produce embryonic stem cells.

These benign ovarian tumors, appear to be derived by spontaneous development of activated eggs. The disorganized character of teratomas appears to arise, not from changes in the DNA sequence, but from genetic imprinting, an epigenetic modification that affects the pattern of gene expression (keeping some genes turned off and others on). In natural reproduction the sperm and egg have different, but complementary, patterns of imprinting, allowing a coordinated control of embryological development. When an egg is activated without a sperm, the trophectoderm (the outer layer in a natural embryo—sometimes called the trophoblast) and its lineages fail to develop properly. In the absence of the complementary genetic contribution of the male, the activated egg is simply inadequately constituted to direct the integrated development characteristic of human embryogenesis.

SYSTEMS BIOLOGY

This example points to another new dimension of our advancing knowledge. Through systems biology, we are beginning to recognize how even a small change of one gene can affect the entire balance of an enormous network of biochemical processes necessary to initiate and sustain the existence of a living being.

Systems biology offers us the view of an organism as a dynamic whole, an interactive web of interdependent processes that express emergent properties not apparent in the biochemical parts. Within this dynamic self-sustaining system is the very principle of life, the organizing information and coordinated coherence of a living being. With the full complement of coordinated parts, an organismal system subsumes and sustains the parts; it exerts a downward causation that binds and balances the parts into a patterned program of integrated growth and development. Partial organic subsystems (cells, tissues and organs) that are components of this larger whole, if separated or separately produced, may temporarily proceed forward in development. But without the coherent coordination and robust self-regulation of the full organism, they will ultimately become merely disorganized cellular growth.

ANT proposes that small, but precisely selected alterations will allow the harnessing of partial developmental trajectories apart from their full natural context in order to produce ES cells.

CDX2

Altered nuclear transfer is a broad concept with a range of possible approaches; there may be many ways this technique can be used to accomplish the same end.

One variation involves the deletion or silencing of a gene essential at the most primary level of coordinated organization. As described in a January 2006 paper in the journal Nature, stem cell biologist Rudolf Jaenisch has established the scientific feasibility of this approach in a series of dramatic mouse model experiments in which he procured fully functional embryonic stem cells from a laboratory construct that is radically different in developmental potential than a normal embryo.

Using the technique of RNA interference, he was able to reversibly silence the gene Cdx2 in the donor nucleus before nuclear transfer to the enucleated egg. And a study just two months ago in the journal Science suggests that it may be possible to achieve the goals of ANT through the preemptive silencing of Cdx2 in the egg even before the act of nuclear transfer, thereby producing the biological (and moral) equivalent of an inner cell mass tissue culture. This article showed that in mice, m-RNA for Cdx2 is present in the egg and asymmetrically distributed in the first cell division after fertilization. This asymmetric distribution of Cdx2 directs the cells at the two-cell stage to form two distinct cell lineages. One of the cells at the two-cell stage goes on to become the trophectoderm and forms the outer layer of the embryo (and later the extra-embryonic membranes, including the placenta). The other cell forms the 'inner cell mass' which is the source of embryonic stem cells. By selective silencing of Cdx2, the authors were able to produce an unorganized mass composed exclusively of cells with the character of inner cell mass.

This is the organic equivalent of a model airplane kit without the glue, you have parts but no capacity to form a coherent whole. The gene Cdx2 has been shown in mouse models to be essential for the early integration of organismal function. In the absence of expression of this gene, as with a teratoma, the trophectoderm fails to grow and there is only partial and unorganized cellular process. Lacking one of the two essential cell types, it is the equivalent of trying

to sing a duet with only one voice. The coordinated interactions that are essential for embryonic development are simply not possible. Nonetheless, an inner cell mass is produced from which functional embryonic stem cells can be extracted.

It is important to recognize that the improper development of the trophectoderm is not reasonably considered a defect within a part but rather a failure in the formation of the whole. An early embryo does not have parts in quite the same sense as an adult organism or even as a later-stage embryo just a few days or weeks later. Natural embryogenesis is, by definition, the period during which the whole, as the unified principle of growth, produces the parts. The differentiation of parts during early embryogenesis lays down the fundamental axes, body plan, and pattern of integrated organogenesis. An embryo does not have a central integrating part like the brain; rather, the essential being is the whole being. At this stage, a critical ''deficiency'' is more rightly considered an ''insufficiency,'' not a defect in a being, but an inadequacy at such a fundamental level that it precludes the coordinated coherence and developmental potential that are the defining characteristics of an embryonic organism. In testimony to a U.S. Senate subcommittee on stem cell research, Dr. Jaenisch stated: ''Because the ANT product lacks essential properties of the fertilized embryo, it is not justified to call it an 'embryo.'

Many scientists, moral philosophers and religious authorities (including some of the most conservative evangelical and Catholic leaders) have expressed strong encouragement for further exploration of this project. Of course additional animal studies, including some with non-human primates must precede any translation of these findings into practice with human cells.

ADVANTAGES OF ANT

ANT, in its many variations, could provide a uniquely flexible tool and has many positive advantages that would help advance stem cell research.

—Unlike the use of embryos from IVF clinics, ANT would produce an unlimited range of genetic types for the study of disease, drug testing and possibly generation of therapeutically useful cells.

—By allowing controlled and reproducible experiments, ANT would provide a valuable research tool for a wide range of studies of gene expression, imprinting, and intercellular communication.

—Furthermore, the basic research essential to establishing the ANT technique would advance our understanding of developmental biology and might serve as a bridge to transcendent technologies such as direct reprogramming of adult cells.

—Moreover, as a direct laboratory technique, ANT would unburden embryonic stem cell research from the additional ethical concerns of the ''left over'' IVF embryos, including the attendant clinical and legal complexities in this realm of great personal and social sensitivity.

The one remaining link with IVF, the procurement of oocytes, is a subject of intense scientific research and there appear to be several prospects for obtaining eggs without the morally dubious and expensive hormonally induced super-ovulation of female patients. These include the use of eggs left over from IVF, the laboratory maturation of eggs cultured from ovaries obtained after surgical removal or from cadavers, and possibly the direct production of eggs from embryonic stem cells (a feat already accomplished with mouse cells).

CONCLUSION

We are at a crucial moment in the progress of science and civilization. Advances in biology have delivered new powers with extraordinary potential for positive application in both basic research and clinical medicine. Yet, at the same time, these new possibilities challenge the most fundamental moral principles on which our society is based. Clearly, both sides of this difficult debate over embryonic stem cell research are defending something important to all of us. Without a resolution that sustains social consensus, there will be a series of continuing conflicts as our science challenges us with further dilemmas at the boundaries of human life.

The English author G.K. Chesterton had a metaphor that may inform our current situation. Little boys are playing soccer on an island, but at the very edges of the field cliffs go down hundreds of feet to the waves crashing against the rocky shore. The boys are playing, but only in the middle twenty yards—no one wants to do a corner kick. Then someone comes and builds a sturdy fence right at the edges of the field: now they can play within the full field without fear of falling off the cliff.

Our current conflict is like this: science is stalled across a broad front. If we can define with clarity and precision the moral boundaries we are trying to defend, we might open a wider arena of legitimate study without fear of the grave dangers posed by breach of the basic moral principles that sustain our civilization. In provoking just such reflection and clarity of definition, the proposal for Altered Nuclear Transfer sets the foundation for a positive future of scientific advance.

Yet, some will say, ''how can such a tiny clump of cells hold such significance?''

But size is not a measure of moral meaning. It is true, from here these cells are barely visible.

But from here one cannot see the people.

And from here one cannot see the earth.

And from here one cannot even see our galaxy.

Three hundred years ago the French philosopher-mathematician Blaise Pascal noted that human existence is located between infinities—between the infinitely large and the infinitely small. He went on to say ''By size the universe surrounds and swallows me up like a dot: by thought I encompass the universe.''

But what kind of thought could encompass the universe? That thought must be a moral thought—that thought must be love.

C.S. Lewis once said that we should answer all of our problems with more love, not less love.

That precious love that nourished and sustained each one of us in the early dawn of our unfolding form.

Now, as we prepare to enter the future with the new powers of our scientific understanding, we should remember the words of St. John of the Cross: ''In the evening of life, we will be judged by love.''

We are all aware of how divisive this issue has been. I believe that there are areas of common ground where people can come together and reconcile what appear to be two opposing opinions. This is the ground on which I have built my legislation.

The HOPE Act is the only bill up for debate which would not be in danger of a Presidential veto. This means that my bill is the only way we can actually move the science forward for at least the next two years.

What this debate is really about is what the American public gets at the end of the day. When all the votes are cast, what can we say to the patients who visit us who want cures for terrible diseases? Some members would focus on adult stem cells and some would leave all the promise with embryonic stem cells. But a balanced and measured approach would give the Federal Government the opportunity to support both.

At the end of the day, one bill is destined for the garbage bin. It sounds harsh, but it's a fact that the President will veto it. Maybe it can be dusted off in 2009 with a new administration, but in the meanwhile, we're wasting time. The HOPE Act actually has a chance of becoming law and putting the force of Federal support into pluripotent stem cell research that can benefit patients in the very near future.

My bill incorporates all of the most promising current scientific advancements which adhere to ethical principles, induding methods using adult stem cells and some using embryonic stem cells.

Since 2001, the Federal Government has funded human embryonic stem cell research using only lines created before August 9, 2001. No embryonic stem cell lines created after 2001 were eligible for funding. Although the White House could change their policy at any time, they haven't. Currently, only 20–21 lines are eligible, down from an original 60.

There are already several methods proposed for deriving pluripotent cells without harming human embryos.

Research involving ANT, naturally dead embryos or single cell biopsy has never before received Federal funding. Our bill would allow these methods to be considered for Federal funding and specifically direct the NIH to establish guidelines to carry out this research. Similiar guidelines or requests for research proposals, RFPs, do not currently exist.

Additionally, my bill provides funding to start the process of developing a stem cell bank. By opening banks to store amniotic and placental cells, this bill will make available a greater variety of stem cells. Different types of stem cells are used in different types of treatments. Anthony Atala has told us that ''So far, we've been successful with every cell type we've attempted to produce from these stem cells. The AFS cells can also produce mature cells that meet tests of function, which suggests their therapeutic value.''

Bottom line—This bill moves the United States one step further towards widespread use of stem cells for treatments for a variety of diseases.

Opponents tell us that this bill doesn't do anything new. This is just not true. In addition to what I've mentioned above, there is scientific proof that these alternatives can create quality, new embryonic stem cell lines.

In fact, one of these methods, using naturally dead embryos, has already produced at least one new embryonic stem cell line which is currently available in a stem cell bank and under your

bill would now be eligible for Federal funding. Donald Landry, Chief of the Division of Experimental Therapeutics at Columbia University, says that increasing the number of stem cell lines created this way would be just a matter of effort.

According to this well-respected researcher, there could be a continuous supply of new embryonic stem cell lines using stem cells derived from naturally dead embryos. The same could be said for other methods:

When the dust clears, The HOPE Act is the only bill up for consideration which will give the American public new research for their tax dollars. Under The HOPE Act, a continuous supply of pluripotent stem cell lines would be available for Federal funding.

We are at a point where there is this great debate in this country over, not the issue of stem cell research but, simply, the source of the stem cells and then the Federal funding of the stem cells. That is the reality. That is where we are today. What Senator ISAKSON and myself and other colleagues are offering is what we believe is a way forward, a way to move the science forward, a way to avoid the culture wars. It is not everything my colleagues who support S. 5, if that would have passed and become law, would have, but S. 5 for many crosses that line, so we can't support it, but we want the research to move forward.

The reality is the science is moving so much faster than the politics here. The science is putting us in a position where we could and should explore the benefits of embryonic research and pluripotent stem cell research without having to cross the moral line. So if S. 30 is passed, the President has said he will not veto S. 30. If S. 30 becomes the law, then, in fact, the amount of Federal dollars available for human embryonic pluripotency research will be far greater than what we have today.

For those out there who are looking for hope—and that is what we call our bill, HOPE—it is hope offered through principled ethical stem cell research. For those who are looking for hope, we are offering some hope. It is not everything. It is not everything that all desire in the area of stem cell research. But the reality of so much of what we are dealing with in stem cell research is about theory. It is about hope.

Let's offer the hope. There is hope of what embryonic stem cells can do. My colleague from Iowa, when he was discounting dead embryo research, said it may take 10 year for that to pan out. Stem cell research of any kind, I have to tell the folks out there, may take 10 year or more. I am not hearing scientists telling me that within the next couple of years we are going to have those therapies which will cure juvenile diabetes or cure ALS or change the situation. We are talking about looking down the road. We are talking about looking at research opportunities in which we want to provide hope. We believe that is the right thing to do.

So my message to my colleagues who support S. 5—my colleague from Arkansas and from Iowa, who talked about he wants to open every door we can—I think we need to push all of them. Well, S. 30 opens a door. It opens a door without crossing the cultural line. It opens the door without being involved in the midst of the battle between those who support embryonic stem cell research and those who support only adult stem cell research. It offers a third way: It offers real dollars and real hope and real opportunity to see if we can make progress. That is our goal.

To my colleagues who support S. 5, at the end of the day if all you do is vote for S. 5, you will cast a vote I am sure in your heart you will feel will be principled, the right message, the right thing to do. But the reality is at the end of the day, there are going to be no more dollars going into Federal research, you are not going to be offering real hope, you will have offered a political statement, but we need to do more.

What Senator ISAKSON and I have tried to do is offer the opportunity to do more, to say, yes, we will move the science forward. There are going to be critics who say it can't be done. Science is fascinating. Oftentimes it is ''my way or the highway.'' Embryonic stem cells, that is the way; adult stem cells, that is the way; autonuclear transfer, that is the way.

I am not a scientist; I just want to move it forward. I understand we are operating in a world where it is about hope. Let's open this door. Let's put aside the cultural battles and the cultural wars.

One last observation, if I may. The Senator from Iowa talked about trying to put this in context, and said, you know, look at the size, what we are dealing with. This embryo—this is a pin. That is small. What is the value of that? I take this, by the way, from Dr. Hurlbett's work. I can show you the next picture here. You know, if you are on the Moon and you are looking at this from there, this would be kind of small. Then if you are standing—by the way, from here, these people would be about the size of a pin.

Now we are kind of looking at the Earth from far away. If you are looking at that, by the way, from the galaxy, boy, that would be very small. If you are looking at the galaxy from the universe, this would be very small. It is not about size. We are dealing with the human embryo, and there is a moral question some of us want to ask and say that there is a line, but in doing that we want the research to go forward, we want to offer hope, we want to offer opportunity, we want to use science as best we can.

S. 30 offers that opportunity. I would hope all of my colleagues on all sides of this issue would come forward. Some would say, it is not all we want, but we are moving the science forward. Let's do that. And in the end, hopefully real hope will be given and real cures ultimately will be found, and we will have done it in a way that does not engage the cultural ways, does not cross the line that some do not want to cross, but in the end makes real progress with real science.

I yield the floor.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. GRASSLEY. Mr. President, I wish to explain to my colleagues why I will vote against S. 5 in its present form, and I believe it will probably be in its present form as we vote on it.

We in Congress are petitioned every day by individuals, by families, by companies, by interest groups, and other entities that have a stake in what the Federal Government does. We were elected to this great body to represent people back home, and to provide reasonable solutions to everyday problems that we confront here in the Congress.

I meet people in Iowa every week who seek cures for different diseases and different disorders. They seek results, and we fight to provide them results so that life is better, life expectancy is longer. Americans want Congress to fund medical research, and we do it in a big way. That is why we provided nearly $30 billion annually for the National Institutes of Health, which is the leading organization on health-related research.

We all know and love someone who has suffered from a devastating disease or disorder. My wife is a breast cancer survivor; my brother died of a stroke; my sister died of an aortic aneurysm. I have friends with diabetes, Parkinson's, and Lou Gehrig's disease. I have known many who have lost a battle to cancer, and others who face a long struggle with Alzheimer's disease.

I want cures as well as everybody else wanting cures. I want to believe that the pain and suffering will end as much as anyone wants it to end. But I cannot in good conscience support a bill that forces American taxpayers to fund research that requires the destruction of innocent human life. This is a slippery slope.

I wish to address six key points that have been put forward by Robert George and by Thomas Berg. They were made in an op-ed piece from the Wall Street Journal on March 13, this year.

These authors state that responsible and productive debate is often lost amidst confusion and misperceptions surrounding the issue of embryonic stem cell research. Both sides of this debate have reasonable arguments. But these authors, including this Senator, believe embryonic-destructive research cannot be morally justified.

First, Professor George and Reverend Berg rightly point out there is not a ban on human embryonic stem cell research in the United States. Yet I believe people in this body leave that impression. More importantly, it has left

the impression—whether from Members of Congress or other people in our society—there is a Federal ban on human embryonic stem cell research. They leave out the fact we are already doing some through the Federal Government. They leave out the fact that the private sector and State governments are doing a lot of embryonic stem cell research as well. So there is embryonic stem cell research going on. The issue is whether the Federal taxpayers ought to be paying for something that would destroy life at the beginning.

What people have forgotten in this debate, then, is George W. Bush was, in fact, the first President to provide Federal dollars for embryonic stem cell research. Throughout the Clinton administration, not one penny of taxpayer dollars was allowed for this sort of research. So there is no Federal ban. In fact, companies and researchers can and are doing it now. There is no legal barrier to prohibit the private financing of it. In fact, we will continue to fund the lines President Bush authorized in 2001. Since the President announced his decision in August 2001, the Federal Government has provided almost $130 million for embryonic stem cell research. Eighty-five percent of the embryonic stem cell research studies in the world use these lines that President Bush's decision in August 2001 allowed.

Because of this funding and the investment in the National Institutes of Health, America, our country, remains one of the global leaders in medical research. Why then do some generate the false impression that the Federal Government is not involved in stem cell research?

Well, that brings me to the second point. The authors say we are a long way away from seeing the therapies the other side promises. Embryonic stem cell research may not be the magic potion many make it out to be. Even the most ardent pro-embryonic stem cell research experts have stated its benefits are years, if not generations, away. George and Berg quote a prominent British expert who is not entirely convinced that embryonic stem cells will, in his life and possibly anyone's lifetime, be holding quite the promise that some desperately hope they will.

One expert from the University of Wisconsin fears a backlash because the cures the public expects could be decades away. I know many of my colleagues and many of my constituents believe embryonic stem cell research holds potential. They believe the hope and the promise of this research will save their lives and the lives of their loved ones. But I cannot support the expanded use of taxpayer dollars to invest in something that is generations away—even if possible—when proven therapies through adult stem cell research, with no moral strings being attached, no lives being taken, are right in front of us.

Third, the authors explain that a human embryo is deserving of at least some degree of special moral status. Most people would agree the embryo being destroyed has the potential to be developed into human life. It is a fact. Therefore, it is only right that a heightened degree of sensitivity and consideration be paid to this life at this stage of development, the embryo.

This bill then plays with human life. The other side's promise of cures disregards the fact that this bill will allow researchers to kill embryos, and pay for that killing, with American taxpayer dollars.

The bill before us says we should fund research using embryos that were on the brink of being thrown away anyway. Thrown away? What about the many children who have been adopted through this process? They were not thrown away or they obviously would not have been here to be adopted.

What about making sure that couples are not exploited and forced to create extra embryos so that industry can make a profit? Think how China makes a profit from harvesting organs from prisoners that they execute, or who knows how they die? Tourist medicine is what it is called. Do we want that sort of ethic in our research? I do not think so.

What about ensuring those so-called leftover embryos are not being created through cloning? How do we ensure human cloning is not made more attractive, and that researchers are limited to how they create and destroy life? Where do we draw the line?

Point number four: There are noncontroversial methods that are worth exploring if you want to do something for curing maladies with stem cells. Other noncontroversial methods of cutting-edge research, those which do not destroy human embryos, offer near equal promise for future medical benefit. Those methods are treating people this very day. Stem cells derived from bone marrow, umbilical cord blood, amniotic fluid, have opened the doors to many therapies. Adult stem cells have already proven effective in treating over 70 diseases and disorders, not something anybody interested in embryonic stem cells can point to. This alternative research has proven effective. We are investing taxpayers' money in research that people are reaping benefits in today.

Last year, I talked about an acquaintance of mine by the name of David Foege whom I happen to know from the years when he was a page in the Iowa Legislature in the 1960s. He grew up in Iowa and now resides in Florida. Four years ago, David Foege was told that he had little chance of survival. His heart was losing all function, and there was little that doctors could do. David turned to stem cell therapy. He found doctors in Bangkok who would harvest his own stem cells and inject them back into his own heart. This year, 25 million of his own stem cells were taken from his blood and injected into his heart. He went from a life-threatening situation to a nearly normal heart function. He went from a life expectancy of 90 days to 10 or 15 more years. He is fighting that death warrant that he received years ago. David Foege is evidence that adult stem cells work, that the investment we have made in adult stem cells is paying off, and it is evidence that we ought to put our money where product is received as opposed to the quandary of when will we get therapies or when will we get maladies fixed by the research in adult stem cells.

I wish I could list the advances with embryonic stem cell research, but I cannot. There aren't any. There are no treatments for human patients derived from embryonic stem cells. So there is no evidence on which to argue that this research should be expanded with public resources; in other words, tax dollars being used. We in Congress have to realize that there is a difference between hope and hype.

The fifth point these authors make, moral concerns are not exclusively religious in nature. Everybody thinks that anyone who is fighting this research is some religious fanatic.

Nobody says it better than Charles Krauthammer, a highly regarded columnist and former member of the President's Council on Bioethics. Mr. Krauthammer doesn't believe that life begins at conception, as many who have a feeling about embryonic stem cells and the destruction of life at that stage. But Mr. Krauthammer says that ''many secularly''—I emphasize secularly; I didn't say religious—''inclined people have great trepidation about the inherent dangers of wanton and unrestricted manipulation''—to the point of dismemberment—''of human embryos.'' Mr. Krauthammer says that we don't need religion to simply ''have a healthy respect for the human capacity for doing evil in the pursuit of doing good.''

Mr. Krauthammer knows firsthand what it is like to live with a debilitating disease. He suffers from spinal cord injury. He spends every day of his life in a wheelchair. Even he knows that it is cruel to play on the hearts of those who suffer by saying that a cure is within reach. He said:

> There's nothing less compassionate than to construct a political constituency of sufferers by falsely and cruelly intimating that their disease is on the very cusp of cure if only the President would stop playing politics with the issue.

We aren't playing politics. Reasonable people can disagree on the moral or fiscal consequences of this bill without being labeled religiously minded obstructionists.

The sixth and final point that Berg and George make is that medical advancements are not the only interest of stem cell researchers. Because the benefit of embryonic stem cell research is only speculative and many years from producing results, most scientists have acknowledged that the primary interest of this type of research is to enhance the basic knowledge of early

human development. S. 5 does not ban human cloning, and it doesn't help draw the line on what researchers should or should not do with so-called leftover embryos. This puts us on a very slippery slope. I urge my colleagues to think long and hard about this issue before casting their vote.

S. 5 disregards respect for human life at the expense of prolonging the pain of those who seek a cure. We in Congress and across the country need to think rationally and to make tough choices. The right choice is to invest in what works. I have spent a great deal of time explaining that I thought that was adult stem cell research. I urge my colleagues to join in defeating S. 5 and supporting the proven and noncontroversial field of adult stem cell research.

I thank the Chair.

The PRESIDING OFFICER. The Senator from Oklahoma.

Mr. COBURN. Mr. President, I thank my colleagues for this bill. Senator COLEMAN and Senator ISAKSON have put a great deal of time into this bill, and I am pleased to work with them in bringing about this formulation. If I am not already a cosponsor, I ask unanimous consent to be added as a cosponsor.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. COBURN. Unlike many in the Chamber, I am a scientist. I am a physician. I have delivered, at last count, somewhere over 4,000 babies. I understand embryology. I understand the science of molecular biology. This debate is going to come down to a couple of moral questions. There are really two moral questions that this country has to answer. I will talk about those, and then I will talk about a few other things that most people don't want to admit to or discuss, issues surrounding this topic.

The first moral issue is, do we have the capability to destroy life in the name of saving life? That is what we are talking about with embryonic stem cells. We selectively snuff out a life so that we can potentially have a treatment in the future. That is the first great moral question. I have seen the various early stages and then every other stage through pregnancy what that life potential is. It is not to be taken lightly, this step of ignoring life or neutralizing life under the proxy of saying we are going to benefit someone.

We have heard many people talk about the promise of embryonic stem cells. They do yield promise for us. However, it is a long way off. But we need to be careful with this step in the direction of destroying life in the name of saving life.

I thought Senator ISAKSON did a very good job of explaining embryos that no longer grow. They have quit dividing. They won't be frozen. They won't be implanted. They, in fact, will be discarded. But they still have tremendous value for us for research. As he noted, 5 of the 21 lines presently being researched, and 3 of the 10 lines that presently have no problems whatsoever came from dead embryos, embryos that still have live cells but won't divide again unless induced to do so, and then won't divide into an embryo.

This is a big question for us because how we answer this question today is going to say a lot about the decisions we make in the future. One of the things we are going to hear about is the tremendous amount of excess embryos around. Here is a RAND study report that disputes that. Here is a scientific research organization that looked at the availability of excess embryos and in fact says the claims are not supported by the facts.

I ask unanimous consent to print this in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

HOW MANY FROZEN HUMAN EMBRYOS ARE AVAILABLE FOR RESEARCH?

Frozen human embryos have recently become the focus of considerable media attention. Frozen embryos are a potential source of embryonic stem cells, which can replicate themselves and develop into specialized cells (e.g., blood cells or nerve cells). Researchers believe that such cells might be capable of growing replacement tissues that could be used to treat people suffering from a number of diseases, including cancer, Alzheimer's disease, and diabetes. Among the most contentious issues in the stem cell debate are whether frozen embryos should be used to produce stem cells for research purposes and whether it is appropriate to use federal funds for research involving human embryos.

Many of the proposed resolutions to the embryonic stem cell debate are based on assumptions about the total number of frozen human embryos in the United States and the percentage of that total that is available for research. Accurate data on these issues, however, have not been available. Guesses on the total number of embryos have ranged wildly from tens of thousands to several hundred thousand.

RAND researchers Gail L. Zellman and C. Christine Fair, together with the Society of Assisted Reproductive Technology (SART) Working Group led by David Hoffman, MD, have completed a project designed to inform the policy debate by providing accurate data on the number of frozen embryos in the United States and how many of those embryos are available for research purposes. Their findings include the following:

Nearly 400,000 embryos (fertilized eggs that have developed for six or fewer days) have been frozen and stored since the late 1970s.

Patients have designated only 2.8 percent (about 11,000 embryos) for research. The vast majority of frozen embryos are designated for future attempts at pregnancy.

From those embryos designated for research, perhaps as many as 275 stem cell lines (cell cultures suitable for further development) could be created. The actual number is likely to be much lower.

VAST MAJORITY OF FROZEN EMBRYOS ARE HELD FOR FAMILY BUILDING

The practice of freezing embryos dates back to the first infertility treatments in the mid-1980s. The process of in vitro fertilization often produces more embryos than can be used at one time. In the United States, the decision about what to do with the extra embryos rests with the patients who produced them.

The RAND-SART team designed and implemented a survey to determine the number and current disposition of embryos frozen and stored since the mid-1980s at fertility clinics in the United States and the number of those embryos designated for research. The survey was sent to all 430 assisted reproductive technology facilities in the United States, 340 of which responded. Estimates for nonresponding clinics were developed using a statistical formula based on a clinic's size and other characteristics. The results show that as of April 1, 2002, a total of 396,526 embryos have been placed in storage in the United States. This number is higher than expected; previous estimates have ranged from 30,000 to 200,000.

Alhough the total number of frozen embryos is large, the RAND-SART survey found that only a small percentage of these embryos have been designated for research use. As the figure illustrates, the vast majority of stored embryos (88.2 percent) are being held for family building, with just 2.8 percent of the total (11,000) designated for research. Of the remaining embryos, 2.3 percent are awaiting donation to another patient, 2.2 percent are designated to be discarded, and 4.5 percent are held in storage for other reasons, including lost contact with a patient, patient death, abandonment, and divorce.

EMBRYOS AVAILABLE FOR RESEARCH DO NOT HAVE HIGH DEVELOPMENT POTENTIAL

Although the 11,000 embryos designated for research might seem like a large number, the actual number of embryos that might be converted into stem cell lines is likely to be substantially lower. Because assisted reproductive technology clinics generally transfer the best-quality embryos to the patient during treatment cycles, the remaining embryos available to be frozen are not always of the highest quality. (High-quality embryos are those that grow at normal rates.) In addition, some of the frozen embryos have been in storage for many years, and at the time that some of those embryos were created, laboratory cultures were not as conducive to preserving embryos as they are today. Some embryos would also be lost in the freeze-and-thaw process itself.

To illustrate how such laboratory conditions might limit the number of embryos available for research, the RAND-SART team performed a series of calculations. Drawing upon the few published studies in this area, they estimated that only about 65 percent of the approximately 11,000 embryos would survive the freeze-and-thaw process, resulting in 7,334 embryos. Of those, about 25 percent (1,834 embryos) would likely be able to survive the initial stages of development to the blastocyst stage (a blastocyst is an embryo that has developed for at least five days). Even fewer could be successfully converted into embryonic stem cell lines. For example, researchers at the University of Wisconsin needed 18 blastocysts to create five embryonic stem cell lines, while researchers at The Jones Institute used 40 blastocysts to create three lines.

Using a conservative estimate between the two conversion rates from blastocyst to stem cells noted above (27 percent and 7.5 percent), the research team calculated that about 275 embryonic stem cell lines could be created from the total number of embryos available for research. Even this number is probably an overestimate because it assumes that all the embryos designated for research in the United States would be used to create stem cell lines, which is highly unlikely.

CONCLUSION

The RAND-SART survey found that almost twice as many frozen embryos exist in the United States as the highest previous estimate. Only a small percentage of these embryos are available for research because the

vast majority are reserved for family building. Among those that are in principle available for research, some have been in storage for more than a decade and were frozen using techniques that are less effective than those that are currently available.

Mr. COBURN. The second question we have to ask ourselves is, if you are a mother of a juvenile diabetic, a 2- or 3-year-old, or you are the wife of a Parkinson's patient or the caregiver of somebody with a spinal cord injury, if we told you that in fact we can do everything to produce a cure, to give you the exact same opportunity for a cure without ever destroying the first embryo, which would your choice be? Would your choice be to destroy that embryo or to do it in a nondestructive way getting exactly the same results?

That is where the science is today. That is going to be disputed. But the false hopes that have been created that that is the only way that we can find these cures is nothing but hogwash, scientifically proven hogwash.

The fact is, we don't know what is going to come from embryonic stem cells. We know a lot that will come from other treatments. I just shared with Senator COLEMAN, we will have a treatment for juvenile diabetes within 5 years, but it won't come from stem cells. It is going to come from the tobacco plant. That is very new research. It has been repeated in mice. It is working. We will have that cure. That is going to get funded, and it will be produced long before anything else that comes to an actual cure.

By the way, autologous stem cells, cells taken from yourself, have already cured five juvenile diabetics by taking the cells from a tube inside the pancreas and growing those cells, regenerating beta cells, and reimplanting those into children who have juvenile diabetes, who are off insulin today. So there are lots of opportunities.

The second moral question that Americans need to ask themselves, as do Members of this body, is if we can do everything without destroying the first embryo, why do we want to destroy embryos? Because it is easy? Because it is convenient? Because we are locked in a mantra that says this is the only way. Think for a minute about what else is going on. We now produce almost every cell type that man has from germ cells, research done in this country, proven in Germany, in Japan, another source of stem cells. Didn't destroy the first embryo, but we have it. Altered nuclear transfer, assisted reprogramming, which you heard Senator COLEMAN talk about, has not been done in humans yet because it hasn't been funded. The fact is, it has been done in mice. You sit and think, what can happen.

When we heard that these were theories by the Senator from Iowa, going to the Moon was a theory, but we did it. The fact is, there are lots of other theories on how to treat disease out there that we are going to be accomplishing that aren't going to have anything to do with stem cells.

It is important that we don't take our eye off the ball. This is a very key moral question that has to be answered. It has to be answered by all the disease groups out there. If, in fact, we can supply the same product in the same timeline with the same results, why would we want to destroy an embryo? If we could do it in an ethically, morally correct way, why would we do it in an ethically less correct way?

Then there is the little problem that you never hear talked about with stem cells. The only way a stem cell therapy is ever going to work without antirejection drugs, the only way it is ever going to work is if you clone yourself. They don't want to talk about that right now. But for a treatment to happen that will keep you free from rejecting that stem cell, that treatment, that set of cells that is not purely yours will mean anybody who gets a treatment from an embryonically derived stem cell will be on antirejection drugs the rest of their life, which has multiple complications. The solution to that—they don't want to talk about it—is you have to clone yourself. So now we are into cloning ourselves and then destroying ourselves so we can have a treatment for ourselves? That is the dirty little secret that nobody with embryonic stem cells wants to talk about.

The interesting answer to that is altered nuclear transfer, oocyte-assisted reprogramming, which has none of those problems because you use one of your cells into an egg, reprogram it to produce pluripotent cells that never produce an embryo. Nobody wants to talk about the real scientific issue of the problems of a treatment for a disease that we have no treatments for yet, that is well down the road, and the big kicker that will come is, what if we get a treatment and then we try to give it and everybody is going to have to be on an antirejection drug. Everybody knows somebody who has had a transplant. Ask them how they like taking their drugs. They like taking them because they have a new liver or heart or kidney, but if they could not take those drugs and have it, they would much rather have that.

So we set up a false choice. The false choice is, embryonic stem cells or nothing. That is not a real choice for this country.

I believe America is a great land, made up of good people. If we answer this second moral question, if we can do this, and we can, through multiple ways, why would we destroy the first embryo? We do not have to destroy the first embryo.

I think we ought to be considering the moral questions, but also the facts that are going to come about as a result of this fascination and hope for a cure. I have had mothers of juvenile diabetics in my office. I have had family members of Alzheimer's patients. I have had a Parkinson's patient plead with me to do this. When I explain to them what is on the horizon, when I explain to them what the potentials are, all of a sudden this hope that has no substance to it yet whatsoever does not have near the meaning as all the other things that are going on that do have meaning.

So we need to refocus on the real search, the real potential that is in front of our country and answer this best, most important moral question: Do we steal life from the innocent to potentially give life to the maimed or the injured or diseased, or do we, in fact, do it in a way that never steals life and accomplishes the same goal?

That is the real question before the Senate. S. 30 does that. S. 5 does not. That is the division. One says: To heck with the ethics, to heck with the problems associated with it, to heck with the rejection, to heck with the antirejection drugs, to heck with the idea we cannot clone ourselves, we want to go this way only.

S. 30 allows all the options, all the accomplishments, all the potential without violating the first ethical clause. That is the question America needs to ask itself in this debate. We can give to all those who are desirous of all these needed benefits of cure and treatment, and we can do it in an ethically responsible manner that will send us down the right road for this country, not the wrong road.

With that, I yield the floor.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. ISAKSON. Mr. President, how much time remains?

The PRESIDING OFFICER. Five minutes remains under the control of the Republican leader.

Mr. ISAKSON. Mr. President, I am going to yield to Senator COLEMAN. But, first, I ask unanimous consent that Senator MCCONNELL be added as a cosponsor to S. 30.

The PRESIDING OFFICER. Without objection, it is so ordered.

The Senator from Minnesota.

Mr. COLEMAN. Mr. President, I want to briefly touch on one other aspect of the bill we have not talked about. I do want to thank my colleague from Oklahoma for articulating what is the basic issue: if we can move science forward without crossing a moral line, if we can avoid the great division in America. Scientific research should be something that as a society we embrace. S. 30 gives us the opportunity to do that. I hope my colleagues from all perspectives on this issue decide they will support S. 30.

One other aspect of S. 30 that is important is there is a provision in the bill that calls for the Secretary of Health and Human Services to look into setting up a national amniotic and placental stem cell bank.

There are three banks of stem cells in this country. I believe Wisconsin has the 21 embryonic stem cell lines of the 78 the President originally authorized. In Minnesota, there is a cord blood cell bank, and there is a bone marrow bank.

What we hope to do, based on research that has recently come to

light—Wake Forest has done some of it—is have the use of amniotic and placental stem cells. These are stem cells, by the way, that can be grown in large quantities. They do not produce tumors, which occur in other types of stem cells. The Wake Forest scientists have noted the specialized cells generated from amniotic cells really, in effect, may have—again, this is all potential—but there is the potential to have the kind of elasticity and pluripotency we see in embryonic stem cells—high-flexibility growth potential in many ways resembling human embryonic stem cells.

The hope is to put together a tissue sampling of 100,000 tissues which would then give you the kind of ability to cut across a diversity we do not have today with the research that is going on.

Again, if S. 5 is passed, it will be vetoed, and the science will not be moved forward. But if S. 30 is passed, with the provisions that provide for stem cell research, that will provide for pluripotent research, that will provide for dead embryo research, which would give you, again, the same kind of stem cells you get from any other kind of embryonic stem cells—these are some of the new techniques out there.

In addition, S. 30 contains a provision for moving forward with a national amniotic and placental stem cell bank, which is another opportunity to move the research forward and to move from hope to reality, which is certainly the hope of the authors of this bill.

With that, I yield the floor.

Mr. President, we yield back the remainder of our time.

The PRESIDING OFFICER. Under the previous order, the next 60 minutes is under the control of the majority leader or his designee.

The Senator from California.

Mrs. FEINSTEIN. Mr. President, it is my understanding I have 20 minutes. Is that correct?

The PRESIDING OFFICER. There is 60 minutes under the control of the majority leader. The Chair is not aware of any designation within that 60 minutes.

Mrs. FEINSTEIN. I see. I thank the Presiding Officer.

Mr. President, I rise in support of the Stem Cell Research Enhancement Act of 2007 that is known as S. 5. It is really the only bill of the two that will allow scientists to fully pursue the promise of stem cell research.

I want to particularly thank Senators HARKIN and SPECTER, KENNEDY and HATCH, who have been in the leadership of this issue for the past several Congresses. I also want to point out, in the case of the distinguished Senator from Utah, he is very pro-life. I have listened to him over these many years. I have listened to the real wisdom he has espoused on this issue. I hope more people will pay attention to him because I think he is right with respect to this issue.

On August 9, 2001—that is 6 years ago—President Bush limited Federal research funding to 78 stem cell lines already in existence. Nearly 6 years have passed, and in that time two things have happened. First, most of these 78 stem cell lines are no longer available for scientific work. Many lines developed abnormalities and mutations as they aged. Only 21 lines are available today. These lines are all contaminated with mouse feeder cells and therefore are useless for research in humans. They do not have the diverse genetic makeup that is necessary to find cures that benefit all Americans, and researchers cannot use them to examine rare and deadly genetic diseases.

This was, in fact, the President's policy. It is now clearly established that policy does not work, that policy is moribund. Yet the President will not relent and Federal research on stem cells cannot go forward.

Secondly, public support for stem cell research—full-blown stem cell research—has grown. Sixty-one percent of Americans responding to a poll in January of this year support embryonic stem cell research. This is also a bipartisan issue. Fifty-four percent of Republicans in an ABC News poll also support embryonic stem cell research.

The majority of the American public support this bill. We know the current policy is handcuffing our scientists and is not allowing this research to move forward. So the solution is obvious. We should pass this bill.

I think the time has come for the President to come to this realization, and it is my hope he will see he has been mistaken.

The bill we are debating today offers a compromise. This bill will not destroy any embryo that would not otherwise be destroyed or discarded. It will allow promising research to move forward. It would end the impasse. It would take off the handcuffs.

President Bush had the opportunity to take a step forward 9 months ago when the House and Senate sent him the Castle-DeGette bill, on which this bill is based. He made it the first and, so far, only veto of his Presidency. My colleagues and I made a commitment that we would raise this issue again and again—as long as it takes. Today we are fulfilling that promise. We know this bill will one day become law—if not this year, then next year; if not next year, then the following year.

The majority of the American people, the majority of the scientific community, other nations, many of our States have embraced the promise of stem cell research. The President can stand in the way of such an overwhelming consensus for only so long.

With every passing week, the inevitability of this legislation grows clearer. Just since the President's veto, officials from his own administration have acknowledged the shortcomings of the current policy. More research has demonstrated the unique promise of pluripotent, multipurpose stem cells. States and private institutions are forging ahead without Federal support.

Finally, and importantly, more Americans are waiting for cures and treatments for catastrophic diseases. This is a very large lobby indeed.

So today we have another opportunity to move hope forward. The two bills before us today present a very stark choice. Only one bill, S. 5, the Stem Cell Research Enhancement Act, embraces all forms of stem cell research. This legislation provides a simple and straightforward way to provide American scientists and researchers with immediate access to the most promising stem cell lines.

It states that embryos to be discarded from in vitro fertilization clinics may be used in federally funded stem cell research, no matter when they were created.

While opponents have suggested this bill will lead us down a slippery slope, the parameters created by the bill are numerous and, in fact, strict. Let me give you some examples.

The embryos must be left over following fertility treatment. The people donating the embryos must provide written consent. The donors may not be compensated for their donation. Finally, it must be clear that the embryos would otherwise be discarded.

This legislation will not allow Federal funding to be used to destroy embryos. With restrictions in place, over 400,000 embryos could become available while ensuring that researchers meet the highest of ethical standards.

Let's be clear. We are talking about embryos that will be destroyed whether or not this bill becomes law. It is an indisputable fact, and everyone would agree these embryos have no future. When President Bush adopted his ill-fated policy in 2001, he allowed lines already in existence to be used for federally funded research because ''the life-or-death decision'' had already been made.

The same is true here. In terms of the basic ideology of the President's earlier policy, this bill is no different than the earlier policy because the life-or-death decision has already been made with respect to these particular embryos. These will never be implanted. They will never be adopted. They will never be used.

This bill has not been held up because it is flawed. There is nothing wrong with this bill. The bill has been held up because of ideology, not policy.

There is a clear scientific consensus on this issue. Embryonic stem cell research has been endorsed by 525 organizations and 80 Nobel prize laureates. These groups and these experts represent the entire panoply of American health care, the young and the old: the American Association of Retired Persons, which we know as AARP; the Society of Pediatric Research; the American Geriatrics Society. They represent a wide range of medical experts. The American Medical Association supports this bill. The American Academy of Nursing supports this bill.

They are from varying regions in the country: the University of California

system, the University of Kansas, the University of Arizona, the University of Chicago, and the Wisconsin Alumni Research Foundation.

They represent patients struggling with a wide variety of afflictions: the Christopher Reeve Foundation, the Lung Cancer Alliance, the Arthritis Association, the ALS Association, the Juvenile Diabetes Research Foundation.

They represent a variety of religious faiths, including the Episcopal Church and the National Council of Jewish Women.

These groups represent a variety of patients, medical disciplines, and religious faiths. They are from all over this country, and they all support expanding stem cell research. This consensus now even includes Bush administration officials. Last month, NIH Director Dr. Elias Zerhouni testified this:

From my standpoint as NIH director, it is in the best interest of our scientists, our science, and our country that we find ways and the Nation finds a way to go full-speed across adult and embryonic stem cells equally.

That is a pretty unambiguous statement from the man who heads the Institutes of Health.

The Senate and the President should listen to the scientists who best understand this issue and give them access to the stem cell lines that successful research demands.

Jennifer McCormick of Stanford University's Center for Biomedical Ethics has said:

The United States is falling behind in the international race to make fundamental discoveries in related fields.

It is time to address and reverse that sentiment.

In a letter to President Bush, Nobel laureates called the discoveries made thus far by stem cell researchers a significant milestone in medical research.

They go on to say that:

Federal support for the enormous creativity of the United States biomedical community is essential to translate this discovery into novel therapies for a range of serious and currently intractable diseases.

They are not alone. Paul Berg of Stanford, George Daley of Harvard, and Laurence S.B. Goldstein of the University of California at San Diego recognize the promise and the need for embryonic stem cell research. These esteemed researchers have said:

We want to be very clear. The most successful demonstrated method for creating the most versatile type of stem cells capable of becoming many types of mature human cells is to derive them from human embryos.

This is the science.

You can quote a scientist here or a scientist there who will differ with that, but the bulk of people in this field worldwide believe as this statement reflects.

As Lucian V. Del Priore of Columbia University said:

This is important and exciting work.

It is time we use the wisdom of these respected scientists and embrace the promise of biomedical research using embryonic stem cells.

Scientists have learned more about stem cells—how they work, how they may one day be used for cures—since we last considered this issue, I guess some 10 months ago. This past August, scientists from the University of Edinburgh used embryonic stem cells from an African clawed frog to identify a protein that is critical to the development of liver cells and insulin-producing beta cells. This could lead to a better understanding of diabetes and liver disease as well as new treatments.

Then during the next month or two, in October, scientists at Novocell, a San Diego biotech company, announced the development of a process to turn human embryonic stem cells into pancreatic cells that produce insulin. This could be another significant step toward using stem cells to treat diabetes.

In September last, researchers used human embryonic stem cells to slow vision loss in rats suffering from a genetic eye disease that is similar to macular degeneration in humans. Macular degeneration is the leading cause of blindness in people aged 55 and over in the world. It affects more than 15 million Americans. This research means stem cells could one day be used to restore vision in many of these patients. Just think of that: fifteen million people who are surely going to go blind, and that blindness might be stopped.

In March, a team at the Burnham Institute in La Jolla, CA used embryonic stem cells in mice to treat a rare degenerative disorder called Sandhoff's disease. This condition, which is similar to Tay-Sachs disease, destroys brain cells. The mice treated with stem cells enjoyed a 70-percent longer lifespan, and the onset of their symptoms was delayed. The stem cells migrated throughout the brains of the mice and they replaced damaged nerve cells. No one ever thought that could be done before. This suggests that embryonic stem cells may effectively treat this disease as well as other genetic neurological conditions, including Tay-Sachs.

So all of this work is just beginning. Scientists will now work to translate these promising advances into cures for humans, and such a feat will almost certainly require access to viable lines of human stem cells. Unless the President's policy is overturned, these lines will not be available, and without access to additional stem cell lines, the cures and treatments will never move from mice to humans.

Many States, frustrated with Federal gridlock and the loss of their best scientific minds, are moving forward. I am particularly proud of my State of California. In 2004, California voters, by a whopping margin, approved Proposition 71 and created the California Institute of Regenerative Medicine. That institute is spending $3 billion over 10 years supporting promising research conducted in California. This work will be done with careful ethical oversight. It also bans human reproductive cloning, something we can all agree is immoral and unethical. Over $158 million in research grants has now been approved, making California the largest source of funding for embryonic stem cell research in America.

Promising projects include creating liver cells for transplantation at the University of California at Davis, developing cellular models for Parkinson's disease and Lou Gehrig's disease, ALS, at the Salk Institute. This will give a better understanding of how these diseases work and yield possible treatments, as will work at Stanford to more effectively isolate heart and blood cells from embryonic stem cells. These are only some of the more than 100 labs in California now working.

One might say: All right, why not let the private sector and the State address this problem? Why do we need Federal research? I want to concentrate a few moments on that. The actions of California and the actions of other private and public institutions do not substitute for Federal funding and a standardized national policy. Much of this debate focuses on stem cell lines themselves, but scientists need much more to succeed. They need expensive equipment and lab space in which to work and collaborate, and there is the rub. For scientists working on embryonic stem cells, this means taking great care not to intermingle their work on approved stem cell lines with those that are not approved. If Federal funds, for example, built a lab or bought a freezer, a petri dish, or a test tube, these resources cannot be used on research involving lines not included in the President's policy. As I said, there are no lines left in the President's policy. Therefore, they can't be used. This has created a logistical nightmare.

The duplication and careful record-keeping required is an enormous disadvantage faced by the U.S. stem cell scientists. Many have gone to extreme lengths to ensure they follow these regulations. The stakes are high: Any mistake could result in the loss of Federal grants for a researcher's lab.

Let me give a few examples. University of Minnesota researcher Meri Firpo buys one brand of pens for her lab that receives Government money and another brand of pens for use in her privately funded lab. This helps her ensure that a ballpoint pen purchased with Federal grant money is not used to record results in her lab that works with stem cell lines not covered by the President's policy.

UCLA is using a complex accounting system to allocate Federal and private dollars in careful proportion to the amount of time a researcher spends working on either approved or unapproved stem cell lines. A stem cell researcher, Jeanne Loring at the Burnham Institute in La Jolla, CA, designed labels for all her equipment: Stem cells in a green circle denote equipment that can be used with all

stem cell lines, while equipment bought with Federal funds is marked with a red circle with a slash through it.

At the University of California in San Francisco, biologist Susan Fisher worked for 2 years to cultivate stem cell lines in a privately funded makeshift lab. Unfortunately, the power—the electricity—in her lab failed. She couldn't move her lines into the industrial-strength freezers in the other lab because they were federally funded. The stem cell lines on which she had worked for 2 years melted and were gone. So 2 years of work was out the window because of this ridiculous situation.

Money that could otherwise be devoted to research is instead used to build labs and purchase duplicate equipment, and the cost is significant. Scientists at the Whitehead Institute for Biomedical Research in Cambridge, MA, didn't want to fall behind international stem cell leaders, so they established a second lab. They had to buy a $52,000 microscope, two incubators which cost $7,500, and a $6,500 centrifuge. They already owned this equipment. They had the equipment, but they couldn't use it because that equipment was published with Federal dollars. To me, this makes no sense. I don't think we can afford this kind of wasteful duplication with what are very precious research dollars. Our scientists should be focused on investigating disease, not worrying about who pays for their pens or their test tubes. So bottom line: We need a reasonable Federal policy that includes funding for viable stem cell lines.

I don't need to tell my colleagues about the famous faces and the average people who are behind this legislation. It is nearly 70 percent of the population. I don't have to tell my colleagues about Michael J. Fox, who showed the Nation the true face of Parkinson's disease. I don't have to tell my colleagues about First Lady Nancy Reagan, who has spoken out in support of this and other legislation, or Christopher Reeve, who lived his life refusing to accept that his spinal cord injury would never be healed, or Dana Reeve, who stood by her husband and then tragically lost her own battle with cancer. Just as important are the millions of Americans who may not have a famous face, but put everything they have in us in the hope that we will do the right thing. The right thing is pretty simple. It is to give them a chance to live—to live.

That is what we are talking about. I don't think there is any other piece of legislation that more involves the right to life than this piece of legislation.

These are people who are going to die. They live with catastrophic, often terminal diseases; they suffer immeasurably. Suddenly, there might well one day be a cure, or their disease might be put in remission. The kind of research might be done that can mend a broken spinal cord. How can we not support this? How can we look at the facts? Life or death is not involved for the embryo that is used. That is exactly what this legislation is. These are embryos that have no chance at life. All we ask is that they be put to work to protect human life. It seems to me that is not too much.

I hope this bill not only will pass here by a substantial margin but that some way, somehow, the 67 votes we need in this body to overturn a Presidential veto will be present. I think the American people demand no less.

I yield the floor.

Mr. HARKIN. Mr. President, I thank the Senator from California for the eloquent statement and for her many years of working on this issue and for her support on so many issues dealing with the health of the American people. I thank Senator FEINSTEIN for being a stalwart in trying to break down the barriers we have to embryonic stem cell research.

I now yield 10 minutes to the Senator from Delaware, Mr. CARPER.

Mr. CARPER. I thank the Senator.

Mr. President, we have made some truly amazing strides in medical research with the creation of new medicine and mapping the human genome. I think we all agree more can be done and more should be done.

We know stem cells hold promise, and we have an opportunity tomorrow to pass critical legislation that enables us to take some of those next steps in finding treatments and cures for diseases such as Parkinson's, juvenile diabetes, heart disease, and even cancer.

Like, I suspect, every Member of this body, I have my own personal experiences in my family and reasons for supporting stem cell research. My mother passed away about a year and a half ago—almost 2 years ago now. She had, in the last decade or so, been stricken by Alzheimer's disease, dementia. Her mother had lived and died with the same disease. Her grandmother lived and died with the same disease. Her sister may be showing early symptoms of the same disease. My mother's father was a butcher. He worked 5, 6 days a week until he was 81 years old in a little mom-and-pop supermarket in Beckley, WV. His hands would shake. Some would probably think, how many fingers would he lose today while trying to cut up the meat. He never did lose any. He was a great hero to me. I remember watching as Parkinson's took its toll on him, as it has others of our colleagues here and in the House, such as Mo Udall, whom we thought the world of, and still do—but to see what happened to them because of that disease. We lost my uncle in Huntington, WV, last year to a form of cancer which is almost always deadly, pancreatic cancer. Those are only a couple of people in my own life, people who were close to me and people in my family whom we have lost or have seen a serious degradation in the quality of their lives. Some day, I would like to be able to say to my sons, who are 17 and 18, you will never have to worry about Alzheimer's disease because of the research and the kind of work that is made possible in this legislation and what it will do for you. I would like to tell them you will never have to worry about Parkinson's or pancreatic cancer.

Today is about much more than curing diseases. It is also about keeping America's research centers competitive and relevant. The United States has always been a key leader in the prevention and treatment of illnesses. We have developed vaccines and antibiotics that have literally saved millions of lives, and still do. We have made tremendous advances in biotechnology and pharmaceutical research as well. Now we have the opportunity to make a national commitment to expand the frontiers of medical research. Stem cell research is a key part of doing that. I know a lot of us agree. The nation that is able to take stem cell research to the next step and use it to truly understand how our DNA works and then to use that information to help find treatments and cure diseases will be in the driver's seat of medical research worldwide for some time to come.

My friend and fellow Delawarean, Congressman MIKE CASTLE, led the way to expand stem cell research. Last year, he introduced legislation that would allow the NIH to support embryonic stem cell research. Congress passed this bill, thanks to the leadership in no small part of Senator HARKIN and others in this body. It was vetoed by the President. I disagree with the President's policy on stem cell research. On this front, I think he is wrong.

This year, several of my colleagues, including my friend Senator HARKIN, have introduced legislation very similar to the Castle bill that we passed last year. S. 5, the Stem Cell Research Enhancement Act of 2007, would advance stem cell research by expanding the number of stem cell lines that are eligible for Federal funding. It would also strengthen the ethical rules that govern stem cell research—a concern that I know is on many people's minds, including my own.

Under the administration's current policy, the number of stem cell lines available for federally funded research has continued to shrink. There are only 21 cells now available, I am told. What is more, many of the current lines are contaminated or have reached the end of their usefulness.

A gentleman named Dr. Elias Zerhouni, the Director of the National Institutes of Health, recently testified before a Senate panel and made a similar claim that these 21 cell lines the National Institutes of Health has will not be sufficient for the research they need to do at NIH.

S. 5 would allow new lines to be derived from excess in vitro fertilization embryos that would otherwise be discarded. To me, the choice seems clear:

Rather than allowing these embryos to be discarded, destroyed, we can use them to further lifesaving research. They may contribute to saving the lives of our spouses, our brothers and sisters, our parents, our children, or our nieces and nephews. S. 5 would allow new lines to be derived from excess in vitro fertilization embryos that would otherwise be discarded. I know people are concerned about that and they have an ethical dilemma they face. I say to people who have those concerns and may have deeply held beliefs, does it make sense to you that these embryos that have been created in fertility clinics are going to be destroyed at the discretion of whoever was the person who donated the eggs and the sperm that fertilized the egg? Does it make more sense to allow the fertilized eggs to be destroyed or to allow that embryo to be—at the discretion of that husband and wife—used to help preserve and enhance and improve life?

These new stem cell lines would dramatically expand our ability to study and find treatments for a wide range of illnesses. The benefits will come not only from having more lines but from having better lines. By expanding our research policy, we can create stem cell lines that help us study specific diseases or create specific treatments.

I close by urging all of our colleagues to join us—a majority of us—in supporting S. 5. It has been made better because the sponsors of the bill have also introduced legislation that, I think, was offered last year by Senators SPECTER and SANTORUM. It is now part of this legislation. It made it better.

We should not wait any longer. If we focus our resources and attention today to find cures, we can save lives—and also save money in the long run. I will close by saying for those who believe this legislation is somehow diverting us from pursuing the use of adult stem cells, or stem cells that may come from umbilical cords, it doesn't do that. We should pursue those paths as well. But we should not close the door on this path; we should pursue this path, too.

To those who brought us to this day, Congressman CASTLE from Delaware, the sponsors of this bill today, all who have joined in supporting it, and the people in the country who joined us as well, thank you for doing a good thing for a lot of people who need our help.

Mr. HARKIN. Mr. President, I thank my good friend, the Senator from Delaware, for his very eloquent and personal statement. That is what this is all about, helping people who are suffering bad problems and need help with their health care.

I yield to a leader on all our health care issues for so many years, and I think he is recognized as such by the entire country. He is a great leader in all health care issues, especially on this issue of stem cell research. I yield to the Senator from Massachusetts, Mr. KENNEDY.

The PRESIDING OFFICER. The Senator from Massachusetts is recognized.

Mr. KENNEDY. Mr. President, I thank my friends, Senators HARKIN and SPECTER, for the extraordinary leadership they have provided on the extraordinary leadership they have provided on this issue, which is so important to families in our country. We deal with a lot of issues around this body. But this particular legislation probably offers more hope to more people than perhaps anything else we will do here in the Senate this year.

When we think of all of the various kinds of illnesses and diseases and accidents that have affected so many families here in the Senate—and, most importantly, the American families—we know we have the best in terms of treatment for these illnesses and sicknesses in the United States for those who are able to receive it. Still, all of these illnesses and sicknesses have defied the ablest and most gifted minds until very recently, and that is with the discovery that started about 10 years ago with the opportunity for using stem cells, which can play a very indispensable role in providing a cure for these individuals.

That is what this is basically all about—an extraordinary opportunity that is out there, and whether we in the United States are going to permit the great institution—the greatest institution for research—the National Institutes of Health to be able to unleash the vastness of the creativity, brilliance, and ability of those researchers and scientists to try to unlock the cures for so many of these diseases, and do it in a way that is ethically sound, and for so many of the reasons that have been spelled out.

This is an enormously timely bill. I thank Senator HARKIN for his persistence and for ensuring we were going to be able to have this on the floor of the Senate in a timely way. I thank Senator REID for scheduling this. I thank the broad bipartisan coalition that has come together on our side and on the other side of the aisle which has given strong support for this legislation.

It is pretty popular at this time in Washington to talk about the differences that exist in our Nation's Capital. There are some very important ones. We have come together, Republicans and Democrats, House and Senate—those who have over a long period of time advocated the pro-life position and those who have felt there should be an ability for individuals to make judgments about their own future—in support of this legislation. So this is a very special time, and this vote we are going to have tomorrow is enormously important.

Again, I thank my colleagues and friends for bringing us to the point where we are today. Nearly a decade ago, American scientists made the revolutionary discovery that tiny cells, called stem cells, held the extraordinary potential to offer new hope and new help in the fight against diabetes and Parkinson's disease, spinal injury, and many other illnesses.

Six years ago, many of us in the Senate joined millions of patients and their families in calling on President Bush to support this lifesaving research. Sadly, he rejected those calls and instead imposed severe restrictions on the search for the cures.

Since those severe limitations were imposed, we have struggled to free American scientists from these unwarranted restrictions. Last year, we scored a great victory when the House and Senate, with broad bipartisan majorities, voted to end those restrictions. But those efforts came to naught with a veto, and we are back at the battle again.

I share that view of my colleagues and friends in saying if we are not successful—although we are hopeful we will be—we are going to continue this battle day in and day out until we are successful.

Today we renew our hope that the President will start anew and consider the merits of this new legislation instead of automatically picking up the veto pen. When Congress passed the bipartisan stem cell bill last year, we voted for hope, for progress, and for life. But President Bush chose to dash those hopes by vetoing the legislation.

Now we are taking up the cause once again. Our legislation again brings together conservatives and progressives, Members of Congress on both sides of the debate over a woman's right to choose. Representatives from big cities, small towns, rural communities—we all agree stem cell research must go forward.

This legislation before us is only six pages long. It is a short, simple bill with enormous goals and vast potential. It overturns the unrealistic and unreasonable restrictions on the embryonic stem cell research imposed by the President's Executive order 5 years ago. His unilateral action bypassed Congress and froze progress in its tracks by barring the NIH from funding research using any stem cells derived after August 9, 2001, an arbitrary date chosen solely to coincide with the President's speech.

Many of us warned at that time that this policy would delay the search for new cures and put needless barriers in the way of medical progress. At a HELP Committee hearing days after the Executive order was issued, many of us raised concerns about the new policy and urged the President to reconsider.

Our concerns were dismissed by the administration, but time has shown that each of the drawbacks we feared then has become a real barrier to progress today.

At the time of the Executive order, the administration claimed that over 60 independent stem lines would be available to NIH researchers. We found, as our friend from California, Senator FEINSTEIN, and Senator HARKIN pointed out earlier, that 21 of those stem lines

are available to NIH researchers and all those were obtained using out-of-date methods and outmoded techniques.

We listened carefully to the words of Dr. Landis, who is chair of the NIH stem cell task force, in testimony before the Senate in January of this year.

''We are missing out on possible breakthroughs.''

''Federally funded research has monitoring oversight and transparency that privately funded research will not necessarily have.''

''The cell lines that are eligible for the NIH funding now have been shown to have genetic instabilities,'' effectively pointing out the missed opportunities that are in place now because of the restrictions put on by the administration and that even the research that is being done in the private sector, as limited as it is, is lacking in the kind of monitoring and oversight and, in many instances, the enormously important ethical considerations that have been included in this legislation.

It has been mentioned earlier in this discussion but needs to be mentioned again, the excellent statement by the Director of the National Institutes of Health before the Senate on March 19, where he points out:

To sideline the NIH in such an issue of importance, in my view, is shortsighted. I think it wouldn't serve the Nation well in the long run. We need to find a way to move forward.

These are two of the most distinguished researchers, scientists. Dr. Zerhouni has had a brilliant record at the NIH. Dr. Landis has had a brilliant record. Anyone who has the opportunity to listen to them respond to questions can't help but leave that meeting recognizing and supporting their position.

Those are the issues. That is what this legislation is about. Our legislation makes the basic change needed to reverse our current policy. As has been pointed out, science without ethics is akin to a ship without a rudder. For that reason, the legislation establishes essential ethical safeguards for stem cell research—enormously important—and has been reviewed earlier during this debate.

Our legislation authorizes new initiatives for obtaining the stem cells from sources other than embryos. We strongly support ongoing research for alternatives to embryonic stem cell research, but it is fundamentally wrong to shut down the promise of new cures while that search is underway.

In the end, this debate is not about abstract principles or complex aspects of science but the people who look with hope to stem cell research to help them with the challenges they face.

It is important to SGT Jason Wittling. Let me read about SGT Jason Wittling. He was injured in Kabala, Iraq. He is in the U.S. Marine Corps:

I was in Charlie Company, 1st Combat Engineering Battalion, 1st Marine Division. I spent 10 years, 1 month, 28 days in the Marine Corps, but who's counting. On May 9, 2003, on the outskirts of Kabala, Iraq, my squad was disposing of Iraqi ordinances.

The fuse went off prematurely, and as a result of the accident, his vehicle overturned on him.

I had burst fractures of my C6 vertebrae in my neck, broke my right wrist, and a number of other injuries. He is in a wheelchair now, a brave and courageous marine.

Sergeant Wittling now looks to stem cell research for new hope for his injuries. He has had multiple surgeries.

Here is LCpl James Crosby of Winthrop, MA. He enlisted in the Marine Corps at age 17. He is married to Angela. He was living in California before his service and injury. On March 18, James was wounded by enemy fire while riding in the back of a U.S. military vehicle in Iraq. A rocket was fired and killed the driver and injured two marines, including James. Shrapnel pierced James's side and penetrated his intestine and spine. James was immediately flown to a hospital in Kuwait. He had his first operation there and was stabilized. He was finally flown to a U.S. military hospital in Germany.

In Germany, James underwent several surgeries to remove shrapnel and repair wounds. James's wife Angela was flown to Germany to be with him. He is now in a wheelchair. He has had multiple additional operations. He has lost 50 pounds, requires a colostomy bag at all times. He has undergone 14 surgeries. He remains paralyzed from the waste down.

He is now in a wheelchair and has high hopes that stem cell research can be of help, permitting him to recover from his wounds.

There are countless others who have similar injuries and recognize the importance of this research.

I am going to conclude with a letter I received from 15-year-old Lauren Stanford, who is from Plymouth, MA, who has juvenile diabetes. In her letter, she wrote of her hope of what stem cell research means to her and her family. She wrote me again this year. While she is still full of hope, you can also hear her frustration. These are her words:

I'm now wearing what is called a continuous glucose monitoring system. It has a wire probe that I insert under my skin every few days on my own. When I first held the wire probe to my thigh, I was scared to death. The needle was huge, and I was going to be plunging it into my body. Would it hurt? What if it didn't work? Was it worth the risk? After about 20 minutes of sweating and shaking, I stopped chickening out and found the guts to do it. And then, as soon as I did it, I knew almost immediately it was the right thing to do. It went in fine. It didn't hurt that much. And it is helping me.

Those were her words. She goes on to write to each of us about our decisions on how to vote on this legislation. Here is what she writes:

Some of you might be scared to vote yes. You know it's the right thing to do; after all, if embryos are being discarded, how can it not be right to use them to help people like me?

Your hand is lingering over the yes lever, just like mine was over the insertion device. You can see it might do some good . . . but you're afraid. Someone might get mad. It might hurt a little. But follow my lead. Be brave.

Do something that might hurt a little or scare you for a second, but after will make so many things so much better. Vote yes to allow scientists to do this valuable research to free kids like me from horrible diseases. Vote yes and take another step along with me to finding cures.

No one ever said doing the right thing, the brave thing, and the thing to make the world better would be easy. I've learned that the hard way. Vote yes. Free me from the machines that keep me alive. Clear away my future of kidney damage, blindness and fear of a shortened life.

Those are Lauren Stanford's words, and they compel us to act. Tomorrow we can cast a vote of conscience and courage. By approving the Stem Cell Research Enhancement Act, we call upon the President of the United States to think anew and decide not to veto hope.

Mr. President, I yield back the remainder of my time.

Mr. HARKIN. How much time remains, Mr. President?

The PRESIDING OFFICER (Mr. WEBB). There is 8 minutes 24 seconds remaining.

Mr. HARKIN. I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. BROWNBACK. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. BROWNBACK. Mr. President, I rise to start the discussion on this side regarding stem cells, regarding the major hope and promise of stem cells, stem cell research and adult stem cells, cord blood, amniotic fluid.

I wish to start off with a story of a patient, David Foege. I have a picture of him here. David Foege lives in Florida and has suffered from end-stage heart disease. He experienced shortness of breath, tiredness, and an inability to concentrate and function in a normal fashion. Over 2 years ago, his cardiologist indicated that he should go to hospice, saying he had no other options. ''I would be provided plenty of morphine to ease my way into a 'transitional state,' '' was the statement of his treating physician. Hospice does provide great service, but David learned about adult stem cell treatments through a company called TheraVitae.

When I saw David last year, he had just returned from his first stem cell treatment. He has just returned from his second one a matter of weeks ago—just this week, as a matter of fact. We have a progress report from him about this amazing work which has taken place, this therapy which has occurred with adult stem cells. Listen to David's letter. It is really impressive and very interesting.

I am one of 7 people in the world who have experienced 2 stem cell therapies!

Susan and I have just returned from Bangkok, Thailand, after 45 days of adult stem cell cardiac treatment and rehabilitation. [One has to wonder why he is in Thailand for that.] The absolute cutting edge of technology, the utilization of my own stem cells reinjected into my heart, allowed the reshaping and a re-functioning of my heart from a life-threatening situation to a nearly normal heart function today.

Following my stem cell [treatment] last year I went from a life expectancy of one day to 90 days to at least one year. The second stem cell treatment has jumpstarted me into the range of normal function. I reasonably can expect a normal life expectancy, which is approximately 10 to 15 more years. I can't '' tell you how great it is to the back in the greatest country in the world, the United States of America. The weather is fabulous here in Florida, and it is wonderful to sleep on my own soft bed.

I am in awe of the Creator, who amazingly engineered us to have our own warranty in our body's toolbox with us at all times . . . our own stem cells! It does not check our politics, race, religion, or sex.

Some of the diseases in addition to heart diseases which can be treated in 2008–2009 are the following [projected into the future]:

Blindness macular degeneration, diabetes, stroke and Parkinson's disease, paralysis of any part of the body including back and/or legs, renal failure.

Being one of the world's longest living renal transplant recipients of 23 years, I can't tell you how thrilled I am for others that they may not have to endure the hellish torture of a renal failure. This reasonable treatment is in the immediate future.

It is an absolutely wonderful time to be alive. The only letters, or designation, I would like to have behind my name is David Foege, Alive!

TheraVitae has the technology to soup-up our cells and differentiate them for maximum effectiveness. I would support embryonic cells, but they have a 100% certain side effect of growing cancer tumors. Our own adult stem cells do not.

Best wishes and great health be with you.

This opens a revolutionary door of opportunity to improve the quality of life like it has for me and cut the spiraling cost of health care in the USA.

On my way to Costco without cane or wheel chair for 30 minute shopping walk, I remain

Sincerely yours,

David Foege, Ph.D. And alive

That is a good way to start this discussion of these miraculous stem cells. They are beautiful, and they are working in at least 72 different human maladies. David Foege had treatments using two. The problem is, he has had to go to Bangkok, Thailand, for both of them instead of the United States.

Adult stem cell therapy has no ethical problems, no ethical questions. They are his own stem cells. Yet he has had to travel to Bangkok because we don't seem to have enough research funding to be able to support this sort of research into areas that are giving cures—treatments, I want to say, emphasize treatments, not cures—to people to give them an enthusiastic life, to give them a chance to live and to sign off ''David Foege, Ph.D., and alive.''

We have now found these amazing stem cells in many places, not only in cord blood. Thanks to my colleague from Iowa, who worked with me and many others, we established a cord blood bank, and we are now—I just checked these numbers before we came over here—at the end of 2006, there have been 10,000 cord blood transplants to unrelated donors. I got those from the New York Blood Center, which was responsible for 2,500 of these units. That is 10,000 people probably alive who wouldn't be—maybe some would, in other ways or shapes. But still it is taking place.

We now need to bank amniotic fluid. We just found in recent research—I want to show this chart as well. Some of my colleagues may have missed this. This came out in JAMA, February 28, 2007: ''Stem cells obtained from amniotic fluid.'' This is the fluid, of course, surrounding the child in the womb.

Amniotic fluid-derived stem cells—AFS cells—can be coaxed to become muscle, bone, fat, blood, vessel, nerve and live cells.

AFS, stem cells, might be capable of repairing damaged tissues resulting from conditions such as spinal cord injuries, diabetes, Alzheimer's disease and stroke.

I hope one of the efforts we can take on banking, that I could possibly do with my colleague from Iowa and many others, is banking amniotic fluid. This has been traditionally thrown away. It may hold the promise of incredible cures. It is a great source of stem cells. They are very malleable, the pluripotent stem cells that are taking place that are in this as well. That may be another one on which we can join together. There is much news to celebrate on the stem cell front, this being one.

In the placenta, I believe, they are finding a rich source of these pluripotent malleable stem cells as well—here another throwaway, if you will. That is an area we are going to be able to find and probably use more and more into the future for these very malleable, pluripotent stem cells from which we can create—not create but use for additional amazing cures.

I want to recognize the work of my colleagues who are on the other side of this debate, Senator SPECTER from Pennsylvania, Senator HARKIN from Iowa—many others who have pushed for a long time in these areas, and much good has happened. In the cord blood banking, that has gone very well. In the adult stem cell research, that work has gone fabulously, as I just read in this opening story of a gentleman just back from Bangkok—although he wished his treatments were taking place in the United States rather than in Thailand. Much good has happened.

We have two major barriers. The first one I believe to be an insurmountable barrier, that first one being, What is the human embryo? If it is a person, as we have discussed many times, then it is entitled to human dignity and should be treated in a dignified fashion and not researched or taxpayer dollars used to research and destroy it. If it is property, it can be done with as its master chooses.

We have discussed and debated this many times. Obviously, here the effort would be to treat the youngest of human beings as property to be researched on, to be destroyed with the use of Federal taxpayer dollars. Yet, if you follow that debate on forward, at what point in time does a human embryo become a person? We know that if you allow it to grow, at some point in time, under everybody's definition, it becomes a person entitled to protection and human dignity. Yet we are saying here: No, at the earliest phases, we are going to treat it as property, and with Federal taxpayer dollars we are going to pay to destroy it and to research on it.

That is the obstacle which cannot be overcome because we believe in human dignity. We believe as a society in human dignity. So our debate, which we have had multiple sets of times, sets of different debates on this here, continues today.

The central question will be, Will we sanction the destruction of nascent human life with Federal taxpayer dollars? That is the central issue. Will we divert taxpayer dollars from adult stem cell research, which is working? See the case of Dr. David Foege—and send these dollars to fund speculative research that likely will never produce any patient treatments? That is the second question with it.

I mentioned the first to be an insurmountable one. I think the second is one of wisdom: Should we be funding something that is working or should we be speculating on something that is not and is producing, indeed, tumors? I will back that up with a number of research papers.

These are the two central questions. These are the two questions we will be debating throughout this period of time.

I doubt there is much surprise left on the vote, on how the votes will take place. It is an important debate. It does frame much of what we move forward with in this country and in places around the world. But these are the two central questions: Will we sanction the destruction of nascent human life with Federal taxpayer dollars? Will we divert taxpayer dollars from adult stem cell research which is working and send these dollars to fund speculative research that likely will never produce any patient treatments?

Central to this debate is the issue of how we treat our fellow man. We would all agree, I hope, that individuals should be treated with respect. We would agree that we should avoid prejudices. We would agree that each individual has an inalienable right to life—my colleagues, my colleague from Iowa, myself, the Presiding Officer, those around, those watching would all agree that we each have an inalienable right to life—to live. We would all hold this for the newborn through the eldest members of our society. But when does that life begin? The question that has vexed this body for some period of

time. Does it begin at birth? Does it begin before birth? When? Biology tells us that life begins much earlier than birth. Here I want to read from the ''Human Embryology'' textbook. It says this:

Although life is a continuous process, fertilization is a critical landmark because under ordinary circumstances, a new genetically distinct human organism is thereby formed.

Such definitions are helpful in clarifying that human life does begin at the embryonic phase. Indeed, myself, my colleague from Iowa, the Presiding Officer all began at that embryonic phase, whether the embryo comes the old-fashioned way, via IVF or a product of various scientific methods such as SCNT human cloning.

With the scientific fact in hand, we evaluate the facts in light of our ethical framework. For instance, we know that the human embryo is a human life. Then the question is, How should we treat it? Human life has immeasurable value, from the youngest to the oldest. Human beings are ends in themselves. It is wrong to use any human as a means to an end. Any time throughout human history when we have done otherwise we have regretted it.

Our value as people is intrinsic. I would say here, I am pro-life, whole life. I believe that all life is sacred, it is beautiful, it is unique, it is the child of a loving God, from beginning to end, it is true here, it is true in the womb, it is true of a child in Darfur, it is true of a lady in poverty, it simply is true.

Yes, we want to treat people and help people who have medical conditions. But we must not trample upon any human to achieve such an end. This is because human beings are distinct and unique amongst all creation. I would note that Ronald Reagan had, I thought, a very folksy way of defining whether this was human life and whether it should be protected. In his 1983 essay on ''Abortion and the Conscience of a Nation,'' he put this in a very commonsense way.

Anyone who doesn't feel sure whether we are talking about a second human life, should clearly give life the benefit of the doubt. If you don't know whether a body is alive or dead, you would never bury it.

I think this consideration itself should be enough for all of us to insist on protecting the unborn. Very commonsense, folksy way, but he does hit the point. Will we do what is ethical with respect to our fellow man? This is one of the central questions of this debate.

Now during this debate some will argue that we should proceed with ethical embryonic stem cell research. Here I would distinguish between embryonic and some of the unquestionably ethical alternatives which we can talk about. With respect to embryonic stem cell research, though, as embodied in the guidelines of the Stem Cell Research Enhancement Act, S. 5, how is it possible to ethically do something that is completely unethical—destroy another human life, innocent human life—for research purposes?

Arguments that the bill provides ethical guidelines, though well intended, I believed are misplaced. The ethics of S. 5 have nothing to do with protecting innocent life from destruction. They will fund, with taxpayer dollars, the destruction of innocent human life.

The ethics of S. 5 have to do with the process of how you donate young human embryos for destruction. Mr. President, we have had this debate before. We have had it on the floor on this issue, and we have had it before regarding other issues. We had it with the fetal tissue research from abortions.

I wish to take the body back to 1991, the Coalition for Research Freedom, in a letter signed by many prominent patient advocacy groups who are advocating embryonic stem cell research today, were advocating fetal tissue research in 1991. They wrote this: Fetal tissue transplantation research is widely recognized as one of the most promising research avenues for such disease and disabilities as Parkinson's, Alzheimer's, diabetes, Huntington's, leukemia, epilepsy, spinal cord injuries, and many other chronic health conditions.

Doesn't that sound familiar, Congress responding to the emotional outcry with legislation to provide for funding for unethical research, research that can only take place with the trampling of the rights of a fellow human.

That was 1991. Those were the promises. That was the move forward by this body. That is what was pushed on forward. We know what happened. It was on the front page of the New York Times in 2001. The news story began like this:

A carefully controlled study that tried to treat Parkinson's disease by implanting cells from aborted fetuses into patient's brains not only failed to show an overall benefit but also revealed a disastrous side effect, scientists report.

In about 15 percent of patients, the cells apparently grew too well, churning out so much of a chemical that controls movement that the patients writhed and jerked uncontrollably.

The story continues:

''They chew constantly, their fingers go up and down, their wrists flex and distend,'' Dr. Greene said. And the patients writhe and twist, jerk their heads, fling their arms about.

''It was tragic, catastrophic,'' he said. ''It's a real nightmare. And we cannot selectively turn it off.''

One man was so badly affected that—

We will see what happens. Hopefully, the sound will come back in a little while.

One man was so badly affected that he could no longer eat and had to use a feeding tube, Dr. Greene said. In another, the condition came and went unpredictably throughout the day, and when it occurred, the man's speech was unintelligible.

For now, Dr. Greene said, his position is clear: ''No more fetal transplants. We are absolutely and adamantly convinced that this should be considered for research only.'' The pattern repeats itself. It is a double tragedy. First, the young human life is destroyed. Second, it is patients who will likely be harmed. There are no embryonic human treatments or applications, despite 25 years of embryonic work in animal models and a decade of work with human embryonic stem cells.

I repeat that. Twenty-five years of embryonic work in animal models, there are no human treatments, and a decade of work with human embryonic stem cells, no treatments.

But what we have learned about embryonic stem cells is that these cells are very good at forming tumors, in particular. The literature abounds with such stories. One example is in an area published last year in Stem Cells. You read the article and find: The expression of the insulin gene could be demonstrated only when the cell is differentiated in vivo into teratomas, those are tumors.

This is one example and there are many others. I wish to point this out because this was the same result we saw taking place with fetal tissue research, was that tumors were formed. That is what took place.

I wish to go to several of the articles now that are published articles on the formation of tumors by embryonic stem cells. Note this one on the insulin gene, this was in the publication Stem Cells, published August 2 of 2006—have another one published April 6, 2006.

They noted there as well the potential for teratoma development in embryonic stem cell lines, even after prolonged differentiation. I have a series of articles. Here is one in Neurochem, 2006, June. They were noting there frequent tumor-related deaths in transplanted animals taking place in that one.

Here is one in Stem Cells in June of 2006. There they note that rats grafted with human embryonic stem cells predifferentiated in vitro for 16 days developed severe teratomas—again, tumors.

The literature is full of that work. These are developing tumors. We note in Stem Cells publication, June of 2006, more than 70 percent of mice that received embryonic stem cells neural precursor cells developed teratomas, developed tumors.

I have a series of those publications, all noting the stem cell therapy in animals produced tumors. Strange. That is what we found took place in fetal tissue research when we were dealing with an older set of cells that had been developed, and now when we back it up to a younger set of stem cells or cells we are using, we are seeing this same feature, forming teratomas or tumors throughout each of the research animals and in some cases in almost every circumstance.

That is what we found then, and we are finding the same thing now, consistent on the research. I have, for those who are interested, if any of the offices are interested, 17 different examples of the formation of teratomas

by embryonic stem cell work in lab animals.

Let's not go down this road of unethical, speculative research. I am sure the research is interesting to some. But the Government needs to pursue what is best for Americans suffering from diseases and injuries. That is what our standard should be in this.

We have an enormous ethical hurdle of killing young human life for this research purpose, and we have an area that needs more funding in the adult stem cell, cord blood, amniotic fluid, and that money is being diverted to other places.

Now let us move from that ethical to the practical question: Should we put millions or billions of dollars into interesting, speculative research on tumor-forming embryonic stem cells or should we put our money where we are already getting strong results with adult stem cell work, cord blood, amniotic fluid, other areas where there is no ethical problem?

Adult stem cells have no ethical strings attached. You can get them from an adult patient without causing the patient harm, you can harvest them from the rich cord blood, and as noted in the Journal of the American Medical Association on March 7 of this year, they can be obtained from amniotic fluid, which I previously cited, without causing harm to the unborn child.

Defying the naysayers, who said this could not work or would not work, there are so many confirmed adult pluripotent stem cells, pluripotent cells, that means they can form a number of different types of cell types, previously thought to only exist in the embryos, can turn into virtually any cell in the body.

And here I want to show—first, let us go to the chart of the areas that were having treatments taking place by adult stem cell therapy. I wish to hold this up. I do not think this is a complete set of areas but 72 current human—this is in humans—clinical applications using adult stem cells: blood conditions, autoimmune, bladder disease, cancer, cardiovascular, liver disease, ocular, wounds and injuries, metabolic disorders.

You can see the list of 72 different areas that are being treated with adult stem cells in humans, in human trials. I wish to hold up to my colleagues—I will be happy to provide this to any offices that would like it—it is about an inch-thick binder of ''New Reasons for Hope.'' These are recent developments published since Congress's stem cell debate and vote of 2006 and the adult stem cell research and other alternative to embryonic stem cell work and research.

This is from June 2006 to March of 2007. Here are the number of additional areas that we have gotten successful work taking place in each of those. I wish to show this as a folder—I have shown it before to my colleagues—if anybody would like to see this. These are the recent advances in adult stem cell research and other alternatives. This is a binder about 4 inches thick, full of the front pages, just the first pages of the research in these fields of what is taking place. There needs to be more taking place in this field to get more of the treatments for more people like David Foege.

If people want to go to the Web site of ClinicalTrials.gov and pull up the latest number of trials and studies of places that are recruiting patients or are filled and no longer recruiting, it pulls up 1,422 studies currently ongoing. This is the first of 50 pages from ClinicalTrials.gov of the various areas and uses of adult stem cells that are going on right now.

Let's look at the money chart. Presently, there is no prohibition against anybody developing new embryonic stem cell lines legally. If a private group or a state wants to develop a new embryonic stem cell line, they can. The limitation is on the use of Federal taxpayer dollars in research areas on newly established embryonic stem cell lines. But if a private group wants to develop an embryonic stem cell line or a State, they can do that now.

Let's look at the funding that has gone into embryonic stem cell research, both human and nonhuman. In fiscal year 2006, the last year that we have full data for, human embryonic stem cell research, $37.8 million, nonhuman embryonic stem cell research, $110.4 million; for 2002 to 2006, human embryonic stem cell research, $132.1 million, nonhuman embryonic stem cell research, $481.7 million; for a total of $613.9 million in embryonic stem cell research. We are putting a lot of money into embryonic stem cell research. Still the scoreboard of where we are getting humans treated after $613.9 million, stem cell research human applications, adult, we have two treatment areas with binders full of information, with 1,422 study trials. We have zero on the embryonic, after 25 years of knowing about this, 10 years of knowing about it in humans, and after $613 million in funding.

After some period of time, should we not think, wouldn't it be better if Dr. David Foege were being treated in the United States instead of Thailand and we had more of that work that is getting him treated taking place here rather than in other places around the world? Wouldn't it be better to take the $613 million that could yield more treatments, if that is what we are after, wouldn't it be better to take that $613 million and say: Let's put more in adult stem cell research where it is yielding results? Doesn't that make sense? Isn't that the right thing to do?

Where we have all of this that is producing results, after 25 years we don't have anything here. That is not fair to say. I am sure we have interesting research information that has come up through that research of that $613 million. I am sure there has been useful research, but it involves the destruction of young human life.

Before people who are watching this think: You have a cure for me in the adult stem cell area, I want to make sure to put forward that many of these are in clinical trials today. Not all of these are widely available yet. However, there has been success in all of these areas using adult stem cells. For some of these treatments adult stem cells were the main component. In others adult stem cells were the part that helped the main component to work. All of these are real and legitimate.

On the eve of last summer's biological debate, some scientists took it upon themselves to criticize this list by publishing a letter in the Journal of Science. In January this year, Science published a response to this initial letter. It is important that we put forward here the context of the adult stem cell treatment that has yielded so many human treatments to date. I want to put this in context.

In their letter ''Adult Stem Cell Treatments for Diseases?'' S. Smith et al. claim that we misrepresent a list of adult stem cell treatments benefiting patients.

But it is the Letter's authors who misrepresent our statements and the published literature, dismissing as irrelevant the many scientists and patients who have shown the benefits of adult stem cells.

We have stated that adult stem cell applications have ''helped,'' ''benefited,'' and ''improved'' patient conditions. Smith et al.'s Supporting Online Material repeatedly notes patient improvement from these cells. We have never stated that these treatments are ''generally available,'' ''cures,'' or ''fully tested in all required phases of clinical trials and approved by the U.S. Food and Drug Administration (FDA).'' Some studies do not require prior FDA approval, and even the nine supposedly ''fully approved'' treatments acknowledged by Smith et al. would not be considered ''cures'' or ''generally available'' to the public at this stage of research.

The insistence that no benefit is real until after FDA approval is misplaced. Such approval is not a medical standard to evaluate patient benefit, but an agency determination that benefits outweigh risks in a broad class of patients.

Physicians and patients use an evidentiary standard. Our list of 72 applications, [is] compiled from peer-reviewed articles, documents observable and measurable benefit to patients, a necessary step toward formal FDA approval and what is expected of new, cutting-edge medical applications.

As this debate moves forward, I look forward to sharing the stories of some of the real patients who have benefited from ethical adult stem cell research. We need more patients treated. We have more patients who need treatment. We have an area of high-yield Federal dollar investment where it should go, and we don't have the ethical barriers. We should be putting that money there; 72 to 0, that is the score. There are at least 72 human treatments and applications using adult stem cells. There are no human treatments with embryonic stem cells. With the rate of tumor formation which I previously noted, none seemed to be on the horizon soon.

This is acknowledged by some scientists. Notably, Science carried a piece in 2005 in which the authors note:

. . . the clinical benefits of the research are years or maybe decades away. This is a message that desperate families and patients will not want to hear.

Yet we do have a message that desperate families and patients do want to hear; that is that we have treatments on the horizon, and we do in the adult and cord blood and amniotic fluid. We need the research money.

Harvard stem cell researcher David Shaywitz wrote in a 2005 Washington Post op-ed:

While stem cell advocates have helped voters connect embryonic stem cell research with compelling images of patients who might one day benefit from treatment, such therapies are unlikely to emerge soon enough to benefit most current proponents. . . .

. . . scientists must do a better job of articulating the limitations of our existing acknowledge, taking care to emphasize not only the ultimate therapeutic potential of these cells, but also how far we are from achieving such therapies.

Which road will we choose? Will we choose the ethical adult stem cell road that holds great promise and is currently producing treatments, or will we choose the unethical embryonic stem cell road that tramples on human dignity and has produced tumors to date? That is the point of the discussion.

This is not just an academic discussion, nor is it just a policy discussion. It involves real people. I showed you one person who was a real person. I started off with talking about David Foege who is excited about being alive. Let me show you Jacki Rabon, a paraplegic. I met Jacki last year. She has continued to improve. I want to share her story with you.

She lives in central Illinois. She had come to DC last year with her mother and sister because she wanted to tout her successful adult stem cell treatment. The courage of Jacki and many others like her is truly amazing. Years earlier, as an active 16-year-old, she was paralyzed in an automobile accident. As the car was flipping multiple times, Jacki was thrown from the vehicle and landed on her back on a country road. Her dreams of earning a volleyball scholarship for college were shattered.

In a letter sent to me last year, Jacki wrote this:

That day changed my outlook, my future aspirations and my complete life. Before the accident I was a very active 16-year-old. I played volleyball in school and was very good. I had hopes of going to college on a volleyball scholarship. I truly was living a nightmare after this tragedy. I really thought my life was over. I couldn't imagine not playing volleyball anymore, jumping on my trampoline with my young nephew, chasing after my niece or just taking a walk around my small community. Not only does something like this change the victim but it also disrupts and seriously affects your family.

I spent a little over a month in the hospital. I had back surgery to stabilize my back. I had a fracture at the T12 area, which made me a paraplegic. I had no feeling below the belly button. I had to learn to become independent again. I had to learn to dress, bathe, transfer from place to place, and take care of my personal hygiene and toiletry issues. It was so difficult and I struggled with these once simple tasks. After I accomplished these I was released and allowed to come home. I was simply told, ''You'll never walk again.'' That was my prognosis!

I got back to school a few months later and that was another adjustment. Everything looks and works differently when you are sitting in a wheelchair. I had to deal with a lot of depression and sadness. But I tried to continue with my life the best way that I could. I truly believe that my faith got me through. If it wasn't for this amazing love of God and my strong will and determination I don't know if I could have proceeded with what my life had become. But I have great determination along with the comforting faith and I didn't intend on giving up that easily. I wanted to give life another opportunity with my new ''lifestyle.''

Can you imagine the anguish of being a 16-year-old, your whole life in front of you, and then being confronted with this sort of tragedy?

Jacki was very fortunate, however, to have so many people who were looking out for her. Her pastor saw a PBS show called ''The Miracle Cell,'' about a procedure called olfactory mucosa transplantation being done in Portugal by Dr. Carlos Lima. The work involved transplanting adult stem cells from spinal cord patients' own sinus area into their spinal cord at the initial injury site.

This gave Jacki real hope. Continuing her letter, she wrote:

I listened to amazing recovery of returned sensation and even the ability to walk again with continued rehab from others after having this surgery. I remember thinking, ''There's my chance!'' I knew I wanted to pursue this possibility for me.

My mom and I started researching this procedure on the Internet and collected as much information that we could. We discovered a Spinal Cord Injury Institute getting ready to open in Detroit, Michigan, that summer. This institute was closely associated with Dr. Lima. We called to see if we could get an appointment to go and meet Dr. Steve Hinderer and asked about the procedure in depth and inquire about my chances of getting it done.

I did go to Detroit and was told that I could well be a good candidate. I was given the guidelines and criteria for having this done. After many months of additional testing, x-rays, etc., I was accepted.

This was very exhilarating for me. I had read about the success stories of the individuals that have gone before me. Their various success stories gave me so much hope!

I had so much support from my family, friends, church, community and surrounding areas to raise the $50.000.000 needed to have this surgery. Without this overwhelming support I could not have gone forward with this incredible opportunity.

I went to Portugal in October 2005. I had the procedure done on October 29th. My experience in Portugal was not all pleasant. My mom and I had to deal with the language barrier and the unfamiliar culture. I returned to the states on November 5th. I rested at home for a few weeks then went to Detroit to the Institute for aggressive rehab. Rehab was very tiring and indeed very aggressive. It was an exhausting experience but a very rewarding one. It was there that I took my first steps on the parallel bars. I was up!

My progress since undergoing this surgery has been amazing! I have a lot of hip movement, some tingling and heaviness in my legs. I have continued with my rehab regimen at home. I have leg braces that were fitted to me. I can walk on parallel bars and have begun walking with a walker. I am up on my feet again! That's the most satisfying feeling. Unless you have been confined in a wheelchair for an extended amount of time you can't really know how rewarding it is to be standing again.

This brings me to the ongoing debate over adult stem cell research. I did not think a lot about this issue before the accident but now it has sparked a great interest within me. First, I am very much against embryonic stem cell research and advancement. I do not support this aspect at all. The killing of human life is appalling to me. But with adult stem cell and non-embryonic stem cell research I have become an advocate. My personal experience with adult stem cell transplantation should awaken the United States to the unlimited possibilities. This technique is simply, ''your body healing itself.'' Medical research in the United States has always been respected and admired for the advances toward cure for cancer, arthritis treatments and medication, heart disease and other well-known diseases and ailments. But when it comes to spinal cord injuries the U.S. is very much in the negative category. We as taxpayers pay more money in the daily care of a spinal cord injury victim than we do on a cure. Now why is that? The medical society treats the injury at the onset then teaches the individual to live in a wheelchair and function accordingly. Then they are sent home and told, ''You will never walk again.'' I experienced that first hand.

But I am walking again. I have goals of walking by the end of the year with my braces and crutches. This was made possible by the procedure in Portugal—Portugal, not the United States—and aggressive rehab. But I had to leave the comfort of my home and country and travel to a foreign area to get this done. Now that is sad, isn't it?

This tragedy that happened to me can happen to anyone. It could be your wife, husband, son, daughter or friend. What would you want for them? Simply a statement, ''You'll never walk again'' or ''Never give up hope there is a better option for you.''

Jacki Rabon writes:

Wake up United States! We are missing out. Let's look at the issue in a more personal level—I can walk again.

Sincerely,

JACKI RABON,
Waverly, IL.

These are the moving words this courageous young lady wrote last summer.

Jacki's progress does continue. We received an e-mail from Jacki's mom, Becki, in the last few weeks. Becki Rabon writes:

Jacki is doing wonderfully. She did have a slight hip problem a few weeks ago. She was experiencing a lot of pain. We had x-rays, Ultrasounds and lab work done.

Thank God, it was only tightness in her hip muscles. The pain of course was not good . . . but it was in a way that is good since Jacki is getting more feeling in her hips.

Otherwise, she is still walking with her braces and a walker at our church. She walks independently now. All I do is help her with getting the braces on and stabilizing the walker while she stands up. Then she can walk by herself. The distance has increased considerably. The next step for her is to start walking outside and at home. She needs to be on more normal terrain.

This is an amazing story, and the science that has gone into Jacki's

treatment is truly revolutionary, miraculous. Adult stem cell therapy—what could it do with another $600 million? How far along could we be?

A June 2006 study in the Journal of Spinal Cord Medicine reported on Dr. Lima having transplanted nasal stem cells into seven patients with spinal cord injury. The patients regained some motor function and sensation, and two patients showed bladder control improvement.

Most of the adult stem cell work in this area is still being done in lab animals, but it is already starting to have human applications. You have to ask yourself, why would we want to go down the unethical embryonic stem cell road when the doors are already being opened by adult stem cells and you already have these types of human stories taking place? Why, when we have something that is working?

Shown in this picture is Jacki Rabon.

I am going to tell an amazing story about Dr. Dennis Turner. He came in to testify in the Senate Commerce Committee Subcommittee on Science and Technology. He testified in 2004. He suffered from Parkinson's disease. I want to read portions of his testimony. I show you a picture of Dr. Dennis Turner. He stated:

For 14 years I've had Parkinson's Disease. This irreversible disease involves the slow destruction of specialized cells in the brain, called Dopamine Neurons. By early 1991 I suffered extreme shaking of the right side of my body, stiffness in my gait and movements. After some years of medication, I developed fluctuation and poor response to Sinemet. This made daily activities needing the coordinated use of both hands hard or impossible, such as putting in contact lenses. My disability prevented me from using my right arm.

Other than my Parkinson's symptoms I was physically very active and fit. Because of this Dr. Levesque felt that I'd be a good candidate for an experimental treatment. He explained that he would take a very small tissue sample from my brain, removing its adult neural stem cells. He would then multiply and mature these cells into Dopamine Neurons, then inject these cells back into the left side of my brain. He proposed treating only the left side because it controls the right side of the body, the side with the most severe Parkinson's symptoms.

Dr. Levesque did not tell me that this treatment would permanently cure my condition. Science has yet to learn what causes Parkinson's Disease, much less how to remove it. However, since this cell-replacement approach had never been tried in a human patient we hoped for the best. And since my only other realistic alternative was to continue growing worse until I eventually died, I decided to have the surgical procedures in 1999, one to remove the tissue and another to inject the cells. I was awake for both procedures, under local anesthesia.

Soon after having the cells injected my Parkinson's symptoms began to improve. My trembling grew less and less, until to all appearances it was gone, only slightly reappearing if I became upset. Dr. Levesque had me tested by a Neurologist, who said he wouldn't have known I had Parkinson's if he had met me on the street. I was once again able to use my right hand and arm normally, enjoying activities that I had given up hope of ever doing.

Since being diagnosed with Parkinson's Disease my condition had slowly, but continuously worsened. I can't say with certainty what my condition would have become if Dr. Levesque had not used my own adult stem cells to treat me. But I have no doubt that because of this treatment I've enjoyed five years of quality life that I feared had passed me by.

Last year, after 4 years of being virtually symptom free, my Parkinson's symptoms began reappearing in my body's left side. Today I have various degrees of trembling in both hands, although I feel that the left is slightly worse. Nevertheless, I wouldn't hesitate for a second to have Dr. Levesque use my adult stem cells to treat me a second time, since in my case they were safe, effective, and involved no risk of rejection.

Because of my improvements through Dr. Levesque's treatment I've been able to indulge in my passion for big game photography these past 5 years.

This man suffering severe Parkinson's for 5 years being able to indulge in his passion for big game photography.

While on safari in 2001 I scrambled up a tree to avoid being run over by a Rhino. I swam in the South Atlantic with Great White Sharks. Two weeks ago I returned from Africa after photographing Cheetahs and Leopards in the wild.

This is a man with severe Parkinson's.

Here are a few examples of the pictures I took. They represent memories and experiences I feel I have Dr. Levesque to thank for. I came here to offer him my sincere gratitude, and to offer others with Parkinson's a concrete reason for hope.

This summarizes my history with Parkinson's and the positive effects I experienced through a treatment that used my own adult stem cells. I'm very happy with its results and would dearly love to have a second treatment.

Mr. President, I cite this example because here is a route forward for us. We want to treat people with Parkinson's. Here is a route forward that has been shown in a human clinical trial setting, with positive results for a period of time. Why would we want to waste that? Why wouldn't we want to fund that and to use it aggressively?

The PRESIDING OFFICER (Mr. CASEY). The Senator's time has expired.

Mr. BROWNBACK. Thank you very much, Mr. President. I yield the floor and will continue to use more of my time later.

The PRESIDING OFFICER. The Senator from Michigan.

Ms. STABENOW. Mr. President, I rise today to urge my colleagues to vote yes on S. 5. This is a bill that will bring hope to millions of Americans and their families. This is the bill, this is the opportunity for us to move forward on critically needed research. By passing the Stem Cell Research Enhancement Act, we can make a major step forward in scientific research and bring hope and help to millions of Americans fighting a debilitating disease every day.

I think we all have members of our own families who can speak to those issues—Parkinson's, Alzheimer's, juvenile diabetes, other kinds of diseases—where we know with a little bit of help and focus, both in terms of stem cell research but also in terms of funding research, we can see huge changes, huge opportunities for treatment and for possible cures. That is what this bill is all about. It is so important we move forward in a positive way and pass this bill as quickly as possible.

It is very sad we have this issue up before us again. In the last Congress, we passed legislation by wide bipartisan margins to lift the President's restriction on Federal funding for embryonic stem cell research. By wide margins, the majority of Americans supported this legislation, and still support this legislation. Unfortunately, the President issued his first and, so far, only veto to strike down our legislation. So we are back here again.

I see Mr. HARKIN, a great Senator from Iowa, on the floor. I commend him for his leadership, and so many of my other colleagues. Earlier today, Senator FEINSTEIN was on the floor, and I thank her, certainly, for her leadership, as well as Senator KENNEDY. So many people have worked so hard in bringing us to this point. I thank our leader, our Senate majority leader, Senator HARRY REID, for making this a priority as an agenda item for us in the Senate.

I know how deeply personal this issue is for many people. I respect that many of my colleagues have different views on stem cell research. I have also studied this issue very extensively. Over the past several years, I have met with people from all different faiths, all different backgrounds, from religious figures to medical researchers on the cutting edge of breakthrough technology. I have met with mothers who have to give multiple daily injections to their children to help them make it through the day.

They argue that many diseases and chronic conditions—as I have mentioned before, diabetes, and also ALS, Parkinson's, spinal cord injuries, many types of cancers—will be treated or even possibly cured with stem cell research. Too many families are struggling to care for children with diabetes or watching elderly parents succumb to Alzheimer's disease, like my husband did, or like my grandmother, who died of Parkinson's disease.

Too many Americans suffer from illnesses that make ordinary things such as daily household chores nearly impossible. As cochair of the Senate bipartisan Parkinson's Caucus, I receive letters and calls from people all across our great Nation on how important stem cell research is to them, how important this legislation, this opportunity at this time is to them and their families.

I have met many Michigan families dealing with chronic health issues every single day. For example, a wonderful advocate and friend, Bob Kullgren, from Grand Rapids, shared with me his daughter Kate's story.

When she was 12 years old, she was diagnosed with juvenile diabetes. Her family took her for multiple visits to the hospital and injected her with insulin three to four times every single day. These routines only helped to manage Kate's disease, not cure it.

As a teenager, Kate worked as a counselor at a camp for children with diabetes. She watched as some of her fellow counselors began experiencing the early stages of blindness caused by their juvenile diabetes. I cannot imagine how terrifying it must be to begin to go blind when you should be thinking about going to the prom or graduating from high school. None of us wants that for our children.

Another bright young woman who has visited my office several times is Julielyn Gibbons. For over 12 years, Julielyn has lived with Crohn's disease. It is a disease that causes intense abdominal pain. For her, stem cell research offers the promise of not only curing this lifelong debilitating disease but also the hope of being able to live a normal life. She e-mailed me:

I want to be able to bring children into the world knowing that they will never have to suffer as I have, and that possibility best exists through stem cell research.

S. 5, a strong bipartisan bill, is an important and, in fact, a critical step forward toward giving Julielyn and Kate that hopeful future we all want for our children. S. 5 expands Federal financing of research on additional stem cell lines created from embryos freely donated from in vitro fertilization clinics under strict ethical guidelines. These embryos are frozen and will likely be destroyed. Think about that. These are frozen embryos that will likely be thrown in the garbage can. They are being thrown away. Which is better: To have the opportunity to use those cells, those precious cells to be able to create life, to create cures, or to see them thrown away? That is what is happening right now.

This bill also would authorize the National Institutes of Health to look at other ways of creating new stem cell lines. This does not preclude other opportunities for research. In fact, this is a bill to make it clear we want to use every possibility to save life, to be able to cure diseases, and that we will continue to see that is done with the highest ethical standards, which is what is guaranteed under this legislation.

The current administration's policy, frankly, is tying the hands of scientists and impeding their progress on treatments and cures for diseases that families every day are waiting for. Sean Morrison, the director for the University of Michigan's Center for Stem Cell Biology, told me the federally approved lines are of limited use because they are not genetically diverse enough to realize the full potential of this research—so many more are needed. In other words, we don't have enough right now. We can't do what needs to be done, what families are asking for across this country.

While we look toward the future, we should remember those who have passed while we have had this debate as well. Every day the clock is ticking on somebody who is ill. Every day the clock is ticking on somebody with a fatal disease who could be helped in some way or cured if we were doing everything we could to provide the research and the cures and the treatments. What pains me the most is that some of the brave advocates I have had the privilege to meet during my congressional career are no longer here today. They are no longer here this week to see this vote. Hopefully we will not have many more people who will be seeing their lives deteriorate or lose their lives before we are able to actually begin to do what needs to be done with this research.

It is for them and for all the families I have met that I will cast my vote this week, a vote for life, for hope, for a bright future. I know the cures won't come tomorrow, but they may never come if we do not act now. I urge all of my colleagues to vote yes on S. 5, and I urge the President of the United States to do what is right, to do what the overwhelming majority of the American people are asking him to do and asking us to do, which is to say yes to lifesaving research, to say yes to that which will provide hope for a cure. I hope we will say yes in a very large margin to S. 5.

Mr. President, I yield the floor, and I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. HARKIN. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. HARKIN. Mr. President, how much time is remaining on our side in this round?

The PRESIDING OFFICER. There is 42 minutes.

Mr. HARKIN. Mr. President, I yield 10 minutes to the distinguished Senator from Rhode Island.

The PRESIDING OFFICER. The Senator from Rhode Island is recognized.

Mr. WHITEHOUSE. Mr. President, I thank the distinguished Senator from Iowa.

I speak today in support of S. 5, the Stem Cell Research Enhancement Act, offered by the majority leader, to whom we all owe a debt of gratitude for bringing this important bill to the floor. As a new Member of this body, as is the Presiding Officer, it also gives me great pride to express my appreciation for the leadership of Senator HARKIN, Senator SPECTER, Senator KENNEDY, and Senator HATCH, whose voices over the years have placed us in the position to pass this legislation, as I hope we will tomorrow.

I also wish to recognize the exceptional work and extraordinary leadership of my colleague and friend from Rhode Island, Congressman JIM LANGEVIN. Congressman LANGEVIN has been both a State and national leader on this issue, championing the passage of H.R. 810 in last year's Congress and of H.R. 3 in January, as well as playing an integral role in Rhode Island's stem cell dialogue. Just today he was with our Lieutenant Governor Elizabeth Roberts, as she issued her report, ''Discovering Rhode Island's Stem Cell Future: Charting the Course Toward Health and Prosperity.'' This report is an important step toward developing a comprehensive statewide plan for stem cell research initiatives in Rhode Island.

Congressman LANGEVIN did not arrive at his position on stem cell research easily. He grappled, as we all do, with the ethical and scientific issues involved, meeting with a host of individuals and groups spanning the ideological spectrum. After serious and heartfelt consideration, he concluded, as have many of our Senate colleagues, that a central part of his deeply held beliefs about life is a commitment to those who are challenged by diabetes, by heart disease, by Alzheimer's, by Parkinson's, by spinal cord injury, by stroke, and by the myriad of diseases and conditions that stem cell research might help or even cure. I share this deep commitment to stem cell research and a sincere optimism about the hope it offers for so many lives.

I want to share the story of one of those lives. It is the story of Lila Barber, a 12-year-old girl from Westerly, RI, who came to visit me here in Washington 2 weeks ago. In 2005, Lila started experiencing pain in her leg. The pain got progressively worse over a 5-month period, until it was keeping her, and her parents, up all night. The Barbers began a medical journey, from doctor to doctor and test to test, only to be told that Lila had bursitis. As it turned out, Lila did not have bursitis; she had osteosarcoma, a cancerous bone tumor on her tibia below her knee.

Years ago, doctors would have had no option but to amputate Lila's leg. But reconstructive techniques have improved, and most limbs can now be replaced with a metal and plastic artificial joint or a cadaver bone transplant. Fortunately, Dr. Richard Terek, an orthopedic surgeon specializing in musculoskeletal oncology at Brown University, was able to save her leg using such a cadaver bone transplant, which preserves as much normal tissue as possible. In the year following Lila's surgery, she was home-schooled as she underwent 16 rounds of chemotherapy. Lila's chances of long-term survival are now good—75 percent.

But even if Lila remains cancer free, she will face a painful and ongoing medical struggle. Since the donor bone and cartilage are not living, Lila's transplanted tibia will not grow as she does. Even worse, it will break down over time. This is a place where stem cell research could vastly improve care

for cancers like Lila's. In the short-term, stem cell research could allow surgeons to develop techniques to use Lila's own cells to biologically and mechanically enhance bone tissue transfer. That is, Lila's own stem cells could be used to repopulate the lost bone and cartilage. In the longer term, stem cell research might allow scientists to grow entirely new replacement bones and joints. One day, children with osteosarcoma and other bone tumors might receive new bones that actually grow with their bodies into adulthood. Such bone tissue enhancements would also be beneficial to individuals with injuries from accidents, sports injuries, or just the wear and stress of age. This is just one area of promise in the broad landscape of hope stem cell research opens to Americans.

As for Lila, with frequent monitoring from Dr. Terek, and sporting a bright bandanna on her first days back to school in the seventh grade, she is getting back to her old ways. She even attended the Nickelodeon Kids' Choice Awards last weekend, a trip made possible by A Wish Come True, an organization in Rhode Island that grants wishes to children with life-threatening and dangerous illnesses.

For the Barber family, their greatest wish is for Lila's good health. Stem cell research holds the promise of making that wish, and millions of wishes like the Barbers', come true. Let us throw off the ideological shackles constraining our progress imposed by the bleak and benighted policies of the Bush administration. Let us all support S. 5 and embrace the promise for life and health and hope and cure that these discoveries present to mankind.

I thank the majority leader for sponsoring this vital legislation. I thank the Senator from Iowa for his leadership on the floor.

I yield the floor.

The PRESIDING OFFICER. Who yields time?

Mr. HARKIN. Mr. President, I am glad to yield 10 minutes to the distinguished Senator from Maine.

The PRESIDING OFFICER. The Senator from Maine is recognized.

Ms. COLLINS. Mr. President, first, let me thank the Senator from Iowa for yielding time to me.

As a longtime supporter of stem cell research, I am pleased the Senate is once again taking up the Stem Cell Research Enhancement Act. I am very proud to be a cosponsor of this bipartisan bill. It will expand the number of stem cell lines that are eligible for federally funded research, enabling scientists to take full advantage of the scientific and medical opportunities provided by stem cells. At the same time, the bill establishes clear standards to ensure this research is conducted ethically.

The promise of embryonic stem cell lines lies in their potential to develop into virtually any cell, tissue, or organ in the body. As a consequence, this research holds tremendous potential to treat, and perhaps even cure, a vast array of diseases and conditions. Researchers could, for example, potentially generate insulin-producing islet cells for patients with juvenile diabetes; neurons to treat Parkinson's disease, ALS, and Alzheimer's, as well as bone marrow cells to treat cancer. It is estimated that more than 100 million Americans are afflicted by diseases or disabilities that have the potential to be treated through this promising research.

I have heard some of our colleagues today, in arguing against this bill, say that the promise won't be fulfilled, that it is overblown, and that it is raising false hopes. We cannot say for certain what avenue of scientific research is necessarily going to produce the results all of us hope for, but surely it makes no sense to cut off a promising source of research that could benefit from Federal funds. I, for one, am very optimistic about the potential. There are no guarantees. There are no guarantees with any scientific research, but certainly the promise is there. It would be foolhardy for us to continue to restrict this research, to place artificial barriers in the way of research that offers such hope and such promise to so many American families.

In August of 2001, President Bush announced that Federal funds could, for the first time, be used to support research on embryonic stem cells. But that research, under the President's Executive order, was limited to existing stem cell lines that were created prior to 9 p.m. on that day.

In the 5½ years since the President made that announcement, this stem cell policy has fallen far short of its original goals. While the Human Embryonic Stem Cell Registry at the NIH lists 78 stem cell lines, at best, no more than 22 lines will ever be available for research under the current policy. Moreover, as Dr. John Gearhart of Johns Hopkins University told the Special Committee on Aging last year, existing lines are ''contaminated with animal cells, lack genetic diversity, are not disease-specific, and are not adequate for researchers to apply to a wide variety of diseases.'' Limiting researchers to these lines, therefore, places huge and unnecessary roadblocks in the way of possible treatments and cures for a wide range of devastating diseases.

We have learned a lot about stem cells since 2001. For example, scientists have now created methods for growing stem cell lines that are free of animal cells, thus greatly improving their potential for treating and curing disease. They have also created disease-specific stem cell lines. Under the current Federal policy, however, these new and improved stem cell lines are not available to federally funded researchers in the United States. It is time for us to update our stem cell policy to reflect what we have learned so that we can accelerate this important research.

The legislation before us lifts the current restriction so that stem cell lines are eligible for federally funded research, regardless of the date on which they are created. Federal funding, however, would continue to be restricted to stem cells derived from embryos originally created for fertility treatments that are in excess of the clinical need and that otherwise would be discarded. That is the issue before us. Are we going to use these stem cells—these cell clusters which otherwise would be thrown away—for what could be lifesaving and life-enhancing research? That is the issue.

The legislation has other important safeguards that require informed consent of the donors, and it prohibits any financial inducement to donate. Finally, the bill calls upon the NIH to develop strict guidelines to ensure that researchers adhere to clear ethical and moral standards.

As the founder and the cochair of the Senate Diabetes Caucus, I am particularly excited about the promise stem cell research holds for an ultimate cure for diabetes. Early research has shown that stem cells have the potential to develop into insulin-producing cells to replace those which have been destroyed in individuals suffering from type 1 diabetes.

During the last Congress, I chaired a hearing in conjunction with the Juvenile Diabetes Research Foundation Children's Congress to examine the devastating impact juvenile diabetes has had on too many American children and their families. We heard heartbreaking testimony from children who traveled here to tell us what it is like to live with juvenile diabetes, just how serious it is, and how important it is that we fund the research necessary to find a cure.

One of those was a constituent of mine from Falmouth, ME, Steffi Rothweiler. She told the committee that she could not remember having a normal life without diabetes. She described her parents, who have given up a full night's sleep and their weekends, on guard every hour of every day to make sure Steffi's diabetes is controlled as tightly as possible so that she can stay as healthy as possible. Steffi asks that we do all we can to find a cure for diabetes as quickly as possible. We simply cannot ignore the potential embryonic stem cell research holds for children like Steffi.

I am sensitive to the ethical concerns raised by opponents of this research. But I wish to emphasize once again that the cell clusters which will be used for this research would otherwise be discarded. In my view, the ethical choice is to use them for research that may benefit millions of Americans rather than just discard them as medical waste.

Moreover, what is often ignored in this debate is that embryonic stem cell research is now occurring in the private sector and in other countries outside the purview of the NIH. Therefore,

if we could extend these ethical guidelines that routinely accompany federally funded research, all of us should be for that as a goal.

I wish to quote testimony from Dr. Allen Spiegel, who was, at the time, Director of the National Institute of Diabetes and Digestive and Kidney Diseases. He made that very point at our 2005 hearing on juvenile diabetes. He testified that, while NIH routinely worked very closely with the private sector, in the area of stem cell research, ''there is a wall.'' By expanding our current stem cell policy, we can tear down that wall, allowing for more research but ensuring that it is conducted with clear ethical standards.

Now, the other argument we always hear is that we don't need to have this kind of stem cell research because adult stem cells derived from tissue, such as bone marrow, are a sufficient replacement for embryonic stem cells in forwarding this important research.

The fact is, both are promising. But, again, as Dr. Spiegel testified at the hearing that I chaired with regard to diabetes research:

> We need to do embryonic stem cell first because it can give us a better understanding of what causes type 1 diabetes . . . because it will actually inform our ability to work with adult stem cells . . . and finally, because, and one cannot guarantee or promise this, the embryonic stem cells themselves, if successfully turned into insulin-secreting beta cells, could be the source of cell therapy.

That is the testimony from the experts.

It would be tragic not to take advantage of this opportunity to accelerate research that can potentially help millions of people suffering from devastating illnesses. I urge our colleagues to join in voting for this important legislation.

Again, I thank the chairman for yielding me time. This is legislation that truly can make a difference to the lives and well-being of so many American families.

Thank you, Mr. President.

The PRESIDING OFFICER. The Senator from Iowa.

Mr. HARKIN. Mr. President, I thank the Senator from Maine for her very eloquent statement regarding this bill. The Senator is right on the mark in talking about the ethical—if I can get her attention for a second—part of this issue.

As the Senator knows, in S. 5, we have very strict ethical guidelines. One, the only embryos that can be used are those slated to be discarded anyway from our IVF clinics. Secondly, there has to be written informed consent by the donors. And, third, there cannot be any monetary or other kinds of inducements at all to the donors of these embryos. Those guidelines are actually stricter than what is in law right now. As the Senator knows, we have these strict guidelines.

The other point the Senator brought up, if she has a minute for me to explore this point with her a bit, is that we have in vitro fertilization clinics. My information is that last year about 50,000 babies were born by IVF. I have friends of mine who had children thanks to IVF; otherwise, they would never have had children. Obviously, there are some embryos left over. They would like to be able to donate those for embryonic stem cell research because they are not going to have any more children.

So it seems to me the ethics question is, are we just going to discard them as hospital waste, which is done every day, or would it be more ethical to say let's use those with the strict guidelines we have to save lives, to make life better, to ease suffering and pain?

The Senator from Maine put her finger on it. That, to me, is the ethical way, I would think. What our bill is trying to do is to let those donors of those embryos say, yes, do this. You can do that, and use that for research. I thank the Senator from Maine for her contribution.

The PRESIDING OFFICER. The Senator from Maine.

Ms. COLLINS. Mr. President, if the Senator will yield for just a moment so I can respond to the excellent points that he made, first, I commend Senator HARKIN, Senator SPECTER, and others who have worked on this bill for including those clear safeguards. This isn't a case where anyone is going to be selling the left over, unused embryos from in vitro fertilization. In fact, the bill appropriately prohibits any financial inducement, any sort of money changing hands. So that is an important safeguard.

But the Senator put his finger on what I think is the primary ethical choice. The left over cell clusters are going to be discarded. They are going to be discarded. They are discarded every day, every month, every year as medical waste. How much more enhancing it would be to use them for research that could save lives, that could prolong lives, that could improve the quality of life for someone suffering from juvenile diabetes or Parkinson's or Alzheimer's or other devastating diseases.

I believe this bill is a very ethical bill that will help move us forward in the search for better treatments, for better diagnoses, and someday a cure. I cannot believe that we would cut off such promising research when we know it can be done in an ethical way.

I applaud the Senator for his leadership in this area. I hope we will proceed to a very strong bipartisan vote in support of legislation that means so much to the American family.

We do a lot of debate on this Senate floor, but it is rare that we have a debate on an issue that touches so many Americans personally. All of us have family members who have suffered from these devastating diseases, and this offers—does not promise—but offers the potential for research that could really make a difference.

I thank the Senator. I am very happy to join him in this effort.

Mr. HARKIN. Mr. President, I thank the Senator from Maine. How much time does our side have remaining?

The PRESIDING OFFICER. There is 17 minutes remaining.

Mr. HARKIN. Mr. President, I will take a couple more minutes to expand on this point.

I mentioned this morning, if you are faced with a situation where embryos are going to be discarded and destroyed totally or these embryos could be donated for embryonic stem cell research and propagated and given life and then proceed to give life to others, is that not the better ethical choice? In other words, what I am saying is, when you discard an embryo from an IVF clinic now as hospital waste, that is destroyed. But if you take an embryo and take out of the embryo the 100 or 200 cells in it, extract them, the embryo itself is not an embryo any longer, but the cells are still alive. They are still alive. They propagate, they grow, they become stem cells that we already know—we have already done that—develop into nerve cells, bone cells, heart muscle tissue, motor neurons. They already know that.

On the one hand, you are really destroying the embryos, and on the other hand, you are taking the embryos, you are changing them into something else that propagates life and that actually could be—we don't know, as the Senator said, we don't know the end result but could actually enhance and make life better for many people. It seems to me this is the more ethical way to go.

Mr. President, I yield the remainder of the time to the Senator from Maryland.

The PRESIDING OFFICER. The Senator from Maryland.

Mr. CARDIN. Mr. President, first, I thank Senator HARKIN for his leadership on this issue and Senator COLLINS and those who have been responsible in bringing forward S. 5 for us to have an opportunity to vote for the Stem Cell Research Enhancement Act.

I join my colleagues. Rarely do we have an opportunity in this body to cast a vote that literally offers hope to over 100 million people in this country. We all have constituents who are suffering from Parkinson's or Alzheimer's disease or juvenile diabetes or ALS or spinal cord injury and other illnesses and injuries that very much the stem cell research offers hope that we will be able to make advancements to improve quality of life.

But there is more involved here than just the health and lives of Americans. We also are talking about the United States and its preeminence internationally in medical research. We have led the world in medical research in this country. People from all over the world come to America to get their health care needs met and to train their health care professionals.

We have been on the cutting edge. In my own State of Maryland, we have the NIH, we have the Naval Medical Center at Bethesda, we have Johns

Hopkins University, the University of Maryland Medical Center—all on the leading edge of research technology.

S. 5 will help us maintain our preeminence in medical research, as well as help millions of people as we make advancements in medical research.

Let's review quickly the current status of embryonic stem cell research.

It offers tremendous promise, we all know that. We all know embryonic stem cells hold the greatest promise for being able to regenerate parts of our organs and bodies that will allow us to deal with horrible diseases and injuries.

On August 9, 2001, the President's Executive order restricted embryonic stem cell research. If we could go back to 2001 and look at the situation in 2001, there were many who thought maybe that would be adequate at that time. We didn't know a lot about embryonic stem cell research back in 2001. NIH at that time had predicted, I remind my colleagues, that there were 60 to 78 stem cell lines that would be available under the President's Executive order, when in reality there were only 22, and some have been contaminated with mouse feeder cells.

We lack the genetic diversity necessary to perform research today on embryonic stem cells, and the most vulnerable groups are minorities because they are disproportionately affected by the lack of diversity in the stem cells that are available.

What is affected? Research dollars are not being made available. Money is not coming forward to deal with the most promising forms of research in our Nation. The role of the United States in medical research is being jeopardized. We are actually losing our best researchers to other countries which don't have these unreasonable restrictions.

I think the argument can best be made not by researchers, not by legislators, but by listening to some of our constituents.

I had the opportunity to have Josh Basile as an intern in my office. Three years before he was an intern in my office, he was a healthy young person leading a very healthy, very active life—a tennis player and doing all those things that a person his age would do. But then he was on the beaches off the Atlantic, and a wave caught him and he became a quadriplegic overnight. He is determined he is going to walk again. He is determined he is going to make progress. In fact, he is making progress. He is rehabilitating himself the best he possibly can. He has brought back motion where people thought it was impossible for motion to come back because he is determined. He is keeping his body ready, but he is asking us to do our share to allow the medical researchers to have the tools necessary to help him so one day he can walk.

One of my closest friends—my closest friend in law school—Larry Katz, when he was a very active attorney in Baltimore, was diagnosed with ALS. I watched him as his body left him and he died a very difficult death.

Any of us who have experienced these types of life circumstances know that we have a responsibility to do everything we can to make sure that our scientists have the appropriate tools to do the research to bring about the answers to provide the resources, the money, and the appropriate scientific methods in order to unlock the mysteries of so many diseases.

Stem cell research offers tremendous promise. The work being done at the University of Maryland Medical Center and the work being done at Johns Hopkins in my community—Dr. John Gearhart and Dr. Douglas Kerr, I met with these scientists frequently to try to get a better understanding about this. I am not a scientist. I don't know all the technicalities, but I have had a chance to meet with these scientists and see what they are doing and learn firsthand the promise that embryonic stem cell research holds out to all of us. They have been able to implant embryonic stem cell growth in mice and see movement where there was no movement before. It holds out such great promise.

We can do better and we have to allow our scientists the ability to do that. Let me quote from one other Marylander, Dr. Elias Zerhouni, who is the Director of the National Institutes of Health and a resident of Baltimore. Last month, he reiterated his support for lifting the current ban, stating that:

> From my standpoint, it is clear today that American science will be better served and the Nation will be better served if we let our scientists have access to more stem cell lines.

There is a lot of fact and a lot of fiction out there as to what this means and what this bill does, what exactly the restrictions are under current law. There are some who argue that this legislation will encourage the creation of in vitro fertilization for research. Nothing could be further from the truth. The only lines that are available are those that are currently in existence. As my colleagues have repeated over and over on this floor, those who claim that this will divert the cell from its original purpose for implantation are wrong. The facts are that these embryos would be otherwise discarded.

Those who say we have to protect against abuse, read the language of the bill. The bill requires the donor's consent, and it can't be with compensation. It provides guidelines for the ethically sound use of embryonic stem cell research.

In June of 2001, 2 months before President Bush issued his stem cell policy, Sue Stamos and her daughter Faith came to visit me in my House office. At the time, Faith was 3 years old, a very brave little girl who had been diagnosed with juvenile diabetes. She asked me for my support for Federal research to help find a cure for Faith, and I promised back then I would do everything I could to help the Stamos family.

Back in 2001, our knowledge of stem cell research was nowhere near what it is today. We didn't know what promise it held at that time. Today, 6 years later, we have a much broader and deeper knowledge about the scientific possibilities of stem cells but much less capacity to research stem cell lines than we had anticipated.

Last year, I voted to keep my promise to Sue and Faith Stamos and to the thousands of other Marylanders who are waiting for cures. Today, again for Faith and Josh and thousands of other Marylanders, I will vote to expand the stem cell lines available for federally funded research. I hope my colleagues will join in sending a message to Americans that this Congress will not stand in the way of medical progress through the proper use of embryonic stem cell research.

I urge my colleagues to support this legislation, and with that, Mr. President, I yield the floor.

Mr. ISAKSON. Mr. President, I wish to associate myself with the remarks of many of the speeches that have been made this afternoon, particularly when Senator COLLINS of Maine a little while ago talked about whether we should decide—''we'' meaning Members of the Senate—what the promise of embryonic stem cell research is. We can't. We are not scientists. Mr. COBURN certainly would qualify as a medical doctor, but there are no scientists here of the eminence of people doing this critical work.

Ms. COLLINS made a very good point, and the point I would like to reiterate from the presentation I made this morning is that there is nobody here arguing against furthering science and furthering embryonic stem cell research. The question is which route we take.

The proposal in S. 30, which Senator COLEMAN and myself have brought forward, is an affirmation of the need to expand embryonic stem cell research. It is an affirmation that there is a way to do it. In the course of the last couple of years, we have discovered a lot of new, interesting, and dynamic things, most important of which is that 5 of the 21 lines that exist right now, under the grandfather clause the President issued in August of 2001, are lines derived not from the destruction of a live embryo or an implantable embryo but from a naturally dead embryo.

Let me briefly but succinctly go back to that definition. It is very much the same as a clinically dead person with an irreversible cessation of brain waves but the rest of their body still lives on life support so that they are able to donate, through a medical power of attorney, their organs to be transplanted and which can then save a human life. It is the same medical principle, where with that determination of death, although there is still life in the body,

that individual is able, through their grant, to donate their organs in order to save another life.

This is the same principle in terms of naturally dead embryos. Embryos developed for in vitro fertilization, after 3 days, are implantable viable embryos. In 4 additional days, additional embryos are created with the cell mass necessary to become a viable fetus and ultimately a human being. But after the seventh day, which is called level III, or the Gardner III principle, the embryonic stem cell embryos are clinically dead, although cells within the embryo are alive. That is the same principle as an organ donation from an individual who suffers from an irreversible cessation of brain waves.

S. 30, which I stand on the floor today to promote and commend to the Members of the Senate, does exactly and precisely what most of the Members of this body want to do, and that is further the NIH investment in embryonic stem cell research. As I said this morning, three of those lines happen to exist in the State of Georgia. Three lines currently under the grandfather clause issued by the President's Executive order in August of 2001, three lines that currently are continuing to be funded by the National Institutes of Health, three lines that are contributing to the breakthrough or hopefully the steps of the breakthroughs, in terms of any number of cures, but in particular those of diabetes and those of spinal column injury.

By adopting S. 30, sending it to the House and the House adopting it, and the President having said he will sign it, then we know we can break through this logjam and we can create additional lines for embryonic stem cell research and exponentially bring forward the public information that is so necessary in the research and medical community. Because the critical benefit the National Institutes of Health investment makes is it makes the discoveries come into the public domain because the NIH is a public entity and it is the taxpayers' money.

So I would submit that S. 30 is the right way to enhance what most, if not all, here want to do and that is to enhance the cure of dread diseases, the breakthroughs necessary to solve any number of problems, and do so in a way that clearly respects the viability of an embryo by selecting those lines only from embryos that are clinically dead. You are then not destroying what could become a viable human being, but you are adding to and furthering embryonic stem cell research in the same way that 5 of the existing 21 lines currently being researched are being brought forward.

I wish to read one paragraph from Dr. Edward Ferdin, who wrote on the Landry and Zucker report on this very subject, and I quote:

> Dr. Landry points out a similar standard is invoked at the end of life—meaning this dead embryo standard—in the use of neurological criteria for the determination of death. When the integrative unit of the body ceases because of the loss of brain wave, a patient is declared dead even though the individual cells and tissues of the body may continue to function for some period of time. In the absence of the brain, there is no longer a person presently within the body. The fact that individual cells, tissues, and organs in the brain-dead body continue to live is what enables transplant surgeons to save thousands of lives each year through organ donation.

The same could be true if we were to make the same use of cells of deceased embryos in pursuit of the cures for degenerative diseases and further the advancement of embryonic stem cell research.

I see my colleague from Texas, Senator CORNYN, has come to the floor to speak, so I yield the floor.

The PRESIDING OFFICER (Mr. CARDIN). The Senator from Texas.

Mr. CORNYN. Mr. President, let me begin by expressing my heartfelt appreciation to the Senator from Georgia, Mr. ISAKSON, and the Senator from Minnesota, Mr. COLEMAN, for working diligently, creatively, and in a very determined way to try to solve a problem that has previously existed in this area that has made it difficult, if not impossible, for some of us to support the expansion of embryonic stem cell research because we were concerned that a very important moral line would be crossed.

I, for one, strongly support medical research, development, and innovation to combat disease and develop effective treatments to improve the quality of health for all Americans, and I am sure we all feel the same way. During the 109th Congress, I was proud to support legislation that promoted expansion of stem cell research without harming or destroying human embryos, and today I am proud to join Senators COLEMAN and ISAKSON in cosponsoring the HOPE Act, the Hope Offered Through Principled and Ethical Stem Cell Research bill.

This HOPE Act advances stem cell research, while respecting life and focusing on cures by allowing the Secretary of the Department of Health and Human Services to establish guidelines for research on embryos that have died from natural causes. The bill directs HHS, Health and Human Services, to prioritize research likely to produce the greatest results in the near term, and authorizes Federal funding for research only if such lines have been derived in such a manner that it does not harm or kill a living human embryo. Finally, it directs the Institute of Medicine to conduct a study to delve further into the possibilities of amniotic and placental cell bank programs, areas which I understand from my reading have a lot of promise.

I am also encouraged by the scientific advances made in the roughly $3 billion of Federal money put into stem cell research since about 2001 that have created real advances in adult and cord blood stem cell research, and I strongly support efforts to build upon these promising therapies which are already being used in medical treatments for a variety of reasons. Current Federal stem cell policy funds research using established embryonic stem cell lines, thus taxpayers are not forced to support research that would require the use and destruction of human embryos at the earliest stage of development.

It is essential to note that there is no law that prohibits embryonic stem cell research in this country. I think, unfortunately, this has been misportrayed and misunderstood in many quarters. In fact, this administration is the first one to support federally funded embryonic stem cell research within parameters. But the issue before us is solely an issue of whether American taxpayers will be forced to fund research that many of them oppose on fundamental moral grounds. It creates a slippery slope when human life is sacrificed for medical experimentation.

The current Federal policy does not forbid others from conducting such research on lines other than those approved by the President, provided it is funded from sources other than the Federal taxpayer. There are States, I think notably California and others, that have voted to spend their own taxpayers' money for that purpose but not the Federal taxpayers' money.

Adult stem cells—and this is again one of those areas where, when you mix science and politics, I fear always the science suffers—and this is part of the good news of this research, this $3 billion invested in stem cell research since 2001—the good news is that adult stem cells are treating real patients who suffer from more than 70 different diseases and disorders right now.

I think many people would be surprised to learn that embryonic stem cells have had few modest successes in animal trials and so far have produced zero treatments for human beings. I think many people would be surprised because of the overhyped and oversold story about embryonic stem cell research. I think our job ought to be to try to come up with a reasoned piece of legislation based on the facts, not based on hype. I think that is what Senator ISAKSON and Senator COLEMAN have done.

All of us have deep sympathy for parents, for children, for families who continue to struggle with painful, serious diseases. I continue to study this issue with great care. I remember every year the parents of children who suffer juvenile diabetes coming to my office along with their children. It really tugs at your heartstrings to see these parents wanting their children to be cured from this terrible disease. We all hope and pray that someday they will be.

I have been encouraged by recent reports from America's scientific community which revealed that great potential exists for obtaining embryonic-like stem cells without creating and then harming human life. At the beginning of this month there were 1,373 publicly available clinical trials related to adult stem cells—1,373 publicly

available clinical trials related to adult stem cells—including 671 that are currently recruiting patients.

In my State of Texas, for example, 93 adult stem cell clinical trials are currently being conducted on everything from brain injuries to different forms of cancer to heart disease.

I am proud to say that medical research in my State has been at the forefront of the adult stem cell research field. For example, the Texas Heart Institute reported evidence of the effectiveness of treating congestive heart disease with the patient's own stem cells. Heart disease, as we all know, is the No. 1 killer in the United States. Yet the researchers at the Texas Heart Institute are finding that adult stem cells injected directly into the heart are not only improving blood flow and blood vessel formation, but they are even growing new heart tissue.

Another clinical trial in Texas, started this last year at the University of Texas Medical School at Houston and Memorial Hermann Children's Hospital, is among the first to apply adult stem cells to treat traumatic brain injury. The researchers in this trial are using children's own bone marrow stem cells to treat brain trauma. This is an especially important area to see adult stem cell research branching out into because of the devastating effect that brain injuries have had on survivors' lives.

These trials and others like them are bringing us new treatments all the time for real patients right now. I will continue to support the expansion of research that may lead to the improved treatment of disease without compelling taxpayers to fund destruction of human embryos, a procedure that many find morally objectionable.

Let me say in conclusion, again, how much I appreciate the creativity and determination of my two colleagues who have led the effort on this important legislation. I am proud to cosponsor it, proud to support it. I think generations yet unknown will continue to benefit from the kind of medical research that we will approve if we pass this bill and when it is signed by the President.

I yield the floor.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. ISAKSON. Mr. President, I ask unanimous consent that a letter from the American Medical Association dated April 10, 2007, be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

AMERICAN MEDICAL ASSOCIATION,
Chicago, IL, April 10, 2007.

Hon. MITCH MCCONNELL,
Minority Leader, U.S. Senate,
Washington, DC.

DEAR SENATOR MCCONNELL: As Congress considers stem cell legislation, the American Medical Association (AMA) believes that it is important that any such legislation follow certain research and medical practice guidelines.

In general, the AMA supports federal funding of biomedical research which promises significant and scientific benefits. More specifically, we—

support biomedical research on multipotent stem cells (including adult and cord blood stem cells);

encourage strong public support of federal funding for research involving human pluripotent stem cells (embryonic); and

encourage continued research into the scientific issues surrounding the use of umbilical cord blood-derived hematopoietic stem cells for transplantation.

Further, AMA research policy supports certain ethical considerations, including donor anonymity, non-coercion of donors, absence of financial inducement and written informed consent of the donor regarding the nature and scope of the research involved. The AMA advocates these guidelines to ensure appropriate and ethical stem cell research, with the hope that continued stem cell research may lead to potential cures and therapies for those suffering from many devastating diseases.

Sincerely,

MICHAEL D. MAVES, MD, MBA,
Executive Vice President, CEO.

Mr. ISAKSON. I would like to address that for a second. This is a letter that does not endorse a particular bill, but it lays out the AMA's support for embryonic stem cell research. I want to make a couple of affirmations quickly, if I can.

It says:

In general, the AMA supports Federal funding of biomedical research which promises significant scientific benefits. More specifically we, support biomedical research on multipotent stem cells, (including adult and cord blood stem cells); encourage strong public support of federal funding for research involving human pluripotent stem cells (embryonic); and, encourage continued research into scientific issues surrounding the use of umbilical cord blood-derived hematopoietic stem cells for transplantation.

Further, AMA research policy supports certain ethical considerations, including donor anonymity, non-coercion of donors, absence of financial inducement and written informed consent of the donor regarding the nature and the scope of the research involved.

S. 30, the Coleman-Isakson bill, contains exactly each and every one of those items laid out by the American Medical Association.

I might further add, unlike any other legislation, it does not pick a favorite, but it encourages NIE to make investments in all research that has the most imminent promise in terms of benefiting the lives of individuals.

So you heard people talking about embryonic, you heard people talking about adult, you heard people talking about cord blood. The Coleman-Isakson bill recognizes the value of all and leaves to the scientists at NIH the prioritization of those investments but ensures those investments are made in the furtherance of the research, just exactly as indicated in the letter from the AMA.

I see my colleague from Minnesota, Mr. COLEMAN, is on the Senate floor.

I yield to Senator COLEMAN.

The PRESIDING OFFICER. The Senator from Minnesota.

Mr. COLEMAN. Mr. President, I thank my colleague from Georgia for his leadership and the opportunity to work together on something that I hope is a unifying force for this body. Let's agree where we can agree. I think that is what S. 30 offers.

I listened to the debate on S. 5. I see my colleague, the Senator from Iowa. I do not know if there is a greater champion in the Senate than the Senator from Iowa when it comes to supporting the rights of individuals with disabilities. I worked on disability discrimination when I graduated law school 30 years ago. One of my heroes in this regard has always been the Senator from Iowa.

Coauthor of S. 5 is my colleague from Utah, Senator HATCH. I don't know if there is a man of greater moral integrity in this body than ORRIN HATCH. He is an extraordinary man. He and I have had long conversations about this bill. Good people disagree.

For some of us there is that moral line that says we cannot support Federal funding for the destruction of a human embryo. It is a line that a number of people cannot cross. So what happens is, if we have a concern of just having S. 5—and there is a battle that is being waged there. Again, it will pass. It will pass in this body and pass in the House. Then the reality is it will be vetoed. There will not be enough votes to override the veto. So in the end, those with good intentions who want to move science forward are not going to be able to do that.

This message to those who are suffering from ALS and suffering from juvenile diabetes—the research is not going to be moved forward at all.

A number of my colleagues have put forth S. 30 as an opportunity. Dr. Hurlbut said: We offer one small island of unity in a sea of controversy, a place we can come together and promote the opportunity and support pluripotent stem cell research, research that has the ability to provide the kind of flexible cell material that offers great hope. Again, hope; it offers great hope.

The good news is research is going forward in this area. This research offers an opportunity, not just in the area of stem cell research, but if you talk to some of the scientists, science itself is going to be opened, perhaps, to other advancements. We are going to learn more about stem cells just from doing this research.

I have a chart that lays out what ANT is. This is just one of the options under S. 30. S. 30 would provide Federal funding for research that does not involve the destruction of an embryo. Some of it is dead embryo research. This is ANT. Under the natural process you have a fertilized egg, the egg and sperm, the fertilized egg that becomes an embryo.

SCNT, as I understand it, is the way we got Dolly the sheep. We have a somatic cell from an adult. It was an animal—or it could be from a human. You put that cellular material, which has all the DNA, all that program in the enucleated egg, the egg gets fertilized, and you get an embryo.

What ANT does, and the type of research, among a number of options—there are some thoughts you could reprogram these cells. You could do a range of things, but what you are doing is altering the cell nucleus. It is kind of a key in there, something that unlocks the cell. If you take it out—I think it is CDX2, but I am not a scientist. But what you essentially do if you take that out before you transfer into this enucleated egg, before you put this genetic material with all the DNA and everything in there, in the end what you are going to get is an inner cell mass with all the ability to produce the pluripotent cells that you would get, but there is no embryo, and it doesn't cross the moral line.

The opportunity for this Congress, in a bipartisan way, to support this kind of research is a positive thing.

I see my colleague from Missouri. I have some other comments, but I believe we have some time, and I will use that time later.

I want to reiterate that I hope my colleagues who support S. 5—we simply have disagreement over crossing that line—I hope they can come with us and support S. 30.

My concern is about the House. Last year this body passed a bill similar to S. 5. It also passed the Specter-Santorum bill, which provided, by the way, a number of alternative means of producing cells. Some of those, by the way, are included in S. 5. But, again, S. 5 will not become law.

If you want alternative ways to go forward, you have to support S. 30. The House killed the Specter-Santorum bill. Their approach was, they wanted to have 100 percent of nothing—no alternative ways if they didn't get exactly what they wanted in their bill that was similar to S. 5.

I hope my colleagues who are looking to provide hope will understand there is a path to move the science forward. There is a path for funding. There is a path to set up, as we have in S. 30, a stem cell bank, a bank of amniotic and placental stem cells. I hope our colleagues in the House do not do a repeat of what happened last year in which an effort to support alternative means was destroyed because they did not get their way in their version of S. 5.

This is an opportunity to come together. It is not a whole package. It is not everything. It is not all the research that will come forward in S. 5 because for some of us, there is a line that we should not cross. But I think all of us can agree we want to support alternative means. We want to support dead embryo research, ANT, reprogramming, and create the opportunity to have more research being done next year than is being done this year.

That is the promise. That is the hope that S. 30 offers.

With that, I see my colleague from Missouri. I yield the floor.

The PRESIDING OFFICER. The Senator from Missouri is recognized.

IRAQ FUNDING

Mr. BOND. Mr. President, this is a very important debate, but I have another very important subject that I need to bring to the attention of this body. First and foremost, as I address this body, Congress has yet to take the necessary steps to approve emergency funding for our troops serving in a war zone. While I applaud the steps taken by the leadership of the Senate to appoint conferees moments after passing the supplemental appropriations bill, Speaker PELOSI and the House leadership have been too busy conducting foreign policy to appoint conferees.

I am here. We are ready—I, along with a number of my colleagues—to get to work and get the funds where they are needed. As I said time and time again on the Senate floor, our generals and military commanders are in the best position and are best suited to know the needs of our forces. When they tell us they need the funds urgently, I do not believe they are leaving much room for interpretation.

General Schoomaker, Army Chief of Staff—a no-nonsense operator—said:

> Without approval of the supplemental funds in April, we will be forced to take increasingly draconian measures which will impact Army readiness and impose hardships on our soldiers and their families.

Secretary Gates, whom war critics and opponents alike embraced this straight-talking, candid Secretary of Defense, said:

> This kind of disruption to key programs will have a genuinely adverse effect on the readiness of the Army and the quality of life for soldiers and families.

In addition, this, too, would degrade the already perilous State of the National Guard's home front mission to support civil authorities. We are told that 88 percent of the Guard units at home are not equipped to respond to natural disasters or a potential terrorist attack.

That is why I was proud to support, with my friend and National Guard Caucus cochairman, Senator LEAHY, inclusion of a billion dollars in the supplemental for Guard equipment.

The most significant and important constitutional role this Congress is supposed to be undertaking is exercising its power over the purse. Yet, ironically and most detrimentally to our troops, that one paramount duty seems to be the last one on the to-do list of some in Congress. Instead, the retreat-and-defeat crowd has sought to micromanage the war from 8,000 miles away, setting timetables and prescribing troop movements. This same message will discourage our allies, who are beginning to help, obviously, our troops, and only encourage our enemies.

The recent action taken by the retreat-and-defeat crowd would suggest they are vested in defeat in order to achieve the goals of the far left wing of the Democratic Party where Michael Moore, George Soros, and others who support their party with tens of millions of dollars for 527s will do anything to undermine President Bush, even if it means losing the war that radical Islam and al-Qaida have declared on us.

As we have seen in recent weeks since the implementation of General Petraeus' plan, there is movement in the right direction. It cannot be changed overnight and nobody should expect an immediate turnaround, but it is the best hope we have. Senator MCCAIN, who just returned from Iraq, reports that Sunni sheiks in Anbar are now fighting al-Qaida, more than 50 joint United States-Iraqi stations have been established in Baghdad, Muqtada al-Sadr has felt the heat, and his followers overall are not contesting them. Finally, Senator MCCAIN observed that Iraqi Army and police forces are increasingly fighting on their own, with their size and capability growing.

While Senator MCCAIN and I would agree that there are no guarantees for victory and we have a long way to go, we certainly need to make every effort to achieve it. Yet some Members of this body and the other body say the real war on terror is in Afghanistan, not Iraq. If that is so, why are our marines fighting in Al Anbar against al-Qaida?

Charles Krauthammer, on March 30 in the Washington Post, wrote on this very topic:

> Thought experiment: Bring in a completely neutral observer—a Martian—and point out to him that the U.S. is involved in two hot wars against radical Islam insurgents. One is in Afghanistan, a geographically marginal backwater with no resources and no industrial or technical infrastructure. The other is in Iraq, one of the three principal Arab states, with untold oil wealth, an educated population, an advanced military and technological infrastructure that, though suffering decay in the later years of Saddam Hussein's rule, could easily be revived if it falls into the wrong hands. Add to that the fact that its strategic location would give its rulers inordinate influence over the entire Persian Gulf region, including Saudi Arabia, Kuwait, and the Gulf States. Then ask your Martian: Which is the more important battle? He would not even understand why you are asking the question.

The war in Iraq is a very important front on the larger global battlefield. If anyone doubts this, then all we need to do is to listen to what Osama bin Laden had to say back in December 2004 in a message to Muslims in Iraq.

Bin Ladin said: I now address my speech to the whole of the Islamic Nation. Listen and understand. The issue is big, and the misfortune is momentous. The most important and serious issue today for the whole world is this Third World War which the crusader Zionist coalition began against the Islamic Nation. It is raging in the land of the Two Rivers. The world's millstone and pillar is in Baghdad, the capital of the caliphate.

That is what Osama bin Laden said. He has gone on to say: The whole world is watching this war and the two adversaries—the Islamic Nation, on the one

hand, and the United States and its allies on the other. It is either victory and glory or misery and humiliation.

Now, obviously we did not declare war on radical Islam; it declared war on us.

In addition, some in the House have sought to strike the term ''global war on terror,'' pandering again to the likes of the George Soros wing of the party, undercutting U.S. efforts.

The global war on terror is a real mission that 9/11 showed us has no geographical boundaries and one that so many of our brave men and women have died for since the attacks of 9/11.

The terrorists have been targeting the United States throughout the 1980s and 1990s. The United States never responded to those attacks, and the message sent was one of weakness, not strength. We would be repeating the same mistake today by communicating a weakness of our will by our political leaders. We withdrew from Vietnam, we withdrew from Beirut, we withdrew from Mogadishu. These repeated withdrawals signal to our enemies all over the world that if they inflict enough damage on our most heroic citizens, the marines will never surrender, but Washington will.

A precipitous withdrawal, such as that being prescribed by the wannabe generals here in the Congress, would be disastrous. The Iraq Study Group's recommendations reached the same conclusion. James Baker, the group's cochairman, just wrote:

> The report does not set timetables or deadlines for the removal of troops as contemplated by the supplemental spending bills the House and Senate passed. In fact, the report specifically opposes that approach. As many military and political leaders told us, an arbitrary deadline would allow the enemy to wait us out and would strengthen the positions of extremists over moderates. A premature American departure from Iraq, we unanimously concluded, would almost certainly produce even greater sectarian violence and further deterioration of conditions in Iraq and possibly other countries.

The intelligence community, in open hearing, said precipitous withdrawal on a political timetable would lead to heightened killings of Shias and Sunnis, offer a safe haven for al-Qaida to reestablish itself, and likely a region-wide war between Sunni and Shia countries.

To ignore these questions and considerations simply because they are unpalatable is shortsighted at best and dangerous at the worst. Those who want to end the war precipitously because they want to embarrass the President do not want to talk about the fact that the war in Iraq will do anything but end—in fact, would only grow even more dangerous. If we leave, radical Islamists will follow us home.

What I say to those who want to get out either immediately or on a political timetable, not based on the conditions on the ground, is if you want to run the war on terror from this body, you will own it. Even if some would-be generals in this body think they are smarter than General Petraeus and can devise a better plan in legislation—and I doubt that they can—how can they adjust their legislation conditions on the battlefield? To micromanage a war is to ensure defeat.

When a newly revitalized al-Qaida carries out renewed 9/11-scale attacks, you will own those attacks as well. There are hundreds of thousands of soldiers, marines, guardsmen, and reservists and their families who will remember, and I will help remind everyone.

As you may know, I proudly hail from the Show Me State. If all of the rhetoric in Washington about supporting the troops is true, and I believe people mean it, then I suggest that the Congress show our troops we do support them by getting them the funds and giving them a chance to succeed and not taking away management from the hands of our capable generals in the field and bringing to it this body where, in our great military wisdom, we know better than the troops, the officers, and the commanders on the ground what the conditions are in Iraq and the other battlefields.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. ISAKSON. Mr. President, how much of our time remains?

The PRESIDING OFFICER. Twenty-five minutes.

Mr. ISAKSON. Mr. President, I yield 10 minutes to the Senator from Georgia, Mr. CHAMBLISS.

The PRESIDING OFFICER. The Senator from Georgia is recognized.

Mr. CHAMBLISS. Mr. President, I rise today in support of the Isakson-Coleman stem cell research bill. For me, this issue is personal on many levels, and it weighs heavily on my heart, my mind, and my conscience. I have given great care in coming to my decision to be a cosponsor of this bill and have spent much time reflecting, thinking, and praying about making the right decision on this issue of stem cell research because it is a very controversial but yet a very forward-leaning issue.

Today we are debating the various types of research and what many view as the potential to cure diseases. There is no question that everyone here is supportive of medical research and, in particular, of stem cell research. However, there is still so much to be learned from science, so many discoveries yet to be made, and so much that we still do not know.

I am aware that there are very promising alternatives to embryonic stem cell research, such as deriving stem cells from umbilical cord blood and bone marrow. Those cells have demonstrated the capability of turning into most tissue types, thus helping to provide the basis for advanced research to find cures for diseases such as juvenile diabetes, Parkinson's disease, sickle cell anemia, and heart disease. Research from adult stem cells has saved thousands of lives, and funding for this research certainly should continue.

While I am familiar with the advancements made in the adult stem cell research, there is still a lack of scientific evidence to show that embryonic stem cell research yields the strong results we have from the adult stem cell lines. There is also the issue of whether taxpayer dollars should be used for research that many believe is morally wrong.

While the morality of embryonic stem cell research is an issue for many Americans, including myself, I also believe there is a constant need to continue working to advance science and medical research. As a country, it is important that we stay on the cutting edge of medical research and remain globally competitive, because the United States offers the best health care in the world.

This legislation, introduced by Senators ISAKSON and COLEMAN, will not only advance science, it will allow for embryonic research to take place using non-viable embryos. The cells in those embryos have naturally quit dividing and therefore would not be used for fertilization. Even if these embryos were frozen or saved, no practicing physician would ever attempt to implant them because the developmental stages have naturally stopped.

This legislation will allow the Department of Health and Human Services to extend Federal funding for research on embryonic stem cell lines only if the lines were derived without harming a viable embryo. I believe this approach is an effective way to provide for advancements in science and give them to those who are waiting for cures without compromising the value of life.

Many of us have personally benefitted or had family members who benefitted from the advancements made in modern medicine over the past 5, 10, or 20 years. I think we are all grateful for the progress that has been made. It is my most sincere hope that we continue to see monumental steps made in medical research—stem cell and otherwise—and that we find cures for those suffering from diseases such as Alzheimer's, cancer, multiple sclerosis, and spinal cord injuries.

Make no mistake about it, if you sincerely, as a Member of this body, want to see an advancement in the area of medical stem cell research, this is the alternative you must vote for because this is a bill, if it gets the required number of votes, which will go to the President's desk, and it is the bill which the President will sign, and we can move forward on the issue of embryonic stem cell research. I am proud to be a cosponsor and intend to vote for this legislation. I urge my colleagues to do the same.

I yield my unused time back to the manager of the bill.

The PRESIDING OFFICER. The Senator from Georgia is recognized.

Mr. ISAKSON. Mr. President, how much time remains?

The PRESIDING OFFICER. Twenty minutes.

Mr. ISAKSON. Mr. President, I yield 10 minutes to the Senator from Oklahoma.

The PRESIDING OFFICER. The Senator from Oklahoma is recognized.

Mr. COBURN. Mr. President, I have been listening to the debate on this bill from my office. I have written down some of the miraculous statements that have been made on the floor of the Senate, and I thought I would resubmit some of them with some constructive criticism.

Seventy-eight stem cell lines are no longer useful. That is not accurate. All stem cell lines are contaminated with mouse feeder cells. Not true, either. The policy does not work. Not true. Research on stem cells under the present cannot go forward. I would remind the body that stem cells, embryonic stem cells are being researched every day in this country with private money. This is about using Federal dollars to destroy embryos; it is not about blocking embryonic stem cell research.

The statement was made by the Senator from California that these are embryos that would already be destroyed. Now that is not accurate at all. Only S. 5 embraces all forms of stem cell research. S. 30 embraces every form of stem cell research, including embryonic stem cells, but it makes the correct distinction of taking a nonviable embryo that is still viable for embryonic stem cells but not viable to create a human and uses those instead of the true potential-for-life embryos. There would be no limitation on the numbers of these.

If we go to a fertility clinic today where embryos are created, what we see is a range of embryos in terms of their quality. Then they are graded. Some are implantable. Some are frozen. Some have quit dividing. Those that quit dividing but are not dead but don't have the potential are the ones S. 30 will allow to be used for embryonic stem cells. It bypasses the ethical dilemma we have and still gives us embryonic stem cell research.

It was just released by the Journal of the American Medical Association and was on CNN, 13 young people from the ages of 14 to 31, now living in Brazil, who had type 1 diabetes were treated with their own immune cells given back to them, and they now live without insulin. That was released today. It didn't have anything to do with an embryonic stem cell.

Someone during the debate said: We all know embryonic stem cells hold the most potential. I believe the Presiding Officer now in the chair said that. That is not true. They don't hold the most potential. They hold great research potential, but what we ought to be interested in is therapeutics. How do we treat diseases? How do we accomplish therapies to do the most good for the most people?

What we are going to find out is, there will be some potential from embryonic stem cells. But if I had a child with diabetes, I would want it fixed as soon as I could, not 10 or 15 years from now. The fact is, we have all these treatments that are coming about. I am convinced, as much as I am alive and standing here today, that within 10 years new onset type 1 diabetics will be cured within 2 months of the onset of their disease. That is going to happen. We are going to see that. We will see tremendous treatments for that, whether from germ cell lines, embryonic stem cell lines that are harvested correctly and ethically, and other treatments, including autologous or their own stem cells used to treat the body.

I introduced into the RECORD the RAND study on the available embryos. We had it quoted today, there are 400,000 of them out there. That is not true. It is more like 13,000 available. So when we have this exaggerated claim that 400,000 embryos are waiting to be destroyed for embryonic stem cell research, that is not true.

Mr. COLEMAN. Will the Senator from Oklahoma yield?

Mr. COBURN. I am happy to yield.

Mr. COLEMAN. I believe the Senator from Oklahoma earlier introduced a RAND study that talked about the number of embryos. I believe there are nearly 400,000 that may be in IVF clinics. Apparently, only 2.8 percent have the potential to be discarded. Is that correct?

Mr. COBURN. That is correct.

Mr. COLEMAN. Is there a sense that the Senator from Oklahoma has in terms of decisions that parents and others are making about the kind of life potential of those 97 percent that are not being discarded, that are being frozen for future attempts at pregnancy?

Mr. COBURN. There is no question it happens every day. One of the things we have seen in our State is, we sometimes overfertilize eggs and create too many. But when it comes down to the individual couple who says: We are going to try this implantation, we are going to save these, then if they have a child, they may want to have another child, so that many of these are saved in reserve for that family. To say there are 400,000 when, in fact, there are probably less than 13,000 that could be available, if you look at the other side of that, how many nongrowing, nonviable embryos are available today? Fifty to seventy to one hundred thousand of the stage 3 embryos that can be used for embryonic stem cell that doesn't violate the ethical dilemma we face today. So the reason I put the RAND study in there is so the RECORD will show the facts, not the desire of a Member of the Senate to overstate the case. The fact is, there are less than 13,000 available. The fact is, level 3 embryos, there are 100,000 available. Nobody talks about that. In fact, 3 of the 10 that are the best lines right now running came from exactly that source. So we know that is the potential.

Let me continue. We had the statement: Science without ethics is like a ship without a rudder. That is true. Therefore, when we start destroying life, where is our rudder? When we start marginalizing the weakest and the most vulnerable in our society to say we are going to do something good somewhere when, in fact, the science doesn't show that yet, where is our rudder? That is what S. 30 does. S. 30 gives an ethical option for every need we have in the scientific community to accomplish everything the scientific community wants to accomplish. There are no limitations in S. 30.

The Senator from Minnesota has made the point, President Bush is going to veto S. 5. He has already said he is going to veto it. So a year from now, where do we want to be in terms of stem cell research? Do we want to have more embryonic stem cell lines and do we want to have more embryonic stem cell lines the NIH can use money to research on? The answer is, yes, we do. There is one way to do that. That is S. 30. S. 30 allows that. I am convinced, as an obstetrician and as a scientist, that 10 years from now we won't use embryos whatsoever to produce stem cells. We will use embryonic stem cells to help us research genetics and drug treatments for difficult diseases that we already have, and we will use other methods to produce cell lines that will give us cures to disease.

I ask unanimous consent to print in the RECORD the recent announcement of the article in JAMA on CNN, ''Type 1 diabetics live without insulin in stem cell experiment.''

There being no objection, the material was ordered to be printed in the RECORD, as follows:

[From CNN.com]

TYPE 1 DIABETICS LIVE WITHOUT INSULIN IN STEM CELL EXPERIMENT

Chicago, IL (AP).—Thirteen young diabetics in Brazil have ditched their insulin shots and need no other medication thanks to a risky, but promising treatment with their own stem cells—apparently the first time such a feat has been accomplished.

Though too early to call it a cure, the procedure has enabled the young people, who have Type 1 diabetes, to live insulin free so far, some as long as three years. The treatment involves stem cell transplants from the patients' own blood.

''It's the first time in the history of Type 1 diabetes where people have gone with no treatment whatsoever . . . no medications at all, with normal blood sugars,'' said study co-author Dr. Richard Burt of Northwestern University's medical school in Chicago, Illinois.

While the procedure can be potentially life-threatening, none of the 15 patients in the study died or suffered lasting side effects. But it didn't work for two of them.

Larger, more rigorous studies are needed to determine whether stem cell transplants could become standard treatment for people with the disease once called juvenile diabetes. It is less common than Type 2 diabetes, which is associated with obesity.

The hazards of stem cell transplantation also raise questions about whether the study

should have included children. One patient was as young as 14.

Dr. Lainie Ross, a medical ethicist at the University of Chicago, said the researchers should have studied adults first before exposing young teens to the potential harms of stem cell transplant, which include infertility and late-onset cancers.

In addition, Ross said that the study should have had a comparison group to make sure the treatment was indeed better than standard diabetes care.

Burt, who wrote the study protocol, said the research was done in Brazil because U.S. doctors were not interested in the approach. The study was approved by ethics committees in Brazil, he said, adding that he personally believes it was appropriate to do the research in children as well as adults, as long as the Brazilian ethics panels approved.

Burt and other diabetes experts called the results an important step forward.

'VERY PROMISING TIME'

''It's the threshold of a very promising time for the field,'' said Dr. Jay Skyler of the Diabetes Research Institute at the University of Miami.

Skyler wrote an editorial in the Journal of the American Medical Association, which published the study, saying the results are likely to stimulate research that may lead to methods of preventing or reversing Type 1 diabetes.

''These are exciting results. They look impressive,'' said Dr. Gordon Weir of Joslin Diabetes Center in Boston, Massachusetts.

Still, Weir cautioned that more studies are needed to make sure the treatment works and is safe. ''It's really too early to suggest to people that this is a cure,'' he said.

The patients involved were ages 14 to 31 and had newly diagnosed Type 1 diabetes. An estimated 12 million to 24 million people worldwide—including 1 to 2 million in the United States—have this form of diabetes, which is typically diagnosed in children or young adults. An autoimmune disease, it occurs when the body attacks insulin-producing cells in the pancreas.

Insulin is needed to regulate blood sugar levels, which when too high, can lead to heart disease, blindness, nerve problems and kidney damage.

Burt said the stem cell transplant is designed to stop the body's immune attack on the pancreas.

A study published last year described a different kind of experimental transplant, using pancreas cells from donated cadavers, that enabled a few diabetics to give up insulin shots. But that requires lifelong use of anti-rejection medicine, which isn't needed by the Brazil patients since the stem cells were their own.

The 15 diabetics were treated at a bone marrow center at the University of Sao Paulo.

All had newly diagnosed diabetes, and their insulin-producing cells had not been destroyed.

That timing is key, Burt said. ''If you wait too long,'' he said, ''you've exceeded the body's ability to repair itself.''

The procedure involves stimulating the body to produce new stem cells and harvesting them from the patient's blood. Next comes several days of high-dose chemotherapy, which virtually shuts down the patient's immune system and stops destruction of the few remaining insulin-producing cells in the body. This requires hospitalization and potent drugs to fend off infection. The harvested stem cells, when injected back into the body, build a new healthier immune system that does not attack the insulin-producing cells.

Patients were hospitalized for about three weeks. Many had side effects including nausea, vomiting and hair loss. One developed pneumonia, the only severe complication.

Doctors changed the drug regimen after the treatment failed in the first patient, who ended up needing more insulin than before the study. Another patient also relapsed.

The remaining 13 ''live a normal life without taking insulin,'' said study co-author Dr. Julio Voltarelli of the University of Sao Paulo. ''They all went back to their lives.''

The patients enrolled in the study at different times so the length of time they've been insulin-free also differs.

Burt has had some success using the same procedure in 170 patients with other autoimmune diseases, including lupus and multiple sclerosis; one patient with an autoimmune form of blindness can now see, Burt said.

''The body has tremendous potential to repair,'' he said.

The study was partly funded by the Brazilian Ministry of Health, Genzyme Corp. and a maker of blood sugar monitoring products.

Mr. COLEMAN. I yield 2 additional minutes to the Senator from Oklahoma.

Mr. COBURN. There are two ethical questions America has to answer. One is, is it OK to destroy life with the potential of helping cure maladies—we haven't seen it yet—with the potential, the hope to cure maladies? In the midst of that ethical question, is it OK to destroy that life when you could do the same thing without destroying life by using class 3 embryos? That is the first ethical dilemma. The second ethical dilemma we face as a nation and as citizens of this country and as Members of this body is, if in fact it is true there are other ways to get to the exact same goal of treatments—we all want to fulfill the hopes and the desires, whether they are paraplegics, quadriplegics, diabetics, Parkinson's or others, all these tremendous diseases that we know we are going to be able to eventually find a cure for—if we can do that without ever having to destroy the first embryo, wouldn't we all rather go that way? That is what S. 30 offers. S. 30 offers an opportunity to accomplish exactly the same thing without destroying the first life. How we answer that question is going to say a lot about our country.

My hope is a year from now we are standing on this floor and seeing all this promise come true, whether it be altered nuclear transfer, whether it be germ cell, which I happen to believe is going to be another great option in terms of multipotent and pluripotent stem cells, that we will see the fruits and the wisdom of the Senate that passes a bill, S. 30, which actually makes a difference. S. 5 isn't going to make any difference. It is going to get vetoed. It is not going to do anything to help us except create a political posture that the President has said he will not bow to. He is not going to sign it. He is going to veto it, and the House will not override it. So the question is, if you want to give hope, if you want to promote a potential for treatment and cures for all these strong and tough diseases families are facing and individual patients are facing, the way to do that is to make sure S. 30 becomes law. It will, in fact, be the thing that makes the difference. S. 5 won't. S. 5 is going to get vetoed, and we will be back here doing the same thing next year and the next year and the next year.

The point is, let's do what we can today, and S. 30 accomplishes that.

I thank the Senator and yield the floor.

The PRESIDING OFFICER. The Senator from Minnesota.

Mr. COLEMAN. I thank the Senator from Oklahoma for both his passion and his expertise. I think he said this morning—how many babies has the Senator delivered?

Mr. COBURN. A shade over 4,000.

Mr. COLEMAN. This is one Senator who understands the value of life and has a hands-on approach.

It is interesting. President Clinton's bioethics commission concluded, if we have some other alternatives, why wouldn't we use them? They concluded the derivation of stem cells from embryos remaining following infertility treatments is justifiable only if no less morally problematic alternatives are available for advancing the research. I believe what is happening is the science is moving faster than the politics, that we have today the opportunity through a number of processes to move forward with pluripotent stem cell research in ways that are less morally problematic, that don't cross a line, that don't cross the line that says we should not have Federal funding for the destruction of a human embryo.

I know my colleagues and friends who support S. 5 quite often have talked about excess embryos that we have and that may not be used for any other purpose. I would ask them to ask these questions. I believe their intent is this narrow intent, but as you look at S. 5, the question raised is, is this the beginning of the production of embryos? If in fact this is the acceptable path to go, why wouldn't we produce embryos that would then get Federal funding to do the research? Is the use of these embryos only for the purpose of stem cell research? Where would we draw the line? Who draws that line? Why wouldn't we use this to study embryonic growth, cell patterns, a whole range of other things? Once we have crossed the line, where does it end? If it is difficult to coax embryonic stem cells into the desired kinds of differentiated type cell types, would we want to allow the embryos to develop longer so we could kind of coax them into later development so we can see that later stage embryos may be a better source of more advanced cells and tissues and organs? Even if we don't do that, if we move down this path, are there other nations or other countries that don't have the kind of moral concerns we have? Why would they not want to go that route?

We have already begun the process. What we offer in S. 30 is a possibility to bring this country together to provide

Federal funding for stem cell research that provides the hope of what pluripotent stem cells may be able to do. It sets up a tissue bank for amniotic and placental stem cells which offer great promise without the moral dilemma. At a time when clearly the Nation is divided, we offer a time to come together.

My concern is, last year we passed a bill in this Senate that provided for alternatives, Specter-Santorum. It was rejected in the House. I hope my colleagues don't take an all-or-nothing approach. I hope they don't look to get 100 percent of nothing—nothing meaning that S. 5 is going to be vetoed—and then stop us from at least moving forward with the opportunity to put Federal dollars in research and production doing stem cell research that doesn't cross a moral line.

I see my colleague from Oklahoma.

Mr. COBURN. I wanted to add one other thing. When the American people think about stem cells and potential treatments, the thing that is never talked to them about is the idea of tissue rejection. There isn't going to be an embryonic stem cell that produces a cell that can be used in any human without the use of antirejection drugs. The only way you can get around that is to clone yourself. The only way you can get around it totally, without any rejection whatsoever, is to be a female and clone yourself, because cells have these wonderful little engines in them called mitochondria. They have separate DNA. That DNA of the cloned egg will be accomplished as a part of that.

So this idea we think we are going to have this great answer, even once we get to treatments—treatments that use embryonic stem cells rather than altered nuclear transfer, or oocyte-assisted reprogramming—those cells will all have to have accompanying with them, all those treatments, anti-rejection drugs.

If you know anybody who has had any type of organ transplant, ask them how it is to take those drugs. The only way you do that is, we come to the next ethical dilemma: Is it OK for you to clone yourself, then destroy that life you have cloned so you can take part of that for you? All those ethical dilemmas are gone in altered nuclear transfer because now you are inserting stem cells from your own body. They are your own cells. There is no rejection.

In this study in Brazil I just put in the RECORD, there is no rejection because they are using their own cells. They have eliminated the ability of their body to destroy their islet cells in their pancreas and have done that with their own cells. There is no rejection so they are not on any medicines. They are not on insulin anymore because they are now producing insulin.

So the fact is, we should make sure we understand if and when—and there is no guarantee the ''when'' is going to come—we have embryonic stem cell treatments, those are going to be accompanied by antirejection treatments as well. However, if you use your own cells for the same treatment—we heard Senator BROWNBACK talk about the numerous studies that are ongoing now with autologous or self-giving reparations from your own body—there is no rejection issue.

So it is easy for us to talk, and it is easy for us to offer hope, but we need to make sure when we talk about that hope, when we talk about embryonic stem cells, we are balancing it with a realism that we are not off treatment, even though we offer a cure, because now we have a treatment to make sure the cure works. So it is a step that is positive, but it is not the panacea that has been described on this floor today.

Mr. COLEMAN. Mr. President, how much time do I have left?

The PRESIDING OFFICER. Two minutes.

Mr. COLEMAN. Mr. President, I ask unanimous consent to have printed in the RECORD a letter from Markus Grompe, MD, from the Oregon Health & Science University.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

OREGON STEM CELL CENTER, OREGON HEALTH & SCIENCE UNIVERSITY,

Portland, OR, April 10, 2007.

Embryonic stem cells have many potential uses in biomedical research, including cell transplantation therapy, in vitro studies of developmental and disease processes as well as drug testing. To date, the establishment of human pluripotent stem cell lines that can be used for these applications always involves the destruction of nascent life, the embryo. Human embryos can be generated by fertilization or by cloning (somatic cell nuclear transfer).

However several recent studies, pioneered in animals, have firmly established that it is also possible to generate pluripotent cells equivalent to embryonic stem cells without destroying embryos (the alternative methods). While these approaches have been only tested in animals to date, it is highly likely that similar approaches will work for human cells as well. Additional research is needed to realize the potential of the alternative methods and make them practical on a large scale. For this reason I strongly support Senate Bill 30. This bill will provide the necessary support to establish and validate methods for producing pluripotent cells without destroying human life.

Several of the proposed methods have scientific as well as ethical advantages. The third and fourth techniques described in the President's Council on Bioethics May 2005 White paper will produce cells that are immunologically matched to the patient from who they were derived. These cells could then be used for transplantation without being rejected by the immune system. It is also expected that these approaches will make the production of pluripotent cell lines technically easier and more efficient that methods that rely on embryos.

In my own laboratory we would use the alternative methods to produce liver and pancreas cells for the treatment of liver diseases and diabetes.

Sincerely,

MARKUS GROMPE, M.D.,
Director.

Mr. COLEMAN. In that letter Dr. Grompe talks about what my colleague from Oklahoma just talked about. He talks about producing cells that are immunologically matched to the patient from whom they were derived. He says:

These cells could then be used for transplantation without being rejected by the immune system. It is also expected that these approaches will make the production of pluripotent cell lines technically easier and more efficient than methods that rely on embryos.

Then he goes on to say:

In my own laboratory we would use the alternative methods to produce liver and pancreas cells for the treatment of liver diseases and diabetes.

We have an opportunity under S. 30 to move the research forward, to move it forward in a unified way, a way that avoids the culture wars, avoids the great divide, that has the opportunity for moving forward without dealing with the issues of immune reactions that opens up a vision of hope. This is about hope. S. 30 is hope offered through principled and ethical stem cell research—the HOPE Act.

I hope my colleagues on both sides of the aisle—whatever their position is on S. 5—understand if they want to move the ball forward, if they want to look into the eyes of their constituents and say we are going to give you something, some sense of hope, we are going to move research forward, the only way to do that today is through supporting S. 30. I urge my colleagues to support S. 30.

Mr. President, I yield the floor and yield back the remainder of our time.

The PRESIDING OFFICER (Mr. SALAZAR). Who yields time?

The Senator from Iowa.

Mr. HARKIN. Mr. President, do I understand the situation is that now our side has 60 minutes?

The PRESIDING OFFICER. The Senator is correct.

Mr. HARKIN. Mr. President, I yield 10 minutes to the Senator from Florida.

The PRESIDING OFFICER. The distinguished senior Senator from Florida is recognized.

Mr. NELSON of Florida. Mr. President, this, to me, is an issue where we ought to be using some common sense. We have all of these enormously plaguing diseases that are upon us, and we have the first rays of hope we can cure these diseases.

Who among Americans has not been touched by diseases such as ALS and Parkinson's and spinal cord injury and diabetes and Alzheimer's and cardiovascular disease and cancer? Who among us, one way or another, has not been touched by it? Now we have this ray of hope that the scientists tell us, by growing these stem cells, we have this opportunity for enormous medical breakthroughs.

At the National Prayer Breakfast this year, the speaker was Dr. Francis Collins. He is the fellow who headed the project of mapping the entire human genome. I have heard Dr. Collins speak on other occasions in which

he has talked about the promise of all of the stem cell research.

Dr. Collins—and I say this for a specific reason—was the speaker at the National Prayer Breakfast because he is this eminent scientist who successfully mapped the human genome, but he is also a man of a deep and abiding faith who happens to support not only the stem cell research that we address here today—which is in this bill to open the coffers of the Federal Government so we can finance beyond the limited number of lines in embryonic stem cell research—but Dr. Collins would make the case for going beyond in something known as somatic cell nuclear transfer, which is taking an egg, scooping out the nucleus, taking a donor's skin cell, taking the nucleus from that, and implanting it in the egg, stimulating the process to grow, and growing a specific line of stem cells that are exactly tailored to the donor's cells, and growing whatever the stem cells are.

But that is another advance. That is not even what we are addressing today. We are addressing Federal funding for the first kind of growing stem cells. Why we would not use the resources of the Federal Government to attack these diseases that the scientists and the medical profession feel have enormous progress, why we would not do that is beyond me.

With regard to the second kind—somatic cell nuclear transfer—you are not even dealing with a fertilized egg, so you do not have that question. The question there is, are you going to where you do cloning? Well, we have the capability of passing the laws that say cloning for a human, where it would be implanted into the womb—we can say that is not only unlawful, that is criminal. That does not mean we do not proceed with the research and the development on stem cell research—in that case, somatic cell nuclear transfer.

So this is a matter that can bring hope to millions. As I said, there is simply not an American who has not been touched one way or another through friends or family by this list of horrible diseases. If that gives us promise, that is enough for this Senator, and I hope it is enough for a two-thirds majority of this Senate so when the President vetoes it, we can override it.

This is a bipartisan bill that is going to expand the number of stem cell lines that would be eligible for federally funded dollars for research. It clearly would accelerate the progress toward the cures and treatments for these dread diseases.

Every other Senator and I have heard from thousands of people back in our States who suffer—suffer daily—from these dread diseases. With this ray of hope—like a sunburst coming through the clouds—we cannot turn our face from it. We have to face it. We have to give hope to these people who are suffering. That is the task before this Senate.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Iowa.

Mr. HARKIN. Mr. President, I am waiting for the arrival of another Senator to speak.

I listened to some of the debate that was just concluded, and I thought I heard—I am almost certain I heard—the distinguished Senator from Oklahoma say S. 5 would provide money for the destruction of human embryos.

Well, I am sorry, I hate to disagree with my friend from Oklahoma, but that is not so. As a matter of fact, we do not provide that kind of Federal money now with the stem cell lines that are being researched—the few that are being researched now—and we do not under our bill. We still operate under what is called the Dickey-Wicker amendment which prohibits the use of Federal funds being used to destroy embryos. So we do not do that anyway. I think the Senator from Oklahoma ought to read the bill a little bit more carefully and understand we do not provide for the destruction of embryos.

I always find curious, every time someone speaks for the President—a spokesperson for the President—they always say the one line the President will not cross is he will not provide taxpayer money for the destruction of embryos. Well, if that is the case, then he should have no problem with S. 5, the bill we have before us, because it does not provide Federal funding for the destruction of embryos. It provides Federal funding for the research on stem cell lines that are derived by others—private entities, State entities, or whatever. But we do not provide any funding for the destruction of embryos whatsoever. I wanted to clear that up to make certain that did not sit out there.

I also listened earlier to my good friend—and he is a good friend—Senator BROWNBACK talking about the 72 diseases being treated with adult stem cells. Well, if all of these diseases are being treated so well with adult stem cells, then why do all the patient advocacy groups that are affiliated with those diseases support our bill, S. 5? We have 525 different patient advocacy groups supporting our bill.

I wish to ask the Senator from Kansas, how many does he have supporting S. 30? Senator BROWNBACK's list includes several types of leukemia and lymphoma, but I have a letter from the Leukemia & Lymphoma Society, by Mr. George Dahlman, the vice president for public policy. He wrote a letter dated April 4 of this year. He says:

On behalf of The Leukemia & Lymphoma Society, I am writing in response to assertions that adult stem cells have treated or cured several blood cancers, including several leukemias, lymphomas and multiple myeloma.

As a representative of more than 700,000 patients and their caregivers in this country who battle blood cancers on a daily basis, our organizations would like to emphasize, as the Senate debates S. 5, the Stem Cell Research and Enhancement Act, that we exist today because we have not found cures for these devastating diseases.

He says:

Furthermore, the claim that treatment of blood cancers with cord blood, blood, or marrow stem cells demonstrates the potential of ''adult stem cell'' research or is a substitute for embryonic stem cell research is misleading and disingenuous.

So again, Senator BROWNBACK's list included leukemia and lymphoma, but the various organizations that represent all these people support S. 5. I ask unanimous consent that a copy of that letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

THE LEUKEMIA & LYMPHOMA SOCIETY,
April 4, 2007.

Hon. HARRY REID,
Majority Leader, U.S. Senate,
Washington, DC.

DEAR SENATOR REID: On behalf of The Leukemia & Lymphoma Society, I am writing in response to assertions that adult stem cells have treated or cured several blood cancers, including several leukemias, lymphomas and multiple myeloma.

As a representative of more than 700,000 patients and their caregivers in this country that battle blood cancers on a daily basis, our organization would like to emphasize as the Senate debates S. 5, the Stem Cell Research and Enhancement Act, that we exist today because we have not found cures for these devastating diseases.

Furthermore, the claim that treatment of blood cancers with cord blood, blood or marrow stem cells—known as hematopoietic stem cells—demonstrates the potential of ''adult stem cell'' research or is a substitute for embryonic stem cell research is misleading and disingenuous. While these hematopoietic treatments can rejuvenate similar cell lines, they have not demonstrated robust ''plasticity'' or the ability to give rise to more varied lineages. That ability is the characteristic that gives hope to researchers and patients and should be clearly understood in this debate. The concept that ''adult stem cells'' can differentiate into more diverse tissue types is highly controversial and evidence to date has been inconclusive. While deserving of further scientific study, there is no clear evidence that the use of adult stem cells can substitute for pluripotent stem cells that have the capability of making diverse tissue types.

We support exploring every avenue of research, including embryonic stem cell research, until a cure is found. The most respected scientists in our field view embryonic stem cells as an area of research that must be explored, and one that our government must make a commitment to support. The Leukemia & Lymphoma Society asks that you and your colleagues pass S. 5, and not accept any substitutes.

Sincerely,

GEORGE DAHLMAN,
Vice President, Public Policy,
The Leukemia & Lymphoma Society.

Mr. HARKIN. Mr. President, I see my colleague, Senator BROWN from Ohio, is here. I yield to him 10 minutes. If he needs more time, I can yield him more.

The PRESIDING OFFICER. The Senator from Ohio is recognized.

Mr. BROWN. Mr. President, I thank the Senator from Iowa, who, frankly, more than anybody in this institution and almost anybody in the country, has led the charge on embryonic stem

cell research and the work he has done will save lives, which is what this issue is all about.

The Senate is about to vote on legislation that ends the ban on Federal funding for embryonic stem cell research. President Bush, as we hear—although I still hope he changes his mind—does not support lifting the ban on stem cell research, but do we know who does? The American Medical Association thinks we should lift the ban. So does the American Society for Microbiology, the Association of American Medical Colleges, the Cancer Research Foundation of America, the Juvenile Diabetes Research Foundation, the Parkinson's Action Network, Project ALS, and the Society for Pediatric Research. The list goes on and on and on.

We in this body should ask ourselves: Why do these groups support Federal funding? Because the research offers victims of these diseases hope. Not a magic bullet, not a miracle cure, not certainty but, quite simply, hope: hope that a child with a spinal injury will recover the ability to walk; Hope that a parent with Alzheimer's will be able to step back from the abyss of dementia. Hope.

Recently the Director of the National Institutes of Health stated in a Senate hearing that he supports expanded stem cell research. Dr. Zerhouni, who basically is one of the President's chief medical advisers and an appointment of President Bush, said:

> It is clear today that American science would be better served and the Nation would be better served if we let our scientists have access to more cell lines.

That would give them the opportunity to expand their research, to open one more door, provide one more opportunity for research; in a word, to provide hope.

If we don't listen to the leader of one of our Nation's most prestigious scientific institutions, whom will we listen to? Because of embryonic stem cell research, medical science may one day be able to dispense with the use of terms such as ''incurable'' or ''irreversible'' or ''unremitting,'' words that spell disaster to loved ones, words that spell no hope so often for patients. If we can do what we have the opportunity to do today, to open another door, to give another window of opportunity to our medical scientists, to our researchers, we can provide that hope to so many patients and so many loved ones of those patients. That is amazing. Getting anywhere near that goal would be amazing.

More than 200,000 people in my State, more than 200,000 Ohioans have Alzheimer's disease. More than 40,000 Ohioans have Parkinson's disease. Almost 700,000 Ohioans have diabetes. That is about 1 in 14 Ohioans who have diabetes. I have a family member suffering from diabetes. My best friend, John Kleshinski, is someone who provided hope for so many. He lived in Boston for many years. He grew up in Ohio with me. John Kleshinski provided hope to so many children in inner-city Boston because of his philanthropy, because he gave young children in Boston a chance to learn music, to play the piano, to sing, to learn other musical instruments. John Kleshinski always provided hope. John was diagnosed with juvenile diabetes when he was 13. Last November, at the age of 55, he died of a heart attack. Throughout his life, he did everything possible, everything within the limits of modern medicine to prolong his life and to live the healthiest life he could. If we had done the advancements in embryonic stem cell research, it could have made a difference in John Kleshinski's life. If we are going to choose life, if we are going to value life, this issue is so very important to give people hope.

Looking at these conditions alone, at Parkinson's, diabetes, especially juvenile diabetes, and Alzheimer's, it is clear there are huge stakes involved when Federal actions delay the moment when embryonic stem cell research produces its first human treatment. We can act tomorrow and pass this legislation. We can continue to try to persuade the President, as his own medical adviser did, to change his mind. His own medical adviser changed his mind over the last couple of years about stem cell research. If we can pass this bill tomorrow and hopefully convince the President to change his mind, it will provide hope for so many Americans.

This bill, Senate bill 5, will advance stem cell research, and most legislators are in support of S. 5, which passed the HELP Committee, and it has passed in the other body. But President Bush has threatened to veto this bill. He vetoed similar legislation last year as his first and only veto since he has been President. I hope he takes a step back. I hope he considers the people he is hurting by stifling embryonic stem cell research. I hope he listens to his own medical adviser, Dr. Zerhouni. I hope he listens to the millions of Americans whose lives will be shattered by disabling and terminal illnesses, the families whose hearts will be broken by the loss of a loved one, the children who will not grow up, the parents who will not meet their grandchildren, the grandparents who will no longer recognize their friends and their family members. Parkinson's disease, Lou Gehrig's disease, Alzheimer's disease, cancer, arthritis, diabetes, paralysis, the advancement of embryonic stem cell research can provide hope for cures of all these diseases.

Investing in embryonic stem cell research is an expression of empathy and compassion. We have an opportunity to turn potential cures into real ones. We must not squander it. Hope, Mr. President, hope.

Mr. HARKIN. Mr. President, I wish to thank the Senator from Ohio for his eloquent statement. This is what it is all about. He got it right when he said this is about hope. It is not hope based upon any kind of false foundation. All the leading scientists, Nobel Prize winners, heads and former heads of NIH, and 525 different advocacy groups, all relying upon good scientific expertise, have said the foundation here is solid, that we can build hope because we know embryonic stem cells develop into all the cells of the human body. We know. We have had embryonic stem cells that have differentiated into nerve tissue, more neurons, heart and muscle tissue, and bones. So we know the possibility is there because it has already been done.

Again, we have a long way to go. No one is saying that absolutely we will do this, this, and this, but that is what scientific research is about. It is about looking and studying and examining and trying to develop these ideas. We know the foundation is there. So the hope we hold out to people with Parkinson's, Alzheimer's, ALS, and spinal cord injury is one that is real, but it will not happen unless we get about embryonic stem cell research and lift the handcuffs, the shackles off our scientists.

So the Senator from Ohio is right. It is about hope. That is what this bill is all about. It is about hope. Not the false hope of saying: Oh, adult stem cells will take care of it. Adult stem cells have their place, and some of them have proven adequate to do different things but not everything. There is hope with amniotic fluid stem cells, cord blood stem cells. Now, the bill S. 30 talks about that, which is taking it from naturally dead embryos. That raises ethical questions in and of itself. Who decides when something is naturally dead? I would ask my colleagues who are promoting S. 30—and they are my good friends; I know they mean well and they are trying to advance a certain point of view, but are they saying you can take something that is dead and bring it back to life? If so, that is—I have only known where that has happened once in the history of humankind, and we just celebrated Easter Sunday. So they can't be saying they are taking something dead and bringing it back to life. So if it is not dead, what is it? Is it a sick embryo? Is it an embryo that isn't quite propagating as fast? What is it and who decides? Who gets to decide? S. 30 doesn't say that. S. 30 has no ethical guidelines to decide, or who decides what is naturally dead. So that raises all kinds of ethical questions in and of itself. So that is why, even if S. 30 were to become law—I don't think it will be—I don't mind supporting S. 30. The fact is our bill, S. 5, does everything S. 30 wants to do. If they want to do research to take embryonic stem cells from blastocysts that are not developing correctly, that can happen under our bill. Our bill opens the door to all kinds of research.

Here is the difference between S. 5 and S. 30. S. 5, the bill we are supporting, does both things. It opens the door for embryonic stem cell research

from leftover embryos from in vitro fertilization clinics, under strict ethical guidelines which I talked about today and laid out. It also would provide for research into naturally dead embryos. Now, S. 30, their bill, the Isakson-Coleman bill, it does one of those. It does research only into stem cells from naturally dead embryos. That is the difference. Our bill allows that to go ahead. Their bill does not allow the more promising embryonic stem cell research to go ahead, and that is from leftover embryos at in vitro fertilization clinics. That is what this is all about. That is what this is all about.

Again, I repeat: It is about what the Senator from Ohio said. It is about hope. Listen, we are not fooling anybody around here, the people watching, the medical community out there, the research scientists, the families of loved ones who are suffering from these illnesses, the kids with juvenile diabetes, they get it. They get it. They know what that is all about. They know there is only one bill on the floor of the Senate now that gives them hope, and that is S. 5. They know it. All this mumbo jumbo we hear, it doesn't mean anything. Only one thing means anything, and that is to pass the bill that takes the shackles off our scientists, that provides for strict ethical guidelines for people who have leftover embryos at an in vitro fertilization clinic who say: I don't want them discarded as hospital waste. I want them to be donated to science to cure diseases and illnesses and to help suffering people.

That is what S. 5 is about. S. 30 does not do that. It simply keeps the handcuffs on our scientists, and we want to remove those handcuffs.

Mr. President, I see my good friend from New Jersey is on the floor, so I yield 10 minutes to the Senator from New Jersey.

The PRESIDING OFFICER. The Senator from New Jersey is recognized.

Mr. MENENDEZ. Mr. President, I appreciate the Senator from Iowa yielding time, and I appreciate his leadership on this issue.

Mr. President we are back again—almost a year after Congress passed breakthrough legislation—discussing embryonic stem cell research and, again, I rise in strong support of this lifesaving, life-enhancing legislation.

I am a proud cosponsor of S. 5, the Stem Cell Research Enhancement Act, because I believe the bill has the potential to make a profound and positive impact on the health of millions of Americans. I believe that it can do so in an ethical manner.

We know embryonic stem cells have the unique ability to develop into virtually every cell and tissue in the body. We know numerous frozen embryos in fertility clinics remain unused by couples at the completion of their fertility treatments. Why should they not be allowed to donate those embryos to Federal research to save lives? We allow people to donate organs to save lives. Why couldn't a couple, if they so choose, donate their frozen embryos instead of simply discarding them, throwing them away, throwing away hope?

We can do this ethically and still cure illnesses, enhance lives and, hopefully, even save lives. But the truth is, we should not even be having this debate right now because if the President had done his duty last year and not vetoed H.R. 810, this bill would already be law, and this country's dedicated medical researchers would be well on their way to discovering treatments and cures for many of the most savage diseases afflicting us. But when given the opportunity to carry out the will of the people, he stood for ideology and ignorance over science and research.

Mr. President, enough is enough. It is time for a change. I have no doubt that the Senate will pass this important legislation and thus seek to advance federally funded research on embryonic stem cells. I have no doubt that if it becomes law, the bill would save and improve lives all over America. I have no doubt that the majority of Americans want us to pass this bill into law. My only doubt is whether our President will do his duty and sign it into law.

During the last Congress, President Bush vetoed H.R. 810, crushing the hopes of millions of Americans. This year, I fear and suspect that he will follow the same misguided path. But before he takes us down that route, one that leads to more heartbreak and suffering, I have one question. Why? Why is he standing in the way of research that will save lives? Why is he keeping our parents, our children, and our friends locked in wheelchairs and hospital beds? Why is he letting conservative ideology rob the lives of so many suffering Americans?

The simple fact is, whatever the claims of those who ignore science in favor of ideology, embryonic stem cell research offers one of the most promising leaps forward in the history of medicine. Speak to those who are eager to do the research and you hear of potential cures for juvenile diabetes, Alzheimer's, Parkinson's disease, and spinal cord injuries. If we unlock the door to this research, we can find treatments and cures for these debilitating and painful diseases. We owe it to our parents, our children, and our grandchildren to unlock that door.

But President Bush prefers ignorance and pain over mercy and miracles. Where is the compassion he often speaks of? His own scientists are trying to explain the power of this research, but he continues to turn a deaf ear, refusing to listen to common sense and reason. Mr. President, it is time to start listening.

The preamble of our Constitution says all Americans have the right to ''life, liberty, and the pursuit of happiness.'' I believe this implies the freedom to be physically able. By not allowing embryonic stem cell research, we are prohibiting individuals from pursuing their rights. We are blocking them from a possible cure or treatment. And we are standing in the way of their freedom.

Last Congress, the interim chair of the National Institutes of Health stem cell task force, bravely and bluntly spoke of the importance of embryonic stem cell research and the drawbacks of the current policy prohibiting research.

He said:

> Science works best when scientists can pursue all avenues of research. If the cure for Parkinson's disease or juvenile diabetes lay behind one of four doors, wouldn't you want the option to open all four doors at once instead of one door?

How can we tell our loved ones that their cure could be waiting behind a laboratory door, but that door is locked? We must pursue all avenues of research and unlock the potential that embryonic stem cell research holds.

But if that isn't enough, recently, before the Health Education, Labor, and Pensions Committee, the Director of the NIH, Elias Zerhouni, said the great promise of human embryonic stem cell research is being impeded by President Bush's policy. He said:

> It is in the best interest of our scientists, our science, and our country that we find ways and the nation finds a way to go full speed across adult and embryonic stem cells equally.

So if President Bush won't listen to his own scientists, who will he listen to? Perhaps he will listen to the American people who are crying out in virtual unison for change. More than 70 percent of Americans support embryonic stem cell research. Three out of four Americans understand the hope and promise this research provides.

This bill means all the prayers for cures and therapies for Alzheimer's disease, muscular dystrophy, heart disease, and other illnesses could be answered. This bill provides a promise that families might no longer have to see a loved one suffering. This bill means hope for individuals challenged and fighting to live a life with dignity. I have met with children and families all over New Jersey who have shared their daily struggle with diseases and conditions that could be cured or treated if we were to pursue embryonic stem cell research.

Young children have come to my office and told me how they have to prick themselves with a needle, administer insulin shots, or use an internal pump on the side of their body in order to keep their juvenile diabetes under control. These children might be freed of this grave responsibility if we support embryonic stem cell research. Don't we owe them the opportunity of a better life? Don't we owe it to the husband whose wife shakes uncontrollably from Parkinson's disease to help find a cure that will restore her body? Don't we owe it to the athletes who told me about their life-altering spinal cord injuries, to give them the freedom to walk again?

None of these individuals chose their current situations. But we can choose to help get them out of those situations. We owe it to the American people, to the millions of Americans and their families suffering from life-altering disabilities and diseases, to demonstrate our Nation's full commitment to finding a cure and doing all we can to help their dreams and hopes come true. Stem cell research has vast potential for curing diseases, alleviating suffering, and saving lives. I know my colleagues recognize the enormous potential of this research, too. It is time for the President to start listening.

The question is, Why does President Bush continually ignore the American people? He ignores what the American people are saying about Iraq, and now he ignores what they are saying about embryonic stem cell research. Both decisions result in lost lives, and both decisions cause pain and suffering. This is unacceptable to me and the overwhelming majority of Americans. It should be unacceptable to the President as well.

I am very passionate and dedicated to this cause because the promise of stem cell research has personally captivated my family, like it has so many other American families. My mother suffers from severe Alzheimer's disease. When I look at her empty gaze and her shriveled body, I cannot help but wonder if we had started embryonic stem cell research years ago, would she still be suffering today, would she be cured, would she at least be able to recognize her children and her grandchildren, would she have been with me on the day I took the oath of office in this Chamber.

I don't want my children to be asking the same types of questions. We cannot wait any longer.

The Stem Cell Research Enhancement Act is an ethical life-enhancing, lifesaving piece of legislation. I believe it is the moral obligation of the United States Government and the President of the United States to allow this process—these potential cures—to be fully explored.

Embryonic stem cell research holds the promise of hope and the possible restoration of life.

We owe it to current and future generations to ensure that their lives remain as bright and prosperous as today's science allows.

It is time for the President to start listening to the American people and to the scientists, not just special interests. It is time for him to sign this important piece of legislation into law and open the door to the hope and promise of embryonic stem cell research.

It is time for hope and cures—not despair and disease.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. HARKIN. Mr. President, I thank the Senator from New Jersey for a very eloquent and poignant presentation of his position on embryonic stem cell research. I think what the Senator reflected is, again, the hopes of so many families in America who have a loved one suffering from Alzheimer's or juvenile diabetes, or a young person who has had an accident and is a paraplegic for life with a spinal cord injury. You say: What can we do to help? How can we help? Well, it is one thing to be sympathetic—and we are sympathetic to those who suffer from illnesses or injuries—but if we have it within our grasp, as the Senator from New Jersey said, to open some doors and see what is behind those doors, it seems to me we are compelled to do that.

We don't know where the scientific research may lead. But we do know if we don't do it, it is not going to lead anywhere. We know that. As I said earlier, the foundations are there to give hope to people that embryonic stem cell research will lead to great discoveries and treatments and interventions. I can only say to my friend from New Jersey that, in all of my meetings with scientists over the last dozen years or more—and especially since Gerhardt and Thompson isolated stem cells in 1998—the scientific community's enthusiasm for this is almost boundless because they realize that harnessing the power of embryonic stem cells that can develop into any form of a cell in the body could lead to interventions and cures that are now beyond our grasp.

I listened to the Senator from New Jersey, especially when he talked about opening doors. I have often likened biomedical research, scientific research, to saying if there are 10 doors, and you don't know what is behind any of those doors, if you are only going to open one door, what are your odds of finding the right answer? Well, if you open two doors, the odds get better. If you open five doors, you know it is 50–50. So the more doors we open, the better our chances are of finding these discoveries.

The Senator is right. If we open one door at a time, the odds are always going to be 10 to 1—or I guess it would be 9 to 1. It would be 9 to 1 that you are not going to find the right answer.

If we start opening all these doors and get the scientists talking with one another and looking at things, well, that means the span of time that it would take to find these cures is collapsed.

Scientists don't work in a vacuum. They collaborate. They talk with one another. They read one another's papers. They find out what other scientists are doing. They find out if a scientist has opened a different door and collaborate on that. That is why it is necessary to begin to open these doors.

I thank the Senator from New Jersey for talking about that point.

Earlier I was responding to the comments of my friend from Kansas, Senator BROWNBACK. He was talking about 72 diseases being treated with adult stem cells. I pointed out his list included several types of leukemia and lymphomas, but I had printed in the RECORD earlier a letter from George Dahlman of the Leukemia and Lymphoma Society saying they support S. 5.

Senator BROWNBACK's list also included testicular cancer. I have a letter from Craig Nichols, M.D., board member of the Lance Armstrong Foundation. Here is what he says:

As a member of the Lance Armstrong Foundation Board of Directors, I am writing in response to assertions that adult stem cells have treated or cured the disease of testicular cancer. . . . I feel it is important to set the record straight on this issue. . . .

There is not an FDA-approved adult stem cell treatment generally available to treat testicular cancer. Rather, adult stem cells enable testicular cancer patients to withstand a higher dose of chemotherapy during treatment for the disease.

We support exploring every avenue of research, including embryonic stem cell research within specified ethical limits, until a cure is found.

The Lance Armstrong Foundation asks that you and your colleagues pass S. 5, and not accept any substitutes.

I ask unanimous consent that a copy of this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

LIVESTRONG,
LANCE ARMSTRONG FOUNDATION,
APRIL 6, 2007.

Hon. HARRY REID,
Majority Leader, U.S. Senate,
Washington, DC.

DEAR SENATOR REID: As a member of the Lance Armstrong Foundation's (LAF) Board of Directors, I am writing in response to assertions that adult stem cells have treated or cured the disease of testicular cancer. While the mission of the LAF is to inspire and empower people affected by all types of cancer, I feel that it is important to set the record straight on this issue.

Testicular cancer is the most common cancer among men ages 15–35 and approximately 8,000 men will be diagnosed with testicular cancer in the United States this year. While testicular cancer is one of the most curable forms of cancer, our organization would like to emphasize as the Senate debates S. 5, the Stem Cell Research and Enhancement Act, that we have not completely eradicated the disease.

There is not an FDA-approved adult stem cell treatment generally available to treat testicular cancer. Rather, adult stem cells enable testicular cancer patients to withstand a higher dose of chemotherapy during treatment for the disease.

We support exploring every avenue of research, including embryonic stem cell research within specified ethical limits, until a cure is found. The most respected scientists in our field view embryonic stem cells as an area of research that must be explored, and one that our government must make a commitment to support. The Lance Armstrong Foundation asks that you and your colleagues pass S. 5, and not accept any substitutes.

Sincerely,

CRAIG NICHOLS, M.D.,
Member of the Board,
Lance Armstrong Foundation.

Mr. HARKIN. Mr. President, Senator BROWNBACK's list of 72 diseases includes Parkinson's disease. I have a letter

from six Parkinson's groups: The American Parkinson's Disease Association, the Parkinson's Action Network, the Michael J. Fox Parkinson's Research Foundation, the National Parkinson Foundation, the Parkinson's Disease Foundation, and the Parkinson's Alliance & Unity Walk.

Here is what they say:

Opponents of S. 5 are using as ammunition the assertion that embryonic stem cell research is not needed in this country because many diseases, 72 of them, including Parkinson's, have been treated or cured with adult stem cells. This assertion is an absolute falsehood. If there were a therapy to adequately treat the symptoms or halt the progression of this unrelenting disease, the millions of Parkinson's patients, caregivers and their physicians would be pursuing that treatment right now. . . .

The Parkinson's community asks that you and your colleagues pass S. 5 and not accept any substitutes.

I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

PARKINSON'S ACTION NETWORK,
Washington, DC, April 6, 2007.

Hon. HARRY REID,
Majority Leader, U.S. Senate,
Washington, DC.

DEAR SENATOR REID: We recognize that you are hearing from many patient advocacy and research organizations refuting a belief that adult stem cells have been used in treating or curing a long list of ailments, conditions and diseases. As representatives of more than one million people with Parkinson's disease and their families, our organizations would like to emphasize as the Senate debates S. 5, the Stem Cell Research and Enhancement Act, that we exist today because we have NOT found a cure or adequate treatments for Parkinson's using adult stem cells or otherwise. Furthermore, Dr. Elias Zerhouni, Director of the National Institutes of Health and President Bush's top scientist, when recently testifying before the Senate declared that the idea that adult stem cells hold as much promise as embryonic stem cells ''doesn't hold scientific water.''

Because the unique promise of embryonic stem cell research is critical to advancing understanding of and treatments for Parkinson's disease, the Parkinson's community is dedicated to expanding federal funding for embryonic stem cell research. As you may know, Parkinson's occurs when dopamine producing neurons in the brain die. To this date, scientists have had more success in generating dopamine cells from human embryonic stem cells than any other type of stem cell, including adult, umbilical, or amniotic.

While replacement of these neurons may be one therapy resulting from additional embryonic stem cell research, other avenues of Parkinson's research will benefit from this legislation and expansion of the current policy. Researchers will be aided in studying the causes of Parkinson's, developing more accurate models to improve our understanding of the disease, and, ultimately, halting the unrelenting neurological degeneration and loss of quality of life for Parkinson' s patients.

Opponents of S. 5 are using as ammunition the assertion that embryonic stem cell research is not needed in this country because many diseases, 72 of them , including Parkinson's, have been treated or cured with adult stem cells. This assertion is an absolute falsehood. If there were a therapy to adequately treat the symptoms or halt the progression of this unrelenting disease, the millions of Parkinson's patients, caregivers and their physicians would be pursuing that treatment right now.

The most respected scientists in our field view embryonic stem cells as an area of research that must be explored and one that our government must make a commitment to support. The Parkinson's community asks that you and your colleagues pass S. 5 and not accept any substitutes.

Sincerely,

JOEL GERSTEL,
American Parkinson Disease Association.
AMY COMSTOCK RICK,
Parkinson's Action Network.
DEBI BROOKS,
The Michael J. Fox Parkinson's Research Foundation.
JOSE GARCIA-PEDROSA,
National Parkinson Foundation.
ROBIN ELLIOTT,
Parkinson's Disease Foundation.
CAROL WALTON,
The Parkinson Alliance & Unity Walk.

Mr. HARKIN. Mr. President, Senator BROWNBACK's list includes multiple sclerosis. Here is a letter from the National Multiple Sclerosis Society:

S. 5 is the only bill that is pro-patient, procure, and pro-research. Please work to pass S. 5 immediately. Thank you for bringing this important vote to the Senate floor.

Joyce Nelson, President and CEO of the National Multiple Sclerosis Society.

I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

NATIONAL MULTIPLE SCLEROSIS SOCIETY,
Washington, DC, April 5, 2007.

Hon. HARRY REID,
Senate Majority Leader,
Washington, DC.

DEAR SENATOR REID: The National Multiple Sclerosis (MS) Society strongly supports the Stem Cell Research Enhancement Act (S. 5). We ask that as Majority Leader, you help champion S. 5 through the Senate without any amendments and with the widest possible majority of support.

The National MS Society believes all promising avenues of research that could lead to the cure or prevention of MS or relieve its symptoms must be explored. The Society supports the conduct of scientifically meritorious medical research, including research using human cells, in accordance with Federal, State, and local laws and with adherence to the strictest ethical and procedural guidelines. Research on all types of stem cells is critical because we have no way of knowing which type of stem cell will be of the most value in MS research. Stem cells—adult or embryonic—could have the potential to be used to protect and rebuild tissues that are damaged by MS, and to deliver molecules that foster repair or protect vulnerable tissues from further injury.

Until there is a cure for MS, we hold that every ethical avenue of research, which may have the potential to prevent or repair the consequences of this disease, must proceed and be supported. Please communicate to your colleagues that only a vote in favor of S. 5 is a vote in favor of moving stem cell research forward in our county. A vote against S. 5 is a vote against the 400,000 individuals living with the devastating effects of MS and against progress for research.

S. 5 is the only bill that is pro-patient, procure, and pro-research. Please work to pass S. 5 immediately. Thank you for bringing this important vote to the Senate floor.

Sincerely,

JOYCE NELSON,
President and CEO.

Mr. HARKIN. Mr. President, Senator BROWNBACK's list also included spinal cord injury. Here is a letter from the Christopher and Dana Reeve Foundation:

While there are indeed a number of promising avenues now being investigated that address paralysis and spinal cord injuries through rehabilitation, cellular therapies and pharmaceuticals, there simply is no merit to any claim that adult stem cells have successfully treated or cured spinal cord injuries. . . .

The Christopher and Dana Reeve Foundation strongly endorses the Stem Cell Research Enhancement Act, S. 5, and thanks you for your leadership in bringing this vital legislation to the Senate floor.

Signed by Peter Wilderotter, President.

I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

CHRISTOPHER AND DANA REEVE FOUNDATION,
April 5, 2007.

Hon. HARRY REID,
Majority Leader, U.S. Senate,
Washington, DC.

MAJORITY LEADER REID: On behalf of the Christopher and Dana Reeve Foundation (CDRF), I am writing to chronicle our support of the Stem Cell Research Enhancement Act, S. 5. The CDRF advocates for millions of Americans afflicted by paralysis from injury or disease for expanded federal support for embryonic stem cell research to ensure that science is enabled to move forward as vigorously as possible. The Stem Cell Research Enhancement Act is an ethical and responsible means for science to do so, and I urge all of our Senators to please vote ''Yes.''

We believe that absolute candor should rule in the stem cell research debate and that the time has come to overthrow the misguided tenets of its opponents. Research is not performed in a vacuum. The CDRF funds a number of research initiatives through our individual grants program, research consortia, and translational fund and examines various methods of research that can complement and ideally expedite discoveries and treatments. While there are indeed a number of promising avenues now being investigated that address paralysis and spinal cord injuries through rehabilitation, cellular therapies and pharmaceuticals, there simply is no merit to any claim that adult stem cells have successfully treated or cured spinal cord injuries.

The CDRF believes that embryonic stem cell research must receive federal funding in order to advance this area of scientific endeavor and which will potentially lead to treatments and possibly cures for many truly devastating diseases and disorders.

The Christopher and Dana Reeve Foundation strongly endorses the Stem Cell Research Enhancement Act, S. 5 and thanks

you for your leadership in bringing this vital legislation to the Senate floor.

Sincerely,

PETER T. WILDEROTTER,
President.

Mr. HARKIN. Mr. President, again, Senator BROWNBACK's list includes several blood conditions. Here is a letter from the American Society of Hematology:

ASH supports S. 5 because our members are interested in expanding the current federal policy on embryonic stem cell research to allow scientists to explore the full promise of this field. The other bill that will be considered by the Senate will not change current policy in any meaningful way. . . .

Again, our Society urges your support of S. 5. . . .

I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

THE AMERICAN SOCIETY OF HEMATOLOGY,
Washington, DC, April 4, 2007.

Hon. HARRY REID,
Majority Leader, U.S. Senate,
Washington, DC.

DEAR SENATOR REID: On behalf of the American Society of Hematology (ASH), I urge you to vote ''yes'' on the Stem Cell Research Enhancement Act (S. 5). This legislation expands current policy by providing for federal funding of embryonic stem cell research on lines derived after August 9, 2001 while still requiring strong ethical guidelines for research.

Stem cell research is an issue that has been gaining import with the general public over the past year and it is clearly a high priority for our country. S. 5 is scheduled for floor consideration in the Senate on April 10. Although at least one additional bill will also be considered by the Senate, a vote in favor of S. 5 is most critical. A vote against S. 5 is unacceptable.

ASH represents more than 10,000 hematologists in the United States who are committed to the study and treatment of blood and blood-related diseases. ASH supports S. 5 because our members are interested in expanding the current federal policy on embryonic stem cell research to allow scientists to explore the full promise of this field. The other bill that will be considered by the Senate will not change current policy in any meaningful way.

Hematologists have pioneered the field of stem cell research for over 40 years with innovative discoveries about adult bone marrow stem cells and how they could be used to cure human diseases. Today, ASH members are poised to contribute to research on embryonic stem cells that has the potential to lead to the next generation of important therapies for a broad range of intractable diseases.

Embryonic stem cell research could make a major difference in the fight against many blood and blood-related diseases, in addition to cancer, Parkinson's, Alzheimer's, diabetes, and spinal cord injuries. After nearly six years under President Bush's restrictive federal policy, there are only 21 embryonic stem cell lines available for federal funding. Research in this area has slowed to pace that is unacceptable; S. 5 will reinvigorate embryonic stem cell research in this country for the benefit of patients who are suffering.

Again, our Society urges your support of S. 5. The current federal embryonic stem cell research policy needs to expand to help researchers find treatments and cures for over 100 million Americans who suffer from many deadly and debilitating diseases.

Thank you,

ANDREW I. SCHAFER, MD,
President

Mr. HARKIN. Mr. President, a report in Science magazine analyzes the list to which Senator BROWNBACK referred. The authors found there are FDA-approved treatments for only nine diseases on Senator BROWNBACK's list and all of those are blood-related diseases such as leukemia.

I ask unanimous consent that this article in Science be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD as follows:

SCIENCEXPRESS

ADULT STEM CELL TREATMENTS FOR DISEASES?

Opponents of research with embryonic stem (ES) cells often claim that adult stem cells provide treatments for 65 human illnesses. The apparent origin of those claims is a list created by David A. Prentice, an employee of the Family Research Council who advises U.S. Senator Sam Brownback (R–KS) and other opponents of ES cell research.

Prentice has said, ''Adult stem cells have now helped patients with at least 65 different human diseases. It's real help for real patients''. On 4 May, Senator Brownback stated, ''I ask unanimous consent to have printed in the Record the listing of 69 different human illnesses being treated by adult and cord blood stem cells''.

In fact, adult stem cell treatments fully tested in all required phases of clinical trials and approved by the U.S. Food and Drug Administration are available to treat only nine of the conditions on the Prentice list, not 65 [or 72]. In particular, allogeneic stem cell therapy has proven useful in treating hematological malignancies and in ameliorating the side effects of chemotherapy and radiation. Contrary to what Prentice implies, however, most of his cited treatments remain unproven and await clinical validation. Other claims, such as those for Parkinson's or spinal cord injury, are simply untenable.

The references Prentice cites as the basis for his list include various case reports, a meeting abstract, a newspaper article, and anecdotal testimony before a Congressional committee. A review of those references reveals that Prentice not only misrepresents existing adult stem cell treatments but also frequently distorts the nature and content of the references he cites.

For example, to support the inclusion of Parkinson's disease on his list, Prentice cites Congressional testimony by a patient and a physician, a meeting abstract by the same physician, and two publications that have nothing to do with stem cell therapy for Parkinson's. In fact, there is currently no FDA-approved adult stem cell treatment—and no cure of any kind—for Parkinson's disease.

For spinal cord injury, Prentice cites personal opinions expressed in Congressional testimony by one physician and two patients. There is currently no FDA-approved adult stem cell treatment or cure for spinal cord injury.

The reference Prentice cites for testicular cancer on his list does not report patient response to adult stem cell therapy; it simply evaluates different methods of adult stem cell isolation.

The reference Prentice cites on non-Hodgkin's lymphoma does not assess the treatment value of adult stem cell transplantation; rather, it describes culture conditions for the laboratory growth of stem cells from lymphoma patients.

Prentice's listing of Sandhoff disease, a rare disease that affects the central nervous system, is based on a layperson's statement in a newspaper article. There is currently no cure of any kind for Sandhoff disease.

By promoting the falsehood that adult stem cell treatments are already in general use for 65 diseases and injuries, Prentice and those who repeat his claims mislead laypeople and cruelly deceive patients.

Mr. HARKIN. Mr. President, I see that my friend from New Jersey is also in the Chamber. He has been a strong supporter of medical research through all his lifetime. I yield 10 minutes to the Senator from New Jersey. I assure him that if he needs more time, we will yield him some more time. I yield to the distinguished Senator, my good friend, Mr. LAUTENBERG.

The PRESIDING OFFICER. The senior Senator from New Jersey is recognized.

Mr. LAUTENBERG. Mr. President, I thank my friend and colleague for his leadership on this issue. I hope we can find out there are lots of leaders around here who just have not shown their intention to lead. I congratulate Senator HARKIN for his hard work.

People ask me why stem cell research isn't available. The people who ask me that question most frequently are the families who come to see me. I love seeing their children. I am a grandfather of 10 kids. The oldest is 13, the youngest is 3. When I look at what my responsibilities as a Senator are, I think of my children and grandchildren, and I think about everybody else's children and grandchildren at the same time. I couldn't make it good enough for my grandchildren when it comes to helping them rid themselves of a condition, or permitting them to live an easy, normal life in many cases.

My oldest grandson is 13, and he is asthmatic. Whenever my daughter takes him to play sports, she always checks to see where the nearest emergency clinic is because if he starts to wheeze or he needs some help, she wants to know where to go.

I see it with lots of visitors I have, like families with a diabetic child. I had one boy who was 10 years old come to my office in New Jersey. I sat around a long table with families who have a child who is diabetic. I asked the kids their responses to their disease, what is the worst part of it. They all said: Sticking your finger, and not feeling good when everybody else looks as if they are having fun.

People ask me: Why can't we do something about this? We are spending billions on a war that brings us gloom and despair, and we spend billions on tax cuts for people who don't need them—but we need help.

This 10-year-old boy I referred to, when I asked him what the worst part of having diabetes was, he said: I can't go to sleep-overs anymore.

I said: What do you mean?

He said: One time I slept over at my friend's house and during the night I got sick and he called his mother and she got mad. So my parents won't let me go to sleep-overs anymore. I am sad about that because I like my friend, but we can't do anything about that.

Then he said: But I'm only going to live to 31 anyway.

With that his father sat right up and said: No, no, that's not true at all. We are going to take care of you.

I wish President Bush was in that office when I had some of those kids in there or when I have families with an autistic child come to meet with me. It affects everything that the family does. It would means the world to them if their child could be treated to become healthy.

We have an epidemic across our country with autism. We see that 1 in every 150 families in America are affected by autism and the fact that they must go to public agencies or hire teachers or send children to particular schools.

When we look at the situation, we see that stem cells have the potential to save lives and alleviate the suffering of millions of Americans. Of course we should fully fund research for embryonic stem cells regardless of when they were developed. That is common sense. But we have a President who is held captive by ideologues who are at war with science.

Over 5 years ago, President Bush enacted a policy that made no scientific sense, only political sense for his base. He put a stop to the development of new stem cell lines for research. Once again, that is a devastating blow to people who have a diabetic in their family, or cancer, Parkinson's, autism, or other diseases.

In New Jersey, the number of those affected by autism is staggering. In 1991, there were 234 cases of autism diagnosed. In 2005, less than 15 years later, we saw 7,400 cases of autism.

We say we want to help these people, but the President says he doesn't believe in it and threatens another veto when this bill is presented to him.

There is no good answer I can give these families and children. But I do assure them that I will do all I can to reverse the President's policy so we can work hard for a cure for their diseases.

Tomorrow we will have the opportunity to vote to help these kids. The science is clear: Stem cell research, particularly embryonic stem cell research, has tremendous potential to help us better understand treatments and cure a number of diseases. That is why Americans overwhelmingly support stem cell research. Studies show that 7 out of 10 Americans—70 percent—favor embryonic stem cell research. Virtually every major medical scientific and patient group supports embryonic stem cell research. Organizations such as the American Medical Association, the American Diabetes Association, the Christopher Reeve Foundation, the Elizabeth Glazer Pediatric AIDs Foundation, and the list goes on and on. In my home State of New Jersey, support for stem cell research is overwhelming. In fact, Rutgers University, our State university, is one of the leading advocates of stem cell research.

Our country has always been about hope, about the chance for a better life. So when President Bush talks about vetoing a stem cell research bill, it denies hope to millions of Americans. Last year, Congress passed similar legislation that would have reversed the President's policy on stem cells, but the President vetoed that bill based on what he calls ethics and morality. What is ethical about denying a cure to children suffering from diabetes? Is there anything moral about denying people who have paralysis the chance to perhaps walk again?

Any real ethical issues are addressed by this bill. New stem lines will come from embryos donated by fertility patients under strict guidelines. They will not be embryos created for research. What we are talking about in this bill are embryos that would otherwise be disposed of, discarded, thrown away.

We stand at a crossroads in America. We can either take the position that cells in a petri dish are a gift for healing or we can throw away the opportunity to alleviate human suffering. The men, women, and children who suffer from diabetes and other life-threatening conditions are racing against time. Recent statistics show that one out of three children born today will suffer diabetes in their lifetime.

We have wasted so much time and opportunity already, between the President's policy and his veto last year. Those who would benefit from the potential of embryonic stem cell research need the President to put aside politics and deal with the facts. I would love to see President Bush meet some of these families or see the children who come to meet with me who are diabetic. We have had 300 children in one of the meeting rooms in the Senate. To see those children, how beautiful they are, and how desperately they want help. Yet for some reason, our Government wont' help out. We see the President again threatening a veto and saying he will not permit funding for this research. It is a terrible thing.

I salute the bipartisan leadership of Senators HARKIN and SPECTER on this issue. Everybody in Congress and in this country has had contact with someone who is suffering from a condition who desperately needs help. It is hard to understand why we wouldn't have 100 votes in this body to say, yes, we want to do whatever we can for children who are sick or children who are likely to encounter these problems in the future. Yet the President has insisted on turning his back on these opportunities. It is a pity.

Mr. President, I yield the floor.

The PRESIDING OFFICER (Mr. MENENDEZ). The Senator from Iowa.

Mr. HARKIN. How much time remains on our side, Mr. President?

The PRESIDING OFFICER. The Senator's time on this side has expired.

Mr. HARKIN. Mr. President, I obviously yield the floor, and I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. BROWNBACK. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. BROWNBACK. Mr. President, I wish to resume the discussion on embryonic stem cell research. I wish to resume the discussion on adult stem cell successes and why we should not move forward on destroying more human life for the purposes of research.

I wish to start out with a simple picture, a picture of one child, Hannah. She was a frozen embryo. I wish to just go through this briefly because we talk about frozen embryos as though this is something you can discard and there is really no significance here, or if there is, it is minimal, it is not really human, it is just something that is sitting there in a frozen state and we should just research on this person. I note this because Hannah was a frozen embryo. She was adopted. She was implanted. Then here we are looking at her in April of 2001 at age 28 months.

I met Hannah. She has been in my office. She is a bright, young, vivacious girl. I point out that she starts out as what we are talking about researching on here—she starts out being frozen, alive, adopted as an embryo, arrives in a clinic, is thawed, implantated, and develops a heartbeat. Here is a picture of her at 21 weeks. We can see her, and we can see the development.

The reason I point this out, and I guess it should be obvious to everybody, but what we are talking about is something in embryology books that is defined as human. It is defined as a person with a 46-chromosomes. It is defined as a unique person who will never be recreated. We are defining and talking about somebody. If these frozen embryos are adopted, they can be implanted and grow into human beings.

Hannah as she was in April of 2001, Hannah who was in my office.

I urge more people to look at this as a possible option. A number of people have embryos at IVF clinics, frozen embryos at IVF clinics. This is a viable option if people don't want to have them implanted in themselves. If they are extra, they could consider that there are a number of people who cannot conceive who want to adopt. I urge people to look at this as a possible and viable option and a beautiful option that people would look at. This is happening quite a few times in places across the United States. It is important. It is a great option.

My wife and I have adopted two children—not at the frozen embryo stage

but at a later stage. I can say with all candor, it is a wonderful thing. It has been a great gift to our family to have two of our children who are adopted. With the rest of our family, it has just been fabulous for all of us.

I hope people will look at this as a viable option. It is a viable option technologically. This is something people can do. You can do this today. This can take place. It does take place. It is a regular event that takes place. It is something you can feel good about in doing and having a beautiful child who is here and functioning and in the world and bringing joy to people's eyes.

Our two adopted children are both 9, and they bring great joy to everybody they are around. Even when they are bugging their older sister, they bring her joy. It is just a great thing to do, and I really hope we can do a lot more of this if people would consider this as a real option rather than just saying these are extra embryos or these are throwaways or they are going to be disposed of anyway. Why not look for the best option? Why not look for this beautiful option which is out there instead of saying: Well, we can't do anything with them anyway; let's just discard them.

There is another option here. There is a different chance. There is another hope. That child, then, can bring into the world so much joy and possibilities that are endless. Why not that one? What is wrong with that option? I hope people will really look at this as a real chance and something they can do.

In my earlier remarks, I read a definition from an embryology textbook which affirmed that each individual life begins as a 46-chromosome embryo. The Presiding Officer did. I did. Senator HARKIN from Iowa did. Textbook definitions are good, but living examples are often even better, and that is what I am showing in this chart. Of course, each one of us alive today is an example that life begins at an embryonic stage because we were all once embryos. Another clear example of this truth is those children today—137, I am told, with 16 currently in utero—who used to be numbered among the so-called spare or leftover embryos. That is not as many as I hope it will be, and I hope in the future we can have a lot more.

Last year, I had the privilege of meeting one of these young children, a young girl named Hannah. We can see her life growth along this continuum in this chart. Of course, if she is terminated in any phase along this way, she is not out here. Life is that continuum. I would like to draw the attention of my colleagues to this and in particular ask, how can we just wantonly destroy these embryos for research purposes with taxpayer funding because they are allegedly spare, left over, or just going to be destroyed anyway? It is wrong to turn living human persons into research objects to be exploited. I believe those embryos which have been adopted make this point very well.

I also wish to note that currently in the United States, it is not illegal anywhere in the country for a person to donate an embryo to develop a stem cell, an embryonic stem cell line. It is not illegal anywhere. What we are talking about in the Senate today is expanding the Federal taxpayer funding for human embryonic stem cell research. We are talking about taxpayer funding of this research that is considered highly unethical to a number of our fellow Americans. It is something we do not need to do.

On the point of not needing to do fund this research with taxpayer dollars, I ask unanimous consent that an article be printed in the RECORD at the end of my statement.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. BROWNBACK. This was an article posted at CNN at 4:05 eastern daylight time that ''Type I diabetics live without insulin in stem cell experiment.'' This is just out on CNN this afternoon. ''Thirteen young diabetics in Brazil . . . '' That is a point I have been making. This research should be done in the United States. Instead, it is going other places:

Thirteen young diabetics in Brazil have ditched their insulin shots and need no other medication, thanks to a risky but promising treatment with their own stem cells—apparently the first time such a feat has been accomplished.

This is just a highlighting of this particular article. Again, the research is being done in Brazil. You will see some consistency on points. If you followed my earlier comments, I was talking about a gentleman who was getting a heart treatment with his own stem cells in Bangkok, Thailand; a young lady in Illinois who received treatment for her spinal cord injury, a paraplegic, in Portugal. Now this diabetic work is being done in Brazil. All of this adult stem cell work that is taking place is outside of the country rather than being done here and us funding and doing it in America. If we are losing the battle in the research anywhere, it seems to be in the adult stem cell field that is producing these types of treatments.

Let me proceed. This is an AP story. It was on CNN. I am reading:

Thirteen young diabetics in Brazil have ditched their insulin shots and need no other medication thanks to a risky but promising treatment with their own stem cells—apparently the first time such a feat has been accomplished. Though too early to call it a cure, the procedure has enabled the young people, who have Type 1 diabetes, to live insulin-free so far, some as long as three years. The treatment involves stem cell transplants from the patients' own blood.

''It's the first time in the history of Type I diabetes where people have gone with no treatment whatsoever . . . no medications at all, with normal blood sugars,'' said study co-author Dr. Richard Burt of Northwestern University's medical school in Chicago, Illinois.

While the procedure can be potentially life-threatening, none of the 15 patients in the study died or suffered lasting side effects. But it didn't work for two of them. Larger, more rigorous studies are needed to determine whether stem cell transplants could become standard treatment for people with the disease once called juvenile diabetes. It is less common than Type 2 diabetes, which is associated with obesity.

The hazards of stem cell transplantation also raise questions about whether the study should have included children. One patient was as young as 14. Dr. Lainie Ross, a medical ethicist at the University of Chicago, said the researchers should have studied adults first before exposing young teens to the potential harms of stem cell transplant, which include infertility and late-onset cancers. In addition, Ross said that the study should have had a comparison group to make sure the treatment was indeed better than standard diabetes care.

Burt, who wrote the study protocol, said the research was done in Brazil because U.S. doctors were not interested in the approach. The study was approved by ethics committees in Brazil, he said, adding that he personally believes it was appropriate to do the research in children as well as adults, as long as the Brazilian ethics panels approved. Burt and other diabetes experts called the results an important step forward.

''It's the threshold of a very promising time for the field,'' said Dr. Jay Skyler of the Diabetes Research Institute at the University of Miami. Skyler wrote an editorial in the Journal of the American Medical Association, which published the study, saying the results are likely to stimulate research that may lead to methods of preventing or reversing Type 1 diabetes.

''These are exciting results. They look impressive,'' said Dr. Gordon Weir of Joslin Diabetes Center in Boston, Massachusetts. Still, Weir cautioned that more studies are needed to make sure the treatment works and is safe. ''It's really too early to suggest to people that this is a cure,'' he said.

The patients involved were ages 14 to 31 and had newly diagnosed Type 1 diabetes. An estimated 12 million to 24 million people worldwide—including 1 to 2 million in the United States—have this form of diabetes, which is typically diagnosed in children or young adults. An autoimmune disease, it occurs when the body attacks insulin-producing cells in the pancreas. Insulin is needed to regulate blood sugar levels, which, when too high, can lead to heart disease, blindness, nerve problems and kidney damage.

Burt said the stem cell transplant is designed to stop the body's immune attack on the pancreas.

A study published last year described a different kind of experimental transplant, using pancreas cells from donated cadavers, that enabled a few diabetics to give up insulin shots. But that requires lifelong use of anti-rejection medicine, which isn't needed by the Brazil patients since the stem cells were their own.

The 15 diabetics were treated at a bone marrow center at the University of Sao Paulo. All had newly diagnosed diabetes, and their insulin-producing cells had not been destroyed. That timing is key, Burt said. ''If you wait too long,'' he said, ''you've exceeded the body's ability to repair itself.''

And he talks about repairing itself later in this article. I wish to hit that point. The procedure involves stimulating the body into producing new stem cells and harvesting them from the patient's blood. Next comes several days of high-dose chemotherapy, which virtually shuts down the patient's immune system and stops destruction of

the few remaining insulin-producing cells in the body. This requires hospitalization and potent drugs to fend off infection. The harvested stem cells, when injected back into the body, build a new healthier immune system that does not attack the insulin-producing cells.

Patients were hospitalized for about 3 weeks. Many had side effects. One developed pneumonia, the only severe complication. The doctors changed the drug regime after treatments failed in the first patient who ended up needing more insulin than before the study, and another patient also relapsed. The remaining 13 live ''a normal life without taking insulin,'' said the study coauthor, Dr. Julio Voltareli of the University of Sao Paulo. ''They all went back to their lives.''

The patients enrolled in the study at different times so the length of time they have been insulin-free also differs. Dr. Burgess had some success using the same procedure in 170 patients with other autoimmune diseases, including lupus and multiple sclerosis; one patient with an autoimmune form of blindness can now see, Dr. Burgess said, and then he had this quote: The body has a tremendous potential to repair.

The study was partly funded by the Brazilian Ministry of Health and Genzyme Corporation, a maker of blood sugar monitoring products.

Now, why are we not doing these treatments in America? Why would we not be funding this sort of work? We do not have unlimited amounts of funds to go around. We are putting $613 million into speculative embryonic stem cell research that has produced no cures. Yet we are having people from the United States go to Bangkok and to Portugal and to Brazil to get these treatments that are financed by the Brazilian Ministry of Health, along with a private corporation that is the maker of blood sugar monitoring products. Why is it not being done here? There are now 13 young diabetics who ditched their insulin shots. That is beautiful news. It should be done here.

Yet we are starving this field that is producing so many results, putting in $613 million into embryonic stem cell research that is highly speculative, that is considered unethical by many of our fellow citizenry in the United States, and is producing no treatments or cures, while people are going to Brazil to be able to deal with diabetes or to Portugal to deal with spinal cord injuries or to Thailand to deal with congestive heart failure and heart disease.

Now is something wrong with this? I think it clearly is wrong when we are not seeing these treatments here, the treatments are going to other places, and we are not funding them. We need to do more in the adult stem cell field, in the cord blood field, we need to do more in amniotic fluid, we need to do more in the placenta stem cell field. American citizens should not have to go to Brazil and other places to get this cutting-edge technology.

Yet we will spend a lot of time debating on the floor over embryonic stem cells, or the need to do research on both adult and embryonic, but the problem is we do not have infinite amounts of money. We do have a limited research budget. The money we are putting into the embryonic field, destroying human life at taxpayer expense, does not go into adult stem cell work. It does not go into other areas where we could do more research, to get the results that would treat people so that diabetics do not need their insulin shots. It is cutting-edge work being done somewhere else. We are not funding it.

I want to talk, too, about another aspect of this that I have not brought up previously, and that is private-sector funding. I note on this diabetes story that was out on the AP wire that there was a private corporation, Genzyme Corporation, a maker of blood sugar monitoring products.

It is not illegal anywhere to do embryonic stem cell research in this country, and if it is so promising in the health care field, one would think there would be heavy private-sector investment taking place in embryonic stem cell research. If this is producing and holds the key to curing Alzheimer's and Parkinson's and diabetes, then one would think there would be a flood of private-sector money coming into this field to develop and to get the early patents on some of the work.

Let's see what is happening in the investor community on this. How many private investors are going into it? We can talk about following the money into the field. This is a July 17, 2006, edition of the New York Sun, an article written by Harold Furchtgott-Roth, former FCC Commissioner. I wish to quote some from this article. I will put this in. He says this:

> For investors, the debate over Federal funding of embryonic stem cell research is an indication that profits are remote. In many, if not most, areas of technology—including electronics, chemistry, and computing—the frontiers of research and development are spearheaded by private business. Where profits are a powerful inducement, innovation needs little federal funding.
>
> From pharmaceuticals to electronic monitoring equipment, much of medical research advances to the drumbeat of capitalism. Innovative ideas are rewarded. Tens of billions of private dollars in America and around the world finance new research because it offers visible roads to rewards.

What does he say about stem cell research? We knew this to be true, that there is heavy investment in the commercial sector in pharmaceutical supplies and electronics and computing.

One of the big driving areas is the private sector or the investors going into these fields and investing heavily. So what are they doing in stem cell research, in embryonic stem cell research today?

> To date, private investment in stem cell research has been relatively small and unrewarding. Several publicly traded but relatively small American companies

He lists a couple—

> . . . conduct research and development on stem cells. Many privately held companies also pursue stem cell research, but venture capital backing for stem cell research is waning.

It is not growing, it is waning.

> Nor is there substantial private research and development migrating abroad. American financial institutions raise enormous funds to invest in businesses engaged in medical research both in America and abroad—

We certainly know that to be true—

> but little if any of that money targets foreign investment in stem cell research companies.
>
> The current policy does not appear to have left America backward in the basic science of stem cell research. According to a recent study in ''Nature Biotechnology,'' American scientists account for the dominant share of research publications on embryonic stem cell research, and the number of publications is growing rapidly. Perhaps American science will be even more dominant with greater Federal funding, but the stimulus for that funding should not be that we are falling hopelessly behind the rest of the world.

Mr. President, I ask that the rest of this article in its entirety be inserted at the conclusion of my comments.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 2).

Mr. BROWNBACK. Mr. President, my point in saying this is that we know this is true. We know that in the medical health field, if there are some great results that are coming that could be patentable or provide treatments—that the medical sector of our economy is growing as a percentage of the gross national product, that I think is somewhere around 15 percent now, growing faster, that there is a heavy investment in medical research taking place, we know that in the pharmaceutical industry, we know that in the medical treatment areas that is taking place.

So why is that not happening in embryonic stem cells? The reason is because it is not producing any results. Instead, we have health ministries and corporations going abroad to make these investments in the adult field when they feel like there is not sufficient interest here taking place.

That should tell us something; that is, the private sector is not putting money in. Indeed, the private-sector research is waning. These are all indicators that we ought to be looking at and asking ourselves: What is taking place?

Now earlier I covered some of the advances in stem cell research that has happened, and I note I wish to build on the statement put forward by today's AP story on Type 1 Diabetes being treated in Brazil with adult stem cells and my comments about the lack of private-sector investment.

I wish to hit another point as to why the private sector is not investing in embryonic stem cell research. I made it part of this presentation earlier, but I wish to make it stronger now; that is,

that embryonic stem cells produce tumors.

This is continuing to come out in all the data, and I think it is part of the reason why you do not see private investors going into this field. If this is the pharmaceutical field and the drugs you are treating people with are producing tumors, it is unlikely that that drug is going to get approved by the FDA, it is unlikely it is going to move forward in any sort of drug delivery system or it is going to be accepted by the public if there is a high likelihood that you are going to get tumors.

Mr. President, I ask unanimous consent to put this set of documents in at the end of my statement.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 3).

Mr. BROWNBACK. This is a series of front pages of articles of the various scientific publications where we have had, to date, tumors being developed by embryonic stem cells. These are in animal models because, of course, we do not have any human clinical trials that are taking place yet with embryonic stem cells. These are all in the animal field. But we are seeing continuously in the research results, as I stated earlier, that the embryonic stem cells injected into animal models are creating teratomas, creating tumors.

This, as I quoted earlier, happened in the fetal tissue debate of 15 years ago, when they were creating teratomas or tumors, and we are now seeing the tumors come up again consistently in the research data on embryonic stem cell work. And here—this gets quite technical. But I wish to read some of the quotations in these various articles, that if any of my colleagues would like to look it up, this will be in the RECORD.

Here is a research article from 2004, when cultures were transplanted in diabetic mice—we were just talking about a successful diabetic treatment in humans—this is in diabetic mice. They formed teratomas—again those are tumors—and did not reverse the hyperglycemic state. This is the first page of a 2004 scientific publication. Here is an embryonic stem cell publication, and this is the front page of this article, that is out in a 2006 article: Embryonic stem cells derived neuroprogeny, more than 70 percent of mice that received these types of embryonic stem cells developed teratomas, thus posing a major safety problem is what this article noted, that 70 percent of mice developed tumors. It does not sound like that one is going very well.

We have another one in the Stem Cell publication, again 2006 publication, developed severe teratomas, in this particular publication, using human embryonic stem cells again in lab rats, grafted into lab rats. That one is not going very well.

Here is a 2005 article from a publication: Four weeks postimplantation, cells implanted in high numbers formed teratomas in the majority of the animals implanted. That one is not going very well.

Here is a Brazilian publication involving brain tissue: Unlimited self-renewal in high differentiation poses the risk of tumor induction after engraftment. This is December of 2004. That one is taking place, and it is not going very well.

Here is another publication. This one is from 2003. Conclusions: Transplanted ES cells can be grafted. The cells will, however, form a tumor if they leak into an improper space such as the thoracic cavity. Now we have a bigger problem. If the stem cells leak into another area, they form tumors in other parts of the body. That is not going very well.

Here is another publication. This is a 2005 publication. When the cultured cells were transplanted into diabetic mice, they reversed the hyperglycemic case for 3 weeks, but the rescue failed due to immature teratoma formation and then formed cancer cells. So they did something for 3 weeks, and that didn't work out very well.

Here is another publication. This is out of Washington University, 2004. Results suggest transplanting ES cells into the injured spinal cord does not improve locomotive recovery and can lead to tumor-like growth of cells, accompanied by increased debilitation, morbidity, and mortality. That one is not going well.

That is a set of publications. This is just the front pages of these that I am entering into the RECORD. My point is not to belittle embryonic stem cells. My point is this is highly consistent with the fetal tissue work earlier and what is working. We have a route that is moving. Why would we move on forward, putting $620 million of Federal money into an area that has not worked for 25 years.

I recognize my colleague from Alabama.

Mr. SESSIONS. I wanted to ask my colleague if he will yield for a question?

Mr. BROWNBACK. I am happy to yield for a question.

Mr. SESSIONS. I thank my colleague for the many hours of effort he has put into this to analyze the data that is out there about this important issue. It has been helpful to us. I know some people think it is an easy question for them. Senator BROWNBACK has taken the road less traveled. He has been willing to dig into the issue because it does touch on real moral and ethical questions. It is not a light matter.

Let me ask the Senator a question. Is it true that the embryonic stem cells we are talking about here, if allowed to grow and mature, would be a human being, and that human being's height, hair, eye color, and all, would have been determined at that very moment when it was at that embryonic stem cell stage, how they would grow and mature?

Mr. BROWNBACK. Yes. My colleague states the obvious. It is when you get that first set of chromosomes from your mother and father that your hair color, so many of your features are determined. It doesn't change. That is your genetic material, and you get it from the very earliest instance.

Mr. SESSIONS. So the life that is being proposed here, it is life, I think no one can dispute that. It is a living organism. This life, if allowed to develop, will be developed into a distinct human person?

Mr. BROWNBACK. Yes.

Mr. SESSIONS. So I think that implicates some questions to all of us. It is not a thing outside the realm of reason. Good people question whether we should experiment on that life. You had a number of children who were brought here, snowflake babies. I didn't get to be with you on that occasion, but it was reported to me. Would you tell us about those children you saw?

Mr. BROWNBACK. I have a picture of one here. This is Hannah, one of the first snowflake babies. It is a pretty simple and direct story. Just like you and me, they started out as embryos. They went into a frozen state for a period of time. Then they were allowed to be adopted by other individuals and implanted into a mother's womb and then grew in a normal process that takes place. The point you made earlier that I think should be so obvious to all of our colleagues is this is Hannah here and this is Hannah at an earlier stage when she is an embryo, just as we were at one point in time.

Mr. SESSIONS. This very type embryo is what we are talking about experimenting with under the legislation that is before us.

Mr. BROWNBACK. With Federal taxpayer dollars; that is what we are talking about.

Mr. SESSIONS. With regard to this, we know good people can differ. I certainly believe good people can differ. I don't count myself morally superior to anybody on these questions. I am not a scientist. I certainly haven't studied it to the extent that you or other Members of this body have. Senator COBURN and Senator HATCH and others have studied it. Some have different opinions about it. I don't think it is an insignificant matter that this is a piece of life, a small embryonic life that would grow into a distinct human being. That is what we are talking about providing Federal funds to experiment with.

It is not a crime today for a private person or a university to experiment on this, even if it causes people moral and ethical problems, is it?

Mr. BROWNBACK. That is correct. It is not a crime today.

Mr. SESSIONS. Private people are doing that today?

Mr. BROWNBACK. That is correct.

Mr. SESSIONS. I guess in 2001, President Bush acknowledged there were embryonic lines available at that time and that any action we took at that moment against those lines did not implicate human life. He said those lines

would be available for embryonic stem cells for any university that would apply; is that correct?

Mr. BROWNBACK. That is correct, and that Federal taxpayer funds could be used to experiment on those human embryonic stem cell lines where the life-and-death decision had already been made.

Mr. SESSIONS. I had heard at some point that those lines may not be continuing, but I am informed that in fact those lines do continue, at least some of them, and that there is a substantial number of embryonic cells available for research if they were asked for, but they haven't been all utilized; is that correct?

Mr. BROWNBACK. That is correct as well.

Mr. SESSIONS. So when we get up to this line of experimenting with human life, one of the things I would ask myself is, is this medically necessary? Is this a matter about which we are debating that would prevent some sort of research? The way I see it, there are federally funded stem cells available for research today, as you have explained. Then there is no limit whatsoever on the number of stem cells that are available in the private sector, at our universities and our great research centers in the world and in the United States; is that correct?

Mr. BROWNBACK. That is correct. Any sort of private sector investment can take place, any sort of State or local investment can take place, although, as I noted in the article, the private sector does not seem to be putting much money into the field. I believe that is clearly because of a lack of results.

Mr. SESSIONS. I think that is important for you to share with us. Because decisions become easier when there is not a crisis. We deal with self-defense issues and moral issues a lot of times, but doesn't seem to me we are at that critical juncture in our scientific activity that would require the American people, through the expenditures of their dollars, to affirm this procedure. Would the Senator not agree if the American people fund this procedure, then it represents a national blessing of the procedure, in effect, an approval of this procedure as moral and legitimate?

Mr. BROWNBACK. Well, it clearly does. It says you treat the youngest of human life as property, not as a person. You noted this is alive. Yet some would say it is not a life. It is alive, but it has not yet risen to the level of being a human life. This would say we can treat humans at the youngest age of their life continuum as property and that we will use Federal taxpayer dollars to destroy them and to do research on them at that point in time. If you can do that at earlier stages, why not later? What is the differentiation? At what point in time does this become removed from property to becoming a person as it somehow does magically in this process? My point is, the place to start is at the beginning, when the life begins. Otherwise, there is no significant place you can draw any line along the way saying at this point in time it becomes a person entitled to the protection of the law and society. Right now we are treating the youngest of humans as property.

Mr. SESSIONS. I am uneasy about it. I don't claim to know all of it. I haven't studied it to the extent you have. I know entities of great augustness such as the Catholic Church have serious theologians and scientists. They are uneasy with it. I am not Catholic, but I understand that. People have invested a lot of time and effort and feel this is crossing a line that is dangerous for us to cross. From what I am hearing from your remarks, you don't think it is necessary to cross that line to do the kind of research that could actually save lives and that we all hope will save lives one day?

Mr. BROWNBACK. If our objective is healing people, if that is our objective, we have a far more likely route, a route that is already producing substantial success that is lying right in front of us, without ethical concerns or dilemmas—adult stem cells, cord blood. Increasingly, in the future, in amniotic fluid we will find abundant supplies of stem cells with no moral problems whatsoever. That is what doesn't make any sense to me either. We are going to take away all human dignity from the youngest humans. We are going to do so in an arbitrary fashion because we are not saying where you develop the status of human dignity at some point in time, but we are going to take it away from you here. We are going to use Federal taxpayer dollars to destroy you. Yet we have another way that is producing good results in the adult stem cells, stem cells in your body and in mine, and this route is producing tumors. It doesn't seem to make a whole lot of sense why we would invest $613 million more into the future as we have in the past since 2002. Why would you put more into this area that has all these problems? I respect my colleagues who are on the other side of this debate. They want to produce results and they want to cure people. But it seems as if all the evidence is leading us the other way without ethical dilemma. So why would we then do that, if all the evidence is pointing another way and we don't have unlimited resources, we can't put this to better, higher use, and not having hopefully people in the future have to leave our country to get adult stem cell therapies from out of country?

Mr. SESSIONS. I will say this, I thank you for utilizing the free speech this great Senate allows us to raise questions that some perhaps just as soon would not talk about. I do think a decent respect for those millions of Americans who strongly believe this is not a good thing to do, that this is crossing boundaries we ought not to cross, and saying we are going to take your money in disrespect of your views and spend it on a procedure you strongly feel is not the right thing, committing our Nation officially as approving this procedure is not a bridge we have to cross. That is where I come down at this point. I do not claim to be all knowing, but that is what I would say.

I say to Senator BROWNBACK, I would share with you a letter I received in March, just about a month ago, from a constituent in my State who e-mailed me in support of S. 5, and I sent back some of the thoughts my staff and I had put together on it. I got this letter. It is addressed to me, but it could probably be better addressed to you based on the work you and others have done. He had a child who had a recent four-wheeler accident and was a quadriplegic. This is his quote:

> In our desire to see our son again have use of his limbs, we allowed our opinions to be influenced by the media. You were so kind to respond to our e-mail with a letter stating your opinions and thoughts. After doing more research, listening to the opinions of a long-time quadriplegic, and praying about this issue, we are pleased with the position you have taken against this legislation. We felt we owed you an apology—

They certainly did not—

> and thank you for your adherence to Christian moral boundaries when voting on public policy.

I know a lot of people have different views on this issue, and some think everybody in the country has a certain view on it. But I think if more people understood the remarks you made, the great research that is ongoing that could actually cure or heal spinal cord injuries, could help with diabetes and Parkinson's and other diseases—if this were critical to the passage of this legislation, I think we would have a more difficult choice to make.

But I think, as you have explained it, at this point in history and in science, we are at a point where that research can continue. It is not stopped, and it is not necessary for us to make that final step to cross this barrier and begin to officially, as a nation, experiment with human life.

So I say to the Senator, thank you for your work. You have led me around to this position. I think I will not be supporting S. 30 and will be supporting S. 5. I think it is a better way—excuse me, which one is it, I ask Senator BROWNBACK?

Mr. BROWNBACK. S. 30.

Mr. SESSIONS. Yes, I think you are correct. I will be supporting S. 30 and voting against S. 5. And this has been an important debate. The American people have had the opportunity to hear some good arguments and a great deal of science and research. We are heading in the right direction, I believe, with the President saying he will not accept S. 5. I respect him for it. He stood up, absolutely. He has studied the issue, and he has firm views about it. Whereas the legislation may pass here, I am hopeful it will not finally become law.

Thank you very much.

Mr. BROWNBACK. I thank my colleague from Alabama. I note for his

constituent, who sent such a kind letter, one of our lead examples is this woman shown in this picture, Jacki Rabon, who is a paraplegic, not a quadriplegic, from a car accident and was treated with adult stem cells—her own—in Portugal instead of the United States and is now walking with the aid of braces. There is tingling and feeling now throughout her legs, and hopefully that will continue. In all of these cases, it is important we get early treatments and people get treated—and I want to see that increasingly in the United States.

Mr. SESSIONS. Let me just interrupt you there because people miss this, perhaps. You are saying she was treated with adult stem cells?

Mr. BROWNBACK. She was treated with her own stem cells.

Mr. SESSIONS. So it was not necessary for her treatment to have embryonic stem cells?

Mr. BROWNBACK. It was not necessary. The only thing that was necessary is she had to travel to Portugal.

The PRESIDING OFFICER. The time controlled by the Senator has now expired.

Mr. BROWNBACK. Thank you, Mr. President.

EXHIBIT 1

TYPE 1 DIABETICS LIVE WITHOUT INSULIN IN STEM CELL EXPERIMENT

CHICAGO, IL (AP).—Thirteen young diabetics in Brazil have ditched their insulin shots and need no other medication thanks to a risky, but promising treatment with their own stem cells—apparently the first time such a feat has been accomplished. '

Though too early to call it a cure, the procedure has enabled the young people, who have Type I diabetes, to live insulin-free so far, some as long as three years. The treatment involves stem cell transplants from the patients' own blood.

''It's the first time in the history of Type I diabetes where people have gone with no treatment whatsoever . . . no medications at all, with normal blood sugars,'' said study co-author Dr. Richard Burt of Northwestern University's medical school in Chicago, Illinois.

While the procedure can be potentially life-threatening, none of the 15 patients in the study died or suffered lasting side effects. But it didn't work for two of them.

Larger, more rigorous studies are needed to determine whether stem cell transplants could become standard treatment for people with the disease once called juvenile diabetes. It is less common than Type II diabetes, which is associated with obesity.

The hazards of stem cell transplantation also raise questions about whether the study should have included children. One patient was as young as 14.

Dr. Lainie Ross, a medical ethicist at the University of Chicago, said the researchers should have studied adults first before exposing young teens to the potential harms of stem cell transplant, which include infertility and late-onset cancers.

In addition, Ross said that the study should have had a comparison group to make sure the treatment was indeed better than standard diabetes care.

Burt, who wrote the study protocol, said the research was done in Brazil because U.S. doctors were not interested in the approach. The study was approved by ethics committees in Brazil, he said, adding that he personally believes it was appropriate to do the research in children as well as adults, as long as the Brazilian ethics panels approved.

Burt and other diabetes experts called the results an important step forward.

VERY PROMISING TIME

''It's the threshold of a very promising time for the field,'' said Dr. Jay Skyler of the Diabetes Research Institute at the University of Miami.

Skyler wrote an editorial in the Journal of the American Medical Association, which published the study, saying the results are likely to stimulate research that may lead to methods of preventing or reversing Type I diabetes.

''These are exciting results. They look impressive,'' said Dr. Gordon Weir of Joslin Diabetes Center in Boston, Massachusetts.

Still, Weir cautioned that more studies are needed to make sure the treatment works and is safe. ''It's really too early to suggest to people that this is a cure,'' he said.

The patients involved were ages 14 to 31 and had newly diagnosed Type I diabetes. An estimated 12 million to 24 million people worldwide—including 1 to 2 million in the United States—have this form of diabetes, which is typically diagnosed in children or young adults. An autoimmune disease, it occurs when the body attacks insulin-producing cells in the pancreas.

Insulin is needed to regulate blood sugar levels, which when too high, can lead to heart disease, blindness, nerve problems and kidney damage.

Burt said the stem cell transplant is designed to stop the body's immune attack on the pancreas.

A study published last year described a different kind of experimental transplant, using pancreas cells from donated cadavers, that enabled a few diabetics to give up insulin shots. But that requires lifelong use of antirejection medicine, which isn't needed by the Brazil patients since the stem cells were their own.

The 15 diabetics were treated at a bone marrow center at the University of Sao Paulo.

All had newly diagnosed diabetes, and their insulin-producing cells had not been destroyed.

That timing is key, Burt said. ''If you wait too long,'' he said, ''you've exceeded the body's ability to repair itself.''

The procedure involves stimulating the body to produce new stem cells and harvesting them from the patient's blood. Next comes several days of high-dose chemotherapy, which virtually shuts down the patient's immune system and stops destruction of the few remaining insulin-producing cells in the body. This requires hospitalization and potent drugs to fend off infection. The harvested stem cells, when injected back into the body, build a new healthier immune system that does not attack the insulin-producing cells.

Patients were hospitalized for about three weeks. Many had side effects including nausea, vomiting and hair loss. One developed pneumonia, the only severe complication.

Doctors changed the drug regimen after the treatment failed in the first patient, who ended up needing more insulin than before the study. Another patient also relapsed.

The remaining 13 ''live a normal life without taking insulin,'' said study co-author Dr. Julio Voltarelli of the University of Sao Paulo. ''They all went back to their lives.''

The patients enrolled in the study at different times so the length of time they've been insulin-free also differs.

Burt has had some success using the same procedure in 170 patients with other autoimmune diseases, including lupus and multiple sclerosis; one patient with an autoimmune form of blindness can now see, Burt said.

''The body has tremendous potential to repair,'' he said.

The study was partly funded by the Brazilian Ministry of Health, Genzyme Corp. and a maker of blood sugar monitoring products.

EXHIBIT 2

[From the New York Sun, July 17, 2007]

IN THE STEM CELL DEBATE, COUNT INVESTORS OUT

(By Harold Furchtgott-Roth)

The Senate this week will consider legislation to expand federal funding for scientific and medical research of human embryonic stem cells. It promises to be an emotional debate, largely uninfluenced by the sober calculus of the investment community. Whatever the outcome, investment opportunities are not immediate.

Large parts of the academic and scientific community insist on the medical benefits of expanded federal funding for such research, a view shared by Majority Leader Frist and many Senate Democrats. But the commercial benefits are not there yet.

For investors, the debate over federal funding of embryonic stem cell research is an indication that profits are remote. In many, if not most, areas of technology—including electronics, chemistry, and computing—the frontiers of research and development are spearheaded by private business. Where profits are a powerful inducement, innovation needs little federal funding.

From pharmaceuticals to electronic monitoring equipment, much of medical research advances to the drumbeat of capitalism. Innovative ideas are rewarded. Tens of billions of private dollars in America and around the world finance new research because it offers visible roads to rewards.

Other areas of research have enormous merit and advance scientific knowledge, but promise little if any profit. Sponsors of such research request federal and other noncommercial funding because private investment would be profoundly risky, if not pointless.

Thus, in this week's Senate debate, the primary issue is not whether stem cell research is lawful, but which forms the federal government will fund. Some day, perhaps, profit incentives for stem cell research will make federal funding unnecessary, but we are far from that outcome.

To date, private investment in stem cell research has been relatively small and unrewarding. Several publicly traded but relatively small American companies, including Aastrom, Geron, StemCells, and ViaCell, conduct research and development on stem cells. Many privately held companies also pursue stem cell research, but venture capital backing for stem cell research is waning.

Nor is there evidence of substantial private research and development migrating abroad. American financial institutions raise enormous funds to invest in businesses engaged in medical research both in America and abroad, but little if any of that money targets foreign investments in stem cell research companies.

Many leading medical research areas such as Germany have far greater restrictions on stem cell research than America. A few, such as Britain, Japan, Korea, and China, have relatively few restrictions on stem cell research, but most research is conducted by the government.

The current policy does not appear to have left America backward in the basic science of stem cell research. According to a recent study in ''Nature Biotechnology,'' American

scientists account for the dominant share of research publications on embryonic stem cell research, and the number of publications is growing rapidly. Perhaps American science will be even more dominant with greater federal funding, but the stimulus for that funding should not be that we are falling hopelessly behind the rest of the world.

The Senate debate will not be strongly influenced by the investment community. Because investment opportunities are small, American financial institutions are not waiting to pour hundreds of billions of dollars in private companies if the federal government were to expand funding for stem cell research.

Most of the debate is about the ethics of stem cell research. Most Senate Republicans worry about the ethics of embryonic research, particularly about possible incentives for creating embryos for harvesting. Senate Democrats focus more on potential benefits from research.

Federally funded scientific research often takes years or decades to yield commercial applications, if ever. Embryonic stem cell research, despite all of its enormous promise and political cache, is no different. If it were different, it would not need federal funding. This week's debate, while having enormous political stakes for the Senate, will simply confirm to investors that widespread commercial applications of stem cell research remain distant.

Almost five years ago, President Bush unveiled a policy that for the first time permitted limited federally funded research of stem cells. It was attacked from both sides at the time and will certainly be attacked again this week in the Senate. Despite the rhetoric, the policy has not put American scientists or investors at an international disadvantage.

EXHIBIT 3

INSULIN EXPRESSING CELLS FROM DIFFERENTIATED EMBRYONIC STEM CELLS ARE NOT BETA CELLS

[By S. Sipione, A. Eshpeter, J. G. Lyon G., S. Korbutt, and R.C. Bleackley]

ABSTRACT

Aim/hypothesis. Embryonic stem (ES) cells have been proposed as a potential source of tissue for transplantation for the treatment of Type 1 diabetes. However, studies showing differentiation of beta cells from ES cells are controversial. The aim of this study was to characterise the insulin-expressing cells differentiated in vitro from ES cells and to assess their suitability for the treatment of diabetes.

Methods. ES cell-derived insulin-expressing cells were characterised by means of immunocytochemistry, RT–PCR and functional analyses. Activation of the Insulin I promoter during ES-cell differentiation was assessed in ES-cell lines transfected with a reporter gene. ES cell-derived cultures were transplanted into STZ-treated SCID-beige mice and blood glucose concentrations of diabetic mice were monitored for 3 weeks.

Results. Insulin-stained cells differentiated from ES cells were devoid of typical beta-cell granules, rarely showed immunoreactivity for C-peptide and were mostly apoptotic. The main producers of proinsulin/insulin in these cultures were neurons and neuronal precursors and a reporter gene under the control of the insulin I promoter was activated in cells with a neuronal phenotype. Insulin was released into the incubation medium but the secretion was not glucose-dependent. When the cultures were transplanted in diabetic mice they formed teratomas and did not reverse the hyperglycaemic state.

Conclusions/Interpretation. Our studies show that insulin-positive cells in vitro-differentiated from ES cells are not beta cells and suggest that alternative protocols, based on enrichment of ES cell-derived cultures with cells of the endodermal lineage, should be developed to generate true beta cells for the treatment of diabetes. [Diabetologia (2004) 47:499–508]

EMBRYONIC STEM CELL-DERIVED NEURONALLY COMMITTED PRECURSOR CELLS WITH REDUCED TERATOMA FORMATION AFTER TRANSPLANTATION INTO THE LESIONED ADULT MOUSE BRAIN

[By Marcel Dihne, Christian Bernreuther, Christian Hagel, Kai O. Wesche, and Melitta Schachner]

ABSTRACT

The therapeutic potential of embryonic stem (ES) cells in neurodegenerative disorders has been widely recognized and methods are being developed to optimize culture conditions for enriching the cells of interest and to improve graft stability and safety after transplantation. Whereas teratoma formation rarely occurs in xenogeneic transplantation paradigms of ES cell-derived neural progeny, more than 70% of mice that receive murine ES cell-derived neural precursor cells develop teratomas, thus posing a major safety problem for allogeneic and syngeneic transplantion paradigms. Here we introduced a new differentiation protocol based on the generation of substrate-adherent ES cell-derived neural aggrgates (SENAs) that consist predominantly of neuronally committed precursor cells. Purified SENAs that were differentiated into immature but postmitotic neurons did not form tumors up to four months after syngeneic transplantation into the acutely degenerated striatum and showed robust survival. Stem Cells 2006:24: 1458–1466.

TRANSPLANTATION OF HUMAN EMBRYONIC STEM CELL-DERIVED CELLS TO A RAT MODEL OF PARKINSON'S DISEASE: EFFECT OF IN VITRO DIFFERENTIATION ON GRAFT SURVIVAL AND TERATOMA FORMATION

[By Anke Brederlau, Ana Sofia Correia, Sergey V. Anisimov, Muna Elmi, Gesine Paul, Laurent Roybon, Asuka Morizane, Filip Bergquist, Ilse Riebe, Ulf Nannmark, Manolo Carta, Erik Hanse, Jun Takahashi, Yoshiki Sasai, Keiko Funa, Patrick Brundin, Peter S. Eriksson, and Jen-Yi Li]

ABSTRACT

Human embryonic stem cells (hESCs) have been proposed as a source of dopamine (DA) neurons for transplantation in Parkinson's disease (PD). We have investigated the effect of in vitro predifferentiation on in vivo survival and differentiation of hESCs implanted into the 6-OHDA (6-hydroxydopamine)-lesion rat model of PD. The hESCs were cocultured with PA6 cells for 16, 20, or 23 days, lending to the in vitro differentiation into DA neurons. Grafted hESC-derived cells survived well and expressed neuronal markers. However, very few exhibited a DA neuron phenotype. Reversal of lesion-induced motor deficts was not observed. Rats grafted with hESCs predifferentiated in vitro for 16 days developed severe teratomas, with hESCs predifferentiated for 20 and 23 days remained healthy until the end of the experiment. This indicates that prolonged in vitro differentiation of hESCs is essential for preventing formation of teratomas. Stem Cells 2006:24:1433–1440.

SURVIVAL AND ENGRAFTMENT OF MOUSE EMBRYONIC STEM CELL-DERIVED IMPLANTS IN THE GUINEA PIG BRAIN

[By A.J. Robinson, A.C. Meedeniya, K.M. Hemsley, D. Auclair, A.C. Crawley, and J.J. Hopwood]

ABSTRACT

α-Mannosidosis is a lysosomal storage disease resulting from a deficiency of the enzyme α-D-mannosidase. A major feature of α-mannosidosis is progressive neurological decline, for which there is no safe and effective treatment available. We have a guinea pig model of α-mannosidosis that models the human condition. This study investigates the feasibility of implanting differentiated mouse embryonic stem cells in the neonatal guinea pig brain in order to provide a source of α-mannosidase to the affected central nervous system.

Cells implanted at a low dose (1.5 10^3 cells per hemisphere) at 1 week of age were found to survive in very low numbers in some immunosuppressed animals out to 8 weeks. Four weeks post-implantation, cells implanted in high numbers (10^5 cells per hemisphere) formed teratomas in the majority of the animals implanted. Although implanted cells were found to migrate extensively within the brain and differentiate into mature cells of neural (and other) lineages, the safety issue related to uncontrolled cell proliferation precluded the use of this cell type for longer-term implantation studies. We conclude that the pluripotent cell type used in this study is unsuitable for achieving safe engraftment in the guinea pig brain.

NEURALLY SELECTED EMBRYONIC STEM CELLS INDUCE TUMOR FORMATION AFTER LONG-TERM SURVIVAL FOLLOWING ENGRAFTMENT INTO THE SUBRETINAL SPACE

[By Stefan Arnhold, Helmut Klein, Irina Semkova, Klaus Addicks, and Ulrich Schraermeyer]

Purpose. To determine whether transplantation of embryonic stem (ES) cells into the subretinal space of rhodopsin-knockout mice has a tumorigenic effect.

Methods. Mouse ES-cell–derived neural precursor cells carrying the sequence for the green fluorescent protein (GFP) gene were grafted subretinally into the eyes of rhodopsin$^{-/-}$ mice, whereas control animals underwent sham surgery. Eyes were retrieved after 2, 4, and 8 weeks after cell injection or sham surgery for histologic analysis.

Results. Gross morphologic, histologic, and immunohistochemical analysis of eyes at 2 and 4 weeks after engraftment exhibited no morphologic alterations, whereas neoplasia formation was detected in 50% of the eyes evaluated at 8 weeks after engraftment. Because the neoplasias expressed differentiation characteristics of the different germ layers, they were considered to be teratomas. The resultant tumor formation affected almost all layers of the eye, including the retina, the vitreous, and the choroid.

Conclusions. Although ES cells may provide treatment for degenerative disease in the future, their unlimited self-renewal and high differentiation potential poses the risk of tumor induction after engraftment. Thus, more care must be taken before using ES cell transplantation as a therapeutic option for patients with degenerative disease. Invest. Ophthalmol. Vis. Sci. 2004;45:1251–1255)

Advances in stem cell research and associated technologies over the past decade have increased hopes for the development of cellular therapies for age-related degenerative diseases. These diseases arise due to progressive cell loss; thus, replacing these cells would be an ideal therapy.

With respect to degenerative diseases of the mammalian visual system, the death of specific cell populations within the retina is associated with blinding diseases of the eye, such as age-related macular degeneration (AMD) and retinitis pigmentosa (for review see Ref. 1). Transplantation of stem cells into the retina to replace lost cells or to act as supporting cells to prevent further degenerative cell loss is also discussed increasingly as a practical approach for treating blindness. Unfortunately, the application of cellular therapies is limited because of a scarcity of donors for suitable cell populations, such as neural stem or progenitor cells, that can be transplanted either into the subretinal space or into the vitreous chamber. However, these cell populations can be obtained in huge quantities by differentiating embryonic stem cells into the respective cell types, thus making cell replacement therapies more plausible.

The isolation of human embryonic stem cells from preimplantation blastocysts has made cell replacement therapy an even more realistic option as human ES cells share similarities with their counterparts in the mouse. Many attempts have been made to induce in vitro differentiation of ES cells into many cell types, including hematopoietic precursor, heart and skeletal muscle, endothelial, and neural cells. Interesting data from an in vitro study in which ES cells were exposed to defined extracellular factors demonstrated the differentiation potential of ES cells into retinal neural progenitor cells.

Herein, we describe the transplantation of GFP-labeled, ES-cell–derived neural precursor cells into the subretinal space of the rhodopsin knockout mouse to determine the integrative capacity of these cells and to evaluate their potential to differentiate into retinal cells. Furthermore, any rescue effects or associated complications exerted by the transplanted cells were evaluated.

MATERIALS AND METHODS—ES CELL CULTIVATION AND NEURAL PRECURSOR SELECTION

ES cells of the cell line D3 of the mouse strain 129 were purchased from ATCC (Manassas, VA). To keep ES cells in an undifferentiated state, we cultivated them feeder cell independent, with the supplementation of leukemia inhibitory factor (LIF: 100 nM; Invitrogen-Life Technologies, Gaithersburg, MD) in DMEM (Invitrogen-Life Technologies) plus 15% fetal calf serum (FCS) and the established supplements as previously described. The cells were allowed to aggregate in hanging drops to form embryoid bodies (EBs). Hanging drops containing the EBs were rinsed off after 2 days and subsequently cultivated in suspension (DMEM, 10% FCS) for another day. Finally, at day 3, EBs were transferred to tissue culture dishes (DMEM with 10% FCS) and allowed to adhere for 12 hours. Selection of neural precursor cells was achieved by cultivation in an astrocyte-conditioned, serum-free medium containing insulin, transferrin, selene chloride, and fibronectin, as previously described. Selection was performed for up to 18 days. The efficiency of the selection procedure was continuously investigated immunocytochemically with an antibody against the intermediary filament nestin, which is specifically expressed in neural precursor cells. To study the further differentiation of selected neural precursor cells, we transferred them to a medium (DMEM/Ham's F12) with a serum content of 10% FCS.

For an alternative way to induce neurogenesis, ES cells were cultured in hanging drops as spheroidal aggregates (EBs) in DMEM supplemented with 20% FCS for 3 days. Afterward, EBs were cultured in suspension in the presence of 0.1 μM retinoic acid for another 4 days.

ENGRAFTMENT AND TUMOR FORMATION AFTER ALLOGENEIC IN UTERO TRANSPLANTATION OF PRIMATE EMBRYONIC STEM CELLS

[By Takayuki Asano, Naohide Ageyama, Koichi Takeuchi, Mikio Momoeda, Yoshihiro Kitano, Kyoko Sasaki, Yasuji Ueda, Yutaka Suzuki, Yasushi Kondo, Ryuzo Torii, Mamoru Hasegawa, Shigeo Ookawara, Kiyonori Harii, Keiji Terao, Keiya Ozawa, and Yutaka Hanazono]

Background. To achieve human embryonic stem (ES) cell-based transplantation therapies, allogeneic transplantation models of nonhuman primates would be useful. We have prepared cynomolgus ES cells genetically marked with the green fluorescent protein (GFP). The cells were transplanted into the allogeneic fetus, taking advantage of the fact that the fetus is so immunologically immature as not to induce immune responses to transplanted cells and that fetal tissue compartments are rapidly expanding and thus providing space for the engraftment.

Methods. Cynomolgus ES cells were genetically modified to express the GFP gene using a simian immunodeficiency viral vector or electroporation. These cells were transplanted in utero with ultrasound guidance into the cynomolgus fetus in the abdominal cavity (n=2) or liver (n=2) at the end of the first trimester. Three fetuses were delivered 1 month after transplantation, and the other, 3 months after transplantation. Fetal tissues were examined for transplanted cell progeny by quantitative polymerase chain reaction and in situ polymerase chain reaction of the GFP sequence.

Results. A fluorescent tumor, obviously derived from transplanted ES cells, was found in the thoracic cavity at 3 months after transplantation in one fetus. However, transplanted cell progeny were also detected (~17) without teratomas in multiple fetal tissues. The cells were solitary and indistinguishable from surrounding host cells.

Conclusions. Transplanted cynomolgus ES cells can be engrafted in allogeneic fetuses. The cells will, however, form a tumor if they ''leak'' into an improper space such as the thoracic cavity.

TERATOMA FORMATION LEADS TO FAILURE OF TREATMENT FOR TYPE 1 DIABETES USING EMBRYONIC STEM CELL-DERIVED INSULIN-PRODUCING CELLS

[By Takahisa Fujikawa, Seh-Hoon Oh, Liya Pi, Heather M. Hatch, Tom Shupe, and Bryon E. Petersen]

Embryonic stem (ES) cells have been proposed to be a powerful tool in the study of pancreatic disease, as well as a potential source for cell replacement therapy in the treatment of diabetes. However, data demonstrating the feasibility of using pancreatic islet-like cells differentiated from ES cells remain controversial. In this study we characterized ES cell-derived insulin-expressing cells and assessed their suitability for the treatment of type I diabetes. ES cell-derived insulin-stained cell clusters expressed insulin mRNA and transcription factors associated with pancreatic development. The majority of insulin-positive cells in the clusters also showed immunoreactivity for C-peptide. Insulin was stored in the cytoplasm and released into the culture medium in a glucose-dependent manner. When the cultured cells were transplanted into diabetic mice, they reversed the hyperglycemic state for 3 weeks, but the rescue failed due to immature teratoma formation. Our studies demonstrate that reversal of hyperglycemia by transplantation of ES cell-derived insulin-producing cells is possible, However, the risk of teratoma formation would need to be eliminated before ES cell-based therapies for the treatment of diabetes are considered. (Am J Pathol 2005, 166:1781–1791)

Diabetes mellitus is one of the major causes of death in advanced countries, and has been shown to adversely affect health and quality of life, It is associated with various severe or fatal complications, including blindness, kidney failure, heart disease, stroke, neuropathy, and amputations. Type I diabetes, or insulin-dependent diabetes, results from the cellular-mediated autoimmune destruction of pancreatic islet cells that are known to produce insulin. Type I diabetic patients experience high blood glucose levels as a result of insulin deficiency. There is no cure for this form of diabetes to date. Several approaches have been used in attempts to reverse the disease process for type I diabetes, including whole organ pancreas transplant and islet transplants. In addition, options such as the potential use of pancreatic stem and progenitor cells are being investigated. Currently, the only clinically approved treatment for type I diabetes, with the exception of insulin injection, is islet cell transplantation in combination with immunosuppresive therapy. Unfortunately, this option is only available to a very limited number of patients because of a severe shortage of donor tissue sources. This shortage has focused interest in developing renewable sources of insulin-producing cells appropriate for transplant.

Embryonic stem (ES) cells have been proposed as a potential source of pancreatic B cells because they are self-renewing elements that can generate the many cell types of the body. Recent studies suggest that mouse ES cells can be manipulated to express and secrete insulin. However, insulin-producing grafts derived from ES cells in these initial reports have a high degree of cellular heterogeneity and proliferation, uncharacterized growth and tumor-forming potential, as well as low insulin levels compared to pancreatic islets. Additionally, some researchers claim that the insulin-positive cells derived from ES cells may not be real insulin-producing B-like cells. In one study, contrary to previous reports, no message for insulin was detectable in culture, which suggested that the cells may be concentrating the hormone from the medium rather than producing. Another study showed that the main producers of insulin in culture were neurons and neuronal precursors.

TRANSPLANTATION OF APOPTOSIS-RESISTANT EMBRYONIC STEM CELLS INTO THE INJURED RAT SPINAL CORD

[Michael J. Howard, Su Liu, Frank Schottler, B. Joy Snider, and Mark F. Jacquin]

ABSTRACT

Murine embryonic stem cells were induced to differentiate into neural lineage cells by exposure to retinoic acid. Approximately one million cells were transplanted into the lesion site in the spinal cords of adult rats which had received moderate contusion injuries 9 days previously. One group received transplants of cells genetically modified to over-express bc1–2, which codes for an anti-apoptotic protein. A second group received transplants of the wild-type ES cells from which the be1–2 line was developed. In the untransplanted control group, only medium was injected. Locomotor abilities were assessed using the Basso, Beattie and Bresnahan (BBB) rating scale for 6 weeks. There was no incremental locomotor improvement in either transplant group when compared to control over the survival period. Morbidity and mortality were significantly more prevalent in the transplant groups than in controls. At the conclusion of the 6-week survival period, the spinal cords were examined. Two of six cords from the bc1–2 group and one of 12 cords from the wild-type

group showed gross evidence of abnormal growths at the site of transplantation. No similar growth was seen in the control. Pathological examination of the abnormal cords showed very large numbers of undifferentiated cells proliferating at the injection site and extending up to 1.5 cm rostrally and caudally. These results suggest that transplanting KD3 ES cells, or apoptosis-resistant cells derived from the KD3 line, into the injured spinal corddo does not improve locomotor recovery and can lead to tumor-like growth of cells, accompanied by increased debilitation, morbidity and mortality.

INSULIN EXPRESSING CELLS FROM DIFFERENTIATED EMBRYONIC STEM CELLS ARE NOT BETA CELLS

[By S. Sipione, A. Eshpeter, J.G. Lyon, G.S. Korbutt, R.C. Bleackley]

ABSTRACT

Aim/hypothesis. Embryonic stem (ES) cells have been proposed as a potential source of tissue for transplantation for the treatment of Type I diabetes. However, studies showing differentiation of beta cells from ES cells are controversial. The aim of this study was to characterize the insulin-expressing cells differentiated in vitro from ES cells and to assess their suitability for the treatment of diabetes.

Methods. ES cell-derived insulin-expressing cells were characterized by means of immunocytochemistry, RT-PCR and functional analyses. Activation of the Insulin I promoter during ES-cell differentiation was assessed in ES-cell lines transfected with a reporter gene. ES cell-derived cultures were transplanted into STZ-treated SCID-beige mice and blood glucose concentrations of diabetic mice were monitored for 3 weeks.

Results. Insulin-stained cells differentiated from ES cells were devoid of typical beta-cell granules, rarely showed immunoreactivity for C-peptide and were mostly apoptotic. The main producers of proinsulin/insulin in these cultures were neurons and neuronal precursors and a reporter gene under the control of the insulin I promoter was activated in cells with a neuronal phenotype. Insulin was released into the incubation medium but the secretion was not glucose-dependent. When the cultures were transplanted in diabetic mice they formed teratomas and did not reverse the byperglycaemic state.

Conclusions/Interpretation. Our studies show that insulin-positive cells in vitro-differentiated from ES cells are not heta cells and suggest that alternative protocols, based on enrichment of ES cell-derived cultures with cells of the endodermal lineage, should be developed to generate true beta cells for the treatment of diabetes. [Diabetologia (2004) 47:499–508]

The PRESIDING OFFICER. The Senator from Iowa.

Mr. HARKIN. Mr. President, how much time do we have on our side?

The PRESIDING OFFICER. Fifty-five and a half minutes.

Mr. HARKIN. Mr. President, I will take about 10 minutes or so, I suppose—maybe 15 at the most. Then I will yield back the remainder of my time for anyone who is interested in what is happening on the floor. I think Senator ISAKSON will follow up and close off the debate for the remainder of today.

But I want to respond to a couple things that have been said that I was listening to both on the floor and off the floor so people understand that sometimes things are not as clear cut as perhaps they are presented. There are always two sides to every story, as we know.

But I heard my good friend from Kansas talking about the type 1 diabetes research that was conducted in Brazil. Indeed, the JAMA, the Journal of the American Medical Association, reported today they had some success with this. I just want to read, though, from the Juvenile Diabetes Research Foundation that obviously has been following this issue very closely. They said that today's report underscores the need for continued work across a range of important scientific areas. They said:

For that reason, we continue to strongly support passage of S. 5, the Stem Cell Research Enhancement Act, which will allow scientists to more fully explore this critical area of research.

I will not go into all of the things they are saying about the procedure. It is a risky procedure that happened in Brazil. They do not know at this point whether the people are really cured. Will their symptoms—diabetes symptoms—come back after a few months? No one really knows. But it is promising. Again, I am hopeful that research pans out. But I want to point out, the Juvenile Diabetes Research Foundation says that is fine, but still, let's get S. 5 passed so we can continue on with this needed research in embryonic stem cells.

I also want to talk for a little bit about two or three issues. One is just the broader issue of why embryonic stem cell research has not yet led to human treatments. Well, scientists have been doing research on adult stem cells for over 30 years. There are no—I repeat, no—arbitrary restrictions on research with adult stem cells. Scientists and private companies do not have to be skittish about doing this research. They do not have to worry about that all of a sudden the Federal Government is going to ban it or limit it.

Now, compare that situation with embryonic stem cells. First of all, scientists did not even know how to extract them until November of 1998. The first Federal grant for these stem cells was not awarded until 2002, and again on a limited number of lines that are available. Even now only a tiny fraction of the total Federal budget for stem cell research is used for embryonic stem cells. The vast majority still goes for adult stem cells.

Here is a chart I have in the Chamber that shows that. Embryonic research lags far behind adult stem cells. For fiscal year 2006, the National Institutes of Health funding for embryonic stem cells, $38.3 million; for adult stem cells, $200.3 million. So, again, people say: Well, why isn't embryonic stem cells doing more? You can see it is being totally underfunded as compared with adult stem cells.

Again, we have not had the 30 years of research. There has been more than five times as much funding for adult stem cell research as for embryonic stem cells. So, again, scientists are studying embryonic stem cells with one arm tied behind their back.

The fact is, it does not matter what many of the Senators think about the potential of embryonic stem cell research. What matters is what scientists think. What is their view, those who know this area, who are studying it, Nobel prize laureates, the head of NIH? Let's look at what the head of NIH—this is a man appointed by President Bush. He heads, as Senator SPECTER has often said, the crown jewel of the Federal Government; that is, the National Institute of Health. Here is what he said:

The presentations about adult stem cells having as much or more potential than embryonic stem cells, in my view, do not hold scientific water. . . .I think they are overstated. . . .My point of view is that all angles in stem cell research should be pursued.

That was Dr. Elias Zerhouni, the head of NIH.

Breakthroughs are coming, but they take time. To clamp down on embryonic stem cell research before it even has a chance shows a total lack of understanding about how science works. More importantly, it denies hope to the millions of Americans who suffer from Parkinson's, ALS, juvenile diabetes, spinal cord injuries, and other treatable diseases and conditions.

Secondly, I want to respond to an issue that is presented in the Isakson-Coleman bill, S. 30—this whole idea of the promise of extracting embryonic stem cells from dead embryos. I must say—and I say to my good friend from Georgia—this still kind of mystifies me. As I said earlier, when something is dead, it is dead. I do not know anybody who can extract and bring back to life something that is dead. So we have to get over the idea we are talking about dead embryos. They are not dead; they are alive. They are living. They are living organisms. They are not dead. So again, an embryo dies or gets sick or ill for a reason. There is something wrong with it. Chances are the stem cells that come from that ''dead embryo'' aren't so great either. So why does anyone think a dead embryo holds the secret to, say, curing juvenile diabetes?

Here is what three top scientists wrote about dead embryos:

There is no proof that dead embryos will work. Beyond the fact that scientists haven't developed a reliable method for determining an embryo's ''death,'' there is no scientific evidence that stem cells derived from these embryos would have the required properties or be safe for human therapies.

Paul Berg of Stanford, George Daley of Harvard, and Lawrence S. B. Goldstein of the University of California at San Diego, these three people have been involved in embryonic stem cell extraction research. They say there is no evidence this will have the required properties or be safe for human therapies.

I want to read from the bill, S. 30. This is the definition of naturally dead:

The term ''naturally dead'' means having naturally and irreversibly lost the capacity for integrated cellular division, growth, and differentiation that is characteristic of an organism, even if some cells of the former organism may be alive in a disorganized state.

Well, I have a hard time understanding that, but then this is not a scientific definition. I submit there is no scientific test to determine when an embryo reaches this state where they can say it won't differentiate or grow. It is an eyeball test. I have been told when people get in vitro fertilization and they produce embryos, the embryologist, if I can use that term, will look at them and some exhibit better signs than others. Some look healthier than others, have more activity than others. These are the ones they will implant. The other ones that look healthy, they freeze. If there are some that don't look very healthy, they are discarded.

I assume these are the ones we are talking about in S. 30; is that right?

Mr. ISAKSON. Mr. President, if the Senator will yield, I am very grateful for the opportunity. The Senator from Iowa is exactly right, because he is describing in layman's terms what is known as the Gardner principles of in vitro fertilization. After an in vitro fertilization, at the end of 72 hours, clearly transplantable or implantable embryos are formed. Within the next 4 days, up to 7 days, additional viable embryos can actually be developed. At the end of the seventh day, the cellular division process stops. That is called Level III Gardner principles.

To try and use layman's terms to answer the question, because the Senator from Iowa is a great Iowan and I am a Georgian, but I am not a scientist and he isn't either, and we are down here talking about some pretty complicated stuff, the best analogy to make in terms of a naturally dead embryo is the same description you have of death when someone donates their organs after a traumatic brain injury that causes an irreversible cessation of brain waves. By definition in all 50 States, the individual is clinically dead and a living will or a durable power of attorney can direct what is done with the rest of their life in terms of transplanting organs or whatever. The same thing is true in the Gardner principles. After that seventh day, the cellular division stops. The embryo is not sick. The embryo is not handicapped. It is not transplantable and it can't become a fetus, but you can derive stem cells.

I won't take any more of the Senator's time except to say one other thing. There are 21 lines grandfathered in the August 2001 order of the President that still have NIH money being invested. Five of those 21 lines are lines which were derived from naturally dead embryos. For 5½ years, the NIH has invested money in those lines that were derived from embryos that were destroyed and invested money in those that were derived from embryos that were naturally dead.

I don't have the paper in front of me so I can't read it verbatim, but to go back to my opening remarks today, in each case they have found, in comparing those studies, of those lines over the last 5½ years, since August of 2001, that they are pluripotent, undifferentiated cells in lines BG01, 02, and 03, which are three of the five lines derived that way. So we have the NIH for 5 years investing in it. We have a clear scientific definition of what an embryo is, which is not a sick embryo, but it is a natural process in Gardner Level III principles of in vitro fertilization. What it does do is it allows you to address the ability to expand stem cell research without crossing the line or destroying a viable embryo.

I yield back.

Mr. HARKIN. No, no. I would ask my friend as we engage in this—and I have obviously been talking to scientists and others about this—we get into another problem, and I will read something from a scientist who wrote me a letter on this. Who decides? Who decides when that embryo is not implantable? How is that decided? I am told there is no scientific dividing line on that. It is sort of an eyeball test. One scientist might say no, another scientist may say yes. Your bill, with all due respect, does not give any clear delineation.

Mr. ISAKSON. Again, if the Senator will yield.

Mr. HARKIN. Yes.

Mr. ISAKSON. In the Gardner principles, all the doctors who perform the great science of in vitro fertilization, which has touched my family and many others—it is great research. It has allowed families to have children who couldn't. After the fertilization you have 3 stages: 72 hours where you have clearly implantable embryos, at 7 days where you still can develop those embryos, and then the remainder which are embryos but do not have under the microscope the cellular collection and cluster of the 8 critical cells to make up an implantable embryo that becomes a fetus. That is made through a scientist, not a politician, looking into a microscope and making those decisions. Again, making the analogy to the irreversible cessation of brain waves, how do we scientifically today, when someone has a traumatic brain injury, determine if they are legally dead? It is done by measuring the brain waves, the same way an in vitro fertilization doctor would measure the cellular division and collection in the remaining embryos after the seventh day.

Mr. HARKIN. Mr. President, I ask my friend for further clarification. Is it not true that some of these after 7 days could be implantable?

Mr. ISAKSON. The only thing I can tell the Senator is the only doctor in the house, Senator COBURN, when asked that question in committee when we had the hearing—and I was at the hearing and so were you—said: Any doctor who did that would be out of his mind because they would know the implantation could not result in a viable fetus and ultimately a child. That is my only—I am not a scientist, but that is the quote.

Mr. HARKIN. Let me read, though, from a letter from George Daley, who is one of the foremost researchers on embryonic stem cell research at the Dana Farber Cancer Institute at the Harvard Medical School. Mr. Daley has testified, and I think he testified that day we were there. I wrote him a letter asking him about his views on using embryonic stem cells that have been called ''naturally dead.'' He said:

Though some Senators might be persuaded to vote for expanded funding for human embryonic stem cells derived from ''naturally dead'' stem cells, this would be a step backwards for embryonic stem cell research. The definition of a ''naturally dead'' embryo as required in the alternative bill is highly problematic. S. 5 remains the greatest hope for advancing embryonic stem cell research in this country. The concept that human embryonic stem cells might be derived from a ''naturally dead'' embryo originated in an article authored by Landry and Zucker in the Journal of Clinical Investigation 2004. The article contained the following passage:

''For a developed human organism, brain death marks the irreversible loss of the capacity for all ongoing and integrated organic function . . .''

As we just mentioned.

We propose—

Get this:

We propose that the defining capacity of a 4 or 8 cell human embryo is continued and integrated cellular division, growth, and differentiation. We further propose that an embryo that has irreversibly lost its capacity, even as its individual cells are alive, is properly considered organismically dead. Even at its earliest stages, the life of the developing organism is more than the sum of the lives of its constituent cells.

So again, they propose this. It is not an accepted scientific principle. The cessation of brain waves is, on the living organism, an accepted scientific fact, but this is only a proposal.

Mr. ISAKSON. Will the Senator yield?

Mr. HARKIN. Yes.

Mr. ISAKSON. Mr. President, I quoted from that very study today. Those are two distinguished scientists at Columbia University in New York. That paper proposes a principle in terms of future development and decisions. However, I want to repeat for the Senator, in 2001, in August, when the President signed his directive, 5 of the 21 lines that are currently invested in by NIH are those that were developed from naturally dead embryos.

Dr. Steven Stice, the eminent scholar of the Georgia Research Alliance and at the Institute at the University of Georgia operates those three lines today under NIH supervision. They were all derived from naturally dead embryos, and the research they are quite famous for already in terms of addressing diabetes is taking place on those lines.

So I agree 100 percent with everything the Senator read. I read that

paper and I have quoted from that paper. It was just put in front of me and I don't have my glasses on, so I will not get into the big words either. But you are absolutely correct. That was a proposal made on the premise of for the future, but that does not mean the practice did not already exist.

Lastly, the Gardner principles are an accepted principle for in vitro fertilization which have been in existence for decades that clearly delineate the decision between 72 hours, 7 days, and naturally dead embryos.

I yield back to the Senator.

Mr. HARKIN. Mr. President, this is a good discussion.

I ask unanimous consent that this letter from Dr. George Daley be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

CHILDREN'S HOSPITAL BOSTON,
DEPARTMENT OF MEDICINE,
Boston, MA, April 2, 2007.

DEAR SENATOR HARKIN: I am responding to your request to provide my views on the feasibility of deriving human embryonic stem cells from embryos that have been called ''naturally dead.'' This concept is articulated in bill S. 30 pending before the U.S. Senate that states: ''It is the purpose of this act . . . to promote the derivation of pluripotent stem cell lines without the creation of human embryos for research purposes and without the destruction or discarding of, or risk of injury to, a human embryo or embryos other than those that are naturally dead.'' An embryo that is ''naturally dead'' is later defined as ''having naturally and irreversibly lost the capacity for integrated cellular division, growth, and differentiation that is characteristic of an organism, even if some cells of the former organism may be alive in a disorganized state.''

Some senators might be persuaded to vote for expanded funding for human embryonic stem cells derived from ''naturally dead'' embryos at the expense of voting for expanded research support under S. 5. This would be a step backwards for embryonic stem cell research. The definition of a ''naturally dead'' embryo, as required in the alternative bill, is highly problematic, and S. 5 remains the greatest hope for advancing human embryonic stem cell research in this country.

The concept that human embryonic stem cells might be derived from a ''naturally dead'' embryo originated in an article by Landry and Zucker (Journal of Clinical Investigation, 2004). The article contained the following passage: ''For a developed human organism, brain death marks the irreversible loss of the capacity for all ongoing and integrated organic functioning. We propose that the defining capacity of a 4- or 8-cell human embryo is continued and integrated cellular division, growth, and differentiation. We further propose that an embryo that has irreversibly lost this capacity, even as its individual cells are alive, is properly considered organismically dead. Even at its earliest stages, the life of the developing organism is more than the sum of the lives of its constituent cells.''

IVF clinics grade embryos based on morphologic criteria that have been shown in limited studies to correlate with successful births (see Gardner et al., Fertil Sterility 2000). Embryos of highest morphologic quality are transferred to the uterus or frozen for possible future use, and embryos of poor morphologic quality are discarded because they have little possibility of surviving freezing and thawing. Some have argued that these poor quality embryos might be considered ''dead'', and therefore provide a more acceptable source for ES cells.

In actual clinical practice, even poor quality embryos that might be considered ''naturally dead'' by in vitro criteria can give rise to successful pregnancies. Landry and Zucker propose studies that would correlate failure of an embryo to divide in vitro with certain biomarkers that could serve as surrogate criteria for embryo death. However, any such definition of embryo death that depends on in vitro criteria only is scientifically problematic, as embryo incubation in vitro is not as conducive to embryo development as the native in uterine environment. I also cannot envision an ethically acceptable clinical study that would correlate the pregnancy outcomes of enough poor quality embryos to ensure the reliability of criteria for ''embryo death.''

Using poor quality embryos for ES cell derivation will inevitably mean destroying some embryos that might have resulted in a successful pregnancy. I am skeptical that we can devise any highly reliable criteria to define embryo death that will appease the critics of ES cell derivation.

My laboratory has accumulated significant experience with attempts to derive human embryonic stem cells from poor quality embryos—those that are deemed by clinical embryologists to be unsuitable for clinical use and are destined to be discarded as medical waste. We are preparing our data for publication in the scientific literature and thus I offer the following summary for informational purposes only. I will provide you with the final version of our paper once it has been subject to peer-review.

Our experience shows that the poorest quality embryos have the lowest probability of yielding ES cells. Out of approximately 100 embryos that would most likely be considered ''naturally dead,'' we isolated only a single human ES line. Although the chromosomes in this cell line appear normal, I worry that this line might harbor occult genetic defects. Out of approximately 100 embryos that developed slightly better in vitro (yet were still deemed clinically unacceptable and discarded) we derived 5 ES lines. This efficiency is within the expected success rates for human ES cell derivation from healthy embryos; however, I suspect that these lines may have arisen from those embryos that are not truly ''naturally dead.'' Again, I am highly skeptical that any clinical study can be designed that will reliably exclude embryo viability and yet maintain feasibility for deriving human ES cells.

I am left to wonder why we would choose to allow only poor quality embryos for medical research when many thousands of normal embryos are otherwise destined to be discarded as medical waste. I believe we should respect the preference of many couples to donate such excess embryos to medical science, and believe that such embryos are preferable as objects for medical research and possible sources for cell replacement therapies. Human embryonic stem cell research is vitally important for the future of medicine and should be vigorously supported by our federal government. Senate passage of S. 5 is the most sure-fired means of achieving this end.

I am available to answer more detailed questions about this complex issue.

Sincerely.

GEORGE Q. DALEY, MD, PHD,
Associate Professor, Biological Chemistry and Molecular Pharmacology.

Mr. HARKIN. Mr. President, he pointed out in this letter that sometimes in actual clinical practice even poor quality embryos that might be considered naturally dead can, by in vitro fertilization, give rise to successful pregnancies. He says he also ''cannot envision an ethically acceptable clinical study that would correlate the pregnancy outcomes of enough poor quality embryos to ensure the reliability of criteria for 'embryo death.'''

He is saying that the quality for in vitro may be different for in utero. Therefore, it might be a poor quality in vitro, but that doesn't necessarily mean it would be poor quality for implantation in utero. He raises this ethical question.

He says:

I am skeptical that we can devise any highly reliable criteria to define embryo death that will appease the critics of embryonic stem cell derivation.

What you are talking about is the Gardner principle, which has to do with what embryos they implant. That is what that really has to do with. So therefore, sure, you are going to take the healthiest, most vibrant embryo that you are going to implant, first of all, with the hope that it will develop. I still say to my friend that while you can take the ones that don't develop after a week or so and say we will take the stem cells from them—and some happen that way. That is fine. But it just sort of begs the question, if you really want to derive the best stem cells, why wouldn't you use the healthiest embryos rather than the sickest embryos? I am not a scientist, but to me it seems that if you want the best, most vibrant and healthy stem cells, you go after the most vibrant and healthy embryos that have been frozen in vitro fertilization, as our bill says, that otherwise will be discarded. That is my point.

I will soon yield. But I am not opposed to the Senator's bill. I am not opposed to looking at this kind of stem cell derivation. I don't have a problem. I think there are problems defining exactly when it dies and that kind of stuff. But if you pass S. 5, that takes care of all that, and it covers that whole issue. It would seem to me, again, that you would want to go after the healthiest and use the healthiest ones.

Mr. ISAKSON. The Senator is a distinguished member of the Senate and a great debater. I want to make one point. Both the Senator's bill and the bill we have introduced and the added ethical criteria you placed in this year's bill prohibit the fertilization of eggs for the purpose of research.

Mr. HARKIN. That is true.

Mr. ISAKSON. If that is the case, when the Senator made the statement that I was only talking about those used in in vitro, which is different from in utero, which I guess meant implantation, both bills do exactly the same thing. You would never create fertilization farms for research purposes under your legislation, nor under S. 30.

Mr. HARKIN. That is true.

Mr. ISAKSON. Those embryos developed in in vitro fertilization would in all cases be eggs fertilized for the purpose of creating a viable embryo.

Mr. HARKIN. Right.

Mr. ISAKSON. The difference, with all due respect—and I have great respect for the Senator and the character and the quantity and the content of this debate—if you ultimately want to further embryonic stem cell research in the environment that we have, the Gardner principle division in in vitro fertilization for level 3 for the natural death of the embryo, that bridges the ethical question on the destruction of an embryo that was otherwise viable and would be something the White House would sign. So it would further embryonic stem cell research under a proven method which exists today, and NIH, in five different cases, is invested in in terms of BG01, 02 and 03, which happen to be the lines with which I am familiar. With all due respect, since we both prohibit the fertilization of eggs for the purpose of deriving cells for scientific research, it is a matter of how you draw that line.

I appreciate the Senator giving me the time to make that explanation.

Mr. HARKIN. Again, it is a good debate. We should have more of these kinds of exchanges on the Senate floor. I respect my friend, and I respect his approach. Again, we have our differences in the way we approach things. I picked up on one word my friend just said—the ''environment'' in which we are operating. I assume he means the environment being the Presidential declaration of August 9, 2001, that only Federal funding could be used for stem cells derived prior to 9 p.m. but none after that. I assume that is the environment we are talking about.

Mr. ISAKSON. If the Senator will let me respond, that is precisely what I am talking about. As we have had 5½ years since the Presidential directive, and since we—fortunately, and unbeknownst to me certainly, and probably the Senator from Iowa, none of us knew you would have these five lines in those original lines that were grandfathered. So we have had 5½ years of experience at NIH, with lines derived without destroying physically a viable embryo, but it would, rather, be a natural death. So since you have that, and since it doesn't cross that ethical line, that is what I was referring to. And you would have the opportunity to further the science in a bill that can be passed and not vetoed. So, with all due respect, that is what I was referring to.

Mr. HARKIN. That is what I thought. My proposal is to change the environment. That is what we have to do. I say we have to change the environment. The American people want it changed, the scientific community wants it changed, the head of NIH—former head of NIH and 525 different advocacy groups out there want it changed. Why should one person—the President of the United States—have the say-so of what is moral and what is not moral, depending upon a time?

Mr. ISAKSON. May I respond?

Mr. HARKIN. Sure, but why is 9 p.m. of August 9 the moral dividing line that Federal funds can be used on stem cell lines? Before that it is moral, but after that it is immoral. I cannot understand that.

Mr. ISAKSON. I will never, hopefully, debate or question any individual's judgment and morality. I admire it in everybody, and I admire the Senator from Iowa and his principles. The President has made his statement and has said what he would do. My reference was that if science, in the last 5½ years, has shown us this is a way to further that science without crossing that line, then with respect for his principles and morals, I am looking to find ways that fit rather than ways to argue. That is my point.

Mr. HARKIN. I appreciate that. We have to do what we can do sometimes here. Certainly, we have been funding adult stem cell research. Senator SPECTER and I have made certain of that in our Appropriations Committee.

Mr. ISAKSON. And also $132 million for embryonic—those 21 lines.

Mr. HARKIN. Don't get me started on that because those have all been contaminated on mouse feeder cells. My friend from Oklahoma said that was not true the other day, but it is true. They have been growing on mouse feeder cells, every one of them. Again, we don't know if they will ever be able to be used for any kind of human therapies. Maybe yes, maybe no. We do know that the 400-some stem cell lines derived since then privately, or by State involvement, or whatever, have not been used on mouse feeder cells. We know those, more than likely, will have the capacity of being used in human therapy.

I respect people's morality, but I just don't know that I like it when somebody imposes their self-imposed morality on all of the American people. I respect the President's moral views, I really do. But I have a hard time understanding how the President can say Federal funding should not be used for embryonic stem cell research if they were derived after 9 p.m., August 9, 2001, and before that it is morally OK. For the life of me, I have never been able to understand that.

If it is morally unacceptable to use Federal dollars for embryonic stem cell research, then it ought not to be used for these 21 lines either.

Mr. ISAKSON. The Senator makes the point, but if the Senator will yield, I will simply respond.

The President issued that directive in August of 2001. He established that date of August 9. The White House has now said that in the case of S. 30, had the stem cells survived from the naturally dead prohibition, they would live.

That is not everything the Senator from Iowa would like. I understand and respect that. Acknowledging the nice things you said about the legislation, it is a ray of sunshine in the furtherance of that research. I am grateful to the Senator for the time he has allotted me.

Mr. HARKIN. Quite frankly, that is why I don't have any problems with this line of research. All I can say to my friend is that all of the scientists who write me letters and who have weighed in on this issue, and the groups that rely upon scientists and Nobel laureates, they all say that this might be an area of interest, but it doesn't substitute for lifting the ban. I am hopeful. I guess I am a hopeful person.

I am hopeful that the President will understand that we are not asking him to cross his moral line. He said repeatedly through his spokespeople, very recently, that the one bright line the President will not cross is using Federal funds to destroy embryos. I wish they would read the bill. S. 5 doesn't provide money for the destruction of embryos. We don't do that now. We have not done it in the past. So, therefore, this bill should be able to be signed because it doesn't provide one single cent of taxpayer dollars for the destruction of embryos. Of course, neither does the bill of the Senator from Georgia; of course not. So that is why I am a hopeful person, thinking that the President or his people will read this and say: You are right. We have stricter ethical guidelines in this bill than exist right now.

So I am hopeful. I am hopeful that we can get this job done.

Anyway, I just wanted to make one other point tonight before I yield the floor.

Mr. ISAKSON. Before the Senator does that, I appreciate the Senator asking the questions and allowing me the opportunity to respond and, hopefully, in some way clear up, if not totally at least say where we are coming from based on the scientists I have talked to. I respect him very much.

Mr. HARKIN. I wish we could do more of this on the Senate floor. By having respect for one another's opinions and thought processes and sources of information, I think we can get a clearer understanding of where people are coming from. Lots of times we give our speech and leave and nobody is around discussing anything.

Some of the best times I have had on the Senate floor were debating Phil Gramm of Texas. We used to get into some good debates. He was always willing to give and take and talk back and forth in a congenial manner. We need more of that on the floor of the Senate. That is just my opinion.

Mr. President, I want to say one other thing that came up. Again, it has to do with understanding these kinds of moral lines, so to speak. It is true that we all started out as an embryo. I want to remind people what an embryo is. It is a blastocyst that has between 100 and 200 cells. The embryos we are talking about in S. 5 are sitting in in

vitro fertilization clinics and are frozen in liquid nitrogen. They are smaller than a period at the end of a sentence, and they are stored in tiny straws like this.

What I am holding up here is one of the devices used to store embryonic stem cells in liquid nitrogen. They take this top off here, if I can get it off. They have a little tube like this. In this tube, the opening of which is about as big as the end of a period at the end of a sentence, they would put in that little tube an embryo. Then they would put it in this enclosure and put it in liquid nitrogen in a tank and freeze it. Then if the couple who donated the embryos were unsuccessful in having children—I have a couple friends of mine who are now doing that, and their first pregnancy wasn't successful. They were going back for a second. They get one of these frozen embryos, thaw it out, and it is implanted in utero. So that is what these tiny little straws are.

An embryo will never become a human being unless and until it is implanted into a uterus, takes hold, and develops. Sometimes they are implanted and they don't take hold; they are discharged.

So an embryo is what I think we can rightfully call potential life—potential in that if it is implanted and takes hold, it could become a human being. Therefore, it is potential.

Let's look at another chart.

This is Karli Borcherding of Ankeny, IA. She is 12 years old and has type 1 diabetes. These are all the needles she uses in 1 month, 120. Think: How would you like to give yourself four shots every day? Look at all those needles she goes through every month at 12 years of age. Karli has juvenile diabetes, as I said. She knows what will happen if she is not cured. At some point in her life, she will probably become blind. She will probably lose a foot, a leg, or one or more of her limbs. At some point in her life, diabetes will take her.

This is not potential life. This is real life—a human being living right now.

That embryo stored in liquid nitrogen, is it alive? Of course. It is not dead, it is alive. Is it a human being? No. It is a potential human being. Karli Borcherding is a real human being.

So read S. 5. Under the ethical guidelines of this bill, NIH can fund research only on those embryos which are left over from in vitro fertilization and which would otherwise be discarded. Every day, fertility clinics discard unwanted embryos. Last year, 50,000 babies were born to couples who wanted to have a baby, couldn't, and wanted in vitro fertilization. Out of those 50,000, a lot of embryos are left over. When a couple has had one child, two, three—however many they decide—and they have leftover embryos, what happens to them? The clinic calls them up and says: If you want to keep them, you have to pay us every month. Parents may say: We don't want them anymore, we have had all our children. And if you are not willing to pay to keep them frozen for the next 200, 300, 400, 500, 1,000 years or however long, they are discarded. It happens every day of every week of every year.

What we are saying and what the real question is, as long as we have leftover embryos, is it better to have them discarded and flushed down the drain or used for the kind of scientific research that would one day cure Karli Borcherding?

What we are talking about is potential life, potential life frozen in nitrogen, or we are talking about real life. That is really the difference—potential life that would otherwise be flushed down the drain versus Karli Borcherding and her real life. That is why I think Senator HATCH had it correct. He said the real pro-life position is S. 5. That is the real pro-life position.

As I have said before, once an embryo is discarded in an in vitro fertilization clinic, it is discarded. It is dead. But if that embryo was taken and the stem cells are taken out and those stem cells are propagated, they are alive. They don't die; they are alive. They continue to be alive. They are developed into nerve tissue, bone tissue, heart muscle tissue that some day—or they could be developed into the kinds of cells that would help Karli Borcherding become insulin free. That is what this debate is about.

It seems to me, if this is a moral problem for the President or anybody else, we ought to have legislation that would shut down every IVF clinic in this country. Shut them down and ban the procedure in the United States because there are leftover embryos. If it is immoral to take those embryos, even with the written, informed consent of the donors, with no money changing hands, and if they are going to be discarded anyway, if that is immoral, wouldn't it be immoral to just discard them? But you have to do one or the other.

Senator BROWNBACK talked about adoption. I am all for that. That is fine. If couples want to adopt babies from in vitro fertilization clinics, that is fine. But as I said, we have 400,000 frozen embryos right now; 50,000 babies born every year from IVF. I think we have had, what, 135 adoptions. That is fine. They can be adopted, and there may be a lot of donors who have donated embryos. They have had their children, but they really don't want to have other people having their children. That raises other kinds of ethical questions. They might want to say: We would rather donate that for stem cell research to save Karli Borcherding's life.

We have to come to grips with this issue. Is it OK to have IVF clinics, is it OK to have in vitro fertilization? If that is the case, then we have to take it step by step and confront reality. The reality is in vitro fertilization is legal, it is acceptable. It provides couples with children they otherwise could not have, and the reality is that there are leftover embryos. We have to confront that reality. What do you do with them? They are not all going to be adopted. We have to agree that is an impossibility. So are they going to be discarded or with the consent of the donors be used for embryonic stem cell research? That is really the question.

I think there is really only one answer, and that is what all the scientists—I say all, the vast majority of scientists, Nobel laureates, the head of NIH, the former head of NIH, 525 advocacy groups representing all diseases and injuries in the United States that you can imagine, why they all say that S. 5 is the bill we have to pass, that we have to enact into law to take the handcuffs off our scientists. That is why it is so important we have a good solid vote for this bill tomorrow.

With that, I thank my colleague from Georgia for his patience and his kindness.

I yield back whatever time we have remaining on our side for today's purpose.

The PRESIDING OFFICER (Mr. BROWN). The Senator from Georgia.

Mr. ISAKSON. Mr. President, I wish to respond to the distinguished Senator from Iowa. I have also enjoyed today and appreciate the questions, and hopefully we can do it throughout the rest of the debate so when people cast their votes they are informed.

By way of interest, when we talked about the embryonic stem cell lines derived from naturally dead embryos, I thought it would be appropriate to end my remarks today by just acknowledging that lines BG01 and 02, which are under NIH funding now, which were grandfathered in the President's directive, and which were derived from naturally dead embryos, were the lines upon which the research was applied that has developed the first product to be marketed from embryonic stem cell research, pending patent, to deliver neural progenitor cells which will be the cells that deliver pharmaceutical and other therapy for spinal column and brain injuries.

So it is very important to understand that not only is the process, A, an accepted process, B, currently under funding at NIH, C, covered under the President's directive of 2001, but in that 5½ years since, research on two of those lines derived from naturally dead embryos is, in fact, producing a remarkable potential product for better health in all of America.

With that said, I, too, yield back all of our time and again thank the Senator from Iowa.

Mr. HARKIN. Mr. President, I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. HARKIN. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. HARKIN. Mr. President, I ask unanimous consent that when the Senate resumes consideration of the stem cell bills on Wednesday following the opening of the Senate, there be 6½ hours remaining for debate, with the time controlled 1½ hours each: majority and Republican leaders or their designees, Senators HARKIN and BROWNBACK; with the time until 12:30 divided as follows: 90 minutes under the control of Senator HARKIN or his designee and 45 minutes each for Senators COLEMAN, ISAKSON, and BROWNBACK; that at 12:30 p.m., the Senate stand in recess until 2:15 p.m. for the weekly party conference work periods; that at 2:15 p.m., the time until 5:15 p.m. be allocated in the same manner, with the final 30 minutes equally divided and controlled between the two leaders or their designees, with the majority leader controlling the final 15 minutes; that at 5:45 p.m., without further intervening action or debate, the Senate proceed to vote on passage of S. 5, to be followed by a vote on the passage of S. 30; that there be 2 minutes of debate prior to the second vote with the time equally divided and controlled between the two leaders or their designees; that the other provisions of the order governing the consideration of these bills remain in effect.

The PRESIDING OFFICER. Without objection, it is so ordered.

MORNING BUSINESS

Mr. HARKIN. Mr. President, I ask unanimous consent that there now be a period for the transaction of morning business, with Senators permitted to speak therein for up to 10 minutes each.

The PRESIDING OFFICER. Without objection, it is so ordered.

INTELLIGENCE AUTHORIZATION ACT FOR FISCAL YEAR 2007—MOTION TO PROCEED

Mr. REID. Mr. President, I ask unanimous consent that the Senate proceed to the consideration of Calendar No. 20, S. 372, the intelligence authorization bill on Thursday, April 12, following morning business.

The PRESIDING OFFICER. Is there objection?

Mr. ISAKSON. I object.

The PRESIDING OFFICER. Objection is heard.

CLOTURE MOTION

Mr. REID. Mr. President, in view of the objection, I now move to proceed to Calendar No. 20, S. 372, and I send a cloture motion to the desk.

The PRESIDING OFFICER. The cloture motion having been presented under rule XXII, the Chair directs the clerk to read the motion.

The legislative clerk read as follows:

CLOTURE MOTION

We, the undersigned Senators, in accordance with the provisions of rule XXII of the Standing Rules of the Senate, do hereby move to bring to a close debate on the motion to proceed to Calendar No. 20, S. 372, Intelligence Authorization.

Harry Reid, Sherrod Brown, Claire McCaskill, Jack Reed, Jon Tester, Patty Murray, Jeff Bingaman, Amy Klobuchar, Blanche L. Lincoln, Evan Bayh, Benjamin L. Cardin, Max Baucus, Pat Leahy, Chuck Schumer, Byron L. Dorgan, Ken Salazar, Dick Durbin.

Mr. REID. Mr. President, I ask unanimous consent that the mandatory quorum required under rule XXII be waived.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. REID. I now withdraw the motion to proceed.

The PRESIDING OFFICER. The motion is withdrawn.

UNITED STATES TAX CODE

Mr. SPECTER. Mr. President, in the remaining time that I have allocated, I wish to talk about another subject, and that is the United States Tax Code. I believe that as I speak there are thousands of Americans, perhaps hundreds of thousands of Americans, now calculating their income tax for the year 2006.

Today is April the 10th. Tax returns have to be filed during the course of the next week to comply with the Federal tax laws, and this is a matter which is very much on the minds of thousands of Americans, perhaps even some watching the Senate on C–SPAN are in the process of compiling their tax returns. I will use this occasion to again introduce legislation for the flat tax.

The flat tax is a new structure of taxation of income in the United States under a model proposed by Professors Hall and Rabushka, from Stanford University, which would enable taxpayers to file their returns on a simple postcard, which I hold in my hand, where the tax return can be filled out in the course of 15 minutes. It has some 10 lines to fill out: Wages, personal allowance, number of dependents, mortgage interest deduction, charitable contributions, total for deductions, total taxable compensation, tax of 20 percent, tax withheld by employer, and the tax or refund due.

We have a system in the United States today where the statistics are astounding. There are some 582 tax forms to be filled out by Americans who file their tax returns. There are some 6.4 billion hours and $265 billion each year spent in complying with the tax laws. The IRS Code and regulations fill more than 17,000 pages and have grown from some 744,000 words in 1955 to over 7 million words 50 years later in the year 2005.

Albert Einstein, genius that he was, is quoted as saying:

The hardest thing in the world to understand is the income tax.

For a man who developed the theory of relativity, that is quite an indictment of the American tax system.

This change in the tax laws would be a godsend for the U.S. economy. Economists estimate that in the course of 7 years, the gross national product would increase by $2 trillion, attributable solely to the efficiencies which would come about by relieving this enormous regulatory burden.

We talk frequently about the burden of regulation in the Federal Government, but the most onerous regulatory form is the tax form, or the tax regulations, which are a burden on all Americans. When you take a look at the cost of compliance, at $265 billion a year, and take a look at the loopholes of some $390 billion a year, which would be eliminated by the flat tax, and $120 billion a year in tax fraud, with the $10 billion a year it costs to run the Internal Revenue Service, it is obvious what an enormous savings there would be in the economy. Most importantly, there would be the savings to individual citizens who, on the average, require about 14 hours to fill out a tax return. Many citizens now hire specialists because the tax forms have become so complicated.

Mr. President, I ask unanimous consent that a copy of the flat tax return, plus the legislation itself, and my full statement on this subject be printed in the RECORD at the conclusion of my remarks.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. SPECTER. Mr. President, there is one additional comment on the flat tax return. I have incorporated in the statement an analysis of taxes which would be made by people at various levels of the income spectrum, and for a married couple with two children, with an annual income of $40,000, an analysis of the comparison shows a decrease in taxes of $1,217. For middle-class taxpayers, with comparable taxes, a slight increase but relatively little compared to the enormous savings that are involved.

I thank the Chair, and I thank my colleague from Iowa for yielding me the time, and I yield the floor.

EXHIBIT 1

TAX DAY 2007 FLOOR STATEMENT

Mr. SPECTER. Mr. President, this week, American taxpayers face another Federal income tax deadline. The date of April 15 (or April 16 this year) stabs fear, anxiety, and unease into the hearts of millions of Americans. Every year during ''tax season,'' millions of Americans spend their evenings poring over page after page of IRS instructions, going through their records looking for information and struggling to find and fill out all the appropriate forms on their federal tax returns. Americans are intimidated by the sheer number of different tax forms and their instructions, many of which they may be unsure whether they need to file. Given the approximately 582 possible forms, not to mention the instructions that accompany them, simply trying to determine which form to file can in itself be a daunting and overwhelming task. In 2006, studies conducted by the Office of Management and Budget and the Tax Foundation found that American taxpayers, including