

Are We Alone in the Universe?

A Biblical View of Aliens

Dr. Ray Bohlin provides a Christian view on the probability and meaning of life on other planets. From a biblical perspective, what would it mean to find evidence of life beyond this earth?



This article is also available in [Spanish](#).

Life on Mars?

There was great excitement in the media when a group of scientists from NASA announced they had found evidence of life on Mars. Their evidence, an alleged Martian meteorite, was vaulted to center stage, and everyone from CNN to *Nightline* ran special programs with interviews and video footage of the scientists and their prized specimen. President Clinton was so excited by the announcement that he praised the U.S. space program and took the opportunity to establish a bipartisan space summit headed up by Vice President Al Gore to study the future of U.S. space research. Aren't we already doing that?

Anyway, clearly this announcement took the country by storm. Some of the scientists were embarrassingly gushing about how significant these findings were. The media frenzy was prompted by the early release of an article from the journal *Science*, the premier scientific journal in the U.S. The article was due out the following week, but *Science* decided to release it early because it had leaked out.

Here's what the excitement was about. A group of scientists had studied a meteorite that had been found in the ice of Antarctica. Previously, it had been determined that this meteorite had originated on Mars by studying the gaseous content of glass-like components of the meteor. The gas

composition matched very well the atmosphere of Mars. This conclusion seems reasonable.

So, they presumed they had a meteor from Mars. Next they looked for evidence of life on and in the crevices of the meteor. They found two types of molecules that can form as a result of life processes, carbonates and complex molecules called polycyclic aromatic hydrocarbons or PAHs. They also found shapes in the rock that resembled those of known microfossils on Earth. Microfossils are fossils of one-celled organisms which are rather tricky to interpret.

Well, what does this mean? Obviously, the NASA scientists felt the things just mentioned provided ample evidence to conclude that life once existed on Mars. However, the chemical signs could all be due to processes that have nothing to do with life, and the supposed microfossils are 100 times smaller than any such fossil found on Earth. Other groups that studied this same meteorite concluded that either the temperature of formation of the chemicals was far too high to allow life (over 700 degrees C) or that other chemical signals for life were absent. John Kerridge, a planetary scientist from the University of California at San Diego, said, "The conclusion is at best premature and more probably wrong." But listen to the concluding statement in the paper in *Science*:

Although there are alternative explanations for each of these phenomena taken individually, when they are considered collectively, particularly in view of their spatial association, we conclude that they are evidence for primitive life on Mars.[\[1\]](#)

In plain English, there are reasonable non-life explanations for each of the evidences presented, but we just think that they mean there is life on Mars. The evidence *is* very equivocal and was challenged by many other scientists, but the media did not report that as fully. But maybe they are right!

In fact, there is one simple explanation that is consistently ignored by media and scientists alike. If there really is, or has been, life on Mars, what could that possibly mean for evolution, and more importantly, does it somehow refute creation? We'll look at that next.

What Would Life on Mars Mean?

Because of the recent announcement of signs of life on Mars, many people were encouraged in their belief that we are not alone in the universe. These signs are far from certain and probably wrong, but if it's true, what would these results mean to evolutionists? Moreover, is there any reason for Christians to fear confirmation of life on Mars?

Let us assume, then, for the moment that the evidence from this Martian meteorite is legitimate evidence for life on Mars—life that at some point in the past actually existed on Mars. What would it mean?

For evolutionists the evidence is perceived as confirmation that life actually arises from non-life by purely chemical processes. In addition, evolutionists draw the conclusion that life must be able to evolve very easily since it did so on two adjacent planets in the same solar system. Therefore, even though origin of life research is actually at a standstill, such a discovery seemingly confirms the notion that *some* chemical evolution scenario *must work*. I will address this assumption later.

On the other hand, some have stated that if there is life on Mars, creationism has been dealt a death blow. They rationalize that since (1) we now know that life can evolve just about anywhere, and (2) the Bible never speaks of life anywhere but on Earth, the Bible is, therefore, unreliable. Besides, they reason, why would God create life on a planet with no humans? However, since the Bible is absolutely silent on the subject of extra-terrestrial life, we can make no

predictions about its possibility. God is certainly free to create life on planets other than Earth if He chooses.

Getting back to the evolutionists' glee at the possibility of life evolving on other planets, the real question is whether this is the proper conclusion if life is indeed found on Mars? The simple answer, inexplicably avoided by the media, is NO! The simplest answer to the possible discovery of life on Mars is that the so-called "Martian life" actually came from Earth!

Think about it this way. The meteorite that was found is supposed to have existed on Mars previously. How did it get to Earth? Well, it is hypothesized that a large meteorite crashed into Mars throwing up lots of debris into space, some of which finds its way to Earth and at least a few of which are found by Earthlings. If you are thinking with me, you now realize that the same scenario could have been played out on Earth.

Evolutionists suggest that the Earth was under heavy meteor bombardment until at least 3.8 billion years ago—about the time they say life appeared on Earth. Christian astronomer Hugh Ross states it this way:

Meteorites large enough to make a crater greater than 60 miles across will cause Earth rocks to escape Earth's gravity. Out of 1,000 such rocks ejected, 291 strike Venus, 20 go to Mercury, 17 hit Mars, 14 make it to Jupiter, and 1 goes all the way to Saturn. Traveling the distance with these rocks will be many varieties of Earth life. {2}

Ross also documents that many forms of microscopic life are quite capable of surviving such a journey. All this is quite well known in the scientific community, but I have not seen it mentioned once in any public discussion. I believe the reason is that the possibility of life having evolved on Mars is too juicy to pass up.

The Improbability of Life Elsewhere in the Universe

I would like to address the amazing optimism of so many that the universe is teeming with life. No doubt this is fueled by the tremendous success of such science fiction works as *Star Wars* and *Star Trek* which eloquently present the reasonableness of a universe pregnant with intelligent life forms.

Inherent within this optimism is the evolutionary assumption that if life evolved here, certainly we should not arrogantly suppose that life could not have evolved elsewhere in the universe. And if life in general exists in the universe, then, of course, there must be intelligent life out there as well.

This is the basic assumption of the SETI program, the Search for Extra-Terrestrial Intelligence. This is the program, now privately funded instead of federally funded, that searches space for radio waves emanating from another planet that would indicate the presence of intelligent life. But is such a hope realistic? Is there a justifiable reason for suspecting that planets suitable to life exist elsewhere in the universe?

Over the last two decades scientists have begun tabulating many characteristics of our universe, galaxy, solar system, and planet that appear to have been finely-tuned for life to exist. Christian astronomer and apologist, Dr. Hugh Ross documents all these characteristics in his book *Creator and the Cosmos*, [{3}](#) and is constantly updating them. In the book's third edition (2001), Ross documents 35 characteristics of the universe and 66 characteristics of our galaxy, solar system, and planet that are finely-tuned for life to exist.

Some examples include the size, temperature, and brightness of our sun, the size, chemical composition, and stable orbit of Earth. The fact that we have one moon and not none or two or three. The distance of the Earth from the sun, the tilt of the earth's axis, the speed of the earth's rotation, the time it

takes Earth to orbit the sun. If any of these factors were different by even a few percent, the ability of Earth to sustain life would be severely compromised. Recently it has been noted that even the presence of Jupiter and Saturn serve to stabilize the orbit of Earth. Without these two large planets present exactly where they are, the Earth would be knocked out of its present near circular orbit into an elliptical one, causing higher temperature differences between seasons and subjecting Earth to greater meteor interference. Neither condition is hospitable to the continuing presence of life.

Ross has further calculated the probabilities of all these factors coming together by natural processes alone to be 1×10^{-166} ; that's a decimal point followed by 165 zeroes and then a one. A very liberal estimate of how many planets there may be, though we have only documented less than 100, is 10^{22} or 10 billion trillion planets, one for every star in the universe. Combining these two probabilities tells us that there are 10^{-144} planets in the entire universe that could support life. Obviously this is far less than one; therefore, by natural processes alone, we shouldn't even be here—let alone some kind of alien life form.

So unless God created life elsewhere, we are alone, and for the materialistic evolutionist, this is a frightening thought.

Problems with Chemical Evolution on Earth

The statistics given above mean that we are really alone in the universe and that there is no hope of finding intelligent civilizations as in the television program *Star Trek*. While it means there is no one out there to threaten our survival, there is also no one out there to save us from our own mistakes.

This observation highlights why I believe the scientific

community and the media became so excited about the possibilities of life on Mars. Efforts to determine how life could have evolved from non-living matter have been so fraught with problems that it makes the possibility of life elsewhere extremely remote. But if it could be proved that life evolved elsewhere, then it would demonstrate that life springs up rather easily, and we just haven't found the right trick here on Earth to prove it. But this just leapfrogs the problem.

But is the evolution of life from non-living chemicals really that impossible? The difficulties fall into three categories, the Chemical Problem, the Thermodynamic Problem, and the Informational Problem. These issues are presented comprehensively in a book by Thaxton, Bradley, and Olsen titled *The Mystery of Life's Origin*^{4} and in a chapter in the edited volume by J. P. Moreland, *The Creation Hypothesis*.^{5}

Chemical Problems are illustrated by the difficulty in synthesizing even the simplest building block molecules necessary for life from inorganic precursors. Amino acids, sugars, and the bases for the important nucleotide molecules that make up DNA and RNA were all thought to be easily synthesized in an early Earth atmosphere of ammonia, methane, water vapor, and hydrogen. But further experiments showed this scenario to be unrealistic. Ammonia and methane would have been short-lived in this atmosphere; the multiple energy sources available would have destroyed the necessary molecules and water would have broken apart into hydrogen and oxygen. The oxygen was scrupulously avoided in all prebiotic scenarios because it would have poisoned all the necessary reactions.

Thermodynamic Problems arise from the difficulty in assembling all these complex molecules that would have been floating around in some prebiotic soup into a highly organized and complex cell. To accomplish the task of achieving specified complexity in life's molecules such as DNA and proteins, the availability of raw energy for millions of years is not enough. All systems where specified complexity is produced

from simple components requires an energy conversion mechanism to channel the energy in the right direction to accomplish the necessary work. Without photosynthesis, there is no such mechanism in the prebiotic Earth.

The Informational Problem shows that there is no way to account for the origin of the genetic code, which is a language, without intelligent input. Informational codes require intelligent preprogramming. No evolutionary mechanism can accomplish this. Life requires intelligence.

So you can see why evolutionists would get excited about the possibility of finding evolved life elsewhere. It's because life is seemingly impossible to evolve here. So, if it did happen elsewhere, maybe our experiments are just missing something.

Independence Day, The Movie

In the movie *Independence Day*, an alien battle force swoops down on Earth with the intention of destroying the human race, sucking the planet dry of all available resources and then moving on to some other unlucky civilization in the galaxy. But, those indomitable humans aided by good old American ingenuity outsmart those dull-witted aliens and Earth is saved. The story has been told many times, but perhaps never as well or never with such great special effects. The movie was a huge success.

But why are we continually fascinated by the possibility of alien cultures? The movie gave the clear impression that there must be great numbers of intelligent civilizations out there in the universe. This notion has become widely accepted in our culture.

Few recognize that the supposed existence of alien civilizations is based on evolutionary assumptions. The science fiction of *Star Trek* and the *Star Wars* begins with

evolution. As I've stated earlier, evolutionists simply rationalize that since life evolved here with no outside interference, the universe must be pregnant with life. Astronomer Carl Sagan put it this way after he had reviewed the so-called success of early Earth chemical evolution experiments:

Nothing in such experiments is unique to the earth. The initial gases, and the energy sources, are common throughout the Cosmos. Chemical reactions like those in our laboratory vessels may be responsible for the organic matter in interstellar space and the amino acids found in meteorites. Some similar chemistry must have occurred on a billion other worlds in the Milky Way Galaxy. The molecules of life fill the Cosmos. [\[6\]](#)

Sagan strongly suggests that the probabilities and chemistry of the universe dictate that life is ubiquitous in the galaxy. But as I stated earlier, the odds overwhelmingly dictate that our planet is the only one suitable for life in the universe. And the chemistry on Earth also indicates that life is extremely hard to come by. The probability of life simply based on chance occurrences is admitted by many evolutionists to be remote indeed. Many are now suggesting that life is inevitable because there are yet undiscovered laws of nature that automatically lead to complex life forms. In other words, the deck of cards is fixed. Listen to Nobel Laureate and biochemist, Christian de Duve:

We are being dealt thirteen spades not once but thousands of times in succession! This is utterly impossible, unless the deck is doctored. What this doctoring implies with respect to the assembly of the first cell is that most of the steps involved must have had a very high likelihood of taking place under the prevailing conditions. Make them even moderately improbable and the process must abort, however many times it is initiated, because of the very number of successive steps

involved. In other words, contrary to Monod's affirmation, the universe was—and presumably still is—pregnant with life. [\[7\]](#)

The only problem with de Duve's suggestion is that we know of no natural processes that will lead automatically to the complexity of life. Everything we know of life leads to the opposite conclusion. Life is not a product of chance or necessity. Life is a product of intelligence.

Without Divine interference we are alone in the universe and without Christ we are—and should be—terrified. The gospel is as relevant as ever.

Notes

1. *Science*, 16 August 1996, 273:924-30.
2. *Creator and the Cosmos*, NavPress, 2001, p. 210.
3. *Ibid.*, pp. 145-199.
4. Lewis and Stanley, 1984.
5. InterVarsity Press, 1994, pp. 173-210.
6. *Cosmos*, Random House, 1980, p. 40.
7. *Vital Dust*, Basic Books, 1995, p. 9.

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PBS Evolution Series

Darwin's Dangerous Idea

Some evolutionists are definitely worried. Creation, intelligent design and a general dissent concerning Darwinian evolution continue to gain ground—so much so that a deliberate

counterattack has been launched. Using scientists from around the world, professional defenders of evolution, beautiful nature photography, computer graphics and simulations, the prestige of the PBS NOVA series and the financial backing of Microsoft billionaire Paul Allen, a monumental defense and celebration of evolution has been produced.

The new PBS Evolution Series is a seven part, eight hour documentary originally aired on PBS stations around the country in late September of 2001 and rebroadcast in May and June of 2002. Accompanying the video series is an interactive Web site, 360-page companion book, coordinated teacher training and education, and a determined publicity campaign aimed at getting the series into the nation's high schools.

The explicit goals of the series are to help students understand the critical importance of evolutionary theory in understanding so many scientific and health issues of today—from AIDS to antibiotic resistance to fighting agricultural pests to even how we choose a sexual partner. The producers set out to establish the overwhelming evidence behind evolution and the soundness of the science behind it. They specifically sought to pursue solid science journalism and forego the religious realm.

Essentially, the series has failed on all counts. This beautiful documentary is loaded with speculation, exaggerated evidence and claims, glossing over of legitimate controversy, and a persistent hostility towards any religious perspective deemed incompatible with evolution.

Episode One begins with a dramatization of a conversation between Charles Darwin and Captain Robert Fitzroy of the HMS Beagle in South America as Darwin is purchasing a fossil. The fictitious conversation clearly pokes fun at the Biblical account of the flood. Darwin was nowhere near as skeptical as portrayed, and Fitzroy was nowhere near as literal either. This opening scene lays the groundwork for a continual assault

on history and the evidence to make evolution look as positive as possible and opponents of evolution as silly as possible.

This two-hour opening episode crosses paths with religion several more times in discussions of the philosophical meaning of evolution in an interview of Kenneth Miller, a Darwin defender who finds no incompatibility between his Christian faith and Darwinian evolution. In this opening episode the producers present a confusing contradiction. On the one hand Darwin's dangerous idea precludes any true meaning to life and on the other hand, Darwinian evolution is completely compatible with an informed Christian faith. For more detailed analysis of this episode consult the Discovery Institute's free Viewer's guide available on the Internet at www.reviewevolution.com.

“Great Transformations” and “Extinction”

Perhaps the most foundational episode is Episode Two: The Great Transformations. One's expectation would be the presentation of numerous persuasive transitional forms demonstrating without doubt, the common ancestry of all life. Instead we are treated to a certainty based on the usual arguments from authority, selective fragmentary fossil evidence, and speculative molecular mechanisms.

The opening segment presents the mounting evidence for the amazing transition from a terrestrial wolf-like vertebrate to modern aquatic whales. Lots of fossils and reconstructions are paraded before us, unfolding the supposed story of whale evolution. Complete skeletons are pictured with no indication that they are based on very partial fossil finds. The overall transitional series is discussed with certainty despite the fact that evolutionists themselves admit that the known members of the transitional series are not thought to be the actual members of the transitional series but just representative of what the actual transitional species may have looked like.^[1] Also missing is the admission that, by

the very nature of fossils, it can never really be known if any one fossil was ancestral to another.

Also featured in this episode is the stunning Cambrian explosion of animal life forms featuring Simon Conway Morris. Morris freely admits that “this sudden appearance of the fossils led to this term, the Cambrian explosion. Darwin, as ever, was extremely candid, he said, Look, this is a problem for my theory. How is it that suddenly animals seem to come out of nowhere? And to a certain extent that is still something of a mystery.” As the segment develops, no attempt is made to explore or resolve this mystery. The experts make only vague references to evolution tinkering with what already exists. But even tinkering is a design activity, design with a purpose. Natural selection would be better described as a blindfolded man trying to navigate a minefield.

Episode 3 explores the evolutionary significance of extinction. Both the great Permian extinction of 250 million years ago and the KT extinction of dinosaur fame of 65 million years ago are explored and make fascinating stories. Their relation to evolution is obscure, however. Mass extinctions supposedly open up the playing field for new and diverse species to evolve due to less competition. But Darwinian natural selection supposedly thrives on competition. The segments on biological invaders, while important in and of themselves, have little to add to the evolutionary debate. Biological control has been practiced for centuries with no knowledge of evolution.[\[2\]](#) Once again, we witness lots of authoritative posturing but little evidence for evolution.

“The Evolutionary Arms Race” and “Why Sex?”

For many years medical authorities have been warning of the dangers of infectious bacteria becoming resistant to antibiotics. The overuse and misuse of antibiotics in western

society has led to an increase in the number of strains of bacteria that are resistant to our primary defense against infection. In Episode Four of PBS's Evolution Series titled "The Evolutionary Arms Race," we are told this is evolution in action.

First, this statement leads to the conclusion that knowledge of evolution is essential to designing adequate health care. And second, labeling antibiotic resistance as evolution in action implicitly states that evolution is a fact, since antibiotic resistance is a fact. This is another case of a selective use of evidence. What the producers of *Evolution* don't say is that the mechanisms for antibiotic resistance have been known for years. Usually the capacity to resist antibiotics has always been in the bacterial population and does not result from mutation. Even when a mutation is responsible, a new function is never evolved, just the damaging of an existing function. Sometimes the mutation results in the antibiotic being expelled from the cell faster or taken in more slowly. This doesn't create a new species and doesn't fundamentally change the organism.

Another factor left out of the discussion is that antibiotic resistance always comes with a cost of its own. Antibiotic resistant bacteria are always inferior to the original wild-type bacteria. Their growth is stunted. Sometimes these costs can be compensated for but also at additional costs. Resistant bacteria are not better bacteria. Remove the antibiotic and they quickly lose out to the original wild-type bacteria. Therefore, to suggest that in the case of resistant tuberculosis that the bacteria evolved right inside the human host is highly misleading. The bacterial resistant forms were already present, the bacterium has not changed or evolved at all.

While the episode gives numerous examples of natural selection on a micro scale, the evidence discussed tells us nothing of how antibiotic resistance arose in the first place or how

ants, molds, fungi, and bacteria first became intricately associated.

The fifth episode contains perhaps the least science and relevance to evolution, but will certainly be the most entertaining and even titillating for high school students. The episode "Why Sex" tries to ascertain the purpose and even evolution of sexual reproduction. While containing some helpful information and case studies, the program is full of speculative storytelling and an overload of sexual displays and sexual acts from fish to lizards, to birds, to chimpanzees and even a highly unnecessary and suggestive encounter between humans.

Also included is a highly controversial, yet factually presented discussion of evolutionary psychology and one researchers ideas that all forms of human artistic endeavors are little more than sexual displays. Some of their own previously used evolutionary experts would find most of this episode an incredible waste of time and money.

"The Mind's Big Bang" and "What About God?"

The uniqueness of human beings presents a difficult evolutionary puzzle. So much of who and what we are is categorically different from other animal species that trying to account for it by mutation and natural selection presents a tough challenge. In Episode Six, "The Mind's Big Bang," we unfortunately don't get much of an answer.

The episode begins by documenting the amazing human capacity for art in the caves of France. This launches a long series of segments that document the early appearance of artistic expression that has its roots in the development of tool making. Eventually this explosion of capacities rooted in the brain is traced to the remarkable development of human language. As in other episodes there is lots of speculation

about the selective advantages of language, but this tells us nothing of how language evolved. The discussion gives the impression that if we can just discover what language is used for, we will know how it evolved. This is typical evolutionary story-telling masquerading as science.

The Cambridge Encyclopedia of Language candidly admits that “For centuries, people have speculated over the origins of human language. . . . [but] the quest is a fruitless one. . . . We have no direct knowledge of the origins and early development of language, nor is it easy to imagine how such knowledge might ever be obtained.”[\[3\]](#) The Discovery Institute’s Viewers Guide also notes that we are told that language was the key to our becoming human. In Episode Two, however, we were told it was the ability to walk on two legs and in Episode Five it was using our brains to choose sexual partners. This confusion of “key events” exposes them for the speculation they truly are.[\[4\]](#)

The final episode “What About God?” reveals the entire series as the propaganda it is meant to be. Here we meet the old science vs. religion argument in all its glory. The Evolution producers go to great lengths to distort the controversy to their own ends. The Scopes trial and the Sputnik-induced revolution in science education are neatly packaged and distorted as science vs. religion. The inquiring and passionate science students and professors who have no quarrel with evolution are favorably portrayed against uneducated parents and naïve Bible literalists. Theistic evolutionist Keith Miller is pictured as a liberator to Wheaton College students who don’t want to be perceived as unintelligent.

What becomes unmistakably clear in this episode is that the reigning naturalistic stranglehold on science education is to be maintained at all costs. Those who oppose it, risk being branded as dangerous or stupid or ignorant or all three. Censorship of facts contrary to evolution is justified in the name of science. The bottom line is that “It’s OK for people

to believe in God, as long as their beliefs don't conflict with Darwinian evolution. A religion that fully accepts Darwin's theory is good. All others are bad." {5}

The PBS Evolution Web Site

Located at www.pbs.org/wgbh/evolution, the PBS Evolution Web site is a goldmine of information and teaching suggestions along with interactive games and exercises aimed at sharpening one's evolutionary skills. But visitors should also expect that much of the information contained here employs the same sleight of hand that the video series uses in relating evidence for evolution. With such a great volume of information available at the *Evolution* Web site, I will direct my attention to one article as an example. Under the main heading of "Change," an essay is offered critiquing Intelligent Design. The essay is authored by Kenneth Miller, a Brown University biology professor, featured in the first episode as a Roman Catholic who sees no problem with evolution.

The essay is titled "Life's Grand Design" and purports to explain how evolution accounts for the design of nature far better than an intelligent designer would. His entire discussion revolves around the design of the human eye. {6} On page one Miller presents the problem. The eye is exquisite in its design, accomplishing the wondrous effect of color vision with a very complicated design. How could it possibly have evolved one step at a time? On page two, Miller begins his response with the standard blind watchmaker explanation from Richard Dawkins. Miller emphasizes the gradual slight improvements and that all those that are positive will be selected. This is not necessarily true. It is well known that some genetic changes will be so slight that they do not offer a significant enough selective advantage and therefore, will be lost. Miller ignores the uncomfortable details.

Miller then describes how easy it would be to build an eye

from just a few light-sensitive cells. But he starts with "light-sensitive cells." Where did these come from? How did they become light sensitive? The molecular mechanism of light sensitivity is quite complex and one of Michael Behe's examples of irreducible complexity. But once again Miller ignores the uncomfortable details. Miller states, "it is possible to draw a series of incremental changes that would lead directly to the lens and retina eye." But you know, I'm not interested in whether it can be drawn. I want to know how it would evolve biologically.

Finally Miller delivers the *coup de grace*; the eye exhibits design flaws that any engineer would never employ. You see, the human eye seems to have things a little backwards. The light-sensitive cells face the back of the eye or the retina, instead of the front of the eye where the light comes from. Therefore, the incoming light must pass through the nerve cells and blood vessels first, potentially distorting the image. Not only that, but the nerve cells eventually bunch together before punching through the retina en route to the brain, therefore creating a dangerous blind spot. Surely an intelligent designer wouldn't do it that way. The eye is therefore a great example of evolution at work. Evolution simply arrives at the best available solution.

But again, Miller ignores the details. He doesn't reveal that the layer of cells behind the nerve cells, behind the blood vessels and behind the photoreceptor cells, is an immensely important group of cells we will abbreviate as the RPE (Retinal Pigmented Epithelium). The RPE is necessarily in close proximity to the photoreceptor cells, the rods and cones, because the RPE replenishes the necessary molecules for vision. With the RPE at the very back of the retina, these cells act as an absorptive layer to get rid of excess light. Without the RPE we would be blinded by ordinary sunlight. Also the absorption of excess light sharpens our vision. So the designer has a dilemma. Both the nerves and blood vessels must

be in front of the rods and cones or the RPE must be in front because both must be in direct contact with the photoreceptor cells and they all won't fit and function together. Something will get between the light and the light sensitive cells. Putting the blood vessels and nerves in front of the rods and cones creates a very mild light filter, but does create a blind spot where the nerves bundle together. However, putting the RPE between the light and the rods and cones would create a much more detrimental filter and diffusing agent. The vertebrate eye is structured properly when all factors are considered.

“The vertebrate eye provides an excellent example of functional— though non-intuitive design. The design of the retina is responsible for its high acuity and sensitivity. It is simply untrue that the retina is demonstrably suboptimal, nor is it easy to conceive how it might be modified without significantly decreasing function.”[\[7\]](#)

As we have seen in this essay, evolution can offer some impressive evidences on first glance. But time and time again, the intricacies of design are in the details.

Notes

1. The story of whale evolution has indeed grown more sophisticated over the last 10-15 years. Indeed, this was one transition that many creationists had a great deal of fun with. How could a land mammal evolve into a whale? How could the transitional forms possibly be functional on land or in water? If one were to scan the presumed transitional series (found on page 138 of *Evolution* by Carl Zimmer, Harper Collins, 2001) it is quite impressive evidence for evolution. The transitional series, while a little jerky with certain gaps remaining, appears gradual enough and the fossils seem to appear in the expected order and strata. But as always, the truth is in the details. Two recent articles investigate the

evidence with some detail and rigor. Ashby Camp has written a fine summary (last modified March 11, 2002) and critique of the fossil evidence for whale evolution that is available from the TrueOrigins website at www.trueorigins.org/whales.asp. Also, John Woodmorappe has analyzed the mixture of characters in some of the whale-like fossils in his article "Walking whales, nested hierarchies, and chimeras: do they exist?" in *TJ* 16(1) 2002: 111-119. *TJ* was formerly *Creation Ex Nihilo: Technical Journal*.

What we learn from these articles is that the true land mammal ancestor of whales is still in dispute. The pakicetids, the first "intermediate," are true land mammals with a few potential aquatic features in their inner ears. The next group known as ambulocetids show some aquatic features but other features distance them from actual whale ancestors. Many of these are not in the proper stratigraphic position. The pakicetids and ambulocetids are all less than 10 feet long; the fully marine *Basilosaurus* are all over 50 feet in length. Even by evolutionary standards there isn't enough time between these species to evolve even this simple increase in length. None of the species depicted on page 138 of *Evolution* are thought to be actual ancestors of modern whales. The diagram is actually drawn to indicate this fact but most people looking at it won't come away with that impression. Each species is diagrammed as an offshoot of the lineage but not an actual transitional form. How come we always find just "types" of ancestors and never the ancestors themselves? Some character or another always disqualifies the intermediate in question. There seems to be a deeper lesson here that most evolutionists are unwilling to face.

2. The documentation of human interference in the ecosystems of Hawaii and Thailand are summed up with a plea to slow down the rate of human induced extinction and allow nature to take its own more natural and easy-paced course. This implies, however, that humans are somehow outside the loop of nature. If we are just another biological species, then we are only

acting according to our own biological nature. How or why should this be suppressed? As in past mass extinctions, the strong, opportunistic and lucky will survive. Perhaps that includes us, perhaps not. In the naturalistic worldview of the series, what's the difference? This is another example of stealthily applying a Christian worldview that gives intrinsic value to nature while maintaining the guise of naturalism. In a naturalistic worldview, nature just is. Choosing to interfere on nature's behalf indicates intrinsic value and worth that can only come from outside nature itself. In the Christian worldview, this comes from God.

3. David Crystal, *The Cambridge Encyclopedia of Language*, Second Edition, Cambridge: Cambridge University Press, 1997, p. 6,290.

4. www.reviewevolution.com, p. 92.

5. Ibid, p. 107.

6. www.pbs.org/wgbh/evolution/change/grand/, p. 1-6.

7. George Ayoub, On the design of the vertebrate retina, *Origins and Design*, Vol. 17(1): 19-22. This article can also be found on the web at www.arn.org/docs/odesign/od171/retina171.htm.

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Response to News Of First Human Clone

Today, December 27, 2002, it was announced that the first human clone was born at an undisclosed location. The

announcement came from Brigitte Boisselier, the director of Clonaid, the research branch of the Raelian cult. Dr. Boisselier revealed that four other clones are expected by the end of January. The Raelians have been hinting for months that a successful cloned birth was expected. Two other independent researchers, Severino Antinori (an Italian working in an undisclosed Muslim country) and Panos Zavos (from Lexington, Kentucky) have also been hinting at human cloning success and suggesting that a birth will be announced soon.

As of yet there has been no independent verification that the baby girl, named Eve, is truly a clone. Eve was delivered by Caesarian section from her twin sister (the woman who donated the nuclear genetic material from which she was cloned also served as the surrogate mother). There is some reasonable doubt about either the information given the public at this time or the legitimacy of the claim. Dr. Boisselier claimed at the press conference this morning that ten clones were implanted (no information if the ten clones were of the same individual or clones from ten different people). Five of the clones spontaneously aborted within three weeks while the other five have continued without complication. This is a 50% success rate. Normal success rates in other mammals are 2% at best. Even then, many of the clones which survive to birth develop complications in their first months of life, as high as 10% in cattle. This incredibly high 50% success rate for human cloning leaves most researchers believing that either this isn't really a clone or they simply aren't revealing all the other failures.

This announcement is no cause for rejoicing. This baby and the others to follow are human experiments with high odds to develop life-threatening complications. Not only that, but poor Eve, who I believe is a full human being with a soul, will be a research subject all her life, however long that is. Human cloning ought to be banned, both reproductive cloning and so-called therapeutic cloning—or as Stanford University

recently referred to it, “human nuclear transplantation.” Boisselier, Antinori, and Zavos are forging ahead at breakneck speed with only a thin veneer of compassion for childless couples. They are deliberately putting innocent human life at risk both medically and psychologically for personal fame and notoriety. This needs to be condemned before others follow suit, and stopped if at all possible. The Senate needs to act now to join the House in banning all human cloning within U.S. borders.

Other articles of interest from the Probe Web site:

[Can Humans Be Cloned Like Sheep?](#)

[Cloning and Genetics: The Brave New World Closes In](#)

[Stem Cells and the Controversy Over Therapeutic Cloning](#)

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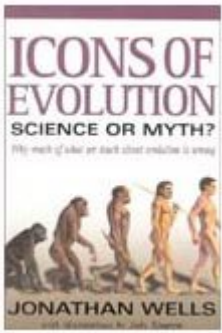
Icons of Evolution

Dr. Ray Bohlin reviews Jonathan Wells' book Icons of Evolution, which exposes the lies and distortions that constitute evolution's best textbook "evidence."



This article is also available in [Spanish](#).

Lies and Distortions Masquerading as Truth in the Halls of Science



Most everyone was required to take biology in high school, and many who went on to college likely took an introductory biology course as an elective, if not as a beginning course for a biology major. Required in most of these courses, mainly because of its inclusion in the textbook, was a section on evolution. Therefore, most people with a secondary education or above are familiar with the more popular evidences and examples of evolution nearly all textbooks have been using for decades. These include the peppered moth story of natural selection, Darwin's finches as an example of adaptive speciation, and the ubiquitous tree of life with its implied common ancestor to all life forms.

These familiar evidences of the creation story of our early 21st century culture are what Jonathan Wells (Ph.D., UC Berkeley, molecular and cell biology; Ph.D., Yale University, religious studies) refers to as the *Icons of Evolution* in his book by the same name (Regnery Publishing, 2000). Wells focuses on ten of these icons and meticulously exposes them to be false, fraudulent or at best, misleading. Many of these difficulties have been pointed out before and are known to a few, but Wells adds a level of sophistication and packages them in a form certain to get the attention of everyone in the educational establishment. This book is not a plea for creation in the schools or a selective and picky rant against trivial details. It is a frontal assault against some of the most cherished and revered "proofs" of the evolution story. There will be no shortage of controversy around this extensively researched and well-written exposé. If these "Icons" are the best evidence for evolution, or at least the easiest evidence to explain, then one is left wondering what the future of evolutionary instruction could be. Even further, what future might there be for evolution itself?

Wells begins with an icon that itself starts at the beginning,

the Miller-Urey experiment. This purports to show that molecules necessary for life could have arisen by simple chemical reactions on an early earth. The Miller-Urey experiment uses an atmosphere of reduced gases: ammonia, methane, water vapor, and hydrogen. Then it adds some energy in the form of sparks, and produces as Carl Sagan said, "the stuff of life." Dating back to 1953, this experiment has been around for nearly fifty years. The problem is that for at least the last twenty-five years origin of life researchers realized that this atmosphere does not reflect that of the early earth. Many textbooks will begrudgingly admit this, but include the experiment anyway. One can only guess the reason: no other simulated atmosphere works. I suppose that textbook writers would suggest that since we "know" some form of chemical evolution happened, they are justified in not representing the facts accurately!

Tree of Life, Homology, and Haeckel's Embryos

The tree of life is ubiquitous in evolutionary literature. The notion that all of life is descended from a single common ancestor billions of years ago is how many would define evolution. But the actual evidence argues strongly against any such single common ancestor, and most animal life forms appear suddenly without ancestors in what is known as the Cambrian explosion of nearly 543 million years ago in evolutionary time. The Cambrian documents life forms so divergent that one would predict a fossil record covering hundreds of millions of years just to document the many transitions required from the first multicellular animal ancestor. Current estimates suggest this change took place in less than 5-10 million years. Yet the tree of life, documenting slow gradual changes, persists.

Another critical evidence for evolution over the years has been homologous structures. The forelimbs of all mammals, indeed all vertebrates, from bats to whales to horses to

humans, possess the same basic bone structure. This is routinely held up as evidence of having descended from a common ancestor. The different forms simply tell of different adaptive stories, resulting in their unique functions relying on the same basic foundation. What becomes puzzling is, first, a confusion of definitions. *Homology* is **defined** as structures having arisen from a common ancestor.^{1} But then homology cannot be used as an evidence of evolution. Something is very wrong, yet textbook orthodoxy concerning homology continues to perpetuate a myth that has been exposed for decades. Second, supposed homologous structures do not necessarily arise through common developmental pathways or similar genes.

Next, Wells turns his attention to perhaps the most inexcusable icon of all: similarities in vertebrate embryos originally pointed out by Ernst Haeckel in the 19th century and used by Darwin in *The Origin of Species* as a powerful evidence for common descent. Haeckel's vertebrate embryos are shown passing through a remarkably similar stage early in development and only later diverging to the specific form. This passage through a common form early in development was seen as obvious evidence for a "community of descent." Yet, once again, the evidence gets in the way.

Since before the dawn of the 20th century, embryologists have known that Haeckel misrepresented the evidence. Vertebrate embryos never pass through a similar stage. What's more, Haeckel left out the fact that the earlier stages of embryonic development between classes of vertebrates pass through remarkably different pathways to arrive at this supposedly similar intermediate stage. The fraud was recently "rediscovered," though most embryologists have been aware of the inaccuracy all along. This shows the longevity of even falsified evidence, due to its persuasive appeal even in the hallowed halls of science. Perhaps scientists are human after all, seduced by a fraud simply because it makes such a good case for a treasured theory.

The Peppered Moth

Probably the granddaddy of all the icons of evolution is the peppered moth story. In pre-industrial England, the peppered moth was common in entomologists' collections. By the 1840s a dark or melanic form was increasing in frequency in populations across England. By 1900 the melanic form comprised as much as ninety percent of some populations. In the 1950s experiments by Bernard Kettlewell clearly established that this change in frequency from a peppered variety to a dark variety was due to two factors.

First, the surface of tree trunks had changed from splotchy, lichen-covered patchwork, to a uniform, dark complexion, due to increased levels of pollution. The pollution killed the lichens and covered the tree trunks with soot. Second, the peppered variety was camouflaged from predation by birds on the lichen-covered tree trunks, and the melanic variety was camouflaged on the dark tree trunk. Therefore, the switch from peppered variety to melanic variety was due to natural selection, acting through selective bird predation as the trees changed from lichen-covered bark to soot-covered bark. Then with stricter air quality standards, the lichens are returning and the peppered variety is predictably coming back strong.

The peppered moth story became legendary as a classic example of Darwinian natural selection. But within 20 years of Kettlewell's work, cracks began to appear. It was soon noted that the characteristic switch from the peppered form to the dark form happened in areas where the lichens still grew on tree trunks. In other areas, the dark form began to decrease before the lichens began returning on trees. A similar pattern of a switch from a light form to a dark form was observed in ladybird beetles. Birds don't like ladybird beetles. Therefore, predation is ruled out as the selector. It all began to unravel when it was observed that peppered moths of

both varieties **never** rest on tree trunks!

Essentially all photographs of moths on the trunks of trees were staged using dead or sluggish moths. They are not active during daylight. If that were the case, how could birds find them on tree trunks at all? Kettlewell released his moths in his mark-recapture-predation experiments in daylight hours, when the moths are naturally inactive. They simply found the nearest resting place (tree trunks in their sluggish state), and the birds gobbled up the non-camouflaged moths. We still don't know exactly where moths rest or whether lichens play any significant role in the story. Yet many biologists insist that the traditional story makes a good example of evolution in action. "To communicate the complexities would only confuse students," they say. Once again, flawed, yet cherished, examples persist because they are just too good **not** to be true!

Birds, Dinosaurs, Fruit Flies, and Human Evolution

The reptile-like bird, Archaeopteryx, has long been heralded as a classic example of a true ancestral transitional form. The improbable change from reptile to bird has been preserved in snapshot form in this remarkable fossil from Germany. Possessing a beautifully preserved reptilian skeleton with wings and feathers, Archaeopteryx was a paleontologist's dream. This would certainly explain why Archaeopteryx has found its way into just about every textbook. But Archaeopteryx has fallen on hard times. As happens with so many perceived transitions, it is universally viewed now as just an extinct bird, an early offshoot of the real ancestor.

Surprisingly, bird-like dinosaurs from much later geologic periods are hailed as the real ancestors. This is based on structural similarities despite their existence after Archaeopteryx. Never mind that the child exists before the

parent. So enamored are some, that birds are just today's feathered dinosaurs. *National Geographic* was recently caught red-faced by perpetrating a fraudulent dinosaur/bird fossil as the real thing in its pages. Scientists have even accepted molecular evidence indicating an *identical* match between turkey DNA and Triceratops DNA. Never mind that the identical DNA match is more likely the result of contamination from a turkey sandwich in the lab and that Triceratops is in the wrong dinosaur family for bird evolution. Such is the power of *wanting* to believe your theory is true.

In the next four chapters, Wells visits the familiar icons of Darwin's finches, fossil horses, mutant four-winged fruit flies, and the ultimate icon, diagrams of the progressive change from ape-like creatures to full human beings. Like the others above, these icons turn out to be far less than what the textbooks suggest. In each case, as in the six discussed above, there are plenty of experts willing to expose the lack of evidence for each icon. But they remain staples in the arsenal of evidences of the evolutionary process. Fossil horses and human evolution turn out also to be indicators of the difficulty evolution has in separating philosophical preferences from conclusions drawn from the evidence.

Textbook writers are either ignorant of current data, which prompts one to be skeptical of the accuracy of the rest of the textbook, or they are willfully misrepresenting the evidence in order to present a united front on the factualness of evolution. Unfortunately for our children, Wells is able to provide direct quotes indicating that at least some see no problem with including misleading or false data in order to make a point. After all, we know evolution is true, so just because we don't have easy simple stories to tell, doesn't mean they aren't out there waiting to be discovered.

The Scientific Academia Reacts

The reasoning behind these *Icons of Evolution* exposes much of the standard story of evolutionary theory to be mythology rather than science. And if these ten icons have been viewed as the best evidence for evolution, the entire theory needs to be questioned and made accountable to the evidence. It will be interesting to watch the evolutionary community react to these revelations. Evolutionary propagandist Eugenie Scott has already reportedly predicted that the book will be a “royal pain in the fanny” for biology teachers. Will the scientific community be able to respond with an appropriate *mea culpa*, or will there be a battery of excuses and obfuscations? I predict the latter. In the last ten years, the evolutionary establishment has been exerting a great deal of effort to demonstrate that evolution is confirmed to such a degree as to be beyond rational dissent. Organizations such as the National Academy of Sciences, the National Association of Biology Teachers, and the National Center for Science Education have lobbied long and hard for the scientific integrity of the standard evolutionary story. They have held up most, if not all, of these ten icons as the principal pillars of the unassailable evidence for evolution.

Evolution is the principal foundation of the naturalistic world view, presented by many in academia as the only scientific, and therefore, objective, view of reality. Without evolution, metaphysical naturalism cannot stand. As Richard Dawkins has said, Darwin made it possible to be an intellectually fulfilled atheist.[\[2\]](#) Without evolution, the naturalistic worldview is in serious trouble. Therefore, the scientific community can be expected to rally fiercely behind the evolution story. Just how they do it will prove interesting indeed. *Icons of Evolution* will help draw the evolutionary establishment out from behind the protective bulwark of its authority and force it to defend its theory on the basis of the evidence. This is a fight I believe it must

eventually lose in the court of scientific and public opinion.

There are two minor, yet unfortunate, problems with the text. The first, actually a book design problem, regards the difficulty finding the legends for some figures and distinguishing them from the regular text. The second involves an unnecessarily inflammatory discussion of the monetary support evolution receives from the U.S. tax-supported National Institutes of Health and National Science Foundation. While Wells' discussion is accurate, it comes across as sour grapes and may provide a convenient target for evolutionary propagandists to dismiss the book without dealing with the evidence.

These problems aside, *Icons of Evolution* is a landmark work and deserves to be read and studied by all who have an interest in the controversy surrounding not only the teaching of evolution, but also the very theory of evolution itself.

Notes

1. "The term 'explosion' should not be taken too literally, but in terms of evolution it is still very dramatic. What it means is rapid diversification of animal life. 'Rapid' in this case means a few million years, rather than the tens or even hundreds of millions of years that are more typical. . . ." Simon Conway Morris, *Crucible of Creation*, (Oxford: Oxford University Press) 1998, p. 31.

2. Richard Dawkins, *The Blind Watchmaker*, New York, NY: W. W. Norton, 1986, p. 6.

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Global Warming

Fossil fuel emissions are unfairly being blamed for global warming. The Kyoto Protocol is based on questionable science, and will cause unnecessary economic hardship.

What is Global Warming?

Over the last few months, dating back to the 2000 election, we have been bombarded with the news of global warming. Unfortunately, this issue has become highly polarized politically. Some scientists and politicians believe the warming has been fully documented as being caused by human interference and drastic measures are necessary to bring it under control, while others just as strenuously maintain that nothing has been proven and drastic measures will only ruin our economy for no reason. What are we to think?

First, let me say at the start of this article that I have been what some would call an environmentalist since high school. I cooperate fully with the recycling program offered by my city: collecting all newspaper, glass, aluminum cans, and certain plastics for pick-up every other week. I don't buy Styrofoam plates or cups since it is not reusable or biodegradable.

I have long been a nature enthusiast, previously as an avid bird-watcher and feeder. Zoos have always been an attraction for me, but even better are opportunities to see God's creatures in their natural habitat. A jog in the woods is more preferable to a run down the street, even with no traffic.

I drive a small fuel-efficient car and as soon as it is practicable for my family financially, I intend to purchase one of those new cars run by both battery and gasoline, which gets close to 60 miles to the gallon.

I think stewardship of God's creation is a good thing and I

think we (meaning humans) have often sought our own needs to the unnecessary detriment of the rest of creation. So with this as a background, what do I think of global warming? I'm afraid that my position will not totally satisfy either of the extremes mentioned earlier. For I don't think global warming requires the drastic action being required by the United Nations' Intergovernmental Panel on Climate Change (IPCC). But neither do I believe that the signs of global warming can be totally ignored, as some economists and political conservatives would have us think.

For instance, it does seem that there is credible evidence that both Arctic and Antarctic ice is receding, most glaciers worldwide appear to be in retreat, and sea levels are rising. The important question, however, is whether global warming is responsible for these events. And perhaps even more importantly, what can we realistically do about it even if rising global temperatures are even partly responsible for these disturbing trends?

In this article I will be examining the evidence for a human component to the increasing temperatures and whether the proposed remedies offered by the IPCC are the best means of effecting real change for the future.

Global Warming and the Kyoto Protocol

The issue of global warming has become a lightning rod issue the world over. When President Bush recently indicated that he would hold back on setting carbon dioxide limits for U.S. power plants, environmentalist groups around the world immediately demonized him. A campaign was put in motion to flood the White House with e-mails condemning his action.

To help understand this issue let's investigate the basics of the greenhouse effect on our planet and see what the fuss is all about. The greenhouse effect simply refers to the ability of some gases in our atmosphere to absorb and hold heat better

than others. This creates a warming blanket around the earth without which life would be much more difficult for all life forms on earth.

It's similar to the effect produced by actual greenhouses with walls and ceilings of glass. Glass allows certain wavelengths of light and radiation in, but traps certain others from getting out. Leave your car in the full sun, even on a pleasant day, and you can later enter the car to blast furnace temperatures. That's a greenhouse effect.

Of great concern today is the fact that some greenhouse gases, such as carbon dioxide, are increasing in the atmosphere and the average temperature of the earth at ground level has increased by about a full degree Fahrenheit since 1900 (0.5 degrees Celsius). Many have become convinced that the increase in carbon dioxide and the increase in temperature are cause and effect respectively.

Further, many believe that the increased carbon dioxide is due to the burning of fossil fuels. Some global climate computer models predict that this is only the beginning of the rise of global temperatures and that by the end of the 21st century, average global temperatures could rise by as much as seven degrees Fahrenheit (3.5 degrees Celsius). As a result, the United Nations Framework Convention on Climate Change, based on the work of the Intergovernmental Panel on Climate Change, issued the Kyoto Protocol in December of 1997.

Simply put, the Kyoto protocol calls on all agreeing nations to reduce their fossil fuel emission by at least five percent below their estimated 1990 levels by around 2010. Most nations were actually assigned reductions of 7-8 percent, including the United States. Now that doesn't sound like much at first glance. However, it is widely recognized, that with the growth in the U.S. economy since 1990, this would amount to as much as a 30 percent actual reduction in fossil fuel use by 2010. To achieve such a drastic reduction would require major shifts

in U.S. energy policy and the economy. We'd better make sure it's worth it.

Next we'll look at the science of global warming.

Scientific Problems with Global Warming

Now I want to discuss some of the problems with the scientific evidence that purports to show that human produced carbon dioxide is responsible for global warming.^{1} As I mentioned earlier, levels of carbon dioxide are increasing in the atmosphere and ground stations have reported a slight warming in this century. Many believe that the increase in carbon dioxide has caused the slight rise in temperature, and they fear this is only the modest beginning of more significant temperature increases in the 21st century. I think there are several reasons to strongly doubt this conclusion.

First, we need to consider the influence of long-term trends. The last ice age ended about 11,000 years ago by most estimates, and the planet has been warming ever since. Sea levels have been rising at the rate of 7-8 inches every 100 years. Therefore, the fact that sea levels are rising is not necessarily due to humanly caused global warming. There was a significant warming trend from around 900 A.D. to 1300 A.D. Greenland was actually green on its coasts at one time. This was followed by what is referred to as the "Little Ice Age" from about 1450 to 1850. Both of these trends occurred without human influence and the current warming trend could just be stabilization from this last Little Ice Age.

I have mentioned that the warming trend has been measured from ground stations. This distinction has been added because there is conflicting data from weather balloon and satellite data. The most significant warming has been measured in the last two decades. However the temperature of the atmosphere has remained constant over the last twenty years.

How can the ground temperatures increase and the atmospheric temperatures stay the same? To be honest, nobody really knows for sure, but there is evidence that the ground based temperatures are in error. This could be due to what is called the heat island effect. It has been noticed that urban measured temperatures have increased faster than rural temperatures. The concrete, asphalt, factories, motor vehicles, and population density of large cities may be biasing these readings and giving a false warming trend.

If the warming trend is real, there may be another significant factor involved that has nothing to do with human interference: the sun. A measurement of solar activity in terms of the sunspot cycle length shows a strong correlation with global temperatures over the last 100 years: including the rise from 1920-1940, the dip from 1940 to 1980, and the rise over the last twenty years.

All these data seem to indicate that global warming, if it exists, is not likely to be due to human action.

The Economic Effects of the Kyoto Protocol

Knowing that the science is highly questionable raises severe concerns about the Kyoto Protocol, which calls for at least a 30 percent reduction in U.S. fossil fuel use by 2010. Not only is this drastic reduction unnecessary to combat global warming, but also its effects on the U.S. economy could be catastrophic.

First, let me point out that some warming is not such a bad thing. It is widely recognized that increased carbon dioxide is good for plants. They grow faster and require less water. A slightly longer growing season is not a negative either. It is simply not factual to suggest that global warming is responsible for increases in severe weather, including hurricanes, tornados, floods, and droughts. Storms, in

particular, have not shown any real increase in frequency or intensity.

John Christy, professor of atmospheric science at the University of Alabama and one of the lead authors of the IPCC report, said, "Hurricanes are not increasing. Tornados are not increasing. Storms and droughts do not show any pattern of increasing or decreasing Variations of climate have always occurred, even when humans could not have had any impact." [\[2\]](#)

Beyond these observations is the realization that the implementation of the Kyoto Protocol would have severe economic consequences. Our own U.S. Energy Information Administration (EIA) says Kyoto could drain more than \$340 billion a year from the U.S. economy (\$1,500 per person), double electricity prices, and cause the price per gallon to soar 65 cents for gasoline, 88 cents for diesel, and 90 cents for home heating oil. What is most significant about these rises in energy prices is that they would affect low-income families most severely. Upper and middle-income families can better shift resources to meet rising energy costs than the poor or the elderly on fixed incomes. Yet no one has talked about this.

The EIA also calculates that the Kyoto treaty could cost 3.2 million American jobs. An exhaustive study commissioned by a coalition of minority business groups concluded that 1.4 million of those lost jobs would be in our Black and Hispanic communities. And average annual family incomes in those communities would decline by between \$2,000 and \$3,000 under Kyoto. [\[3\]](#)

What is most disconcerting is that all this economic impact would be essentially for nothing, because not only is the science of human caused global warming suspect, but even if the Kyoto Protocol is followed, it would result in less than one-half of one degree reduction in global temperature by

2050. It hardly seems worth it.

So What Do We Do?

After exploring the question of global warming, we've found the science behind it to be questionable at best and the economic impact unnecessarily severe, particularly for minority families and businesses. This may raise a question in some people's minds as to why this is being pushed so uncritically by other world governments and by the media.

Well, the first clue comes from a quick perusal down the list of nations from the Kyoto Protocol itself. Some countries like the Russian Federation are simply asked to hold their emissions at 1990 levels with no reduction. Countries from Latin America, Asia, Africa, and Polynesia, including China and India aren't even on the list (except Japan)! The reason is that these countries are still developing their economies and will need unrestricted energy use. However, as these populous nations grow economically, they may well exceed the emissions output of western nations altogether.

Implicitly, this affirms the necessity of fossil fuel energy for healthy economies. This treaty may be little more than a tax on western nations, not a policy for climate change. The late Aaron Wildavsky, professor of political science at UC Berkeley, wrote, "Warming (and warming alone), through its primary antidote of withdrawing carbon from production and consumption, is capable of realizing the environmentalist's dream of an egalitarian society based on the rejection of economic growth in favor of smaller population's eating lower on the food chain, consuming a lot less, and sharing a much lower level of resources much more equally." [\[4\]](#)

Now I don't think all those things are bad in and of themselves. But I don't like the idea of being forced into it in the name of avoiding climate change. A recent *Time* cover story, apart from a wholly typical and irresponsible scare

article promoting the myth of human induced global warming, actually provided some common sense activities for responsible environmental activities that save resources and money. {5}

Among them were: running your dishwasher only when it's full, replacing air-conditioning and furnace air filters regularly, and adjusting your thermostat to a little warmer in summer and a little cooler in winter. You can also set your water heater to no higher than 120 degrees (F); it saves money and is safer. Try low-flow showerheads to use less hot water and wash clothes in warm or cold water. Most detergents today clean just as well in cooler temperatures. Use energy efficient light bulbs. Improve your home insulation. And seal up all the cracks.

Since all of these save electricity, they save not only resources, but also money for you. It just makes sense.

Increased energy prices, which should occur as demand for oil and gas increases and supply remains steady temporarily but begins to drop in 20 to 40 years, will spur development for more renewal energy sources such as solar, wind, and geothermal power. Also, research is progressing in stimulating the ocean to be more biologically productive through seeding with iron to act as a sink for carbon dioxide, if levels are shown to be affecting the general climate.

But where is the voice of the church? For too long we have been silent on environmental issues. As Christians we should lead the way in care for the environment, since we claim to be rightly related to its Creator in the first place.

Notes

1. S. Fred Singer, 1997, 1999, "The Scientific Case Against the Global Climate Treaty," <http://www.sepp.org/GWbooklet/withfigures.html>. All of the scientific evidences in this section can be found in this fair

and reasoned report. Singer is a retired climatologist from the University of

Virginia and has formed The Science and Environmental Policy Project (SEPP) to help educate the public on global warming. This website is a great resource for up-to-date information on the global warming controversy. The report above is available with and without figures, but I reference and recommend the version with the figures copied with permission from peer-reviewed science journals for the full effect.

2. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal*.

3. Paul Driessen, 2000, "Navigating the Treacherous 'Seven Cees' of Climate Care," The Issue Archive of CFACT (Committee for a Constructive Tomorrow) at <http://www.cfact.org/Issues.htm>.

4. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal*.

5. "What Can You Do?" *Time*, April 9, 2001, p. 39.

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The Controversy Over Stem Cell Research

What Are Stem Cells and Why Are They Important?

President Bush recently decided to allow the use of federal funds to research the therapeutic properties of privately produced human embryonic stem cells (ES). President Bush clearly maintained the prohibited use of federal monies to

produce human ES cells, since the procedure requires the destruction of the embryo to obtain them, which is currently prohibited by federal law. To fully understand the ramifications of this decision, I will discuss the nature of stem cells and their potential to treat disease.

Most of the more than one trillion cells that form the tissues of our bodies possess a limited potential to reproduce. If you remove some live human skin cells, they may divide in culture (laboratory conditions) five or six times and then die. Special cells in the underlying skin layers are what produce new skin cells. These cells' sole function is to churn out replacement cells. These are known as stem cells. Most tissues of our bodies possess stem cells that can reproduce the different cells required in that tissue. Bone marrow stem cells can produce the many different cells of the blood. They are called stem cells, since they are seen as the stem of a plant that produces all the "branches and leaves" of that tissue.

What I've described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.[\[1\]](#)

In addition to the advantages of previously unknown adult stem cells and their unexpected ability to produce numerous types of cells, adult stem cells carry the added potential of not

causing any immune complications. Conceivably adult stem cells could be harvested from the individual needing the therapy, grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient's own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

Human Embryonic Stem Cells

The advances in adult stem cell research has only come about in the last three years. Traditionally it was thought that ES cells carried the greatest potential to treat wide-ranging degenerative diseases such as diabetes, Parkinson's, multiple sclerosis, spinal chord injuries, and Alzheimer's. Since ES cells derive from the inner cell mass of the early embryo (5-7 day old blastocyst), they are capable of forming all the tissues of the body. Therefore, researchers have long felt that human ES cells hold the greatest potential for treatment of degenerative diseases.

While the potential has always existed, the problem has been that in order to obtain these human ES cells, the embryo is destroyed during the harvesting procedure. In addition, while ES cells had been obtained and grown successfully in culture from several mammals, including mice, efforts at producing ES cells from other mammals had failed. Nobody was sure human ES cells could even be successfully produced until November 1998 when James Thomson from the University of Wisconsin announced the establishment of five independent human ES cell lines.[\[2\]](#) (A cell line is a population of cells grown from a single cell that has been manipulated to continue growing indefinitely in culture, while maintaining its cellular integrity.) Geron Corporation funded Thomson's work, so it did not violate the federal ban on government funds being used for such purposes.

But his announcement immediately opened up a desire by federally funded researchers to use his already established human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty years away from developing commercially available treatments using ES cells.[\[3\]](#) Clinical trials using adult stem cells in humans are already under way.

In August of 2000, NIH announced new guidelines allowing federally funded researchers access to human ES cell lines produced through private funding. The Clinton administration hailed the new guidelines, but Congressional pro-life advocates vowed a legal confrontation claiming the new guidelines were illegal.

The Options for President Bush

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Stem Cells and the Controversy Over Therapeutic Cloning

Dr. Ray Bohlin explains stem cells and where they come from, insisting the potential of stem cell therapy must be weighed against the personhood of the embryo.

What Are Stem Cells and Why Are They Important?

President Bush recently decided to allow the use of federal funds to research the therapeutic properties of privately produced human embryonic stem cells (ES). President Bush clearly maintained the prohibited use of federal monies to produce human ES cells, since the procedure requires the destruction of the embryo to obtain them, which is currently prohibited by federal law. To fully understand the ramifications of this decision, I will discuss the nature of stem cells and their potential to treat disease.

Most of the more than one trillion cells that form the tissues of our bodies possess a limited potential to reproduce. If you remove some live human skin cells, they may divide in culture (laboratory conditions) five or six times and then die. Special cells in the underlying skin layers are what produce new skin cells. These cells' sole function is to churn out replacement cells. These are known as stem cells. Most tissues of our bodies possess stem cells that can reproduce the different cells required in that tissue. Bone marrow stem cells can produce the many different cells of the blood. They are called stem cells, since they are seen as the stem of a plant that produces all the "branches and leaves" of that tissue.

What I've described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.[\[1\]](#)

In addition to the advantages of previously unknown adult stem cells and their unexpected ability to produce numerous types of cells, adult stem cells carry the added potential of not causing any immune complications. Conceivably adult stem cells could be harvested from the individual needing the therapy, grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient's own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

Human Embryonic Stem Cells

The advances in adult stem cell research has only come about in the last three years. Traditionally it was thought that ES cells carried the greatest potential to treat wide-ranging degenerative diseases such as diabetes, Parkinson's, multiple sclerosis, spinal chord injuries, and Alzheimer's. Since ES cells derive from the inner cell mass of the early embryo (5-7 day old blastocyst), they are capable of forming all the

tissues of the body. Therefore, researchers have long felt that human ES cells hold the greatest potential for treatment of degenerative diseases.

While the potential has always existed, the problem has been that in order to obtain these human ES cells, the embryo is destroyed during the harvesting procedure. In addition, while ES cells had been obtained and grown successfully in culture from several mammals, including mice, efforts at producing ES cells from other mammals had failed. Nobody was sure human ES cells could even be successfully produced until November 1998 when James Thomson from the University of Wisconsin announced the establishment of five independent human ES cell lines.^{2} (A cell line is a population of cells grown from a single cell that has been manipulated to continue growing indefinitely in culture, while maintaining its cellular integrity.) Geron Corporation funded Thomson's work, so it did not violate the federal ban on government funds being used for such purposes. But his announcement immediately opened up a desire by federally funded researchers to use his already established human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty years away from developing commercially available treatments using ES cells.^{3} Clinical trials using adult stem cells in humans are already under way.

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Human Genome Project

Dr. Ray Bohlin takes a brief look at the accomplishment, purpose and consequence of the Human Genome Project.



This article is also available in [Spanish](#).

What's All the Fuss About the Human Genome Project?

In February of 2001, virtually every media outlet, whether TV news, newspapers, radio, Internet news services, or news magazines, was all worked up about the announcement of the completion of the Human Genome Project. In this article we will explore this monumental achievement and what it means for the future of medicine and our understanding of ourselves.

To appreciate this important accomplishment, we need to review a little basic genetics. It may actually astonish most adults just how much genetics the National Institutes of Health assumes we know about our genetic heritage. The educational video from the HGP includes a three-minute review of basic genetic processes like DNA packaging, transcription of DNA into message RNA, and the translation of message RNA into protein. It's no exaggeration to say that when I played this

short piece during a lecture for high school students and their parents, mom and dad were left in the dust.

Honestly, I did that intentionally; because we are only in the beginning stages of a genetic revolution that will transform the way we diagnose and treat disease and how we may even alter our genetic structure. These new technologies bring with them numerous ethical and moral dilemmas we have only begun to address and for which there may not be simple answers. If we don't take the time to familiarize ourselves with genetic research and its implications, we risk responding out of fear and ignorance and potentially throwing away crucial medical advances.

I have contended for a long time that we can no longer afford to remain ignorant of genetic technologies. They simply harbor far too great a power for both tremendous good and tremendous evil. We must work hard to take every thought captive to Christ and see what there is of benefit and what avenues of research and application we need to avoid to preserve human freedom and dignity.

Well let's talk about our genome, the sum total of all our genes. In most of the 100 trillion cells of our body are 46 chromosomes. These chromosomes are tightly coiled and packed strings of a remarkable molecule called DNA (Deoxyribonucleic Acid). DNA is a polymer, a repetitive sequence of four molecules, which I will only refer to by their one-letter abbreviations, A, G, C, and T. The human genome sequence is simply the sequence of these four molecules in DNA from all our chromosomes. If you laid out the DNA from all our chromosomes in each of our cells end to end, it would stretch six feet long.

A gene is a segment of DNA that contains the precise coding sequence for a protein. And proteins do all the real work in our cells. By looking at our completed sequence, it is predicted that our genome consists of 30,000 to 45,000 genes

in each of our cells. So, now that we have the sequence, what does it mean? We'll begin answering that question in the next section.

What Does the Human Genome Project Hope to Accomplish?

The National Institutes of Health in cooperation with several international research organizations began the HGP in 1990 in the U.S. There were four primary objectives among the many goals of the HGP^[1].

The first and primary goal of the HGP was to map and sequence the entire human genome. There is a critical and significant difference between a map and the sequence. There are over three billion letters, or base pairs, in the human genome, spread out over 23 pairs of chromosomes. Trying to locate a sequence of say 1,000 letters, the code for a large protein, is a one in a million task. Therefore, researchers needed a refined roadmap to the genome. The map entails particular sequences that can be used like signs on a road map. If the trait a scientist is studying always seems to be present with this marker, the gene involved is probably nearby. In 1995, a detailed map was published with over 15,000 markers, one for every 200,000 base pairs. This will aid greatly in associating genes with particular diseases. And now with the sequence nearly complete, with over 99% accuracy, determining the precise effect of this gene on disease will be even easier.

A second critical goal was to map and sequence the genomes of several important model organisms: specifically, the bacterium *E. coli*, yeast, the roundworm, fruit fly, and mouse. This information is helpful, because each of these organisms have been used for laboratory studies for decades. Being able to coordinate knowledge of their genomes with cellular and biological processes will certainly inform our study of the human genome and its various functions.

The third important objective of the HGP was to systemize and distribute the information it gathered. Any sequence over 2,000 base pairs is released within 24 hours. The sequence and map data is contained in publicly accessible databases on the Internet. The HGP has also been creating software and other tools for large-scale DNA analysis.

The fourth and final primary goal of the HGP was to study the ethical, legal, and social implications of genetic research. A full 5% of all funds appropriated for the HGP have been earmarked for these kinds of considerations. There are many concerns revolving around the use of genetic sequence data. Not the least of which are worries about ownership, patenting, access to personal sequence data by insurance companies, potential for job discrimination based on personal sequence data, and the prospects for genetic screening, therapy, and engineering. In the next section we'll begin investigating how the HGP thinks this information can be used.

What are the Long Term Hopes for the HGP?

The completion of the sequence was announced jointly in February 2001 in the journals *Nature*[{2}](#) and *Science*[{3}](#). Both *Science* and *Nature* have made these landmark issues available, without subscription, on their websites.

The importance of recognizing the sequence of a particular gene has three important ramifications.[{4}](#) The first is diagnosis. Over the last few years, single genes have been found leading to deafness and epilepsy. Numerous genes, however, will influence most diseases in complex ways. Recently, genetic influences have been found in many forms of hypertension, diabetes, obesity, heart disease, and arteriosclerosis[{5}](#). Genetic analysis of cancer tumors may someday help determine the most effective drug therapy with the fewest side effects. Genetic diagnosis has the potential to more precisely prescribe treatments for many medical conditions.

Second, diagnosing ailments with more precision with genetics will also lead to more reliable predictions about the course of a disease. Genetic information about an individual's cholesterol chemistry will aid in predicting the course of potential heart disease. Obtaining a genetic fingerprint of a cancerous tumor will provide information concerning its degree of malignancy. Third, more precise genetic information will also lead to the development of better strategies for prevention of disease.

Many more ailments in newborns can eventually be screened more specifically to avoid disorders later in life. Currently, babies in the U.S. and other countries are routinely screened for PKU, a metabolic disorder that prevents the breakdown of a specific amino acid found in proteins. This condition becomes toxic to the nervous system, but can be prevented and managed with appropriate diet. Without dietary changes, affected babies face extreme mental retardation. Hopefully, the number of conditions this type of screening applies to can be expanded.

Screening can also be done for adults, to see if they may be carriers of potential genetic conditions. Certain Jewish and Canadian populations regularly obtain voluntary screening for Tay-Sachs disease, a known child-killer. This information has been used to help make decisions about future marriage partners.

Perhaps the greatest benefit will come from what is called gene-based therapy. Understanding the molecular workings of genes and the proteins they encode will lead to more precise drug treatments. The more precise the drug treatment, the fewer and milder will be the side effects.

Actual gene therapy, replacing a defective gene with its normal counterpart, is still very experimental. There are still many hurdles to overcome involving how to deliver the gene to the proper cells, controlling where that gene is

inserted into a chromosome, and how it is activated.

Not surprisingly, some have seen the human genome sequence as a vindication of Darwin. We'll examine that contention next.

Did the Human Genome Sequence Vindicate Darwin?

Amid the controversy and exultation over the release of the near complete human genome sequence has been a not so quiet triumphal howling from evolutionary biologists. The similarity of many genes across boundaries of species, the seemingly messy patchwork nature of the genome, and the presence of numerous apparently useless repetitive and copied sequences all have been laid out for us as clear validations of evolution. Really!

If Darwin were alive today, he would be astounded and humbled by what we now understand about the human genome and the genomes of other organisms.

Let's take a closer look at the claims of one bioethicist, Arthur Caplan^[6], who thought the major news story was missed. So let's just pick a few of the more glaring statements to help us understand that little in his comments should be trusted.

First, Caplan says, "Eric Lander of the Whitehead Institute in Cambridge, Mass., said that if you look at our genome it is clear that evolution must make new genes from old parts."

While it may be true that we can see some examples of shared sequences between genes, it is by no means true that we see wholesale evidence of gene duplication throughout the genome. According to one group of researchers,^[7] less than 4,000 genes share even 30% of their sequences with other genes.

Over 25,000 genes, as much as 62% of the human genes mapped by the Human Genome Project, were unique, i.e., not likely the

result of copying.

Second, Caplan says, "The core recipe of humanity carries clumps of genes that show we are descended from bacteria. There is no other way to explain the jerry-rigged nature of the genes that control key aspects of our development."

Not everyone agrees. The complexity of the genome does not mean, necessarily, that it has been jerry-rigged by evolution. There is still so much we do not know. Caplan is speaking more out of ignorance and assumption than data. Listen to this comment from Gene Meyers, one of the principal geneticists from Celera Genomics, from a story in the *San Francisco Chronicle*:

'What really astounds me is the architecture of life,' he said. 'The system is extremely complex. It's like it was designed.'

My ears perked up. 'Designed? Doesn't that imply a designer, an intelligence, something more than the fortuitous bumping together of chemicals in the primordial slime?'

Myers thought before he replied. 'There's a huge intelligence there. I don't see that as being unscientific. Others may, but not me.' [\[8\]](#)

Jerry-rigged? Hardly! Confusing at the moment? Certainly! But more likely to reveal hidden levels of complexity, rather than messy jerry-rigging.

It will take more than bluster to convince me that our genome is solely the result of evolution. The earmarks of design are clear, that is, if you have eyes to see.

What are the Challenges of the Human

Genome Project?

In closing, I would like to address what are many people's concerns about the potential for abuse of this information. While there is great potential for numerous positive uses of the human genome, many fear unintended consequences for human freedom and dignity.

Some are justifiably worried about the rush to patent human genes. The public consortium, through the National Institutes of Health, has made all its information freely available and intends to patent nothing. However, there are several patent requests pending on human genes from the time before the HGP was completed.

It is important to realize that these patents are not necessarily for the genes themselves. What the patent does protect is the holder's right to priority to any products derived from using the sequence in research. With the full sequence fully published, this difficult question becomes even more muddled. No one is anxious for the courts to try its hand at settling the issue. Somehow companies will need some level of protection to provide new therapies based on genetic information without hindering the public confidence and health.

Another concern is the availability of information about individual genetic conditions. There are legitimate worries about employers using genetic information to discriminate over whom they will hire or when current employees will be laid off or forced into retirement. Upwards of 80-90% of Americans believe their genetic information should be private and obtained or accessed only with their permission. The same fears arise as to the legality of insurance companies using private genetic information to assess coverage and rates. A recent bill (June 29, 2000) before Congress to address these very concerns was amended to the Health and Human Services appropriations bill, but was removed in committee. The bill

will be reintroduced this session.^{9} I would be very surprised if some level of privacy protection is not firmly in place by 2002.

Moreover, many are apprehensive about the general speed of discovery and the very real possibilities of genetic engineering creating a new class, the genetically enhanced. Certainly, there is cause for vigilance and a watchful eye. I have said many times that we can no longer afford to be ignorant of genetic technologies. And while I agree that the pace of progress could afford to slow down a little, let's be careful not to throw the baby out with the bathwater.

After a series of lectures on genetic engineering and human cloning at a Christian high school, one student wrote me to say:

I am a senior, in an AP Biology class, and I find genetics absolutely fascinating. It's both fascinating and scary at the same time. . . . [You have inspired me] to not be afraid of the world and science in particular, but to take on its challenge and trust God.

Amen to that!

Notes

1. "Genetics: The Future of Medicine," *NIH*, Publication No. 00-4873, 2.
2. *Nature*, 409 (15 February, 2001), www.nature.com.
3. *Science*, 291 (16 February, 2001), www.sciencemag.org.
4. Genetics: The Future of Medicine, 9-11.
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A War of Words in Bioethics

Political battles are often won or lost with definitions. Proponents of abortion learned this lesson well. They didn't want to be described as those who were willing to kill innocent life. So they changed the focus from the baby to the woman and emphasized her personal choice. Those who are pro-abortion called themselves "pro-choice" and supported "a woman's right to choose." Changing the words and modifying the definitions allowed them to be more successful and more socially acceptable.

Homosexuals learned the same lesson. If the focus was on their sexual activity, the public would not be on their side. So they began to talk about sexual orientation and alternate lifestyles. Then they began to focus on attacks on homosexuals and argue that teaching tolerance of homosexuality was important to the safety of homosexuals. Again, changing the words and the debate made the issue more socially acceptable.

Now this same war of words is being waged over cloning and stem cell research. The recent debate in Congress about cloning introduced a new term: therapeutic cloning. Those who

want to use cloning argued that there are really two kinds of cloning. One is reproductive cloning which involves the creation of a child. The other is called therapeutic cloning which involves cloning human embryos which are eventually destroyed rather than implanted in a mother's womb.

Representative Jim Greenwood (R-PA) sponsored a bill that would permit this second form of human cloning for embryonic stem cell research while outlawing the first form of cloning to produce children. Although it was put forward as a compromise, pro-life advocates rightly called his legislation a "clone and kill bill." Fortunately, the Greenwood bill was defeated, and a bill banning all cloning sponsored by Representative Dave Weldon (R-FL) passed the House and was sent to the Senate.

Another example of this war of words can be seen in the floor debate over these two bills. The opponents of the "clone and kill bill" were subjected to harsh criticism and stereotypes. Both the debate on cloning and the debate on stem cells has often been presented as a battle between compassion and conservatives or between science and religion. Here are just a few of the statements made during the House debate on cloning:

Anna Eshoo (D-CA): "As we stand on the brink of finding the cures to diseases that have plagued so many millions of Americans, unfortunately, the Congress today in my view is on the brink of prohibiting this critical research."

Zoe Lofgren (D-CA): "If your religious beliefs will not let you accept a cure for your child's cancer, so be it. But do not expect the rest of America to let their loved ones suffer without cure."

Jerold Nadler (D-NY): "We must not say to millions of sick or injured human beings, 'go ahead and die, stay paralyzed, because we believe the blastocyst, the clump of cells, is more important than you are.' . . . It is a sentence of death to

millions of Americans.”

Notice too how a human embryo is merely called a blastocyst. Though a correct biological term, it is used to diminish the humanity of the unborn. In the stem cell debate, it was disturbing to see how much attention was given to those who might potentially benefit from the research and how little attention was given to the reality that human beings would be destroyed to pursue the research.

Moreover, the claims of immediate success were mostly hype and hyperbole. Columnist Charles Krauthammer called it “The Great Stem Cell Hoax.” He believes that any significant cures are decades away.

He also points out how it has become politically correct to “sugarcoat the news.” The most notorious case was the article in the prestigious scientific journal *Science*. The authors’ research showed that embryonic stem cells of mice were genetically unstable. Their article concluded by saying that this research might put into question the clinical applicability of stem cell research.

Well, such a critical statement just couldn’t be allowed to be stated publicly. So in a highly unusual move, the authors withdrew the phrase that the genetic instability of stem cells “might limit their use in clinical applications” just days before publication.

Charles Krauthammer says, “This change in text represents a corruption of science that mirrors the corruption of language in the congressional debate. It is corrupting because this study might have helped to undermine the extravagant claims made by stem cell advocates that a cure for Parkinson’s or spinal cord injury or Alzheimer’s is in the laboratory and just around the corner, if only those right-wing, antiabortion nuts would let it go forward.”

So the current debate in bioethics not only brings in Huxley’s

Brave New World, but also George Orwell's newspeak. The debate about cloning and stem cells is not only a debate about the issues but a war of words where words and concepts are redefined.

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Human Genetic Engineering

Although much has occurred in this field since this article was written in 2000, the questions addressed by Dr. Bohlin are still timely and relevant. Is manipulating our genetic code simply a tool or does it deal with deeper issues? Dealing with genetic engineering must be done within the context of the broader ethical and theological issues involved. In the article, Dr. Bohlin provides an excellent summary driven from his biblical worldview perspective.

What forms of genetic engineering can be done in human beings?

Genetic technology harbors the potential to change the human species forever. The soon to be completed Human Genome Project will empower genetic scientists with a human biological instruction book. The genes in all our cells contain the code for proteins that provide the structure and function to all our tissues and organs. Knowing this complete code will open new horizons for treating and perhaps curing diseases that have remained mysteries for millennia. But along with the commendable and compassionate use of genetic technology comes the specter of both shadowy purposes and malevolent aims.

For some, the potential for misuse is reason enough for closing the door completely—the benefits just aren't worth the risks. In this article, I'd like to explore the application of genetic technology to human beings and apply biblical wisdom to the eventual ethical quagmires that are not very far away. In this section we'll investigate the various ways humans can be engineered.

Since we have introduced foreign genes into the embryos of mice, cows, sheep, and pigs for years, there's no technological reason to suggest that it can't be done in humans too. Currently, there are two ways of pursuing gene transfer. One is simply to attempt to alleviate the symptoms of a genetic disease. This entails gene therapy, attempting to transfer the normal gene into only those tissues most affected by the disease. For instance, bronchial infections are the major cause of early death for patients with cystic fibrosis (CF). The lungs of CF patients produce thick mucus that provides a great growth medium for bacteria and viruses. If the normal gene can be inserted in to the cells of the lungs, perhaps both the quality and quantity of their life can be enhanced. But this is not a complete cure and they will still pass the CF gene on to their children.

In order to cure a genetic illness, the defective gene must be replaced throughout the body. If the genetic defect is detected in an early embryo, it's possible to add the gene at this stage, allowing the normal gene to be present in all tissues including reproductive tissues. This technique has been used to add foreign genes to mice, sheep, pigs, and cows.

However, at present, no laboratory is known to be attempting this well-developed technology in humans. Princeton molecular biologist Lee Silver offers two reasons.^{1} First, even in animals, it only works 50% of the time. Second, even when successful, about 5% of the time, the new gene gets placed in the middle of an existing gene, creating a new mutation. Currently these odds are not acceptable to scientists and

especially potential clients hoping for genetic engineering of their offspring. But these are only problems of technique. It's reasonable to assume that these difficulties can be overcome with further research.

Should genetic engineering be used for curing genetic diseases?

The primary use for human genetic engineering concerns the curing of genetic disease. But even this should be approached cautiously. Certainly within a Christian worldview, relieving suffering wherever possible is to walk in Jesus' footsteps. But what diseases? How far should our ability to interfere in life be allowed to go? So far gene therapy is primarily tested for debilitating and ultimately fatal diseases such as cystic fibrosis.

The first gene therapy trial in humans corrected a life-threatening immune disorder in a two-year-old girl who, now ten years later, is doing well. The gene therapy required dozens of applications but has saved the family from a \$60,000 per year bill for necessary drug treatment without the gene therapy.^[2] Recently, sixteen heart disease patients, who were literally waiting for death, received a solution containing copies of a gene that triggers blood vessel growth by injection straight into the heart. By growing new blood vessels around clogged arteries, all sixteen showed improvement and six were completely relieved of pain.

In each of these cases, gene therapy was performed as a last resort for a fatal condition. This seems to easily fall within the medical boundaries of seeking to cure while at the same time causing no harm. The problem will arise when gene therapy will be sought to alleviate a condition that is less than life-threatening and perhaps considered by some to simply be one of life's inconveniences, such as a gene that may offer resistance to AIDS or may enhance memory. Such genes are known

now and many are suggesting that these goals will and should be available for gene therapy.

The most troublesome aspect of gene therapy has been determining the best method of delivering the gene to the right cells and enticing them to incorporate the gene into the cell's chromosomes. Most researchers have used crippled forms of viruses that naturally incorporate their genes into cells. The entire field of gene therapy was dealt a severe setback in September 1999 upon the death of Jesse Gelsinger who had undergone gene therapy for an inherited enzyme deficiency at the University of Pennsylvania.[{3}](#) Jesse apparently suffered a severe immune reaction and died four days after being injected with the engineered virus.

The same virus vector had been used safely in thousands of other trials, but in this case, after releasing stacks of clinical data and answering questions for two days, the researchers didn't fully understand what had gone wrong.[{4}](#) Other institutions were also found to have failed to file immediate reports as required of serious adverse events in their trials, prompting a congressional review.[{5}](#) All this should indicate that the answers to the technical problems of gene therapy have not been answered and progress will be slowed as guidelines and reporting procedures are studied and reevaluated.

Will correcting my genetic problem, prevent it in my descendants?

The simple answer is no, at least for the foreseeable future. Gene therapy currently targets existing tissue in a existing child or adult. This may alleviate or eliminate symptoms in that individual, but will not affect future children. To accomplish a correction for future generations, gene therapy would need to target the germ cells, the sperm and egg. This poses numerous technical problems at the present time. There

is also a very real concern about making genetic decisions for future generations without their consent.

Some would seek to get around these difficulties by performing gene therapy in early embryos before tissue differentiation has taken place. This would allow the new gene to be incorporated into all tissues, including reproductive organs. However, this process does nothing to alleviate the condition of those already suffering from genetic disease. Also, as mentioned earlier this week, this procedure would put embryos at unacceptable risk due to the inherent rate of failure and potential damage to the embryo.

Another way to affect germ line gene therapy would involve a combination of gene therapy and cloning.^{6} An embryo, fertilized *in vitro*, from the sperm and egg of a couple at risk for sickle-cell anemia, for example, could be tested for the sickle-cell gene. If the embryo tests positive, cells could be removed from this early embryo and grown in culture. Then the normal hemoglobin gene would be added to these cultured cells.

If the technique for human cloning could be perfected, then one of these cells could be cloned to create a new individual. If the cloning were successful, the resulting baby would be an identical twin of the original embryo, only with the sickle-cell gene replaced with the normal hemoglobin gene. This would result in a normal healthy baby. Unfortunately, the initial embryo was sacrificed to allow the engineering of its identical twin, an ethically unacceptable trade-off.

So what we have seen, is that even human gene therapy is not a long-term solution, but a temporary and individual one. But even in condoning the use of gene therapy for therapeutic ends, we need to be careful that those for whom gene therapy is unavailable either for ethical or monetary reasons, don't get pushed aside. It would be easy to shun those with uncorrected defects as less than desirable or even less than

human. There is, indeed, much to think about.

Should genetic engineering be used to produce super-humans?

The possibility of someone or some government utilizing the new tools of genetic engineering to create a superior race of humans must at least be considered. We need to emphasize, however, that we simply do not know what genetic factors determine popularly desired traits such as athletic ability, intelligence, appearance and personality. For sure, each of these has a significant component that may be available for genetic manipulation, but it's safe to say that our knowledge of each of these traits is in its infancy.

Even as knowledge of these areas grows, other genetic qualities may prevent their engineering. So far, few genes have only a single application in the body. Most genes are found to have multiple effects, sometimes in different tissues. Therefore, to engineer a gene for enhancement of a particular trait—say memory—may inadvertently cause increased susceptibility to drug addiction.

But what if in the next 50 to 100 years, many of these unknowns can be anticipated and engineering for advantageous traits becomes possible. What can we expect? Our concern is that without a redirection of the worldview of the culture, there will be a growing propensity to want to take over the evolution of the human species. The many people see it, we are simply upright, large-brained apes. There is no such thing as an independent mind. Our mind becomes simply a physical construct of the brain. While the brain is certainly complicated and our level of understanding of its intricate machinery grows daily, some hope that in the future we may comprehend enough to change who and what we are as a species in order to meet the future demands of survival.

Edward O. Wilson, a Harvard entomologist, believes that we

will soon be faced with difficult genetic dilemmas. Because of expected advances in gene therapy, we will not only be able to eliminate or at least alleviate genetic disease, we may be able to enhance certain human abilities such as mathematics or verbal ability. He says, "Soon we must look deep within ourselves and decide what we wish to become."[\[7\]](#) As early as 1978, Wilson reflected on our eventual need to "decide how human we wish to remain."[\[8\]](#)

Surprisingly, Wilson predicts that future generations will opt only for repair of disabling disease and stop short of genetic enhancements. His only rationale however, is a question. "Why should a species give up the defining core of its existence, built by millions of years of biological trial and error?"[\[9\]](#) Wilson is naively optimistic. There are loud voices already claiming that man can intentionally engineer our "evolutionary" future better than chance mutations and natural selection. The time to change the course of this slow train to destruction is now, not later.

Should I be able to determine the sex of my child?

Many of the questions surrounding the ethical use of genetic engineering practices are difficult to answer with a simple yes or no. This is one of them. The answer revolves around the method used to determine the sex selection and the timing of the selection itself.

For instance, if the sex of a fetus is determined and deemed undesirable, it can only be rectified by termination of the embryo or fetus, either in the lab or in the womb by abortion. There is every reason to prohibit this process. First, an innocent life has been sacrificed. The principle of the sanctity of human life demands that a new innocent life not be killed for any reason apart from saving the life of the mother. Second, even in this country where abortion is legal,

one would hope that restrictions would be put in place to prevent the taking of a life simply because it's the wrong sex.

However, procedures do exist that can separate sperm that carry the Y chromosome from those that carry the X chromosome. Eggs fertilized by sperm carrying the Y will be male, and eggs fertilized by sperm carrying the X will be female. If the sperm sample used to fertilize an egg has been selected for the Y chromosome, you simply increase the odds of having a boy (~90%) over a girl. So long as the couple is willing to accept either a boy or girl and will not discard the embryo or abort the baby if it's the wrong sex, it's difficult to say that such a procedure should be prohibited.

One reason to utilize this procedure is to reduce the risk of a sex-linked genetic disease. Color-blindness, hemophilia, and fragile X syndrome can be due to mutations on the X chromosome. Therefore, males (with only one X chromosome) are much more likely to suffer from these traits when either the mother is a carrier or the father is affected. (In females, the second X chromosome will usually carry the normal gene, masking the mutated gene on the other X chromosome.) Selecting for a girl by sperm selection greatly reduces the possibility of having a child with either of these genetic diseases. Again, it's difficult to argue against the desire to reduce suffering when a life has not been forfeited.

But we must ask, is sex determination by sperm selection *wise*? A couple that already has a boy and simply wants a girl to balance their family, seems innocent enough. But why is this important? What fuels this desire? It's dangerous to take more and more control over our lives and leave the sovereignty of God far behind. This isn't a situation of life and death or even reducing suffering.

But while it may be difficult to find anything seriously wrong with sex selection, it's also difficult to find anything good

about it. Even when the purpose may be to avoid a sex-linked disease, we run the risk of communicating to others affected by these diseases that because they *could* have been avoided, their life is somehow less valuable. So while it may not be prudent to prohibit such practices, it certainly should not be approached casually either.

Notes

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