

# Thou shalt not clone

An ethical argument against the reproductive cloning of humans

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There is an overwhelming consensus nearly worldwide, and particularly in Europe and the USA, that cloning humans is unethical and should be prohibited by criminal law. Every time the debate comes up—after Ian Wilmut's first cloning experiments on mammals, after the Raelians' claim to have cloned a human being, and recently, in the wake of the South Korean cloning scandal—the public, politicians and the press all express a deep unease with human cloning. Even popular culture—in the form of novels and films—usually paints a dark picture of cloning for the purposes of creating exact copies of a human being (see 'Cloning in the media and popular culture' by Giovanni Maio p241 in this issue).

Consequently, there are repeated calls for a total ban on human cloning. France and Germany led an initiative at the United Nations, which failed owing to the insistence by the US government to include both reproductive cloning of humans and cloning of (quasi)embryonic human cells for research and therapeutic applications. However, the rational foundation for a worldwide prohibition of cloning does not stand on firm logical ground (Häyry, 2003; Shuster, 2003). Although there is deep unease and revulsion at the idea of cloning humans, there are almost no sound arguments as to why this violates our basic moral principles, or which principles are under attack—even in countries where public and political resistance to cloning is most prevalent. In this viewpoint, I will attempt to apply the fundamental ethical axiom of human autonomy to the question of cloning and deduce from that axiom a moral interdiction to arbitrarily restrict this autonomy by the act of cloning. I will also examine whether this argument supports a similar ban of so-called therapeutic cloning for research and medical use.

So, how is a clone created? The answer to this question is important because it highlights my main point: the moral interdiction to restrict human autonomy with respect to the special process of cloning as mentioned above. A scientist or a technician puts an oocyte under the microscope and removes the nucleus of the cell using microsurgical tools. Into this void, the nucleus from a donor body cell is inserted, thus creating a new artificial cell equipped with the full genetic potential to develop into a human being. By using a nucleus from a somatic cell, this artificial cell is—with the exception of the few mitochondrial genes—a genetically identical copy of the donor cell. After some biochemical manipulations to convince the cell body to accept the new nucleus and to reawaken silenced genes, this cell will start to divide and initiate the embryonic development process. After another 14 days or so, this cell cumulus—here used as a neutral term, because I resist using the term 'embryo' before nidation (before the cell cumulus has settled into the endometrium)—would have to be implanted into the uterus of a woman in order to grow into a real embryo and eventually a fully developed human being. Known as reproductive cloning, the process has been successfully applied to a range of mammals, so there is little reason to assume that it would not work in humans.

Contrast this scenario with the natural and age-old method of reproduction. Women

and men both produce gametes: oocytes and sperm cells. Whereas men constantly produce millions of sperm each day, oocytes are much rarer and have already formed before birth. The genomes of these gametes are not simple copies of the mother's or father's genome; first, they contain only one copy of each gene in contrast to normal somatic cells which harbour two complete sets; and second, through extensive recombination processes during their meiosis, genes are mixed and shuffled between the maternal and paternal lines. As a result, even individual gametes are not identical because each has its own combination of alleles.

Once an egg and sperm have conjugated under natural conditions, the newly formed zygote undergoes a series of cell divisions while moving through the fallopian tubes into the uterus. After nidation, the cell cumulus has become an actual embryo and has entered into an initial hormonal dialogue with the mother—if it makes it that far. At least two-thirds of these cell cumuli fail to nidate and are simply discharged. Most probably, this is owing to quality control processes to ensure the survival of only those cell cumuli with proper growth and therefore the best chance of normal development. This quality control continues throughout early pregnancy and many more embryos are discharged within the first few weeks if they show any signs of abnormal development. For this reason, anything that exists before nidation cannot be called an embryo in the literal sense of the word, which stems from the Greek word for 'something germinating into something else'. Instead, it should be labelled a 'maybe-embryo', or at least a pre-embryo, as is common in several countries, such as the UK.

It is therefore only after nidation that the embryo's genetic potential becomes reality,

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and it acquires the ability to develop into a human. This has been an ethically and consequently legally binding argument. In the UK, for instance, research on human pre-embryos not older than 14 days is permitted under strictly defined rules. In addition, nidation starts a dialogue between the mother and the future child, initially a material dialogue through the production and release of hormones by both, but one that will soon become an emotional dialogue as well. For this very reason, the artificial uterus—if it is ever developed—would be unethical because it would be unable to establish the emotional part of the maternal-embryonal dialogue, thus denying the embryo an essential condition for becoming a human.

Any discussion on the ethics of human cloning cannot ignore the fact that humans produce natural clones fairly frequently: namely, monozygotic twins who both stem from the same fertilized cell. After the zygote's first cell division, its daughter cells do not remain connected to each other, as is normally the case, but separate. If both cells are able to nidate in the uterus and continue their genetically determined development, the result is two genetically identical human individuals. However, although they are largely identical internally and externally, they are not perfect copies of each other. During their lives—starting from the separation of the first two cells to their development in the uterus and eventually to their death—random processes and mutations further shape their individual history and ontogenesis and leave their imprint from conception on, even in their genomes.

Important to the debate on the ethics of human cloning is the fact that the similarity

and genetic identity of natural twins is not the result of a deliberate decision by someone else; it is a random occurrence that leads to the separation of the oocyte's first two daughter cells. Furthermore, twins, like any other naturally conceived children, are the result of a merger between oocyte and sperm cell; their genetic material has undergone extensive reshuffling and mixing through the recombination processes during gamete development, as with any other naturally conceived embryo.

Therefore, in the case of natural monozygotic twins, there is no human resolution, no conscious decision, no arbitration by any other person. Both the recombination of genetic material and the separation of the daughter cells, which eventually grow into two genetically identical embryos, are driven by chance. The same holds true for a zygote created by *in vitro* fertilization, even by the more sophisticated process of intracellular sperm injection, whereby a technician injects a sperm cell directly into the oocyte. But, even if the choice of the sperm and the egg cell might be regarded as a deliberate or arbitrary decision, both the combination of parental genomes and the recombination of genetic material during gamete development ensures that the embryo and the resulting fully developed human are still the product of random processes. In any case, the resulting child is not a copy—genetically or physiologically—of either parent.

A clone created in a laboratory, however, is an artificial construct. Even if it grows into a human, it is nevertheless the result of deliberate human decision and action, and is therefore, through this arbitrariness, an artefact. There is no chance other than random mutations to ensure that the clone is in any way

genetically different from the donor of the nucleus. And this is the salient argument for any ethical evaluation or legal ban on reproductive human cloning: it must not be permitted to impose the genetic identity of any individual on another. Every person must be as free as possible from the arbitrariness of others. This would of course extend to *in vitro* embryo splitting and subsequent implantation in the uterus with the sole purpose of deliberately creating monozygotic twins, because it also arbitrarily imposes genetic identity on a future human.

So why must humans be free from the arbitrariness of others, including the imposition of genetic identity? Our self-determination and our autonomy, and consequently the prohibition to restrict this autonomy arbitrarily by any other person, are among the basic ingredients of human existence. It is, in fact, an essential part of the definition of being human. By cloning, the clone creator would deny this autonomy to the clone for purely selfish motives and would therefore violate the ethical maxim, which the great philosopher Immanuel Kant formulated 220 years ago, drawing from his Categorical Imperative: "Act that you use humanity, whether in your own person or in the person of any other, always at the same time as an end, never merely as a means" (Kant, 1785). Even if no one can be autonomous in the stipulation of his or her

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own genome, and even if natural procreation can, at least, include egoistic motives for the desired child, the arbitrary production of a genetically identical person is ethically reprehensible because the egoism of the clone generator restricts the clone's individuality.

If we regard this as an ethically binding argument, reproductive cloning would inevitably violate constitutionally guaranteed human rights. Since the Renaissance, our understanding of being human has centred around the concepts of freedom and autonomy. Whether it is "life, liberty and the pursuit of happiness", which the US Declaration of Independence lists as the "unalienable rights" of humankind; whether it is "liberté, égalité, fraternité", the famous motto of the French revolution; or whether it is the simple and elegant statement that "The dignity of man is sacrosanct," the first sentence of the constitution of the Federal Republic of Germany. Returning to Kant, cloning means using one person—the clone—as the means to fulfil the desires of another person: the clone generator. This is why reproductive human cloning is unethical and why it must be outlawed.

However, the same logic, when applied to cloning human quasi-embryonic cell formations for purposes of research, and eventually for therapeutic applications, does not create an argument for a ban on this type of biomedical research. If the salient point is that cloning imposes an arbitrary restriction on the clone's individuality and/or external determination of a future person—and therefore violates its autonomy, its freedom and dignity—therapeutic or research cloning would be ethically permissible, because it is not carried out to create a person genetically identical to the donor of the cell nucleus. The artefact produced in the laboratory is not even a pre-embryo but only a quasi-pre-embryo, because its genetic potential to develop into a complete human—its totipotency—is only virtual. These cloned artefacts are not to be implanted into a woman's uterus and they are unable to achieve this under their own power, as are genuine pre-embryos. These artificial cell cumuli are only allowed ethically, and in some countries

even by law, to provide knowledge as well as stem cells for research and therapeutic purposes, and nothing else.

For some critics of therapeutic cloning, this argument is too weak to allow the procedure. They argue that it would mean taking the first steps down a slippery slope, or weakening a hypothetical ethical dam, which will eventually burst. For these critics, it would ultimately lead to the acceptance and permission of reproductive cloning. But ethical dams only become unsafe if they are not, or are no longer, supported emotionally by a majority consensus or if their foundations are not established through the application of reason and logic. In this article, I have outlined the latter, and the only rational consequence is to ban reproductive human cloning and to permit therapeutic cloning of human quasi-embryonic cells under strictly defined conditions that prohibit any reproductive use of these cells.

Nonetheless, the debate over how we can effectively ban reproductive cloning and whether we can, at the same time, allow therapeutic cloning is not that special. Human society has always dictated that if there is a broad consensus that some activity violates our basic moral values, it is outlawed and anyone who violates this prohibition is excluded from society and punished, in some extreme cases, even draconically. In this way, human society has eradicated—for the most part—cannibalism and human sacrifices, and has become increasingly less tolerant of murder, simply because moral values have changed and grown as civilizations have advanced. Worldwide views to ban reproductive cloning, while allowing therapeutic cloning, make false the arguments of slippery slopes and weakening ethical dams. As reproductive cloning and therapeutic cloning are technically identical—until implantation in the uterus or the extraction of stem cells, which kills the quasi-pre-embryo, respectively—this does not change any of the ethically relevant arguments.

As Albert Schweitzer once said (Schweitzer, 1952), the farmer who mows a blossoming meadow to feed his animals with the colourful crop is morally justified; but the same farmer who

thoughtlessly tears off a single flower on the way home infringes of the moral law for the respect of creation and its beauty. Schweitzer's argument is again based on Kant and his "everlasting admiration" for the "starry sky above me and the moral law within me" (Kant, 1788).

Schweitzer seems to have been a utilitarian, at least in some parts of his theory of ethics, maybe because he was a practicing physicist and a practical ethicist as well. As therapeutic cloning is basically utilitarian, it may therefore be deemed morally justified for exactly this reason—even in Schweitzer's understanding—because in the end, the sole purpose of therapeutic cloning is to derive new knowledge and to search for new ways to reduce human disease. Reproductive cloning, conversely, is reprehensible because it only fulfils the selfish interest of a creator and arbitrarily curtails the freedom of a third party: the clone.

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