Human cloning: who or what counts?

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Abstract

Human cloning has become a controversial topic because of ethical, moral and, to some extent, legal concerns. This article discusses therapeutic cloning, in which the purpose is to replace a defective tissue in order to restore its function, and reproductive cloning, which is a specific technique in which a donor adult cell is transferred into the egg of another. In the article, the authors ask the following questions: Is reproductive cloning a crime against humanity? Or are we worried about the disruption of the traditional way we reproduce? These questions highlight the concern that, with reproductive cloning, a clone can be produced without a sperm or without the egg's genetic material. The article discusses the ethical implications of reproductive cloning.

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Introduction

In recent times, the issue of cloning has taken centre stage because of the attention given to it by the media.[1] The role played by the media in this regard is debatable for many reasons. One of the most important reasons, perhaps, why this role should not be left unchecked is because the media have the power to discredit as much as to legitimise. Regarding cloning, it appears that the media are somehow inconsistent in the sense that therapeutic cloning has not been treated in the same way as reproductive cloning. The former is mostly presented as an important victory of medical technology, while the latter is usually condemned in the strongest terms.[1] As it has been emphasised in earlier research, the main problem with the media is the fact that news gets out fast and the media tend to use this speed of dissemination and the emotion invoked by the issue of human cloning as a way of compensating for thoughtful and reasoned explanation.[1]

Although the debate provoked by cloning is pertinent to all citizens, it appears that, instead of promoting debate, we are actually rather faced with a non-debate situation imposed by either a moratorium on reproductive cloning or, worse, an interdict decided by some political authorities.[2] A moratorium would be a more acceptable alternative that would make space for a "wait-until-certainty" approach, whereas prohibition prevents any dialogue in a patriarchal and paternalistic fashion. One should, however, not leave public opinion with a smorgasbord of options it is ill equipped to ponder. Furthermore, many ethical dilemmas are likely to surface as a result of words and concepts not being clearly understood, and of the different values these words and concepts represent. This is even more so when the religious and societal taboos surrounding human reproduction are at stake.

Two main objections are raised against reproductive cloning. The first is the charge of "crime against humanity" and the second (more subtle) is the charge of "narcissism", the quest for one's replica as a means to immortality.[3] The question is: Are these sweeping statements based on flimsy evidence and unspoken biases? Our claim is *not* that reproductive cloning should be allowed simply because the technology that makes it feasible is available. Our claim is rather that the issue merits more attention and scrutiny before deciding that it *is* a crime against humanity and/or the epitome of narcissism. Importantly, ethical considerations also oblige us to look at possible positive results from human cloning.[4] Equally important, for a fair ethical debate, is to avoid double standards and ill-conceived prejudices. Shouldn't we keep in mind the origin of "Man" as told in Genesis's story of creation? God retrieved a rib from Adam to create Eve and, of course, the bigot Cain (the symbol of bad or evil) and Abel (the symbol of good). So it may be with cloning: good and evil may ensue.

Therapeutic cloning versus reproductive cloning

In order to address reproductive cloning in particular, a basic understanding of its counterpart, therapeutic cloning, is in order. The purpose of therapeutic cloning is to replace a defective tissue in order to restore its function (e.g. cardiac muscle cells destroyed by a myocardial infarct). To achieve this, human stem cells (namely, undifferentiated immature

cells) are manipulated to acquire the function of the targeted organ and implanted in a mature human body. Two sources of stem cells are used for this purpose: stem cells harvested from cord blood at the time of birth of a human infant, and stem cells harvested from human pre-embryos.

Cord blood transplantation has already been practised for 15 years. Medically, it has a much narrower scope and is utilised instead of bone marrow transplantation. Ethically, it poses very different problems (autonomy, donation of blood, privacy and confidentiality in the tests required for its use).[5]

The issue of stem cells from pre-embryos is a totally different ethical matter related to the use of supernumerary pre-embryos resulting from artificial reproductive technology (ART). It should also be said that the same stem cells are used for "preimplantation diagnosis", where a stem cell is isolated from an eight-cell pre-embryo and analysed by polymerase chain reaction to detect possible genetic defects. This gives the choice of "discarding" defective pre-embryos and provides the "advantage" of avoiding a termination of pregnancy.[6]

Reproductive cloning differs from therapeutic cloning in many respects. In brief, a mature and differentiated cell is harvested (e.g. in the case of Dolly the cloned sheep, an udder cell from a six-year-old ewe). The nucleus is extracted from the cell. An egg cell is harvested and the nucleus is removed, leaving only the cytoplasm as a receptacle. The "donor nucleus" is inserted into the "receiver cytoplasm". The ensuing cell undergoes the same steps as those used for standard in vitro reproductive technology, and is then inserted in a recipient uterus.[3]

In the current state of advancement of the technology of reproductive cloning, the main difficulty concerns the "deprogramming" of the donor nucleus. The nucleus was harvested from a tissue that is programmed to function in a specific way (e.g. to produce milk). The cell that is expected to produce an embryo needs to be "totipotential"; i.e. to have the ability to produce daughter cells with the potential and the ability to differentiate into each of the many cell types (around 250 in humans) constituting a mature and fully functional organism. Failing to fully deprogramme the donor nucleus exposes the clone to exhibiting defects (e.g. the premature ageing and arthritis experienced by Dolly).[4] Until this hurdle is overcome, it would be wise to place a moratorium on human reproductive cloning.

Human reproductive cloning: a crime against humanity?

It is estimated that during the 20th century, 120 million people died a violent death. The toll from the Holocaust, as evil and repugnant as it was, contributed to a mere five per cent of the whole massacre. This is not to minimise or to banalise the Holocaust. Only that we seem to have double standards and tend to ignore or to depersonalise the remaining 114 million. Who were they? Where did it happen?

Since the Holocaust, we rightfully have become sensitive to the concept and the abjection of crimes against humanity. This notwithstanding, some perpetrators of crimes against humanity are brought to book while others are left undisturbed in the name of non-interference with national autonomy and sovereignty. Ethnic cleansing, an expression of racism and of alleged racial superiority, is practised to torture and eliminate people who allegedly are different and inferior. Ethnic cleansing often goes together with promoting reproduction of the "superior" race and preventing the "reproductive rights" of the "inferior". Isn't this what is termed "eugenics"?

It seems that the entire debate is peculiarly incomplete. Therefore, it is sometimes necessary to ask somewhat irreverent questions. Could there be two kinds of eugenics, a morally reprehensible and repugnant one and a permissible one? The question is: Does the morality of an action depend on the motive? To make this point clearer, let us return to ART.

As already mentioned, "preimplantation diagnosis" eliminates (or does not give a chance for the development of) "defective" pre-embryos. Prenatal diagnosis of genetic defects (e.g. Down's syndrome, Tay-Sachs disease, sickle-cell anaemia) is commonly viewed as a "legal" right claimed by parents not ready or unable to raise a "defective" child. Likewise, some parents who carry a genetically transmissible disease (e.g. haemophilia) claim the right to reproductive freedom. Multifoetal pregnancy "reduction" is viewed as an acceptable procedure, because it gives the remaining singleton or twins a better chance. Foetal selective "reduction" is seen as permissible unless it is practised with the sole purpose of sex selection.[7]

What is the difference with eugenics?[8] Is it not killing (a harsher concept than selection but with the same end result) for the purpose of selection, genetic or otherwise? And that is what is called a crime against humanity. Once more, this is not a defence of crimes against humanity as we know them from past and present. Neither is this a moral judgement on prenatal screening and its consequences. The argument is rather that we rightfully condemn one while conveniently keep silent about the other; the characteristic of having double standards. Does the difference lie with the motives?

Is reproductive cloning really a crime against humanity? Or are we worried about the disruption of the traditional way we reproduce? A clone can be produced without a sperm or without the egg's genetic material. On closer view, one may even say that, with reproductive cloning, there is no conception but "asexually produced totipotential cells".[9] Sperm is no longer needed. Equally, are we worried because reproductive cloning disrupts our traditional way of thinking about the family fabric?[2] Who is the father, the mother, grandparent, brother or sister of a clone? Who is more important, the biological mother or the adoptive family? What is more determining, our genome or the nurturing that gives us the opportunity to become fully human in the best sense of its meaning?

Human reproductive cloning: the epitome of narcissism

Narcissus, an exceptionally handsome young man, so says the myth, was punished by the goddess Aphrodite of Nemesis for having rejected the love of the nymph Echo. The punishment was to make him indulge in his mirror image. Narcissism is the flaw of being enamoured with one's image, beauty, or greatness. This results in lack of self-criticism and the conviction that one has only rights and no duties to others. With "normal" reproduction, half of the chromosomes are transmitted by each of the two progenitors. With reproductive cloning, the entire genome of the clone is that of the donor nucleus, male or female. The clone is thus a genetic copy of the donor nucleus. The argument then is that the perfect copy has no choice but to be an automaton devoid of autonomy and real free will, manipulated by a malicious twin brother or sister.

This view, however, is debatable. It suggests that we are preprogrammed by our genes. If the view were to apply to a clone, there is no reason why it would not apply to everyone (i.e. we are pre-determined by our genetic work-up; therefore, we have no free will). To adhere to this view is to believe in "genetic preformationism", a kind of naïve geneticism.

The debate between preformation and epigenesis goes back to the 17th century and the first steps in the investigation of the physiology of reproduction. The theory of preformation was suggested by Antonie van Leeuwenhoek (1632-1723), the pioneer of microscopy, who claimed to have identified a homunculus in human sperm cells. That is the theory of spermism – that the human being is there fully preformed as a miniature. Van Leeuwenhoek's claim became contested by those claiming that, on the contrary, the human egg cell contains a femincula – the theory of ovism. Since then, in spite of the scientific disproval of ovism and spermism and thus of preformationism, it seems that the human mind has had difficulties in coming to terms with the scientifically proven alternative, epigenesis.

Both William Harvey (1578-1657), in *De generatione animalium,* and Caspar Friedrich Wolff (1733-1794), in *Theoria generationis,* argued against preformation and advocated epigenesis – the theory that states that the human embryo and foetus result from consecutive steps where the preceding is required for the following to occur.[10] A similar debate has raged (and still does) concerning the theories of the mind: the hard empiricist view of the brain as a tabula rasa against the hard nativist view of the brain, or Platonic neuralism. The former claims that neuronal activation is a necessary condition for the development of both the structure and the function of the brain (the equivalent of epigenesis). The latter, on the contrary, maintains that we do not learn but merely recollect what is already inscribed in the brain (as in Plato's theory of recollection in the *Meno*), in other words the brain contains a sort of mini-brain that just grows with the rest of the body (the equivalent of the homunculus). The brain has, in this view, only a limited flexibility within the boundaries set by the constraints of genetic development.[11] This raises again the question of freedom.

Returning to the objection of genetic identity, it should also be said that the human genome is composed of about 100 000 genes. They constitute only 5 to 10 per cent of the total DNA; the rest of the DNA is non-coding or "junk" DNA.[12] In other words, a large amount of DNA (our chromosomes) has no specific function (or, perhaps, is currently of unknown significance). In addition, genes interact; some are switched on and others are switched off. In other words, carrying the same chromosomes does not necessarily imply identical gene expression. Therefore, the argument about narcissism is more emotional than rational: a clone is not inescapably an automaton manipulated by its genitor, a humanoid slave.

The opposed argument has been raised against reproductive cloning that it produces "imperfect" copies, like a carbon copy not worth the original. This argument could become a counterargument: if the clone is a poor copy, it is no perfect copy. Therefore, the argument against the sanctity of the "I" falls apart. The argument of the imperfection of the clone, while understandable, raises comments mainly because it suggests inconsistency. First, as already mentioned, the raison d'être of prenatal diagnosis rests entirely on the elimination of birth defects – "search and eliminate". Second, if premature ageing is an argument against reproductive cloning,[7] one should stay clear from a series of treatments with similar effects.[8] Third, the best intentioned parents expect from their children to be a fair copy of themselves; the child that happens to be too different is often the cause of conflict. As emphasised by Peabody and Martin,[13] "interests that potentially conflict with the best interests of an infant include the desire of a perfect child, inability or unwillingness to accept a child with mental or neurodevelopmental delay, upset over effect on social image, and so forth". So the question remains: Do we accept or reject identity? Do we accept or reject according to what suits us? Furthermore, the clone is a twin; you don't reproduce yourself but you produce a twin. Finally, is the sanctity of the "I", the precious uniqueness, not what could be viewed as the epitome of narcissism? Is to "like just one of me" and the drama of losing my uniqueness not intrinsically narcissistic?

Conclusions

Individual, religious, and legal views on the meaning and purpose of life clearly cloud the debate on cloning. The more complex the technology, the greater the effect on the learning curve is expected. Using the "wait-until-near-certainty" approach consists of data collection until all eventualities are known: to know we must do. The difficulty is that animal experiments cannot always be translated to human outcome (not to mention the expected objections coming from animal rights advocates). The advantage would be that it delays the sometimes difficult discussions and decisions, and avoids the issue. Prohibition puts an end

to the debate: no cloning, no discussion. Such a decision, however, should be backed by ethical reasoning. Ethical reasoning on this matter should be procedural, in the best interest of those who cannot speak for themselves. It might be unfortunate that legislation has preceded ethics in this regard.

Is it in the best interest of *any* child to be born? According to Savulescu,[8] we don't know whether there is a right not to be born, but there is undoubtedly a right to "procreative autonomy or reproductive freedom". First, not all philosophers would agree with this right.[14] Second, if procreative autonomy or reproductive freedom is a right, why does that right not apply to reproductive cloning? The answer is still awaiting a non-emotional enquiry of an emotion-laden issue. Pointing at the lack of consistency might help progress. We should refrain from trying to anticipate what could go wrong without considering what could go right, for it is incompatible with the view of human dignity: no guilt without a fair trial.

Notes

- Cloning is exemplified by derogatory terms such as "perverse", "repugnant", "affront to the order of things". References are made to playing God, playing human, creating humanoid slaves, not to mention the allusions to Hitler. Clones are labelled "spare parts" produced in "organ farms". Vocabulary of such nature does not provide ethical guidance.
- The concept of "pre-embryo" refers to the first 14 days after conception during which the embryo may split to produce identical twins. The reverse – the fusion of identical twins into a chimera – is also possible, although exceptional. The argument is that, during the pre-embryonic stage, individuality is not established. Since personhood requires identity, the pre-embryo is not a person. Hence, abortion of the pre-embryo is morally neutral. The same would apply to supernumerary pre-embryos (and to so-called embryo experimentation).
- It should be noted that the donor nucleus may be harvested from a child or an adult, male or female. The receiver egg cell can be harvested from any woman from whom egg cells are retrieved in a series of circumstances (not only at the time of IVF). Equally, the "incubating" uterus can be from any surrogate "gestational mother". There is no need to believe that all involved have evil motives. We should be wary of equating reproductive cloning with the movie *The Boys from Brazil*, whose plot was the cloning of little Hitlers.
- In the case of Dolly the sheep, deprogramming was achieved by "starving" the pre-embryo and not by applying electric shocks as it is claimed. Once again, the vocabulary appeals to emotions.
- In Nazi Germany, *Lebensborn* (source of life) was established to promote Arian breeding. So-called defective humans were forcefully sterilised, as shown in *Trial at Nuremberg.*
- "Foetal reduction" refers to the destruction (either by injection of potassium chloride in the chest of a foetus, or by suction) of a number of foetuses in "multifoetal" (more than two) pregnancies. They mostly result from IVF procedures. The "justification" is that multifoetal pregnancy poses a health and life risk to the pregnant woman and the foetuses. Foetal selection is practised when one of the foetuses is diagnosed to be abnormal.
- Dolly the sheep was born on February 22, 1997. She was cloned from a six-year-old ewe's udder. She became a "mother". She suffered from premature ageing (especially painful arthritis). She was euthanised on February 15, 2003. It cannot be ruled out that harvesting a younger donor nucleus would have prevented or delayed her condition.
- To point out this inconsistency, consider a relatively recent report that mentions that highly active antiretroviral treatment (HAART) leads to premature atherosclerosis as a result of the drugs themselves *(News in Brief, The Lancet 2003; 361:499).* Should we refrain from treating HIV/AIDS?

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