Human Cloning & Stem Cell Research
A Christian Perspective

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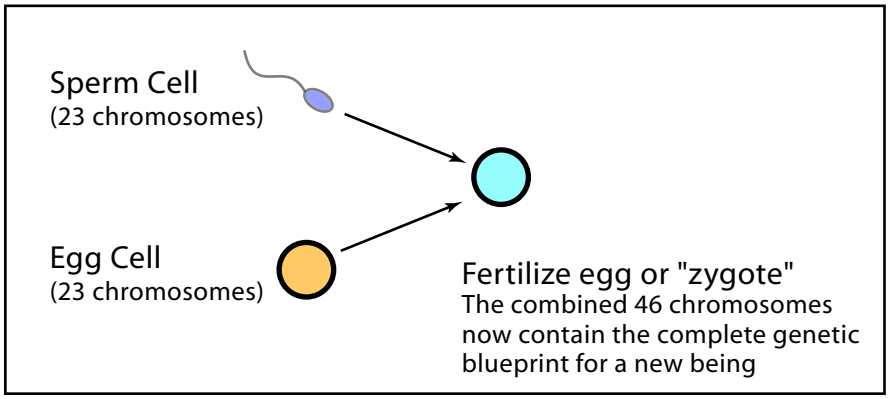
WHY ARE WE CONCERNED ABOUT HUMAN CLONING AND STEM CELL RESEARCH? First, without wanting to be guilty of exaggeration, we believe the human race has faced few decisions of greater significance than how we will choose to address the issues surrounding human cloning. One the one hand, the research community has in effect said, "Stop us if you can!" On the other hand, the breakthroughs in cloning technology have been so rapid and the "advertised" potential benefits of stem cell research so mind boggling that it has left many struggling to understand the issues. Few if any issues highlight the fundamental frailty of humanity more strikingly than the facts and implications of human cloning and stem cell research. Although the biochemical techniques may be sophisticated, the moral choices that have to be made are clear, and the associated details are within the grasp of our society and, perhaps most importantly, our current generation of young people. In addition, because the issues under consideration are moral and ethical, they are an inescapable part of the Christian's walk before God. For both of these reasons, we believe the Christian community needs to be informed so that they can be "salt" and "light" wherever we live.

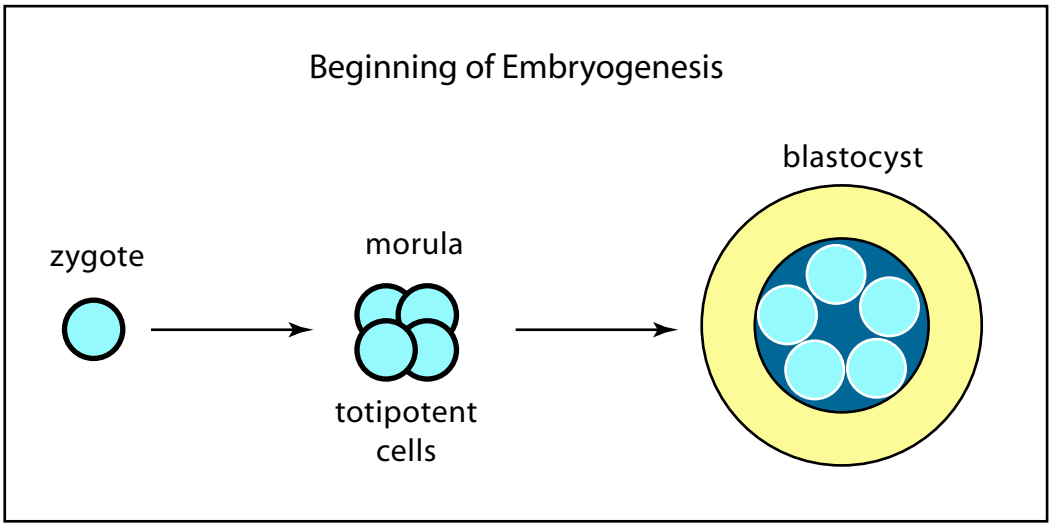
Brushing up on Biology

What's a Stem Cell?

Before the issues surrounding human cloning and embryonic stem cell research can be discussed and then evaluated from a Biblical perspective, it is necessary to arrive at an understanding of the science involved. The journey begins with the miracle of development and the fact that all of the marvelous complexities seen in living organisms originate with a single cell. This unicellular beginning is the result of a merger between two cells, a maternal egg and a paternal sperm. Individually, neither egg nor sperm can lead to life, in that as haploid germ tissue, they are reproductive cells containing only half the number of chromosomes necessary for a new organism. The rest of the cells in the body are known as diploid somatic tissue, referring to the fact that they are non-reproductive tissues containing the full number of chromosomes, half contributed from the maternal line and half from the paternal line. In humans, the diploid, or complete, state refers to a cell containing 46 chromosomes—so then it follows, that the haploid egg and sperm each contain 23 chromosomes. (The statements of this paper apply specifically to higher mammalian biology. Stem cell and cloning issues are directly related to human beings, and associated research species, and thus will be discussed in this context).

Once an egg has been fertilized by a sperm, it contains the complete genetic blueprint for a unique organism. This newly diploid cell is now known as a zygote and is in the first stages of the irreversible and complex process of embryogenesis. The first developmental step is known as cleavage and is marked by a rapid series of cell divisions creating a ball of cells known as a morula. Approximately four days post-fertilization, the morula develops further into a blastocyst, a structure composed





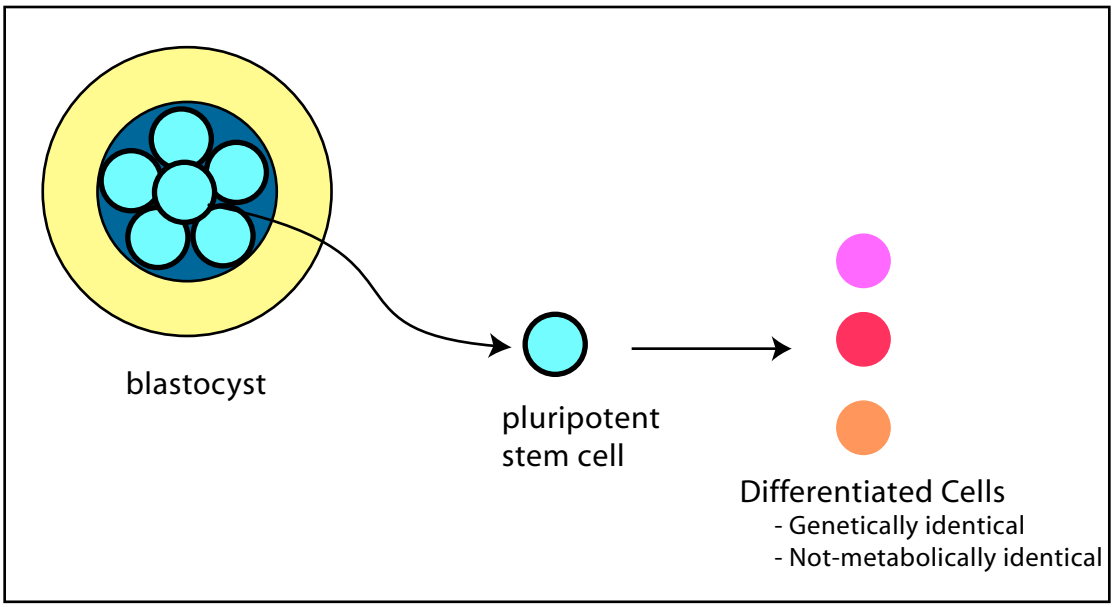
of two defined regions. The first is an outer cell mass, or trophoblast, that will eventually become the chorion, a part of the placenta. The second region lies within the trophoblast and is known as the inner cell mass. It is this inner cell mass that becomes the developing embryo. Approximately twelve days post-fertilization the inner cell mass of the blastocyst begins to transform again, into a state known as the gastrula. Gastrulation leads to three identifiable tissues: the mesoderm, endoderm, and ectoderm, which are the precursors of all adult tissues. Development continues from this point as tissue and organ systems begin to take shape.

While these steps may seem confusing and full of unusual words, they are crucial to understanding both the intrigue and debate concerning stem cells. Humans, along with other living things, do not begin life as miniature, complete beings. Instead, they progress through a series of steps that can only be labeled de novo (from new) synthesis. A single cell becomes 2 and then 4 and then 8…….and then 10 trillion cells! How does this happen and how can a single cell give rise to the multitude of complex and differentiated systems found in a mature organism? A cardiocyte muscle cell is vastly different than a red blood cell or a neuron, yet within a given organism, they are all descendents of a common ancestor (the original zygote). The answers to these questions are found in stem cell biology and further caveats of the process of development.

At the morula stage, all cells are considered totipotent: they are indistinguishable from one another and any individual cell is capable of directing the development of a complete organism including all organ and tissue systems as well as extra-organism support membranes and structures (i.e. the placenta). The fantastic ability of these cells to develop into quite literally any part of an organism is referred to as plasticity. However, as development continues, the plasticity of the growing cells begins to diminish. At the blastocyst stage, the inner cell mass (essentially the developing embryo) has been reduced from totipotent to pluripotent.

A pluripotent cell can still become any part of the developing organism, but it can no longer completely sustain development as the ability to direct the formation of the placenta and other extra-organismal membranes has been lost. As development continues through gastrulation and beyond, the pluripotent cells begin to differentiate and become developmentally restricted to specific organ or tissue systems. The stem cells that remain are now considered multipotent; they can develop into any part of a specific system, but unlike their pluripotent or totipotent predecessors, the system in question has already been chosen.

Perhaps the most familiar example of multipotent stem cells is that seen in bone marrow transplants.Transplant recipients are first subjected to intense chemotherapy and ionizing radiation designed to destroy their own cancerous bone marrow. They are then given a transplant of a compatible donor's healthy bone marrow, with the end goal being repopulation of the now-depleted patient marrow. This type of therapy works because of the multipotent hematopoietic stem cells in the donor



marrow. These stem cells are the base of the hematopoietic (blood) system, and so if they successfully engraft into the recipient, a new, complete, and functioning hematopoietic system can be "grown." A hematopoietic stem cell will not develop into a neuron or lung alveolar cell. However, it is capable of becoming any one of the diverse and numerous members of the entire hematopoietic system.

The Attraction of Stem Cells

In light of the amazing capabilities of totipotent, pluripotent, and multipotent stem cells, it is not hard to understand the intense scientific and medical interest surrounding them. From an investigative research standpoint, stem cells are the tantalizing Rosetta Stone of developmental biology. The perplexing mysteries of how a single cell becomes a functional organism are elusive questions that, although studied intensely, have yet to be answered. Stem cells appear to be the missing link; unlocking their secrets holds the promise of explaining the molecular and cellular changes that turn some genes on and others off at coordinated intervals to eventually produce a functional organism. The intrigue does not stop at the prenatal stage. Stem cells continue to function in adult organisms, acting to replace cells as they wear out and grow old. In a broader sense, beyond just development, the biology of stem cells is about understanding growth. The functioning (and consequently malfunctioning) of the human body is a result of the metabolic growth that permits life, thus making the study of growth an important one indeed. Cancer in all of its vagrancies is a disease of uncontrolled growth; Alzheimer's, Parkinson's, Huntington's and other neurodegenerative disorders are a result of tangled growth; diabetes type I occurs because the growth potential of a certain subset of pancreatic cells is eliminated; birth defects occur because of improperly programmed growth; heart attacks and spinal cord injuries are so devastating because such tissues have lost their ability to re-grow; autoimmune disorders wreak havoc because of improperly targeted growth . . . the list goes on and on. The answers contained in an understanding of stem cells may be applicable to all of these conditions.

There is another major potential application of stem cell knowledge in the field of transplantation and regenerative medicine. Thousands of people worldwide die each year because of organ or tissue failure that could have been prevented through a transplant. Unfortunately, the need for transplants outstrips the source, and rejection issues make matching organs or tissues very difficult. Even in a successful case, the recipient must remain on powerful and inherently toxic immunosuppressive drugs for life. The only exception to this rule occurs in transplants between identical twins, siblings whose genetic material is the same thus preventing rejection. The application of stem cells to this problem lies in the regeneration of identical

transplant material; somewhere, somehow, stem cells possess the capacity to direct the development of an entire organism, including the heart, kidney, liver, or bone marrow needed for a transplant. If a method could be developed that would allow the directed development of an already-compatible organ or tissue, both the demand and the rejection problems of transplantation biology would be eliminated.

It is no wonder that such tantalizing possibilities have the medical and research communities in a frenzy of excitement to begin work on unlocking the secrets of stem cells. The first step toward this goal is to secure a source of stem cells for basic science research and clinical applications through creating what is known as a cell line. This requires isolating founder cells and propagating them until they can be grown indefinitely in vitro (literally, "in glass"—now a general reference to laboratory apparatus). This in turn provides an established, standardized source of cells so that research is consistent within and across different laboratories. Multipotent, adult stem cells have been identified in several tissue types, but there are several problems with targeting these cells for research use. Multipotent cells are fairly restricted in their differentiation potential, and many of the crucial, fate-determining steps of greatest research interest have already occurred. In addition, adult stem cells have not been identified for many tissue types, and even when they can be found, the purification and isolation procedure is very difficult, inefficient, and expensive. To make matters worse, scientists have had difficulty attempting to maintain adult stem cells in an undifferentiated state. After a fairly short time of growth in the lab, the cells typically begin to differentiate, and their research benefits as stem cells are lost[1].

Pluripotent or embryonic stem cells then, have been considered the most desirable for research purposes. They have the most flexibility in their differentiation potential, are extremely easy to harvest, and can be cultured for much longer periods of time.[2] However, since pluripotent stem cells cease to exist after the very early stages of development, their procurement necessitates the use and destruction of human embryos. Embryonic stem cells can be obtained from the surplus embryos created at in vitro fertilization (IVF) clinics and from aborted fetuses. In addition, scientific advancements of the last 4 years have also made it possible to create human embryos through a procedure known as cloning.

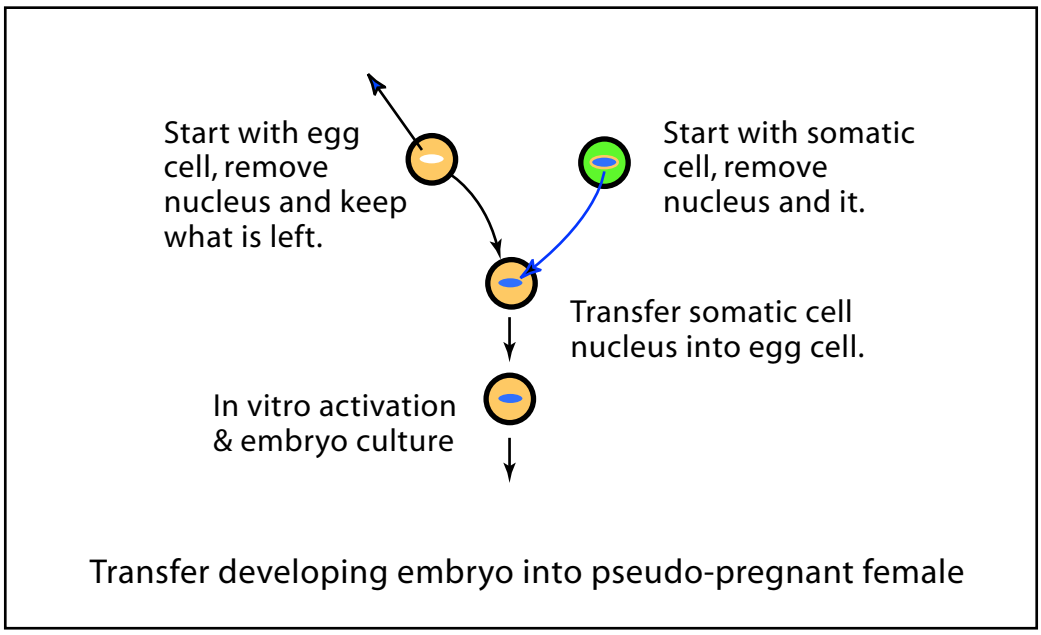
What's Cloning?

Cloning, perhaps more correctly known by its scientific name of "somatic cell nuclear transfer," is a scientific entity distinct from stem cell biology; however, unquestionably closely related. As a result, in order to understand the full panorama of questions surrounding these issues, it is necessary to look at yet another aspect of biology. Cloning is the process of making a clone, an organism genetically identical to another. This process is not new to either science or humanity in general. Bacteria used in laboratory applications are frequently cloned; when bacteria are manipulated to produce compounds of medical interest such as insulin or Factor IX (for use in treatment of hemophilia), the bacterial "factories" must be identical so that the same compound is produced every time. In addition, we are all familiar with naturally occurring clones – identical twins. This type of cloning occurs when the totipotent cells or pluripotent inner cell mass of the blastocyst separate to produce two developing embryos instead of one. In a laboratory setting, cloning had been restricted to simple, unicellular organisms such as bacteria; it is one thing to clone E. coli, it is another thing entirely to clone larger and more complex animals.

However, this changed in 1997 with the birth of the world's first cloned mammal. Under the direction of Sir Ian Wilmut,

[1] These comments regarding adult stem cells are what what might be called the research communities "party line." In late 2001 and the early months of 2002, there are indications that these problems with adult stem cells may have been overcome to the porint that they are potentially a much more desirable source of stem cells for research and medical purposes.

[2] While totipotent cells are technically more flexible, they can differentiate into structures that are not part of the actual organism in question. While developmental biologists may have questions about placental development, such research is irrelevant for other applications.



the Roslin Institute (Edinburgh, Scotland) announced the successful cloning of an ewe, the lamb known to the world as Dolly. Although technically challenging and prone to failure (one live birth out of 250 attempts), the procedure used to create Dolly is not scientifically complicated.

An unfertilized egg cell was taken from a Scottish Black-Faced ewe, and through micromanipulation, the nucleus of the cell was removed. This genetically "empty" cell was then electrically fused with a somatic cell taken from a Finn Dorset (white-faced) ewe. Recall that a somatic cell is diploid and thus contains a full set of chromosomes. As a result, the product of cell fusion is an egg cell that now contains a complete set of genetic instructions – the very same product of traditional fertilization; however in this case, all of the genetic material came from the source of the somatic cell. And, just as in the aftermath of traditional fertilization, the completed egg cell begins to develop. In a form of sheep IVF, developing embryos were implanted in pseudopregnant surrogate mother sheep, and eventually one black-faced ewe gave birth to a white-faced Finn Dorset lamb.

Dolly was a clone of the Finn Dorset ewe from which the original somatic cell was taken. In an irony that highlights the power of cloning, the source of Dolly's genetic material was female and had been dead for six years; the cell used in the somatic cell nuclear transfer procedure came from tissue that had been in cryogenic storage!

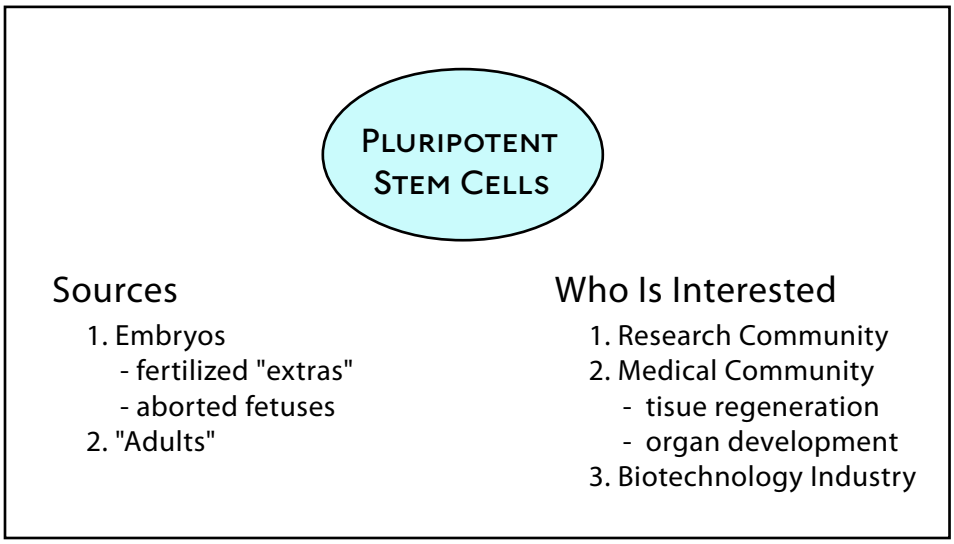
In the four years since Dolly's birth, additional cloned sheep as well as other animals including pigs, cows, and mice have been produced. (Perhaps you have noticed the concept of "pet-cloning" described in the newspapers the past few weeks.) The laboratory procedures used to clone have been modified, but the basic principle remains the same – remove the haploid nucleus from an egg cell, insert the

complete nucleus of a diploid cell, and a clone of the "nucleus-donor" will result. Follow closely now the connection between cloning and stem cells. Human beings are mammals, and therefore it is reasonable to conclude the technology now exists to clone human beings. Such cloned human embryos present a perfect, unlimited source of embryonic stem cells (the inner cell mass of the blastocyst is composed of pluripotent stem cells); and furthermore, the stem cells will be clones of the somatic cell donor. This means it is possible to create an embryonic stem cell line identical to anyone. The research community would have their stem cell source, including the ability to decide the genetics of the cell line and the medical community their access to perfectly matched organ or tissue transplants. Infertile couples could have cloned children, and so for that matter, could lesbian/gay couples. Human cloning supports stem cell research and provides several additional applications. Many people are clamoring for such technology to be put to use, and human embryo research is legal in some nations, Great Britain being one of them. The expertise needed to both work with stem cells and proceed with human cloning is here; the question that must now be answered is, "Should we proceed?[3] "

Stem Cells, Cloning & the Whole Picture

At this point, let's summarize and make sure the connections between stem cell research and cloning are clear. As we have discussed, stem cell research offers great potential to improve the quality of a great many people's lives. However the most focused aspect of this research to date centers around the access to pluripotent cells, and pluripotent cells can only be obtained from embryos.

So who is interested in embryonic stem cells? First, the research community is very interested in stem cell lines as a means to understanding the process by which growth occurs and gene expression is regulated. Second, the medical community is



very interested in learning how to use the developmental abilities of stem cells to regenerate damaged tissue, and perhaps one day, as a source of replacement organs with a perfect tissue match. Third, the biotech community is interested in capturing the business of both the research and medical community by becoming their source of stem cell lines.

To date, embryonic stem cells have been obtained from two sources: fertilized "extras" and aborted fetuses. Fertilized extras are those left over from the efforts of "in vitro" fertilization clinics to help infertile couples have children. Typically,

[3] We are aware of ACT's recent publication about their attempts at human cloning. Although they did get cell division to occur, it was minimal and ceased of its own accord after at most a few cell divisions - in essence an unsuccessful attempt at cloning, but literally as close as it is possible to come without succedding.

some excess number of eggs from the woman are fertilized (approximately 10), and then a lesser number implanted in an effort to effect a pregnancy (3-5).[4] If pregnancy occurs, then at some point the fertilized eggs, which were not used, become "extras."[5] With the consent of the parents who donated the genetic material, these fertilized eggs have been allowed to grow in the laboratory until they reach the blastocyst stage. At this point, the pluripotent stem cells were harvested and laboratory stem cell lines developed. As an introduction to the issues and type of reasoning that is a part of this topic, consider the following statement from the National Institutes of Health Primer on Stem Cells:

> **Although the inner cell mass cells can form virtually every type of cell found in the human body, they cannot form an organism because they are unable to give rise to the placenta and supporting tissues necessary for development in the human uterus. These inner cell mass cells are pluripotent—they can give rise to many types of cells but not all types of cells necessary for fetal development. Because their potential is not total, they are not totipotent and they are not embryos. In fact, if an inner cell mass cell were placed into a woman's uterus, it would not develop into a fetus.**[6]

We do not fault the above as a statement of biology, but we do question the subterfuge and the resultant impression left with the reader. This primer is meant for the public, and as such leaves them with the impression that the inner cell mass is not representative of a human being, and in fact does not even have the potential to become a human being. This is misrepresenting the facts in a way to support embryonic stem cell research. The inner cell mass cannot develop into a recognizable human being once it is ripped out of the blastocyst for precisely the same reason an astronaut in outer space is no longer viable once he is ripped out of his space suit. The placenta and other support tissues are not a human being; however, the developing tissue mass cannot survive without its support structure. Carefully packaged pieces of misinformation of this sort by medical and research professionals should make all of us very wary of the real agenda behind the information that is released to the public.

Back to the relationship between cloning and stem cells. As we have discussed, "extras" from fertility clinics have been demonstrated to be one potential source of embryonic stem cells. The other source that has been demonstrated to provide a viable source of embryonic stem cell lines is the use of certain portions of tissue (that destined to become the reproductive organs) from aborted fetuses.[7]

As you no doubt realize, both of these sources of embryonic stem cells require the destruction of a developing embryo in order to obtain the desired stem cells. In contrast, so-called "adult" stem cells do not require the destruction of an organism. They are multipotent stem cells removed from a functioning human being—the term adult can be a little misleading as this category would also include umbilical cord blood stem cells.

Lastly, human cloning is a potential source of embryonic stem cells—one whose future is literally a matter of months away. In this case, human cloning will be accomplished, presumably via somatic cell nuclear transfer, for the express purpose of creating a blastocyst whose stem cells can then be harvested. In this way, a laboratory stem cell line could be produced

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[4] These numbers are those typically found in articles descriptive of IVF. Recent advances in the field may have altered these values significantly.

[5] Typically, the fertilized eggs are cryogenically stored for potential future attempts at having children. However, at some point, the fertilized eggs reach the point where they are considered no longer viable or no onger wanted as a means to have children by the donors.

[6] Stem Cells: a Primer, National Institues of Health, May 2000, p. 1.

[7] These cells were obtained after the decision to terminate te pregnancy had already been made and with the donor's consent.

for any member of the human race. Even now, we would like you to begin to think about the contrast with other sources of embryonic stem cells, and the resultant implications. In current practice, embryos destined for destruction have been used as a source of stem cells. If cloning is pursued, we will then be creating embryos as part of research efforts and expressly for the purpose of their destruction. We would also like to point out that based upon the current thinking as seen in published literature and even the web site of the Government agency which is responsible for funding biochemical and biomedical research (the National Institutes of Health (NIH)), human cloning is seen as playing a supporting role in the ongoing efforts to tap into the potential of stem cells. Hopefully you have enjoyed the biology lesson and are now ready to move on to an investigation of the key issues associated with this topic.

Identifying Key Issues

Now that we have made it through a discussion of the basic science involved, let's change our focus to identify the key issues that are inescapably intertwined with the topics of human cloning and embryonic stem cell research. In keeping with the title of this paper, we will limit our discussion to the following four areas[8]

- Are we creating / taking human life?
- Is there egalitarianism of life?
- "Therapeutic" cloning—is it?
- Can science be "regulated" in a valueless society?

Are we creating and/or taking human life?

Since we have seen that the developing embryo in the form of a blastocyst is destroyed in order to harvest stem cells, it is of course relevant to determine whether or not we have destroyed a human being in the process. In other words, when does life begin? Since the "battle lines" with respect to this question have been drawn as part of the abortion debate, it is with some trepidation we bring it up again. However, if we look closely at the various answers and who promotes each of the answers, we think you will see a startling pattern emerge.

Let's start by recalling the positions most commonly associated with the abortion debate. First, when do pro-life advocates consider that life has begun? As you know, that answer is generally considered to be at conception. Now how about the advocates of the pro-choice position? Although their position is a bit more varied, we can start by saying they hold to a beginning of life at some point after conception.[9] By state statute, we have held to time periods that vary from 3 months (the first trimester) to 6 months, to in the case of partial birth abortions, right up until the time of birth. (We realize that we have now mixed together the issues of when life begins vs. what is legal. That is because regardless of the exact sentiments of pro-choice advocates with respect to life, the time period in which abortions are legal hinges upon a legal determination that the abortion is not yet "killing" a human being.) Now let's direct our attention to a different group entirely—when does the scientific community say that human life begins? I want to qualify the question carefully at this point. I am not asking

[8] There are of course many other issues worthy of discussion, but these four are the most closely reltated to trying to develop a Christian perspective towards this topic. For ean excellent discussion of issues that are more generic in nature, please see the Position Paper crafted by the Center for Bioethics and Human Dignity, which can be accessed at www.cbhd.org.

[9] In fact, there have been a large segment of the pro-choice movement that has attempted to promote the position succinctly stated by Eleanor Smeal, "Everyone knows that life begins only after birth." This statement was made by Ms. Smeal at a NOW Convention circa 1989.

when does some scientist quoted in the newspapers say that life begins, but rather when does the discipline of science whose area of study is the development of human life, from fertilization to birth, say that life begins. The group of scientists whose practice of science most qualifies them to answer this question are embryologists. So let's ask the question again, "When does science (embryology) say life begins?" Consider the following quote as a partial answer:

> **An international scientific consensus now recognizes that human embryos are biologically human beings beginning at fertilization and acknowledges the physical continuity of human growth and development from the one cell stage forward.**[10]

Now of course, we have all heard claims of scientific consensus before. Is it really possible that embryologists, in general, agree that life begins at fertilization? The above quote was itself footnoted. Here is a partial reproduction of that footnote:

> **R. Warwick, Nomina Anatomica, 3rd ed. (Edinburgh: Churchhill Livingstone, 1989**
>
> **(this ed. includes the international standard for scientifically correct terminology in human embryology)**
>
> **R. O'Rahilly & F. Muller, Human Embryology and Teratology, (NY, Wiley-Liss)1992**
>
> **W. Larsen, Human Embryology, (NY Churchill Livingston) 1993**
>
> **B. Carlson, Human Embryology and Developmental Biology, (St. Louis, Mosby) 1994**
>
> **K. Moore and T. Persuad, The Developing Human: Clinically Oriented Embryology, 6th ed. (Philadelphia, W.B. Saunders**

How surprising this will seem to many—the scientific discipline that "owns" the science associated with the beginning of life is in fairly good agreement, based upon its standard reference works, that life begins at fertilization—from one single cell—in essence, at conception.[11]

Now there remain two other groups from whom we need an answer to the question, "When does life begin?" First, how about the medical community? Well at least one portion of the medical community has definitively answered this question as 14 days.[12] What's more, the answer has become legal precedent as high as the Tennessee State Supreme Course.[13] To summarize these footnotes, the Court accepted the position of the American Fertility Association that life, or at least the beginning of the embryo stage, does not begin until 14 days. Until that time, the developing cell mass has been declared to be a "pre-embryo," and as such is afforded a lesser degree of protection than an "actual person." (Is an embryo then considered to be a real person?)

Lastly, how about the biotechnology industry? What is their answer to the question of when life begins? They have

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[10] Human cloning: The Necessity of a Comprehensive Ban; The Center for Bioethics and Human Dignity Position Paper; accessible at www.cbhd.org.

[11] Given the increasing complex connection between science and the ethical decision made by society, it is suggested that thought be given to the principles which should guide this interchange. Scientific information should be valued according to its source. In the case of the current stem cell debate, Congress has been receiving information via committee testimony and will eventually pass laws that regulate the activities of science in this arena. Most elected officials are not scientists nor are the media that inform the general public. Congress has received input from movie actors, biotech ethicists, the chair of university religion departments, but no embryologists. The National Bioehtics Advisory Committee does not have an embryologists on staff. This is not an intelligent nor ethical approach to dealing with the issues raised by science. We should begin by asking the question, "Who has the most valuable input on this topic, and what do they have to say?" If we do not select the correct sources and learn how to correctly weigh incoming information, we as a society, will make choices based upon selective information and the agendas of special interest groups.

[12] Ethical Considerations for NewReproductive Technology, a report by the Ethics Committe of the American Fertility Society, VI53, no. 6, Fertility & Sterility, Supplement 2, june 1990.

[13] Davis V. Davis, 842 S.W. 2nd 588, 604 (Tenn. 1992).

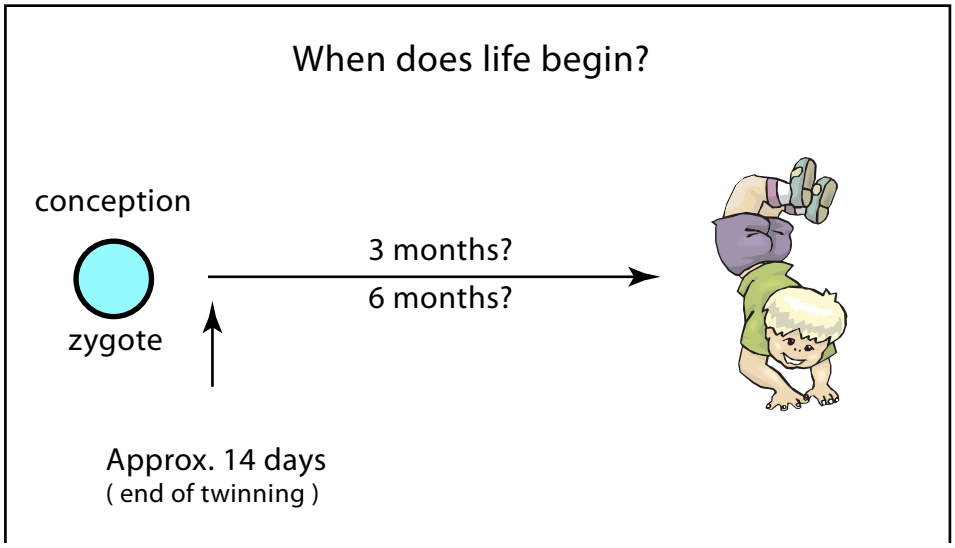
aggressively answered this question in a variety of venues from web site to congressional subcommittee testimony.[14] The biotech community by and large also favors the 14 day time period as the point at which life potentially begins, or perhaps their position could be more clearly stated as a dogmatic assertion that life has not begun prior to 14 days. Since this is a community consisting of scientists and engineers, you might expect their position to be a thoroughly logical and rational position based upon the science of our day. Instead, if you read the references, you will find their position to again be based primarily on the issue of "twinning" and a variety of other convoluted arguments put forth by such entities as their "Chief Ethicist", their Ethics and Advisory Board and the Head of the Religion Department at a supporting University. There is very little substance to debate here; rather, the position is perhaps best summed up by columnist William Saletan who states:

"Since (prior to 14 days) the embryo could become
one body
or two bodies,
maybe it's a nobody."[15]

(We are not going to make the effort in this paper to further critique the position held by those supporting a 14-day time period as the point at which life begins. It is simply not worth the time and effort to do so. We leave it to our readers to review the references. If you do, you will quickly see how little substance there really is and how quickly the arguments digress to a convoluted series of semantic arguments reminiscent of the famous, "What is the meaning of 'is'?" argument presented during an equally unworthy defense of an indefensible position.)

Let's sum up the viewpoints related to the issue of when life begins.

At this point, there are two important connections that should be made by our readers. First, why is the point at which life begins considered essential to this topic? To answer this, recall again the sources of stem cells:

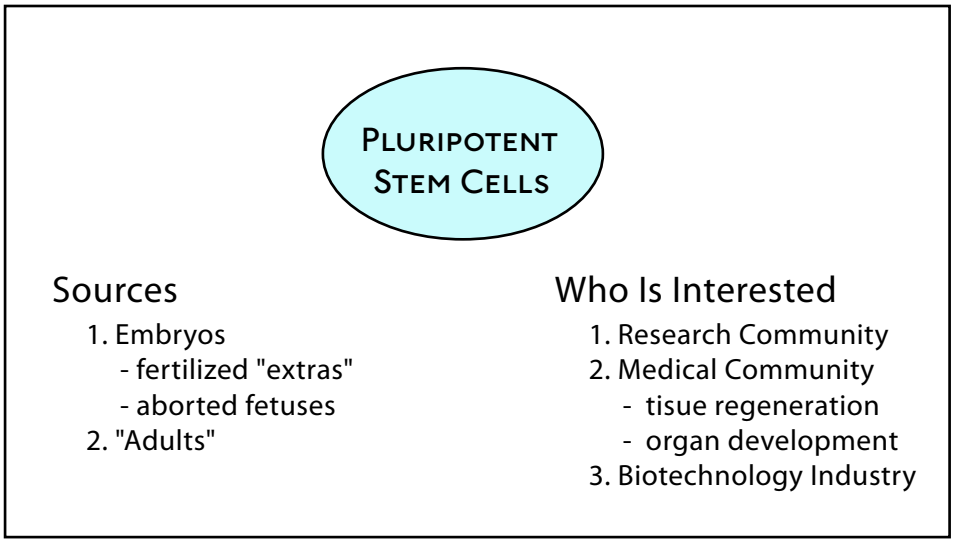


As you can see, two of the sources of stem cells are intimately related to the question of when life begins. Embryonic stem cells derived from fertility extras and aborted fetuses potentially involve the loss of human life dependent upon your

[14] An example of both of these items can be found at the web site of Advanced Cell Technology: www.advancedcell.com.

[15] Everybody's a Twinner, why the cloning industry's latest lobbying blitz is a snow job; William Saletan, posted on MSN News Dec. 27, 2001.

definition of when life begins. Likewise, human cloning involves the creation of human life for the purpose of destroying it



via the harvesting of stem cells, only if, human life begins prior to 14 days.

And that leads us to the second important connection that must be clear. Consider closely the following statement: whenever an individual (or group) defines the beginning of life as something other than fertilization, it is because they have an associated agenda! I think you will see this statement is readily defensible. For example, why does the pro-choice community so vociferously support the beginning of life after the 1st trimester, 2nd or even as late as birth? Any sort of objective analysis would answer the question, "Because that position supports the pro-choice agenda!" If it were not the case, abortion would be the same as committing murder. Take it a step further and ask why has mainland China promoted the position—life begins when the umbilical cord is cut! Is this connected with some aspect of science that we have not yet considered? No, instead it suits their agenda of one child per family and fits their societal pressures to have that one child be male.

Continue our analysis by asking what agenda would be supported by the medical community stepping forward and supporting the 14-day, end of twinning approach? If our hypothesis is correct, the source of the Friend of the Court Brief supplied to the Tennessee State Supreme Court as part of their landmark decision should provide a clue (Brief cited earlier in this paper). Not surprisingly, the agenda of the American Fertility Association stands out clearly—if fertilized embryos created during the in vitro fertilization process have begun human life, than it creates "complications" associated with those "extras" not actually used during fertility treatment. Currently, they are simply discarded; however, if they were really human beings, that life would have to be safeguarded as any other.

Lastly, have you begun to wonder about the biotech community's agenda? As you know, they wish to clone human beings for the purpose of harvesting their stem cells. It just so happens that the blastocyst develops to a stage adequate for stem cell harvesting in a period just less than 14 days. Therefore, if through a smoke screen of convoluted logic and ethical debate they can push the point of life until after 14 days, they can "safely" clone human beings and destroy the resultant embryos without becoming guilty of murder.

At this point, perhaps our somewhat cynical approach in the above paragraphs has made you wonder about our objectivity. We hope you will see it has been for the purpose of countering the propaganda job that has been foisted on the American Public. Our desire is that you clearly recognize that the point at which life begins is certainly a vital issue with respect to the stem cell/human cloning debate. Without attempting to try and "tell you the answer" to this key issue, consider the

following question, "Should we let an agenda driven group determine the answers governing what is obviously an essential issue, i.e. at what point does human life begin? An old mid-western adage provides the wisdom we need to answer the question—letting an agenda driven group answer the essential question of when life begins, would be like, "Putting the fox in charge of the henhouse!"

Let's conclude this topic by returning to science. Once again, what do the scientists who "own" the study of life from its very beginnings have to say about the point at which life begins? Consider this somewhat lengthy quote from a Tucson embryologist:

> **Since 1993, there has been a surge of public interest in human stem cell research and cloning. That was the year President Clinton lifted the ban on fetal tissue research. Also, in that year, Harold Varmus, then-director of the National Institutes of Health, appointed a panel "to study federal funding of human embryo research based on ethical and moral guidelines." Then in 1995, President Clinton created the National Bioethics Advisory Commission to advise him on areas of human embryo research, primarily stem cell research and cloning.**
>
> **Both advisory bodies recommended funding for stem cell research using human embryos, in particular the surplus frozen human embryos from in-vitro fertilization procedures. Those embryos are called "spare" embryos.**
>
> **Because of overwhelming public objection, funding was withheld until it was approved by Clinton in an executive order just before he left office. The research was to be supported by a neat "laundering" scheme, in that in-vitro fertilization "spare" embryos would be supplied to researchers and the researchers would apply for federal funding, so that NIH would not be complicit in the procurement of the embryos.**
>
> **President Bush was quick to rescind that order. That's where we stand today, waiting for further action by President Bush.**
>
> **There have been many congressional hearings on stem cell research with lots of witnesses offering testimony. The major media have published many columns on the subject. Pols, pundits, economists, businessmen, cab drivers and housewives have written articles and been quoted on this core issue of Human Embryology.**
>
> **But get this: Not a single human embryologist has been quoted or was a member of the NIH panel or the NBAC or was asked to testify before either body! The major media have totally abandoned human embryologists on this issue…**
>
> **The result has been "biobabble" including misuse of terms, hype, parsing, deception and convoluted interpretations. The public has not been well served.**
>
> **The "spare" embryos from in-vitro fertilization laboratories have been referred to as "blastocysts." This is not so. They probably consist of stages of earlier embryos: four or eight cells and maybe a few at 16…**
>
> **The idea has been promoted that the "spare" embryos contain only "pluripotent" cells and been coupled with the notion that these cells cannot form embryos; therefore, these embryos are not really embryos. Such tortuous and convoluted reasoning has led to a declaration that "the (spare) embryo in a petri dish is not a human life." So says Sen. Orrin Hatch, R-Utah, and former Sen. Connie Mack, R-Fla.**
>
> **They are wrong. If it "is not a human life," is it then a "human death?" Hardly.**
>
> **Pols and pundits have invented new terms that human embryology has never seen, such as fertilized egg (there is no such thing), prezygote, preembryo, individuation, ovasome and activated egg!**
>
> **The reduction ad absurdum of embryonic life can be observed from writers such as William Safire, who**

described the human embryo as so small that "it is no bigger than the period that ends this sentence." Does that mean that small people are less significant - or even less human - than big people? What supreme arrogance!

The scientific fact (it is not a belief) is that the life of the new individual human being begins at conception. The embryo in a petri dish retains the same integrity and self-directed qualities as in-vivo, unless the manipulation is destructive. Therefore, removing its stem cells destroys that life.

Finally, the issue of stem cell research should embrace a profound warning, one that we really do not want to hear: Obtaining so-called stem cells from an early embryo and putting them into culture takes them out of their natural environment.

Even in this early embryo, changes are going on in the genome of each cell, producing cells with different qualities and rates, which may cause them to sequester unwanted changes when prodded by chemicals in culture. Such changes may be manifest immediately, or, perhaps, after a very long time.

We are now seeing this sort of thing in livestock and mice, which have been cloned, in the form of abnormalities and accelerated aging. My graduate colleagues and I knew about this in the early '60s. We could have predicted these consequences, and did. But no one was listening.

Virtually no human embryologists are being sought for their input into this vital issue (present example one of the few exceptions). The hype is that this "stem cell research may (key word) save lives and cure diseases." Stem cells were first isolated from early human embryos in 1998, but no further reports have, as yet, been seen relative to developing cell lines. Most likely in-vitro fertilization laboratories have done this, but they are keeping quiet, probably because of the likelihood of patents. This has the potential of a billion dollar industry.

The science of human embryology tells us that all of life from the first moment of conception to ultimate death is a continuum. Changing the quality or status of this life continuum - at any point in development - is arbitrary.

The Brave New World is upon us.

C. Ward Kischer, Ph.D., is professor emeritus of anatomy, specialty in human embryology, University of Arizona College of Medicine.[16]

Use your mind and think through the evidence before you. Carefully weigh the arguments. When do you think life begins? Certainly, this is an issue that must be addressed as part of the cloning/stem cell debate. Furthermore, in light of the impact on humanity, how can we take anything but a conservative approach when answering this question?

Is there egalitarianism to life?

Let's begin by defining the term egalitarian.

> **An adherent of the doctrine of equal political, economic and legal rights for all human beings.**[17]

So then the issue we would like to raise, does the concept of egalitarianism apply to human life? Do we, or will our society, choose to consider as axiomatic truth the principle that all human life is of equal value and/or entitled to the same rights?

[16] University of Arizona, Department of Biochemistry web page, and orginallywriten as an editorial and printed in the July 30, 2001 editionof the Tucson Citizen (emphasis is ours).

Now how does this concept interface with stem cell research and the potential of human cloning? The interface is one of conflict and antithesis. Please carefully consider the following:

1. Will we consider destroying life for the benefit of others? (Perhaps even creating life for the express purpose of destruction). This is exactly what would be the case if human life begins when embryologists believe it does. Stem cell lines from fertility "extras" and aborted fetuses require the death of a human being. Perhaps one can argue that good could come from this evil (the destruction of the embryo). However, in the case of using a cloned human as the source of stem cells, no such argument can be made. In this case, a human being will be cloned for the express purpose of destroying it as its stem cells are harvested.

2. Will we consider allowing a certain class of human beings to be the object of experimentation? Certainly this would be true by definition of every human clone. It becomes an even more gruesome possibility with some of the futuristic scenarios of how cloning might be used for such purposes as organ development, etc.

3. Will we promote an "unnatural" process that has a demonstrably high probability of mutations, birth defects and other physical abnormalities? To date, only 3-5 % of mammal cloning is successful. Of that small percentage, close to one third die either right before or right after birth. Of those that do survive, a large percentage develop a host of growth and development abnormalities including heart and blood vessel problems, immune system disorders, diabetes, etc.[18] Perhaps you read in your local newspaper (circa Jan 2002) that the first cloned mammal, Dolly, has developed arthritis at a very early age.

The issue here is that all three of the above points are in direct conflict with, and in fact the antithesis of, an egalitarianism of life. One cannot logically hold to an egalitarianism of life and support stem cell research, especially that based upon human cloning. Do we as a society realize that we are moving away from egalitarianism of life and towards an inequality of life? Consider the following as evidence.

> **I will always choose real people over theoretical people."**
> **That statement, by former Denver defensive back and now Denver Post columnist Reggie Rivers, is at the heart and soul of the argument supporting embryonic stem cell research.**
> **What he calls "theoretical people," however, I would rather call "potential people" because, with the aid of a uterus, they may become a human being.**[19]
>
> **To me, a tiny mass of cells that has never been in a uterus is hardly a human being—even if it has the potential to become human."**[20]

We admit that the issue of when life begins is closely connected to one's attitude toward cloning and stem cell research. However, neither of these men seems to be addressing the acceptability of stem cell research based on the fact that a human

[17] The American Hertiage Dictionnary, 2nd Edition, Houghton Mifflin Co. 1985.

[18] Cloning and the Debate on Abortion, Nigel Cameron & Lori Andrews, The Wilberforce Forum 17 Dec 2001, www.wilberforce.org.

[19] PRO: Supporting such research means backing 'real people," Robert Dolezal, Tucson Citizen editorial, July 30, 2001.

life is not being taken. Instead, implicit with their statements is the belief that a "potential" life is not worth as much as a "real" life. This is potentially a rejection of egalitarianism of life, with a corresponding movement toward a hierarchy of life. Is this where we want to go? A different direction altogether than that upon which our country was founded, and then persevered, through perhaps its previous darkest hour.

Therapeutic Cloning-is it?

Therapeutic cloning is a term coined by the biotech industry so as to distinguish it from "reproductive" cloning, i.e. cloning for the purpose of reproducing the human race. Currently, therapeutic cloning is being promoted as a desirable source of embryonic stem cells—and perhaps one day may be used as a source of human organs, and more advanced medical treatments. The push for government approval of therapeutic cloning has been orchestrated with all the care of a major advertising campaign. Advanced Cell Technology (ACT) publicized their efforts to perform cloning this past Thanksgiving holiday weekend. Actors Michael J. Fox and Christopher Reeves have testified before Congressional Subcommittees urging for governmental approval. The biotechnology companies have been nearly euphoric in their praise of the potentials associated with stem cell technologies derived from human cloning sources. As one example, consider the comments of Thomas Okarma, President of Geron Corp, a major player in the biotech industry.

> **Our nation is on the cusp of reaping the long-dreamed of rewards from our significant investment in biomedical research. . . . Using somatic cell nuclear transfer and other cloning technologies, biotech researchers will continue to learn about cell differentiation, re-programming and other areas of cell and molecular biology. Armed with this information, they can eventually crack the codes of diseases and conditions that have plagued us for hundreds of years, indeed for millennia.**[21]

Should we allow ourselves to get caught up in the promise of the future—or should we perhaps pause, and analyze what we already know? For example, consider the use of the word therapeutic as it modifies cloning. The word therapeutic has long standing meaning in the realm of medical ethics. It always connotes a potential benefit to its object. Many states currently have statutes on the books that make it illegal to perform a medical activity which is non-therapeutic. Clinical trials on a new drug can only be sanctioned ahead of FDA approval if the therapeutic benefit to the patient can be clearly demonstrated. In fact, the Nazi medical experimentation conducted on Jews et al during WWII, was condemned after the war, on the basis that it was non-therapeutic. Consider the following summary of this medical/ethical faux paus by Richard Doerflinger, representing the National Council of Catholic Bishops:

> **. . . the experiments contemplated [in therapeutic cloning] are universally called "nontherapeutic" experimentation in law and medical ethics—that is, the experiments harm or kill the research subject (in this case the cloned embryo) without any prospect of benefiting that subject. This standard meaning of "nontherapeutic" research is found, for example, in state laws forbidding such research on human embryos as a crime. Experiments performed on one subject solely for possible benefit to others are never called "therapeutic research" in any other context, and there is no reason to change that in this context."**[22]

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[20] Dr. David Baltimore, President of California Institute of Technology, Nobel laureate in Medicine, Stem-Cell Research; A Debate, Wall Streety Journal 30 July 2001.

[21] June 20, 2001 testimony before the U.S. House Subcommittee on Health.

We hope you now clearly see through the smoke screen laid down by the biotech industry. There is no possible way therapeutic cloning can be of any benefit to the clone—it is cloned for the specific purpose of destroying it to harvest its stem cells. The advertising campaign is designed for the express purpose of getting us so excited about the possibilities, that we don't question the means. So as you see, this is just a hi-tech version of the "ends justifies the means" argument. The third issue we are facing can now be clearly stated. Will we become so enamored with the end—the potential alleviation of human suffering, that we completely fail to question the means—even if the means include the potential destruction of a human life that we have by "necessity" deemed to be of less intrinsic worth than another?

Regulating Science in a Valueless Society

We believe this issue is likely to be overlooked by many; however, we also believe it is of major significance, since in the words of Shakespeare, our society is about to be "hoist with (its own) petard".[23] Let us explain what we mean. The issue is this—once you have done away with the existence of absolutes, which is by and large the norm in America's post-modern mentality, it becomes impossible to regulate anything on the basis of "right" or "wrong." Dr. Leon Kass was probably the most influential advisor to President Bush while his administration made its first attempts to deal with the issue of embryonic stem cell lines. In fact, he has been appointed by President Bush to Chair an Advisory Council to consider the complex medical and ethical issues faced by our society. In a recent interview, Dr. Kass recounts discussing with graduate students his concerns regarding the pursuit of human cloning. Excerpts from this interview give us insight into the thinking of today's young researchers:

> **. . . while the students were in complete agreement with his (Dr. Kass's) position that human beings should not be cloned, they intensely disliked his support argument."**
>
> **. . . people today are likely to be friendlier to the important consequentialist arguments against cloning: that it will pave the way to despotism, 'manufacture' and 'commodification' of children, extreme control over the lives of others and limited freedom of our offspring—the consequences of which will surely be detrimental."**
>
> **. . . to make a case (egalitarianism of life) against cloning is not likely to be effective in a culture that has increasingly rejected the existence of moral absolutes."**[24, 25]
> **(Parenthetical inserts are ours, and we believe in strict compliance with the context of the article.)**

So perhaps now you see society's dilemma, how will we (or our law-makers) ever really be able to take a stand upon this issue, since we have abandoned any possibility of a moral high ground with the general acceptance of post-modern thought, i.e. there is no such thing as absolute truth. Perhaps nowhere is this problem more startlingly clear than in a comparison of the two quotes below, which have previously been used in the development of this paper.

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[22] May 2001 testimony before the Senate Committee Subcommittee on Science, Technology and Space.

[23] Hamlet, Act III, Scene 4.

[24] Cloning Humans, Leon Kass and Kevin FirzGerald on the "Post-Human Future," Dignity, Winter 2001.

[25] We find it interesting to note that in the follow-up writings of which we are aware, Dr. Kass seems to have abandoned any type of moral argument based upon the egalitarianism of life - almost as if he is convinced that no one will listen to this approach.

The scientific fact (it is not a belief) is that the life of the new individual human being begins at conception. The embryo in a petri dish retains the same integrity and self-directed qualities as in-vivo, unless the manipulation is destructive. Therefore, removing its stem cells destroys that life."(C. Ward Kischer, Ph.D., is professor emeritus University of Arizona College of Medicine.)

I will always choose real people over potential people (i.e. those that with the aid of a uterus may become a human being). (Robert Dolezal, president of the Arizona Chapter of the American Parkinson Disease Association.)

See if you can perceive the problems our society is going to face in dealing with this issue. If we become convinced that Dr. Kischer is right, that human life begins at fertilization, then for many of us that settles the issue. Why? Because if stem cell research as supported by human cloning requires the death of a human being, it is an unacceptable practice, because murder is fundamentally wrong—case closed! However, do you see the fact that Robert Dolezal is not at all debating the point at which life begins nor does that seem to be an issue with him? He is simply promoting good for some at the expense of others. These two individuals, somewhat representative of both academia and our society at large, have no point of common reference. How will our society ever come to agreement or lasting consensus on this issue?

This issue also will require the Christian community to make a choice. Will we stick to what Dr. Kass calls the consequentialist (establishment) arguments, or will we also continue to take a moral stand, even if the world around us becomes less able (or less willing) to consider such a position?

Aligning our Perspective with Biblical Principles

Thus far we have discussed the science associated with stem cell research and human cloning, as well as identified a number of core issues that are directly linked to the science. In this, the third and final part of the paper, we attempt to bring both of these items under the authority of Biblical truth. We have tried to present both the science and associated issues in an understandable while certainly not exhaustive format. In the same way, we will present a reasonable number of key Biblical truths, followed by some suggested applications. The serious student is encouraged to use available reference materials to develop a more comprehensive Biblical understanding.

We use the word "authority" quite intentionally because in our view, Biblical truth is the final authority for the Christian. This does not mean we think the Bible is a scientific textbook, nor does it specifically address the issue of stem cell research and human cloning. Rather, as a source of preserved revelation from God our Creator, it provides a source of absolute truth, which can guide and bound his creation within His will. As such, we do well to carefully and prayerfully extract such truth as has bearing on the issues faced by our society. Consider the following principles as those we believe directly impact our decision making with respect to stem cell research and human cloning. We, of course, are open to disagreement and challenge; however, only to the extent it is Biblically based.

Biblical Principles

God is the author of life

Consider for a minute the following passages of Scripture:

The Lord God formed the man from the dust of the ground and breathed into his nostrils the breath of life, and the man became a living being. (NIV) Gen. 2:7

For you created my inmost being; you knit me together in my mother's womb. (NIV) Ps. 139:13

I know, O Lord, that a man's life is not his own; it is not for man to direct his steps. (NIV) Jer. 10:23

For in him (God) we live and move and have our being. (NIV) Acts 17:28

Do you get the impression that many of those involved in scientific and technological endeavors almost feel as if they are on the verge of becoming the creators of life—the masters of humanity's fate? Almost as if since the mystery of life has been "solved", we no longer have any need for God as a method of explanation? We need to be very clear on this—no matter what capabilities man may develop, God is always the author of life!

As I am bombarded with the boastful claims of science with respect to the potential of human cloning, I think first of two wonderful young ladies who attend our local church. They happen to be identical twins, and as such, are by definition perfect "clones." Has ACT's efforts at cloning a human being, a mere few cell divisions, caught an unsuspecting God by surprise? On the contrary, God is the author of successful cloning! These two young ladies, who share the special bond of twins, have been in the mind of God from eternity past and have a home with Him for all of eternity yet to come.

The second thing that comes to mind associated with these boastful claims of science is its close resemblance to the attitude of a primitive group of nearly stone-age natives in the far western Pacific. I heard a missionary describe such a group a number of years ago, and have not forgotten the illustration. This particular missionary was sent into a jungle region to reach a primitive tribe in the islands of New Guinea.[26] Although the tribal people accepted his family readily enough, there was almost no response to the Gospel. This puzzled the man, until one day when he was out cutting wood with one of the natives. Just before the tree fell, the native man jumped back and uttered a phrase. The missionary realized he had heard the phrase many times before, but his language skills were now becoming adequate to understand it. What the native man had uttered was akin to, "Ha, you who have created this, I have bested you." And now you see why there was so very little response, and why this native tribe was in one essential way similar to the science and technology wizards of our day—pride of heart.

With this in mind, I want to make several forceful statements. Isa 48:11 tells us that God, "will not yield his glory to another"—this includes the scientists and technologists of our day! In addition, any man or woman who can investigate the miracle of human life and not be struck with a sense of awe is both blind and under a strong delusion. And let's not mince words—the footstool to delusion is arrogance!

With the Creator of the universe clearly declaring His role as the Author of life, we do not have to in any way feel intimidated by the boasts of those who in reality are operating under the blindness of arrogance.

God values his work!

If God is the author of life (and He is), then we shouldn't be the least surprised that He values His creation. Consider the following portions of Scripture in support of this point.

Your brother's blood cries out to me from the ground. (NIV) Gen. 4:10 (This being God's comment to Cain after

he murdered his brother Able.)

You shall not murder. (IV) Ex. 20:13 (Of course not—God is establishing a social order that protects His gift of life.)

. . .he gave them over to a depraved mind, to do what ought not to be done. They have become filled with every kind of wickedness. . . murder. (NIV) Rom. 1:28-ff (Let's be clear, the taking of human life is an indication of depravity and is one form by which wickedness manifests itself. Is that a worthy epitaph for our society?)

The "end justifies the means argument" will not stand before a holy God

All to often we act as if we are the final evaluator of our decisions and actions. This is especially true of those gifted members of our society who have leadership roles in the realm of science, business and politics. We tend to forget that we will all give a complete account of lives before God.

. . . For the Lord searches every heart and understands every motive behind the thoughts. (NIV) 1 Chron. 28:9

So then, each of us will give an account of himself to God. (NIV) Rom. 14:2

He (God) will bring to light what is hidden in darkness and will expose the motives of men's hearts. (NIV) 1 Cor. 4:5

Then I saw a great white throne and Him who was seated on it. Earth and sky fled from his presence. . . And I saw the dead, great and small, standing before the throne, and books were opened. And another book was opened, which is the Book of Life. The dead were judged according to what they had done as recorded in the books. (NIV) Rev. 20:11-12

I think it clear that the motives and intents of the heart associated with stem cell research and human cloning must be addressed, because we will give an account to God. Certainly, corporate profits and pushing the barriers of science are not in themselves evil; however, they can certainly become so when they take on the status of idols and are the motive behind manipulative actions directed toward both elected officials and the American Public.

Not only will our actions be judged by God, but keep in mind the fact they will be judged by a holy God!

. . .righteousness and justice are the foundation of your throne. . .let them praise your great and awesome name. . .for the Lord our God is holy. (NIV) Ps 89:14; 99:3

But just as he who called you is holy, so be holy in all you do; for it is written, "Be holy, because I am holy." (NIV) Lev. 19; 1Pt 1:16

God's holiness consists, among other things, of His perfect righteousness and justice. Before this type of God, no argument to support a "good" end will ever be acceptable if it includes an unrighteous means. How could the taking of a human life ever justify the end before a holy God? In fact, we need to realize that rather than placing a premium on the "end," God

always emphasizes the means. Consider the following:

> **Raise up a child in the way he should go, and when he is old he will not depart from it. (NIV) Prov. 22:6**
>
> **If a man remains in me and I in him, he will bear much fruit. (NIV) John 15:5 (Keep in mind that in him is no darkness at all and if we claim to have fellowship with him yet walk in the darkness, we lie and do not live the truth 1 John 1:5-6)**
>
> **. . . fire will test the quality of each man's work. If what he has built survives, he will receive his reward. (NIV) 1 Cor. 3:13 -14**

We could aptly summarize God's way by saying, "If the emphasis is on an upright walk before the Lord, (the means) then the end will take care of itself!" The Chief Need of Man is not Medical Breakthrough or Relief of Human Suffering. Rather, it is a relief from Judgment and Restoration of Fellowship with our Creator! I know this is a hard thing for many of you, but again, we are trying to look at this from God's viewpoint. Consider the following:

> **What good is if for a man to gain the whole world, and yet lose or forfeit his very self? (NIV) Luke 9:25**
>
> **There is no one righteous, not even one;. . . for all have sinned and fall short of the glory of God. . . (NIV) Rom. 3:10, 23 (the bad news). Acts 16:30-31 Sirs, what must I do to be saved? They replied, "Believe in the Lord Jesus, and you will be saved—you and your household."**
>
> **"What must we do to do the works God requires?" Jesus answered, "The work of God is this: to believe in the one he has sent." (NIV) John 6:28-29**
>
> **Dear friends, I urge you, as aliens and strangers in the world . . . (NIV) 1 Pet. 2:11**

Human suffering is an inescapable part of the fact that we live in a fallen world; and no amount of sincere effort or medical breakthroughs can change that fact.

This is not to say that we should not attempt to pursue medical breakthrough and/or alleviate human suffering; rather, we are saying that it must be kept in perspective and put in the proper order. Address first the needs of the everlasting soul-life, and then deal with the physical body and circumstances. If we focus our efforts on the wrong priority, than at best, therapeutic cloning will be: "An improved means to an unimproved end."

(I realize the above paragraph highlights a clear clash of viewpoint between the Christian and the world in which we live. Our world's view of time can in essence be described as follows: we are born, we eke out as many days as possible and then we cease to exist. The Christian's view of time is significantly different. We have been known by God from eternity past, we are born once physically; those who respond to the Gospel are born again spiritually through faith in Christ and have an eternal destiny and home with Him. What's more, quality of life is an inherent part of eternity, whereas in this life we will have "troubles." We make no apology for this contrast and in no way want to try and make it palatable to world view-point. In fact, that is precisely the point of this whole section of the paper—these are clear, non-negotiable aspects of God's revealed will to man. As such, they must govern our attitudes and thinking, and are the appropriate place for dogmatism.

What's more, we expect to receive the derision of the world for holding to such a view.)

Application

We shift gears slightly now, and what follows are areas of suggested application which flow from the principles stated above. This list is in no way all-inclusive, and we suggest that you continue to make application as you feel lead of the Lord. In addition, we certainly recognize the fact that application of truth is always more open to disagreement and differences. Please consider the following:

1. Outlaw cloning—all types. Despite the ongoing debate, it is clear to us that the destruction of an embryo, from the one cell stage forward, is so likely the destruction of a human being, that it should never be intentionally pursued. This of course would mean therapeutic cloning is unacceptable on moral grounds. In addition, because of the immense complications involved and the unacceptability of conducting medical experimentation on human beings, reproductive cloning is also unacceptable. Because of the decisions likely to be made in the next few years, if not the next few months, we strongly urge you to contact your elected officials and inform them you are in favor of a ban on all types of human cloning including so-called therapeutic cloning. (We strongly urge you to mention therapeutic cloning by name, as the biotech industry is seeking to separate this type of cloning from reproductive cloning and remove it from regulation at the same time.)

2. Limit embryonic stem cell research. Embryonic stem cells currently come from fertilization "extras" or aborted fetus tissue; and as discussed, could potentially come from human cloning efforts. In all three cases, we believe a human being has died to provide the stem cells. We believe the "good from evil" argument has some merit with respect to the first two cases; however, we are still opposed to pursuing these two sources of embryonic stem cells. (As mentioned above, we are also opposed to cloning as a source of embryonic stem cells). The reason is not that we feel capable of resolving the "good from evil" conundrum, but rather, we are opposed to the likely events that will transpire should we allow the harvesting of embryonic stem cells from either of these two sources. In essence, we think it highly likely that if these two sources are considered "approved" sources of embryonic stem cells, then it will result in the formation of a number of questionable "cottage-industries." For example, is it not likely that we will now produce a "demand" for aborted fetuses at a specific age of development; and in fact, even likely that an individual could be paid to abort at a specific time period? What would stop fertility clinics from fertilizing a far greater number of eggs than could ever possibly be used as a means to create revenue for sale to research entities? In case you are skeptical, current practice includes the payment of up to $5000.00 to a woman for the harvesting of her eggs for research purposes. Women of what socio-economic class, would you suppose, are most susceptible to the pressures of this type of offer? We are too likely to end up right back at the ends justifies the means argument, which we have already seen does not stand before a holy God.

3. Promote adult stem cell research. As you recall, adult stem cells are really those taken from an

individual—child through adult—and even include umbilical cord stem cells. Although labeled "multipotent" not pluripotent, they have still been shown to possess many of the remarkable qualities of embryonic stem cells. One of the most intriguing articles of late would lead us to believe that perhaps adult stem cells are the best area on which to focus research efforts. Although time will tell, there are no, or at least much fewer, in the way of moral dilemmas associated with this area of research.

Some Final Thoughts

There is a line in the movie Jurassic Park, which loosely paraphrased states, "you spent all of your efforts in seeing if you could, without ever considering if you should." This is a nearly prophetic commentary on the status of society's dilemma today. Nigel Cameron summarizes the attitudes of stem cell/cloning researchers (academic and biotech industry) as, "We're going to do it. Stop us." Meanwhile, our legislators are being hit with a hi-tech publicity campaign, and doubtless PAC donations as well. Finally, the public appears to have been so intimidated by the science involved (or desirous of the outcome) that they have been largely silent in the public arena. In case it is the issue of the science that has kept us quiet, the purpose of this paper is to both make the science understandable, and place it in the context of a Christian/Biblical perspective. We hope that it has been used by God to do so. In addition, we hope that many of you will be motivated to make your views heard to both your elected representatives and those in your "sphere of influence."

One final word of encouragement

No matter what action our society takes with respect to this issue, we would like to remind you that if you make a point of ministering to those who hurt, you will never be hurting for ministry. Like the many so-called liberations undertaken by our society in the past, they have simply led to more hurting hearts which will perhaps now be more receptive to their need of a Savior. As a Christian be ready to stand in the gap as God provides the opportunity.