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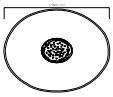
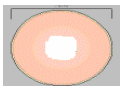
1. What is cloning?

Cloning is asexual (non-sexual) reproduction. It involves taking a cell from the donor parent i.e. from the person who donated the cell and copying genes from the nucleus of that cell. The clone would have about 99% of the genes of the donor parent. The rest would come from the donated egg cell which fuses with the donor cell and starts to develop.

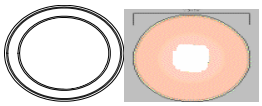
2.How is cloning performed?

The method most likely to be used would be:

1) An unfertilized human egg is taken and the nucleus is removed (this nucleus contains the half set of genes that would need another half-set from a sperm in order to be fertilized)

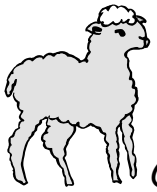



2) A cell is then removed from an adult and placed against the egg which now has no nucleus.



3) **A small spark of electricity is passed across the two cells fusing them into one**

4) The egg is "fooled" by the process into believing it has been fertilised by a sperm, and begins to divide rapidly, in a similar way to a normally fertilised new embryo, providing a form of "twin" to the adult. Variations on this technique are now available, but the principle remains the same.


Cloning has already been performed in animals, most famously Dolly the sheep, the first surviving clone of an adult mammal who was born in February 1997.

3.Why is cloning being promoted?

Scientists, and the Government, have made much of their determination not to allow "human cloning" by which they mean implanting a cloned embryo into a woman's womb, and allowing him or her to develop and ultimately be born (See question 4 for further explanation of this.) However, "therapeutic" cloning – producing a cloned embryo with the intention of using cells, a process which will kill the embryo, has been strongly promoted.

Certain body cells, called "stem cells", unlike ordinary cells, have the ability to renew themselves and to specialise into different cell types needed by the body: skin, muscle, liver, brain cells, heart tissue etc. Stem cells could be used to replace tissue destroyed by disabling conditions such as Parkinson's Disease, heart failure, osteoporosis, diabetes, spinal cord injury etc.

One source of these stem cells is human embryos. To make the cells completely compatible with the patients receiving them, they would be taken from an embryo cloned using the patient's own cells, allegedly thus eliminating problems of rejection. Another possibility may be to use cell lines derived from embryos as a part substitute for existing, expensive ways of drug testing.

Many well-known scientists have stated that embryonic stem cells have much greater potential for transforming into the cells needed to repair damage in older human beings than other sources of stem cells.[1]

However, the truth is that cells from the umbilical cords of newborn babies and from certain adult tissues including bone marrow could have equally great potential and are already providing completely ethical treatments for disabling conditions.

[1] "Embryonic stem cell therapy "best route" by Prof. Harry Moore, Centre for Stem Cell Biology, University of Sheffield. BBC 17 December 2004

4 Is there a difference between "therapeutic" and "reproductive" cloning?

Those who want cloning to be allowed try to make a spurious distinction between what they call two types of cloning: "Therapeutic" and "Reproductive" cloning. It is important to understand that these are NOT actually two different types of cloning. The method of producing the clone would be exactly the same.

In "therapeutic" cloning, the embryo would be created only so that his/her "stem cells" could be used to treat another human being, in the process of which the embryo would be destroyed. In "reproductive" cloning, the cloned embryo would be implanted in a woman and be allowed to develop and eventually be born. Thus the only difference between the two is what would be done with the cloned individual: whether s/he would be allowed to live, or be destroyed in the process of being used for the benefit of others.

Much has been made of reassurances that "reproductive" cloning would not be allowed[2] and "reproductive" cloning is referred to as "human cloning" as though any other sort of cloning were *not* "human cloning." By contrast "therapeutic" cloning is not only presented as though it were *not* human" cloning, but also frequently spoken of as if it were not "cloning" at all.

To facilitate this deception, deliberately misleading and apparently neutral terms such as "cell nuclear replacement" and "stem cell research" are sometimes used to obscure the fact that what is being advocated is actually human cloning.

No form of human cloning is compatible with human dignity, and no form of human cloning is ethical.

5. Is "therapeutic" cloning necessary to cure disabling conditions?

[2] 'New law will close loophole on human cloning' by David Charter *The Times* 16th April 2001

Those seeking to gain support for this destructive practice frequently cite the possibility that "therapeutic" cloning may provide cures for disabling conditions as a justification for allowing it. All too often the potential benefits are cited as if cloned embryonic stem cell research is the panacea for all human illnesses, suffering and misery.

However, it is being promoted without an adequate consideration of the ethics of using human beings in this way.

During the passage of the Human Fertilisation and Embryology Act 1990 those in favour of embryo research made the same sort of promises, now being used about cloning, to claim that, if destructive research on human embryos were allowed, cures would soon be found for disabling conditions. Since then between 300,000 and half a million human embryos have been used in research with no apparent benefits for disabled people.[3]

Even those who support destructive research admit it may take 30 years before any benefit is seen from cloned embryonic stem cell research[4], if indeed any such benefit is *ever* seen.

We suggest that instead of putting resources into yet more destructive research, efforts should be made to promote stem cell research, which does not involve the use of cloned human embryos.

6 Is there an alternative to using cloned human embryos to treat disabling conditions?

[3] "Could he have walked again? Against Stem Cell Research" by Dr. James Le Fanu. Sunday Telegraph 17 October 2004
[4] House of Commons debate on the Human Fertilisation and Embryology (Research Purposes) Regulations, 19th December 2000 *Hansard*, Col. 260

There have been many reports of the great potential of stem cells from sources other than cloned human embryos or indeed from embryos produced by fertilization in an IVF programme, and some reports of disabling conditions being improved or completely overcome by using these ethical sources of stem cells.

Such sources include stem cells from the umbilical cords of newborn babies. ***99% of these are currently thrown away as hospital waste, so there would always be a plentiful supply***

The indications are that stem cells derived from ethical sources may be safer than those from cloned human embryos, because their development into different types of cells is more manageable. Embryonic stem cells have a tendency to differentiate in an uncontrolled way, sometimes producing teratomas which are a type of cancerous growth.[5]

Experiments in rats using stem cells from umbilical cords shows that they can decrease the size of a stroke by 40% and significantly reduce the resulting level of disability.[6]

Other research has developed ways of cancelling out the process by which normal cells divide only a limited number of times before they die. This enables a large number of cells to be generated, and may, in fact, work better than using stem cells from cloned human embryos[7].

In addition German researchers have successfully transformed stem cells from human fat into bone and cartilage, which was used to replace damaged and missing skull tissue.[8]

All this research is ethical, and some has already been shown to be effective, unlike research using cloned human embryos.

[5] "Korean Scientists Succeed in Stem Cell Therapy" by Kim Tae-gyu. The Korea Times. 26 November 2004
[6] "Umbilical cord blood-derived stem cells given intravenously reduce stroke damage." Medical News Today 25 September 2004
[7] 'Alternative to stem cell therapy developed' by Nigel Hawkes *The Times* 26th 2001
[8] "Stem Cells From Fat Used to Repair Skull." By Malcolm Ritter. My Way News 17 December 2004

7. Is it likely that "therapeutic" cloning will lead to "reproductive" cloning?

There have been many assurances by the Government that "therapeutic" cloning will never be allowed to lead to "reproductive" cloning. However, the IVF pioneer Professor Robert Edwards, who with Prof. Patrick Steptoe produced the first IVF baby, Louise Brown, in 1978, has said that "One of my ambitions" is to create a baby for an infertile couple by cloning. He has said "I do not agree with abandoning cloning… we may find that cloning helps infertile patients."[9] It is clear that so called "therapeutic" cloning will inexorably lead to "reproductive" cloning.

Having failed to recognise the wrongness of "therapeutic" cloning, there is no reason why scientists and parliamentarians would not be equally convinced by emotive arguments to allow "reproductive" cloning, by couples where both partners are infertile or those who have a high chance of having children with sex-linked disabling conditions.

Such people may well find it difficult to understand why this is not allowed, since it has already been agreed that cloning of human beings is acceptable as a means to the end of curing or treating disabling conditions in adults.

The only truly "compassionate" way to proceed is to encourage the work already being done on adult stem cell technology, which promises many benefits and is entirely ethical.

[9] Oral Evidence to the Parliamentary Select Committee on Science & Technology. Q1096 24 November 2004

8. Is cloning safe?

So called "Therapeutic" cloning is certainly not safe for the cloned individuals, since they will all be destroyed in the process of extracting their stem cells.

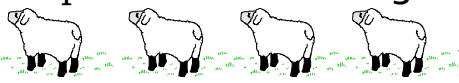
It is also likely that transplanting cloned embryo stem cells may not be safe for the recipients, either because of the risk of cancerous growth or because the genetic damage suffered by stem cells during the cloning process makes the cells ineffective or harmful to use. [10]

It is relevant here to note reported problems with side effects of fetal brain cell transplants into people with Parkinson's disease, which showed very limited benefits for only a few patients, but also revealed a disastrous side effect.

In about 15% of patients, the implanted cells apparently grew too well, giving out so much of a chemical controlling movement that the patients writhed and jerked uncontrollably.

The researchers said there was no way to remove or deactivate the transplanted cells[11]. It would be similarly impossible to remove or deactivate transplanted cells from cloned embryos

"Reproductive" cloning would not be safe for the embryos so used.



It took 277 attempts to clone a sheep before Dolly was born. That is, 277cloned sheep embryos or fetuses died in the attempt to produce one born cloned animal, not to mention all the sheep embryos who died in the process of developing the technique of cloning.

If cloning is allowed in human beings, it is likely that large numbers of human embryos will be destroyed in the process of developing and implementing the technique.

[10] "Stem cells help paralysed woman to move" by Roger Highfield. Daily Telegraph 6 December 2004

[11] Gerald D. Fischbach MD and Guy M McKhann MD, 'Cell Therapy for Parkinson's Disease' *The New England Journal of Medicine* Vol. 344, No. 10, 8th March 2001

It has been reported that up to 98% of cloned mammals have "bizarre" genetic anomalies leading to the response that "it's wrong and should be illegal to court such disasters[12]." by attempting human reproductive cloning.

Additionally Dr. Neville Cobbe, of the Wellcome Trust Centre for Cell Biology, University of Edinburgh has pointed out that cloning apparently does not even guarantee against immune rejection unless the clone is allowed to develop into a fetus (ie "reproductive" cloning) because most cloned embryos have severely disrupted gene expression, including misexpression of genes recognised by the immune system.

Dr. Cobbe notes that this means that even leaving aside the ethical issues, cloning offers little advantage over other stem cells derived from embryos, if the experiments are restricted to the first 14 days of development (which is the current legal limit), and both are far more risky than comparable work with adult or other ethically derived stem cells.[13]

9. What are the ethical arguments against cloning?

All cloning is incompatible with the status, dignity and rights of a human individual, which are inevitably compromised by the process of cloning. Cloning technology, by its very nature, deliberately undermines the uniqueness of each individual by seeking to form him or her as an exact genetic copy of another.

Cloning is equally inconsistent with human dignity whether the cloned individual is destroyed in the process of using his or her cells for the "benefit" **of another, or if s/he is allowed to continue living by being implanted in the womb of a woman.**

Cloned human embryos will be regarded as products of a laboratory process, not as individually valuable human beings with the right to nurturing and protection from harm.
This is reflected by the many assurances that "reproductive" **cloning would not be allowed, which actually means only that no cloned human individual would be allowed to survive.**

[12] Ibid *The Washington Post* 1st April 2001
[13] Personal correspondence with Dr. Cobbe 4 March 2005

Cloning and destructive research are incompatible with the proper respect due to human individuals. It is not possible to treat with "respect" individuals one proposes to destroy in the process of harvesting cells from them for the benefit of another.

10. What is the position of No Less Human on cloning?

No Less Human accepts the fact that every human being is entitled to be treated with respect and the dignity proper to their human status.

It follows, therefore, that all human cloning, whether or not the cloned individual is allowed to survive, is unethical.

Aside from the fundamental ethical arguments opposing research using cloned embyros, there are strong scientific reasons indicating that such research is unnecessary given the possible benefits from research on non-embryonic stem cells, the use of which poses no ethical problems.

No Less Human supports research using stem cells from sources other than embryos, and rejects as unethical all human cloning.

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Alison Davis
National Co-ordinator No Less Human,
The Society for the Protection of Unborn Children 5/6 St. Matthew Street, Westminster London SW1P 2JT