

by Mary Seller

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Legislators are trying to keep up with scientists who have found a way to make animal-human hybrid embryos for use in medical research. But is such use of animal and human material ethical? Here a leading geneticist and priest explains why she thinks scientists should indeed play God.

If we become ill, we expect the medical profession to be able to treat us. That this expectation is nowadays largely not unreasonable is the result of medical research.

Molecular genetics in particular has produced enormous advances in our knowledge of disease mechanisms. The methods involve manipulating DNA, often by cutting and pasting human DNA into that of other organisms using molecular scissors and glue.

Much of this is beyond the imagination of most people in society, but that does not stop them from questioning the morality of it. It is of course entirely appropriate that they should do this, and participate in setting boundaries as to what may be permitted. And just what is permitted has dominated much of the discussion in recent weeks over the Human Fertilisation and Embryology Bill. If it became law, the bill would regulate scientists' creation and use of human cytoplasmic hybrid embryos (cybrids) for use in research.

Cybrids would be produced by inserting a nucleus from a human skin cell into an animal ovum. The resulting cybrid would undergo embryonic development for four to five days until the inner-cell mass arises, from which stem cells will be harvested and the embryo discarded. Stem cells are a rich reservoir for investigation, and if the nucleus is from a donor with, say, motor neuron disease, the vital early stages of disease can be studied.

Is this use of human embryos justified? Answers vary according to whether the early human embryo is considered to be a human being or not. For some, the destruction of the embryo is equivalent to killing a human being, while others consider such use of embryos inappropriate and lacking respect. The status of the human embryo is not something that can be proved either way by scientists, for humans are more than the sum of their genes. Rather, it is something on which people form an opinion. Some are adamant that they do "know categorically" that embryos are human. Others believe that a certain level of bodily structure should be present in the embryo before human status can be accorded. The cybrids under consideration do not have this organisation, for they are a microscopic cluster of undifferentiated cells.

I believe that it is legitimate to use cybrids. While I do have regard for the sanctity of human life, I would reason on this issue using utilitarian principles. I weigh the advantages of being able to understand and eventually help someone suffering an incurable disease, against the loss of life of a cluster of human cells, and find in favour of the former. From reproductive medicine we learn that 70 per cent of all natural

conceptions perish, mostly at the earliest stages. This does make me wonder if early embryos are less precious in God's sight than a sick person.

It is questionable whether a cybrid is an embryo at all. After all, it is not conceived in the conventional sense, by the fertilisation of an egg by sperm. Electric shocks cause the cells to start dividing. There is no guarantee that if a cybrid were implanted in the womb, it would develop into a human being. The cybrid certainly has human nuclear DNA, but its cytoplasm and the organelles therein are not human. Mitochondria in particular (the cellular generators) have their own distinctive DNA that varies between species, and originates from the animal ovum. Mutations in human mitochondrial DNA can cause devastating diseases.

When, 11 years ago, scientists cloned Dolly the sheep, it was a breakthrough in terms of reproduction of species. Dolly was produced by transplanting an adult sheep nucleus into an enucleated egg, also from a sheep. The advent of Dolly demonstrates that the usual definition of an embryo must be widened, and a cybrid may, or may not, come into that category.

However, the missing final proof is not the objective of scientists - that would be a total abuse of humanity. The aim of cybrid work is to understand disease processes and early human development. The introduction of cybrids would certainly reduce the demand for genuine human embryos for use in laboratory investigation.

Should scientists pursue this area of work at all? Divine providence is an important consideration for some, who think that nature should not be interfered with, or that this work is contrary to God's will. As Christians, we believe that God created all things: the entire natural order including humans. People are made in the image of God. This means, among other things, that we reflect certain of God's properties, we are rational beings, capable of relationships and emotions, but especially in the present context, with creative abilities. Humans are curious and ingenious, and have manifested this from their first use of fire and the invention of the wheel through to flying to the moon.

God's creative acts did not happen once only, for we observe that nature is dynamic and continually changing and evolving. Nature is not fixed, God's Creation is continuing. Humans too are ever changing, constantly being renewed by God through Christ. So since change is part of Nature, it seems not unreasonable for humans to intervene in it. In fact, as creative beings made by God in his image, humans are one of the means by which God's Creation continues today.

But God also gave us free will, and we must be ever mindful that we are answerable to him in all we do, so we must always act responsibly. From the life of Jesus Christ we see that God intends that our lives should be directed by love towards others. So it is incumbent upon us to use our creative powers for the good of others. This is the rationale for scientists in their research. Scientists are often accused of "playing God", but that is exactly what scientists should be doing, while remembering always that they are bound to act responsibly.

God certainly intends healing of the sick. Jesus always healed when he encountered a person in need; he never passed one by. Indeed, he often flouted authority to do so: he healed on the sabbath, he touched untouchables, and vociferous criticism did not stop him. Furthermore, he gave power and authority to his disciples to go out into the highways and byways to do likewise. If today we are able to heal anyone through our new scientific endeavours, it is an expression of our discipleship, and can also be construed as another way in which we legitimately "play God".

As a scientist who is also a Christian, I find that what I learn from this research illuminates my knowledge of God, for it allows me to observe some of the wonders of God's Creation that are not overt. Hitherto, the complexities of gene action have been secrets known only to God, but now we know. I can only marvel at the splendour, the majesty of it all, and in awe, I just have to praise God. It also impels me to discover more.

Scientists who are not Christians also marvel. It is not a mere whim or an appetite for fame and fortune that drives scientists on in their work; it is curiosity, and the genuine desire to be able to use their talents to aid the sick and disabled. From the criticism that abounds, this seems not to be apparent to outsiders, but scientists are decent people like themselves, who respect the sanctity of life, and are committed to maintaining the highest ethical standards in their work.

Many people are opposed to this work because of the slippery slope argument. But isn't the slippery slope actually how science progresses? For, like God's Creation, our moral climate is not static, it also moves. A new treatment for a disease that seems "outrageous" is offered by scientists. It is tentatively adopted. With the passage of time we discover that it actually has benefits. Gradually our reservations disappear and the treatment is accepted and incorporated into mainstream medicine. Then another revolutionary technique comes along. It too, is gradually accepted... and so on. A slippery slope: or the way contemporary medicine advances?

Excerpt from "AN EMBRYO IS NOT A PERSON" *The Independent*, UK Sunday, December 17, 2000

I believe that to be a human being is not simply to be biologically alive, but also to experience the powers of mind and spirit that are special to human beings. People have the capacity for creativity, emotion, spirituality; they can reason, exercise responsibility, and make moral judgements. Underlying these is sentience, which in turn depends upon physical structures, predominantly, the central nervous system (CNS).

So a person cannot exist until the embryo has reached an appropriate degree of development. The difficulty comes in defining exactly when the relevant level of complexity has been reached, because embryogenesis is a continuum. It is not that on one day there is no CNS and on the next there is. The CNS develops over weeks, and even at birth is incomplete. Nevertheless it is clear to me that the embryos under consideration do not have the necessary basis for sentience and thus do not have the attributes of personhood. I am content therefore in this case to use utilitarian principles: to weigh up the advantages of being able to treat the victims of devastating diseases against the life of the embryo, and find in favour of the former.

Biological evidence also suggests to me that six-day embryos are not yet human persons. It is not true to say that if left untampered with, all embryos would become babies. In natural conceptions, 70 per cent of embryos perish, most at the early stages. Also, some embryos will split and form twins; occasionally two embryos will fuse and form one. Others still do not yield an embryo at all but form a mass of disorganised tissue. What has happened to the person in these cases if he/she existed at conception?

It is possible that the use of embryos as a source of stem cells may only be a transient measure, for research is revealing that stem cells may be obtained directly from adult tissue. This has been known for some time in a restricted sense, for bone marrow transplants work because the stem cells they contain

populate the host blood system. But recently it has been found that bone marrow cells are much more versatile and can form liver, muscle and blood vessel cells. More surprisingly, brain stem cells can be made to develop into any tissue. All this work is at a preliminary stage, and adult stem cells replicate less well than embryonic ones, but it offers hope for the future. Meanwhile, it seems that therapeutic cloning will sooner provide means for the treatment of patients with bodies damaged by degenerative diseases, diabetes, stroke, heart disease, arthritis, hepatitis, burns, and even renal failure. Closely regulated research allowing embryos to provide stem cells would be a step along the way.