By Sally Pobojewski ● Photos by Martin Vloet

In Support of Medical Research with Human Embryonic Stem Cells

AN INTERVIEW WITH ROBERT KELCH

In his roles as the University of Michigan executive vice president for medical affairs and CEO of the U-M Health System, and as a physician and scientist, Robert P. Kelch (M.D. 1967, Residency 1970) has carefully considered the topic of human embryonic stem cell use in medical research from many perspectives. As the debate intensifies at the state and national levels, Kelch shares his views and explains why he's arrived at the conclusions he holds.

Why is it important to talk about research with human embryonic stem cells?

Research with human embryonic stem cells raises important, complex and sensitive questions that should be considered carefully and discussed widely. It is a particularly important issue for us at the U-M Health System, because several of our scientists are studying human embryonic stem cells. Everyone has an obligation to learn the facts about this important social and scientific issue, so they can make an informed decision.

Why are you so excited about the potential for this type of research?

I think about the therapeutic potential for treating disorders like diabetes, Alzheimer's disease, Parkinson's disease or ALS. I've been in science long enough to know that sometimes we get so excited we over-promise. But I am very excited about this, and I am, by nature, a pretty cautious guy. It is certainly well within my imagination that we can have, for certain diseases, much more effective treatments in a reasonable period of time, if we enhance our ability to do embryonic stem cell research now.

I ask people to imagine a woman in Michigan who has a disorder that could be cured with a cell line that is genetically identical to her own body. Let's say she is paralyzed, and these cells could be differentiated into motor neurons for transplant into her spinal cord, which might allow her to walk again.

Under current Michigan law, she would not have the right — in fact, it would be illegal — for her to use one of her ovaries — or implant the nucleus from one of her skin cells into one of her egg cells, or into an embryonic stem cell — to create this cell line. She would be totally denied that opportunity.

During my 40-plus years in medicine and science, I've seen some of the most startling discoveries, and I've seen society be appropriately very skeptical initially. I think if we can work together to really understand this complex topic and its potential, we will reach a consensus to move forward in a safe manner.

What have you found to be the biggest misconception people have about human embryonic stem cells?

First of all, a lot of people simply don't understand the terminology. I find that it takes at least a half-hour to an hour to explain this complex subject, so if anyone thinks you can do it in a 30-second sound bite, beware. And if you hear slogans designed to cause an emotional reaction, beware. It's much more complicated than you can convey with the usual mass media messages.

If you believe human life begins at conception, the destruction of an embryo to create a new cell line is very troubling. How do you respond to this objection to the research?

I know there are people who, because of their moral, ethical, religious or philosophical beliefs, believe that a human life begins the moment an egg is fertilized in the Fallopian tube, which occurs several days before it implants in a woman's uterus. I respect their position and beliefs. And I don't disagree that this early stage of development, which we call a blastocyst, has the potential for human life.

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But I disagree about what we ought to do with these very early products of conception, especially if they are not going to serve a useful purpose. What do I mean by that? I'm talking about literally hundreds of thousands of frozen blastocysts or early embryos, as some would call them, which were created for in-vitro fertilization. They are going to be discarded by people who no longer have a need or the desire to implant them into either their own uterus or someone else's uterus. These discarded embryos have tremendous potential. I feel morally obligated, for the sake of the greater good, to try to take advantage of this potential by allowing scientists, under strict ethical guidelines, to use these frozen embryos to propagate new human embryonic stem cell lines. And, of course, we would like to do that here. ➤

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What we would like to do is take these very early products of conception, before the implantation phase, and propagate cells from them in ways that will not stimulate them to develop into implantable embryos. We are trying to generate therapeutic cell lines of embryonic cells with all this broad potential, but do it in a way that creates cell lines and not embryos.

Embryonic stem cells give us the opportunity to study, at the earliest stage, disorders caused by a specific gene defect to see if we could find a way to cure the disease. Let's take another example, which to me is very meaningful. Let's say a couple is going through in-vitro fertilization, but they want the early blastocyst to be tested for a genetic disease like Tay-Sachs disease, for example.

We can do that now. We can take one little cell out of the blastocyst to make that diagnosis. If we could use genetically abnormal embryos to produce a stem cell line for research on Tay-Sachs disease, we might learn how to correct the genetic defect.

Most embryos are discarded simply because they are no longer needed and people do not want to put them up for adoption, or because they have an abnormality. Both types have a useful purpose, if studied ethically — and they would be studied ethically — by good scientists.

Why is it so important to the future of the university, the Health System and the state of Michigan to have more embryonic stem cell research here?

One reason is that we have a remarkable group of scientists working in the area of stem cell or developmental biology. We were one of the first of three federally

funded human embryonic stem cell research centers. It is just logical for us to want to expand our work and productivity and not be restricted to a greater degree than our peer institutions.

Second, we have the ability now to generate new stem cell lines and that is a tremendous step forward. But current laws make it impossible to do this in the state of Michigan. This gives Michigan a national reputation of being a place that is less supportive of science. That makes it more difficult to recruit and retain the best and brightest scientists and students.

It's inconsistent to say we have aspirations of becoming a leading state in life sciences research, and then prohibit the development of new lines of human embryonic stem cells. We are being viewed as a state with very restrictive rules that is less supportive of science and scientists than other states.

Why not just put more funding into research with adult stem cells?

We should put a lot of money into cancer stem cells, cord blood stem cells, tissue-specific [adult] stem cells, because we are going to learn a lot from them. But everything we know — and we know more today than we did just a few years ago — indicates that tissue stem cells don't have the potential of embryonic stem cells. Remember an embryonic stem cell has the amazing potential to give rise to all the tissues in the entire body.

Are there areas of research that should legitimately remain off-limits to scientists?

Yes. I've read a summary of the ethical guidelines recommended by the National Academy of Sciences. They sound very, very wise. Doing things in humans that we might do in animals would be unethical to me. Making what we call chimeras — mixing different genetic cell lines to develop an embryo with genetic backgrounds from different species. This is unethical when you are talking about human beings. Working on human embryos that are well beyond the implantation phase is unethical.

Do you agree that researchers should be required to only use excess embryos from in-vitro fertilization clinics? As opposed to South Korean scientists who have created new embryos using donated human eggs.

[The South Korean research] troubles me to some degree. First of all, there's really no need to do that in America, if we agree to use discarded embryos from fertility clinics, because there are so many of them. Estimates indicate there are 300,000 to 400,000 excess frozen embryos in fertility clinics. That's more than enough to meet our needs.

I think it would be highly unethical to recruit someone, pay someone, or give them financial incentives to donate an egg. That would trouble me greatly. On the other hand, if a woman wants to donate her own egg, or donate an egg to someone who is genetically related to her, that's something for us to discuss. Personally, I don't find that unethical.

It's important to keep in mind that society's idea of ethical behavior does change over time. We are doing things today that might have been considered very unethical in the past, and we are considering other things as we look to the future. All the organ transplantation we do now at one point in time was considered unnatural and unethical. Donation of organs from a healthy person to a person with an illness — all that has evolved over time. When the techniques for in-vitro fertilization were first developed, many people considered it to be unethical. Now many of us, including my own family, have been positively affected by that technology.

What area of medicine has the greatest therapeutic potential for human embryonic stem cell research?

It's hard to know where the first, most dramatic, breakthrough will come. I hope it comes for a disease like diabetes mellitus, because it takes such a toll — not only on the patient, but on their families. We know it's curable. We can cure it in inbred mice by transplanting islet cells. We know it's an autoimmune disease. So we know we need to have islets that won't be rejected by the host. Another good example would be spinal cord injuries. There are investigators in California who have used stem cells to help rodents move better after spinal cord injuries. We have to be cautious about extrapolating from other species to man, because we are much more complicated, but we know it can be done. This is not Star Wars research.

The following Web sites contain additional information about stem cells:

www.med.umich.edu/opm/newspage/2005/stemcellqa.htm

http://stemcells.nih.gov

www.medicineatmichigan.org/magazine/2002/winter/stemcell

www.umich.edu/news/index.html?BG/stem_cells