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Biotechnology & the Human Spirit

Facing the unprecedented challenge of reprogenetics

by Margaret Somerville

According to transhumanists, the physical, mental, emotional and even moral capacities of cyborgs will far outstrip those of unmodified humans -- except, the fail to note, their capacity for being human.

WHAT HAS CHANGED IN HUMAN REPRODUCTION?

Let's have a look, first, at the characteristics of human reproduction around fifty years ago:

- ***Whether* and *when* a child was conceived was largely a matter of chance (one could eliminate chance, of course, by not engaging in sexual intercourse, or reduce it by much less effective contraception than is available today).**
- ***Where* it was conceived was always in a woman's body.**
- ***How* life was transmitted to the child was through sexual reproduction.**
- ***What genetic heritage* the child received was determined by the natural recombination of the genes carried in the female parent's ovum and the male parent's sperm.**
- **Those *genes* were received by the child in their natural or *unaltered* state.**
- **The *sex* of the child was a matter of *chance*.**
- **The purpose of the *transmission of life* was *reproduction*, whether or not that was desired.**

Every element in this list has now changed thanks to new technological developments:

- ***When*** **human life is conceived can be controlled through contraception, especially oral contraceptives ("the pill").**
- ***Where*** **it is conceived is no longer limited to a single option. In vitro fertilization (IVF) allows the creation of embryos outside the body of a woman.**
- ***How*** **it is transmitted is no longer limited to sexual reproduction: cloning is asexual replication; and in the future, embryos may be created from the union of two ova, two sperm, or, possibly, from the individual genes that make up a living human. A baby with three genetic parents has already been born.**
- ***What*** **is transmitted -- the embryo's genetic heritage -- can now be altered through genetic manipulation and germ cell line intervention.**
- ***Whom*** **that altered heritage affects is now greatly broadened, in that genetic alterations can go beyond the immediate embryo. Altering an embryo's germ cells means that all future descendants of that embryo will be altered in the same way -- unless, of course, those genes are re-altered.**
- **The *sex* of the child is open to *choice* by the parents, or even others.**
- **The *purpose* for which human life is transmitted is no longer only reproduction, but also the creation of embryos as a source of stem cells for making therapeutic products, a process that necessarily involves killing them. In other words, this particular transmission of human life is undertaken with the primary intention of killing it.**

It is, I propose, inherently wrong to transmit human life other than by sexual reproduction. Any benefits provided by other modes of transmission are far outweighed by the risks and harms.

And what else might the future hold with respect to reprogenetic technologies? Gestation is the one situation where we are still dependent on "using a human." We have not yet developed a safe and effective artificial uterus. Research in this area is taking place, however, and when an artificial uterus is developed (assuming that it will be), the whole process of human reproduction will be open to being carried out in a technoscience environment rather than an intimate human one. It goes without saying that we have no idea what impact this would have on the children brought into the world by these means, including, very importantly, on the bonds between them and their parents and extended families.

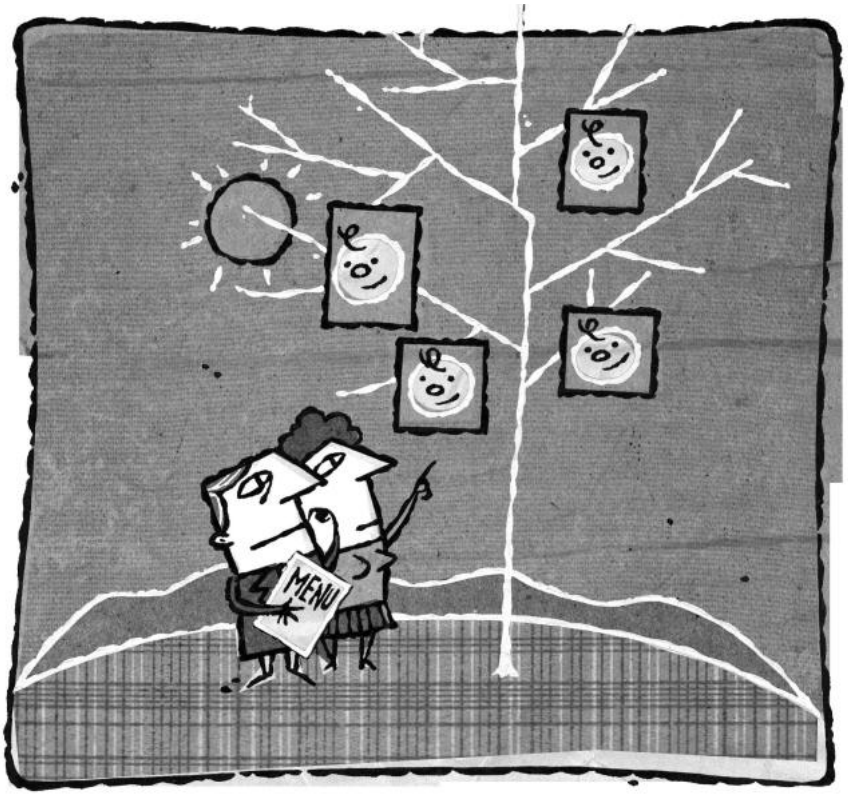
We might, however, get an idea of the scope of the possible changes involved by looking at what resulted from the

creation of the Internet -- although the effects of the Internet are likely to seem minor compared with what would result from the complete technologization, and associated dehumanization, of human reproduction. The technologies that now make up the Internet had each been around for half a century before the Internet became a (virtual) reality: fax machines since the 1930s, modems and radio phones since the 1940s. It was only when we finally figured out how to connect communications and information technologies -- how, for instance, to let one modem talk to another on the telephone and agree between themselves -- that they had the massive impact on our world, including its culture and values, that we have witnessed. This is even more likely to be true for the combined impact of reproductive and genetic technologies -- that is, reprogenetics. In particular, these new technoscience possibilities bring us face to face with unprecedented questions about who we are, how we find meaning in life, and what is required for respect for human life. Let us look at some of these possibilities and the questions they raise.

THE SCIENCE

It bears repeating when considering ethics, especially in novel, controversial and rapidly emerging areas of science such as reprogenetics, that "good facts are essential for good ethics and good ethics are essential for good law."

At present, we can create embryos in vitro, choose the sex of our children, screen them for genetic diseases, and make an embryo from three genetic parents. In the future, reprogenetics will allow us to design our children and their children, clone ourselves, and make babies from two sperm or two ova or more than three genetic parents. Are these ethically acceptable courses of conduct?



And, as avant-garde as such interventions are, there may be others that are even more startling. For instance, 98 percent of the genes that make up the human genome and the chimpanzee genome are the same. Let's assume they function in the same way in each species (they may not) and that we replace the 2 percent of the genes in the chimpanzee genome that differ from human genes with the relevant human genes. Would we create a child that has a *human phenotype* -- he or she looks like any other human -- but has a 98 percent *chimpanzee genome*? What is it: a human, a chimpanzee or neither? Or is it only the 2 percent that matters, making this

child truly human because it has the crucial human 2 percent? Is it that 2 percent that gives humans their human consciousness, language abilities and powers of reasoning? After all, no other animals have discovered DNA and the double helix that is the basis of all life.

With developments in robotics and artificial intelligence, our traditional concepts of what a "being" is will also be challenged. The idea that human beings are "special" is already being criticized. Thus Rodney Brooks, in his recent book *Flesh and Machines*, argues that machines -- robots -- will become more intelligent than we are and, therefore, could deserve greater respect than we do. It merits noting that in this approach, respect depends on being intelligent, an "extrinsic performance" characteristic, not on being human, an "intrinsic worth" characteristic. It reflects a view that attaches value to humans according to what they do, not who they are -- that is, human. Pursuant to this view, humans are more accurately described as "human doings" than as "human beings." In a different sense, the former term may be more *à propos* than the latter to describe the children born through reprogenetic technology -- they are truly the result of human (technological) "doings."

Combinations of humans with machines or animals raise profound ethical questions. At present, human-animal combinations are strongly rejected as immoral and unethical except for "minimalist" techniques such as putting human complement genes into pig embryos to prevent immediate rejection of their organs when they are used for transplantation to humans -- that is, xenotransplantation. In comparison, recent proposals in the United States to create human-mouse hybrid embryos for research purposes caused an outcry, and resulted in statements by researchers, not usually regarded as conservative in their views, that to do so was unethical. Statements reported in newspaper articles -- that the procedure could result in a mouse with some level of human consciousness (or one assumes vice versa) -- explained the deep level of ethical concern.

Because they are more familiar to us through modern medical technology, human-machine combinations may, at first glance, seem less ethically problematic and threatening than human-animal combinations. But that may not prove to be true. Some people who style themselves transhumanists are predicting a posthuman future in which humans will be

redesigned through technology to become cyborgs -- human-machine combinations. According to transhumanists, the physical, mental, emotional and even moral capacities of cyborgs will far outstrip those of unmodified humans -- except, they fail to note, their capacity of being human. It is not difficult to see why we would need ethics to guide science as it is described here.

RESPECT FOR HUMAN LIFE IN LIGHT OF REPROGENETICS

Reprogenetic technoscience challenges our respect for life in unprecedented ways. We are the first people to face these challenges, because no humans before us were able to intervene and affect life in the ways that we now can. What is required of us in using new reprogenetic technologies if we are to maintain respect for life?

Traditional Respect for Human Life

Respect for human life has always required both respect for each individual life and respect for human life in general at a societal level. Even this traditional respect is now being challenged by new technologies such as preimplantation genetic diagnosis (PGD) and prenatal screening.

Individual parents-to-be are screening their embryos and fetuses for genetic problems and choosing to discard embryos or to abort fetuses that are genetically "defective." Whatever our view of the ethics of these decisions at the individual level, at a societal level they will have the effect of wiping out certain groups of people, such as Down syndrome children, achondroplastic (dwarf) children, or those who are profoundly deaf or bipolar. Apart from a failure to respect the lives of the individuals involved, this would eliminate two special subcultures and many of the most gifted and artistic people in our societies. And what other groups would be eliminated or perhaps just reduced in number? In some cultures, one such group in the latter category would be women. It is already the case in some countries where female embryos or fetuses are identified and eliminated. In short, the cumulative effect of individual decision-making is resulting in a situation that would never be tolerated as public policy.

Moreover, such a use of reprogenetic technology involves treating the embryo as an object or thing -- if it is not of

acceptable quality, or of the "right" sex, it will be discarded. That affects the parent-child bond, both in practice in individual cases, and in its role of establishing major societal values and symbols that are part of the fundamental basis of society. The understanding of parental love -- as the parents' unconditional acceptance of and love for the child born to them -- is also drastically changed. These are major changes in the shared morality and values on which society has traditionally rested.

We must directly and honestly address the question: Are we creating a "new eugenics" with our use of reprogenetic technologies? People who want to avoid or finesse this question will argue in response that individual choice regarding the nature of one's child is not a eugenic decision. Rather eugenics is practised only when a choice is made in relation to a group or class or by someone who is not the future parent. But is that simply sophistry?

Respect for In Vitro Human Embryos

Another question we now find ourselves asking is: What does respect for in vitro human embryos require? It is one thing to argue the ethics of using IVF for the purposes of having a child, quite another when IVF embryos are created for research or for their use as the source of stem cells to make therapeutic products to benefit the rest of us. Are human embryos human beings or human products? Is using an embryo as an object, commodity or product unethical? That depends on the respect owed to the human embryo, and that is linked to the embryo's moral status. There are three views on the moral status of a human embryo, representing a continuum from permissiveness to prohibition:

1. The human embryo has *no moral status*, but is equivalent to, say, a skin cell.

2. The human embryo has *moral status* and *deserves respect*, but not (yet) the same respect as the rest of us and therefore it may be used in ways that would not be ethically acceptable if applied to the rest of us -- it is *potential human life*.

3. The human embryo is the *earliest stage of each human life* and as such has the *same moral status* as the rest of us -- we are all ex-embryos. Therefore, its life must be respected and it must not be used simply as a product or a means to an end --

it is *human life with potential*. As is true for all of us until we die, its life is in progress and is a process of becoming.

And what about genetically enhancing (or even disenhancing) human embryos that will later become persons? German philosopher Jürgen Habermas, in his new book *The Future of Human Nature*, argues that to do this is to deprive the future person of their capacity to "be-able-to-be-oneself." The result is that they are not free (we need a sense of the contingency of our origins to feel free to be the authors of our own lives) and they are not equal to others, especially to those who designed them. They are therefore excluded from being members of the community whose communicative interactions create a shared morality, which Habermas calls "species ethics" but I would call "human ethics." Genetic manipulation of human embryos destroys the essence of their humanness and, ultimately, the essence of the humanness of all of us. That would occur because we would all be complicit in such manipulation by not prohibiting it, and because tampering with some people's origins destroys a necessary condition for establishing a moral base for a secular society -- that all people must be free from intrinsic interference by others if they are to have the capacity to take part in the human interaction from which a shared morality arises.

Respect for the Human Germ Cell Line

Yet another question we are the first humans to face is: What does respect for the essence of human life -- the human germ cell line or the genes that are passed on from generation to generation -- require of us? These genes are the product of 800 million years of evolution. We can now change that evolution in nanoseconds. What must we do, what may we do, and what must we not do? In changing an embryo's germ cell line, we change not only that embryo but also all of its descendants in like manner. Is it ever acceptable to do that?

Another way to ask the same question is: What is required of us by the obligation to hold the human germ cell line in trust for future generations as the common heritage of humankind? Does it mean, as many people believe, that we must never intentionally change it, that alteration of the germ cell line is never justified? What if we could eliminate a horrible disease by changing just one gene and we knew it was reasonably safe to do that? Do we object to intentionally altering the human germ cell line because we believe that it is inherently wrong to

do so -- that is, a purpose of doing good can never be a justification for interfering with it? Or do we believe that some interventions might be justifiable -- that is, it is not inherently wrong to intervene on the human germ cell line, but intervening is not currently justifiable because it is too dangerous? Or do we fear that once intervention is allowed, no matter how much suffering we might eliminate, we could not control the range of interventions that would occur? In other words, do we envision a future in which many interventions would be at best frivolous, while others, such as intentionally disenhancing the intelligence of certain embryos, would be profoundly ethically unacceptable?

It is important here to distinguish therapies that involve genetic interventions on somatic cells from germ cell line interventions. Somatic cell genetic therapy affects only the genes of that embryo (or, indeed, of any person treated with it), not the descendants of the embryo (or person). Such therapies can be justified for treating serious disease, provided that they have been shown to be reasonably safe and effective -- which, it merits noting, has not yet been established. On the contrary, genetic therapies that have been used to date have resulted in very harmful consequences, including death.

Respect for the Transmission of Human Life

We must also consider what is required of us with regard to respect for transmission of human life. In the past the only mode of transmission was sexual reproduction. New modes of transmission include cloning (which is asexual replication, not sexual reproduction) and having more than two genetic parents. Future modes could include making embryos -- transmitting human life -- through combining two ova or two sperm. We should regard transmitting human life in these ways as unethical, both from the standpoint of respect for the transmission of human life itself and from the perspective of the rights and claims of the resulting child.

It is, I propose, inherently wrong to transmit human life other than by sexual reproduction. Even on a utilitarian analysis, any benefits provided by other modes of transmission are far outweighed by the risks and harms -- especially to our sense of what it means to be human and to the meaning attached to passing on human life to the next generation in the way it was passed on to us, to say nothing of physical risks.

The "absolute right to reproductive freedom" claimed by those who promote it is regarded as the right to determine whether to have a child; if so, how life will be transmitted to that child (for instance, by cloning); and finally what kind of child will be created (for example, a genetically altered child or a child of a certain sex). This individualistic and adult-centred approach can be compared with a child-centred and societally based approach, which focuses primarily on the "best interests" of the child born as a result of the use of reprogenetic technologies.

Wherever there is conflict between what adults want and what is best, ethical, fair and just for the child, the child's interests must prevail. Take, for instance, cloning from an adult somatic cell, the "Dolly technique" (somatic cell nuclear transfer or SCNT). Cloning is ethically wrong *vis à vis* the children produced because children have a right to their own unique ticket in the great genetic lottery of the passing on of life; a right not to be intentionally created as a copy of someone else; a right not to be designed by another human; and a right not to be placed at serious risk of illness, disability and premature death. Cloning transgresses all of these rights.

As well, the adult-centred, individualistic approach does not take into account the needs of or harms to the community or society as a result of individual choice in reprogenetics. Neither does it factor in what is required to protect the common good or to avoid the moral risks of these technologies, especially at the societal level.

For instance, in making decisions about whether to allow or prohibit the use of sex-selection technology, we must look beyond the personal preferences of people who want a child only of a certain sex and ask what impact helping them to fulfil that goal would have on society and its values. And we must consider the moral risks involved, not just the physical risks. There is an infinite difference between parents who want a child only if it comes into the world satisfying specific criteria for quality or gender, and parents welcoming the child they beget in a spirit of humility and with unconditional love, which they understand as the primary characteristic of the parent-child bond.

These two approaches reflect diametrically opposed values. We cannot avoid the fact that our choice for one approach

over the other will necessarily establish the corresponding societal values. And we should recognize that sometimes saying no is much harder, and requires more courage, than saying yes -- especially when it involves something as seemingly innocuous, at first glance, as a family with three boys wanting a girl.

Whether sex-selection should be altogether prohibited is not clear. Discarding embryos or aborting fetuses on the basis that they are the "wrong" sex would and should be seen as unethical. This does not necessarily mean, however, that using only either X sperm or Y sperm in order to conceive a female or male embryo, respectively, should be prohibited. In particular, if there were a medical reason to avoid a child of a certain sex -- for instance, a serious genetic disease that only affects boys -- such a process would, in my view, be ethically acceptable.

The purpose of transmitting human life is relevant to the ethics of its transmission. The creation of embryos for use in research or to make therapeutic products -- whether through sexual reproduction or asexual replication (cloning) -- raises ethical issues that go beyond those already raised by the use for research of so-called "spare" embryos "left over" from IVF (which is itself ethically controversial). In the former case, human life is being transmitted with no intention of giving the embryo any chance to live (indeed, with the intention of killing it, for instance by taking its stem cells). Furthermore, creating an embryo for the sole purpose of making therapeutic products is to use it as a thing or object. As this example demonstrates, reprogenetics brings into question our most intimate connections as humans with other humans -- with those to whom we give life itself.

THE INTRINSIC VALUE OF HUMAN LIFE

Some hold a "gene machine" view of human life -- we are nothing more than complex biological machines. Others regard human life as having intrinsic and not just instrumental value. They see it as entailing something unique, something special or "more" in comparison with other animals, a "more" that I try to capture in the term *human spirit*. By human spirit, I mean the intangible, invisible, immeasurable reality that we need to experience to find meaning in life and to make life worth living -- that deeply intuitive sense of relatedness or connectedness to others, the

world and the universe in which we live. Those who hold an "intrinsic value" view of human life believe that we have to be concerned about societal values as well as individual rights, and about how individual choices pursuant to individual rights affect these societal values.

It is essential to understand that in choosing the values that will govern the new reprogenetic technoscience, we must consider much more than the immediate benefits we hope for or the thrill of the scientific discoveries we might make. These values go to the heart of what it means to be human, and therefore will affect how we bond to one another as humans, find meaning in life and see the essence of our humanness. These deeply important and intangible human realities are not indestructible -- indeed, they can be very fragile. We must choose, wisely and courageously, after full, open and honest consideration of the ethics of our choices, both what we will do and, even more importantly, what we will not do with reprogenetic technoscience.

Professor Margaret Somerville is Founding Director of the Centre for Medicine, Ethics and Law at McGill University in Montreal.

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