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# To clone or not to clone

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# To clone or not no clone

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**ABSTRACT**

To clone... Or not to clone? That is a good question! Cloning has its advantages, but also its disadvantages. We might not realize what we are doing. It is like a sword with two blades. On one hand, it can save many lives. On the other hand, it can do a lot of harm. A question mark hangs over the future of cloning. Who are we to decide about someone's life, his future, his happiness?

**Key words:** cloning, ethics, religion, human, medical goods

**REZIME**

Klonirati… Ili ne? Pitanje je sad! Kloniranje ima dobrih strana, ali takodje i losih. Mi mozda ne shvatamo sta radimo. To je kao mac sa dve ostrice. S jedne strane, mozemo spasiti mnogo zivota. S druge strane, moze uciniti mnogo stete. Buducnost kloniranja je pod znakom pitanja. Ko smo mi da odlucujemo o necijem zivotu, buducnosti, sreci?

**Kljucne reci**: kloniranje, etika, religija, covek, medicinska dobra

## Cloning

**Cloning** in biology is the process of producing similar populations of genetically identical individuals that occurs in nature when organisms such as bacteria, insects or plants reproduce fragments asexually. Cloning in biotechnology refers to processes used to create copies of DNA fragments, cells or organisms. The term also refers to the production of multiple copies of a product such as digital media or software.
The term *clone* is derived from *κλῶνος*, the Greek word for "trunk, branch", referring to the process whereby a new plant can be created from a twig. In horticulture, the spelling *clon* was used until the twentieth century; the final *e* came into use to indicate the vowel is a "long o" instead of a "short o''. Since the term entered the popular lexicon in a more general context, the spelling *clone* has been used exclusively.

## Organism cloning

**Organism cloning** (also called reproductive cloning) refers to the procedure of creating a new multicellular organism, genetically identical to another. In essence this form of cloning is an asexual method of reproduction, where fertilization or inter-gamete contact does not take place. Asexual reproduction is a naturally occurring phenomenon in many species, including most plants and some insects. Scientists have made some major achievements with cloning, including the asexual reproduction of sheep and cows. There is a lot of ethical debate over whether or not cloning should be used. However, cloning, or asexual propagation, has been common practice in the horticultural world for hundreds of years.

## Horticulture

The term *clone* is used in horticulture to refer to descendants of a single plant which were produced by vegetative reproduction and apomixes. Many horticultural plant cultivars are clones, having been derived from a single individual, multiplied by some process other than sexual reproduction. As an example, some European cultivars of grapes represent clones that have been propagated for over two millennia. Other examples are potato and banana. Grafting can be regarded as cloning, since all the shoots and branches coming from the graft are genetically a clone of a single individual, but this particular kind of cloning has not come under ethical scrutiny and is generally treated as an entirely different kind of operation.

On July 5, 1997, the most famous sheep in modern history was born. Ian Wilmut and a group of Scottish scientists announced that they had successfully cloned a sheep named **Dolly**.

If you stood Dolly beside a "naturally" conceived sheep, you would not notice any differences between the two. In fact, to pinpoint the only major distinguishing factor between the two, you would have to go back to the time of conception because Dolly's embryo developed without the presence of sperm. Instead, Dolly began as a cell from another sheep that was fused via electricity with a donor egg. Just one sheep -- no hanky-panky involved.

While Dolly's birth marked an incredible scientific breakthrough, it also set off questions in the scientific and global community about what -- or who -- might be next to be "duplicated." Cloning sheep and other nonhuman animals seemed more ethically benign to some than potentially cloning people. In response to such concerns in theUnited States, President Clinton signed a five-year moratorium on federal funding for human cloning the same year of Dolly's arrival. Today, after more than a decade since Dolly, human cloning remains in its infancy. Although cloning technology has improved, the process still has a slim success rate of 1 to 4 percent.

Scientists have cloned a variety of animals, including mice, sheep, pigs, cows and dogs. In 2006, scientists cloned the first primate embryos of a rhesus monkey. Then, in early 2008, the FDA officially deemed milk and meat products from cloned animals and their offspring safe to eat.
But what would human cloning involve, and how could you take sperm out of the reproductive -equation?
Dolly, the Finn-Dorset ewe, was the first mammal to have been successfully cloned from an adult cell. She was cloned at the Roslin Institute in Scotland and lived there from her birth in 1996 until her death in 2003 when she was six. Her stuffed remains were placed Edinburgh's Royal Museum, part of the National Museums of Scotland.
Dolly was publicly significant because the effort showed that the genetic material from a specific adult cell, programmed to express only a distinct subset of its genes, can be reprogrammed to grow an entirely new organism. Before this demonstration, it had been shown by John Gurdon that nuclei from differentiated cells could give rise to an entire organism after transplantation into an enucleated egg. However, this concept was not yet demonstrated in a mamallian system.
Cloning Dolly the sheep had a low success rate per fertilized egg; she was born after 237 eggs were used to create 29 embryos, which only produced three lambs at birth, only one of which lived. Seventy calves have been created and one third of them died young. Prometea took 277 attempts. Notably, although the first clones were frogs, no adult cloned frog has yet been produced from a somatic adult nucleus donor cell.
There were early claims that Dolly the ship had pathologies resembling accelerated aging. Scientists speculated that Dolly's death in 2003 was related to the shortening of telomeres, DNA-protein complexes that protect the end of linear chromosomes.However, other researchers, including Ian Wilmut, who led the team that successfully cloned Dolly, argue that Dolly's early death due to respiratory infection was unrelated to deficiencies with the cloning process.

**Celebrity Sheep Died at Age 6**

Dolly, the first mammal to be cloned from adult DNA, was put down by lethal injection Feb. 14, 2003. Prior to her death, Dolly had been suffering from lung cancer and crippling arthritis. Although most Finn Dorset sheep live to be 11 to 12 years of age, postmortem examination of Dolly seemed to indicate that, other than her cancer and arthritis, she appeared to be quite normal. The unnamed sheep from which Dolly was cloned had died several years prior to her creation. Dolly was a mother to six lambs, bred the old-fashioned way.
Image credit: Roslin Institute Image Library

**After Dolly was cloned in 1997, people worried that humans would be next.**

**What animals have been cloned?**
Scientists have been cloning animals for many years. In 1952, the first animal, a tadpole, was cloned. Before the creation of Dolly, the first mammal cloned from the cell of an adult animal, clones were created from embryonic cells. Since Dolly, researchers have cloned a number of large and small animals including sheep, goats, cows, mice, pigs, cats, rabbits, and a gaur.

**Can organs be cloned for use in transplants?**
Scientists hope that one day therapeutic cloning can be used to generate tissues and organs for transplants. The cloned organ could then be transplanted into the patient without the risk of tissue rejection. If organs could be generated from cloned human embryos, the need for organ donation could be significantly reduced.
potential application of cloning to organ transplants is the creation of genetically modified pigs from which organs suitable for human transplants could be harvested. Why pigs? Primates would be a closer match genetically to humans, but they are more difficult to clone and have a much lower rate of reproduction. Of the animal species that have been cloned successfully, pig tissues and organs are more similar to those of humans.

## Human cloning

Human cloning is the creation of a genetically identical copy of an existing or previously existinghuman. The term is generally used to refer to *artificial* human cloning; human clones in the form of identical twins are commonplace, with their cloning occurring during the natural process of reproduction. There are two commonly discussed types of human cloning: therapeutic cloning and reproductive cloning. Therapeutic cloning involves cloning adult cells for use in medicine and is an active area of research. Reproductive cloning would involve making cloned humans. A third type of cloning called replacement cloning is a theoretical possibility, and would be a combination of therapeutic and reproductive cloning. Replacement cloning would entail the replacement of an extensively damaged, failed, or failing body through cloning followed by whole or partial brain transplant.

The various forms of human cloning are controversial. There have been numerous demands for all progress in the human cloning field to be halted. Most scientific, governmental and religious organizations oppose reproductive cloning. The scientific organizations have made public statements suggesting that human reproductive cloning be banned until safety issues are resolved. Serious ethical concerns have been raised by the future possibility of harvesting organs from clones. Some people have considered the idea of growing organs separately from a human organism - in doing this, a new organ supply could be established without the moral implications of harvesting them from humans. Research is also being done on the idea of growing organs that are biologically acceptable to the human body inside of other organisms, such as pigs or cows, then transplanting them to humans.

The first hybrid human clone was created in November 1998, by American Cell Technologies. It was created from a man's leg cell, and a cow's egg whose DNA was removed. It was destroyed after 12 days. Since a normal embryo implants at 14 days, Dr Robert Lanza, ACT's director of tissue engineering, told the Daily Mail newspaper that the embryo could not be seen as a person before 14 days. While making an embryo, which may have resulted in a complete human had it been allowed to come to term, according to ACT: "[ACT's] aim was 'therapeutic cloning' not 'reproductive cloning'.

**Medicine and its sides**

According to medicine cloning can be really good. A scientist can clone organs and help people. There would be a lot of experiments where new organs would be tested. Many sick people would get another chance to live. Of course, all that would not be tested on humans first. And there is a possibility to ward off many incurable diseases while doing so. It has its advantages and disadvantages, but scientists believe the advantages of cloning outweigh the disadvantages.

**Should humans be cloned?**

Due to the inefficiency of animal cloning (only about 1 or 2 viable offspring for every 100 experiments) and the lack of understanding about reproductive cloning, many scientists and physicians strongly believe that it would be unethical to attempt to clone humans. Not only do most attempts to clone mammals fail, about 30% of clones born alive are affected with "large-offspring syndrome" and other debilitating conditions. Several cloned animals have died prematurely from infections and other complications. The same problems would be expected in human cloning. In addition, scientists do not know how cloning could impact mental development. While factors such as intellect and mood may not be as important for a cow or a mouse, they are crucial for the development of healthy humans. With so many unknowns concerning reproductive cloning, the attempt to clone humans at this time is considered potentially dangerous and ethically irresponsible.

**Cloning Ethics**

In regards to cloning ethics, the Bible is clear that God is the Author of all life. One verse in particular is applicable to the cloning issue. In Psalm 100:3 it says, "Know that the LORD Himself is God; It is He who has made us, and not we ourselves. The Bible declares two primary truths related to cloning ethics: (1) life begins early in the womb and (2) God forms life.

Because of recent technological advancements, the cloning of animals (and potentially humans) has been an issue. The Catholic Church and many religious organizations oppose all forms of cloning, on the grounds that life begins at conception. Judaism does not equate life with conception and, though some question the wisdom of cloning, Orthodox rabbis generally find no firm reason in Jewish law and ethics to object to cloning. From the standpoint of classical liberalism, concerns also exist regarding the protection of the identity of the individual and the right to protect one's genetic identity.

The Bible clearly says that humans are all made in God's image and because of that, we all look alike but are not exactly the same. Only God has the right to give and take life. If man takes that role, he plays God, and by doing so he shows no respect of Him. A clone would be just somebody's experiment, and the subject of his selfishness and egoism.

**A piece of my mind**

I have been thinking about this topic for a long time and I really do not agree with the idea of cloning people. That is just not ... human. That person would be completely lost in this cruel world. In addition, who can say what he would be really like? He or she might not be able to feel everything we are able. If he were, that might not be as strong as it is in our case. That might mean no love, no passion, no hope!

Moreover, he could be a monster. Like that poor monster in the novel *Frankenstein*. Because of the way he looks, the humans that he meets assume immediately when they see him that he must be evil and dangerous. They either attack him or flee without giving him any chance to prove to them that he is good and only wants to be their friend. The monster learns that humans are indeed not very kind to each other either- in fact even less so than he originally thought- not to mention how they treat those who are not human or look repulsive. The monster is treated badly time after time solely

because he is so exceedingly ugly. This leads us to the question ``What defines a human being?" To my mind, a human being is defined by a desire for friendship, a thirst for knowledge and a capacity for love. A clone might lack all of these.

However, in my opinion, cloning of human organs can be good. As a matter of fact, it can be great! A lot of sick organs could be replaced with new ones, and life could be much longer. Many lives could be saved, and we might be able to find cures for many diseases.

Science is in progress. It progresses so fast that we are sometimes not even aware of that. Scientists are experimenting with everything, and they always want more and more. That is good, but it might be even better if it was not that fast so that the people can have time to adjust. All that science can turn against us one day. One day you can wake up and find yourself next to you in bed. That would be terrible! Some things, like the secret of life, perhaps should not be found out. We are too small for such a big secret.

Ian Wilmut, one of the creators of Dolly's clone said: "I think you must be a sick mind to use this on people."

He may have known something we don't!