

Research report

Committee: Ecology and Environment

Topic: The Question of Animal Cloning

Introduction:

Animal cloning is, for many, a conflict of morals or religious beliefs. As a relatively recent issue, cloning has not been written into law in many countries. Animal cloning has been frequently debated at the UN (7 years in the last 20 year time period) however no conclusion has been formally reached, as the resolution produced was non-binding and so many countries remained firm in their original standpoint. Animal cloning is being explored because of the positive benefits it could have for people or animals with certain illnesses, such as Parkinson's or diabetes. In early 2018 cloning was used to try to bring back the Northern White Rhino species.

Definition of key terms:

Gene cloning - the process in which a gene of interest is located and copied (cloned) out of DNA extracted from an organism.

Reproductive cloning - involves creating an animal that is genetically identical to a donor animal through somatic cell nuclear transfer. The embryo is placed back into the nucleus, where it can implant and develop. Dolly the sheep is an example of this.

Therapeutic (research) cloning - another use of Somatic Cell Nuclear Transfer (SCNT). This process shall be explained in contextual information. In simple terms, therapeutic cloning produces embryonic stem cells for experiments aimed to help cure diseases.

Natural clones - identical twins, occur in humans and other mammals.

Artificial cloning - the process by which cloning of any kind is done by scientists, rather than being conceived naturally.

Germline cells - eggs and sperm and the cells that produce them.

Somatic cells - the rest of the cells in the body.

Pluripotent cells - cells that can give rise to all cell types in the body.

Blastocyst - a blastocyst is an embryo which has differentiated and now has two different cell types.

Contextual information:

To decide where to input rules and regulations surrounding cloning, the type of cloning being discussed shall have to be stated, as there are pros and cons of each type. Therapeutic cloning and reproductive cloning are similar as they both involve the technique Somatic Cell Nuclear Transfer (SCNT). Somatic cell nuclear transfer involves taking the nucleus from a somatic cell from one person and the nucleus of an egg from another. The nucleus from the somatic cell is placed into the now empty egg. This is stimulated and forms a blastocyst.

In therapeutic cloning, this blastocyst can be used in two ways; the blastocyst can be used by scientists for experiments, or the inner layer of the blastocyst - which is rich in stem cells - is removed and these stem cells are used for a stem cell transplant. The main advantage of this is that the DNA used is the DNA of the person receiving the transplant and so it is not rejected by their body. Its scientific uses include finding cures much quicker than before, for example for diabetes. The main disadvantage of therapeutic cloning is it currently not very effective, sometimes successful as infrequently as one in hundreds, and so can be very costly. Another drawback of therapeutic cloning is that because the blastocyst can become a living organism (reproductive cloning) some believe that it is not ethical to experiment on to find cures. Opposition to all types of cloning often come from countries that are more strictly religious. A significant proportion of countries that voted for the ban in the United Nations on Human Cloning were strongly religious, specifically from Roman Catholic countries. Cloning is opposed by many strongly religious people as editing or creating our own organisms to many is "playing God" as we are making ourselves as powerful as Him and saying that His creations are not perfect, and so even for positive uses religious groups generally remain strongly opposed. Reproductive cloning is where the blastocyst is placed into the uterus and left to embed and grow to term. Reproductive cloning has created media sensations such as Dolly the sheep. Dolly the sheep was the first prominent case of animal cloning in the media and is generally considered to have started the debate surrounding cloning. Reproductive cloning is banned in many countries and human cloning is banned specifically in over 70 countries. It is often considered wrong in many other countries however it is a recent issue and has not been written into law yet. Gene cloning or gene therapy is the third kind of cloning. This kind of cloning involves taking sections of DNA and editing them to remove faulty genes. This is similar to therapeutic cloning as it is used to help people suffering from disease.

Cloning has featured more prominently in the media in recent years as it has become more widely available. Subsequently celebrities have begun to use cloning for their pets, for example Barbra Streisand and Simon Cowell. There are many ethical issues surrounding the cloning of animals for pets. In 2018 PETA criticised

Streisand for cloning her pets as there were many other pets available in shelters available and for her not adopting them, some pets have been put down. Another issue regarding pet cloning is that it necessitates invasive surgery on several animals to produce just one. This is, for many people, a breach of the right of the animal as they are suffering for our gain. The contention around cloning mainly stems from reproductive cloning as to some religious people it is offensive, however to some the issue stems from the idea that some animals or beings could be created that are superior to others. On a daily basis, there is some concern that meat or milk produced by animals as it has not been made 'naturally' will be unsafe to eat but (to date) the only authority to have investigated this, the Food and Drug Association in America, have deemed that food produced by cloned organisms is safe to eat.

Major countries and organisations involved:

ViaGen - an American company that clones pets for around \$50,000. As one of the few companies offering this service, they are popular amongst celebrities. ViaGen have a section on their website offering cloning as a way to cope with the death of a pet, which has been criticised.

Sooam - a South Korean company who offer the same services as ViaGen, at a slightly higher price. Sooam were the first to offer pet cloning to the public.

National Human Genome Research Institute (NHGRI) - an American research institute, largely focused on sequencing the human genome (which they achieved in April 2003). They donate 5% of the annual budget to exploring legal, ethical and social implications of their research. They release reports and information to the public on the implications of animal cloning.

People for the Ethical Treatment of Animals (PETA) - an American animal rights organisation who campaign against allowing animal cloning. Known for their controversial campaigns, PETA have spoken out in the past against celebrities having their pets cloned however many argued that the way they went about saying this was 'shock' tactics.

PPL Therapeutics and Roslin Institute, University of Edinburgh - the group that produced Dolly the sheep. They are one of two clinics in the UK permitted to clone humans for therapeutic cloning.

Institute of Neuroscience, Chinese Academy of Sciences - the first institute to clone and produce living primates. The two crab-eating macaques (monkeys) were born in late 2017. These two monkeys were the only kind this has ever worked; the process was slightly different as fetal cells (from aborted fetuses) was used instead of the adult somatic cells used normally.

Timeline of events:

1952 - first successful SCNT, by Briggs and King on a tadpole embryo.

5 July 1996 - birth of Dolly the sheep, the first cloned mammal.

27 February 2002 - UK government gives go-ahead to scientists permitting cloning of early embryos to provide stem cells for experimentation and medical treatments, and allowing the clones to exist for up to 14 days.

8 March 2005 - the UN adopts the non-binding United Nations Declaration on Human Cloning.

27 November - 5 December 2017 - birth of Zhong Zhong and Hua Hua, the first cloned primates using SCNT.

Relevant UN treaties and events:

- **United Nations Declaration on Human Cloning** - a non-binding statement banning human cloning, proposed by Honduras. The outcome of the declaration was 84 for, 34 against, 37 abstained and 34 were absent.

Possible solutions:

As there is so much contention surrounding this topic, a solution to this issue will be hard to find. Largely religious countries, on the whole, do not allow cloning of any sort at the moment. Finding a solution is also tricky as it is such a recent topic that currently most countries do not have legislation deciding either way yet. In a proposed resolution the type of cloning must be referred to. A proposed resolution must also take into account and respect all religious and non-religious viewpoints. While looking for a delegate's viewpoint, it could be useful into looking into animal rights laws in your country.

For therapeutic cloning, a resolution could involve a certain time limit that embryos are allowed to be experimented on, such as the 14 day limit in the UK. As therapeutic cloning and gene cloning could have such positive benefits from people who have certain illnesses, the benefits of legalising cloning must be considered alongside the concern about negative effects. Specific laws about if food produced by cloned animals is allowed must also be considered. Cloning could be banned in all but a scientific environment, such as legal for finding cures but not legal for individuals to have their pets cloned.

As there are several cases where scientists have claimed to have achieved a clone of something not previously done, all information must be fact checked (and preferably acknowledged by other countries) before written into resolution. It is the delegate's responsibility to ensure that any proposed resolution acknowledges and respects the viewpoint of other groups.

Bibliography:

UN resolution:

https://en.wikipedia.org/wiki/United_Nations_Declaration_on_Human_Cloning

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Articles from scientific journals/institutes:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5378293/>

<https://phys.org/news/2017-03-legally-agreement-human-cloning.html>

<https://www.sciencedaily.com/releases/2007/11/071111182528.htm>

<https://www.genome.gov/25020028/cloning-fact-sheet/#a1-1>

Companies offering cloning mentioned:

<https://viagenpets.com/>

<http://en.sooam.com/about/sub03.html>

FDA (America):

<https://www.fda.gov/animalveterinary/safetyhealth/animalcloning/default.htm>