Committee: World Health Organization

Issue: The issue of DNA cloning

Student Officer: John Megalios

Position: Deputy President

PERSONAL INTRODUCTION

Esteemed Delegates,

My name is John Megalios and I have the utmost honour to serve as Deputy President in the World Health Organization committee of the 3rd ACGMUN. I am currently attending the 11th grade at the American College of Greece – Pierce. In my opinion, MUN is an amazing way to discover new interests, talents and even to discover a career in international diplomacy. Additionally, it equips students with valuable tools for the future and helps them differentiate themselves from other candidates in the job market.

The topic I have been assigned is very interesting as it concerns humanity as a whole. I hope that you will find this study guide helpful and useful but remember that for a successful debate to be conducted delegates need to have researched the subject thoroughly and come as prepared as possible in order to represent their countries' best interests regarding the topic.

I look forward to cooperating with you delegates and I wish you the best of luck with your research. If you wish to contact me for further information you may require or any clarifications that you might need do not hesitate to send me an email here (johnmega8@gmail.com). And as Helene Deutsch said: *"After all, the ultimate goal of research is not objectivity, but truth"*

Kindest regards,
John Megalios

TOPIC INTRODUCTION

Rapid advancements in science and technology in the last couple of decades have allowed mankind to explore new frontiers and to challenge conservative and long-held beliefs and notions. One of those fields is cloning. The creation of exact copies of an organism have always been a very popular topic in science fiction and have fuelled human imagination. The successful cloning of "Dolly the Sheep" in 1996 sparked huge interest in the genetics world and also brought to the table the discussion of human cloning. Furthermore, cloning is a procedure that requires a lot of expertise and opens up many

possibilities for the research sector. Finally, the study guide will be focused on clarifying the branch of cloning and discussing the issues regarding the most controversial type.

DEFINITION OF KEY TERMS

Cloning:

The process of creating an exact copy of a biological unit from which it was derived, especially by way of biotechnological methods.[1]

Reproductive Cloning:

The cloning of organisms with the goal of planting the blastula produced by the technique into the uterus of an adult female and thus creating a new organism.[2]

Therapeutic Cloning:

The permitted creation of cloned human tissues for surgical transplant.[3]

Dolly the Sheep:

The first mammal successfully cloned — Dolly, a sheep — was born in 1996 in Scotland as the result of work by biologist Ian Wilmut. The procedure that produced Dolly involved removing the nucleus from an egg cell and placing the nucleus of an adult sheep's mammary cell into it. Further manipulations caused the egg to “turn on” all genes and develop like a normal zygote.[4]

Cell:

Cells are the basic unit of life. In the modern world, they are the smallest known world that performs all of life’s functions. All living organisms are either single cells, or are multicellular organisms composed of many cells working together.[5]

Genetics:

Genetics is the study of genes and inheritance in living organisms .[6]

DNA:

DNA is a biological macromolecule that carries the hereditary information in organisms. It is necessary for the production of proteins, the reproduction of the cell and basically dictates the genetic characteristics of a person.[7]

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1 https://www.biology-online.org/dictionary/Cloning
2 https://www.dictionary.com/browse/reproductive-cloning
3 https://www.dictionary.com/browse/therapeutic-cloning
4 https://www.dictionary.com/browse/dolly
5 https://biologydictionary.net/cell/
6 https://biologydictionary.net/genetics/
7 https://biologydictionary.net/dna/

Organism:

An organism is a single individual or being. While it may have many separate parts, the organism cannot survive without the parts, as the parts cannot survive without the organism. Some organisms are simple and only contain an information molecule describing how to obtain energy and reproduce the molecule. Other more complex multicellular organisms go through complex mating rituals to introduce two haploid cells together which will fuse and become a new organism.[8]

Bioethics:

A field of study concerned with the ethics and philosophical implications of certain biological and medical procedures, technologies, and treatments, as organ transplants, genetic engineering, and care of the terminally ill.[9]

Human Genome Project:

A federally funded U.S. scientific project to identify both the genes and the entire sequence of DNA base pairs that makeup the human genome.[10]

Stem Cell:

Cells with the ability to reproduce and morph into other specialized cell types within an organism

BACKGROUND INFORMATION

CLONING

Cloning is divided into 3 sub-categories, DNA cloning, therapeutic cloning and reproductive cloning.

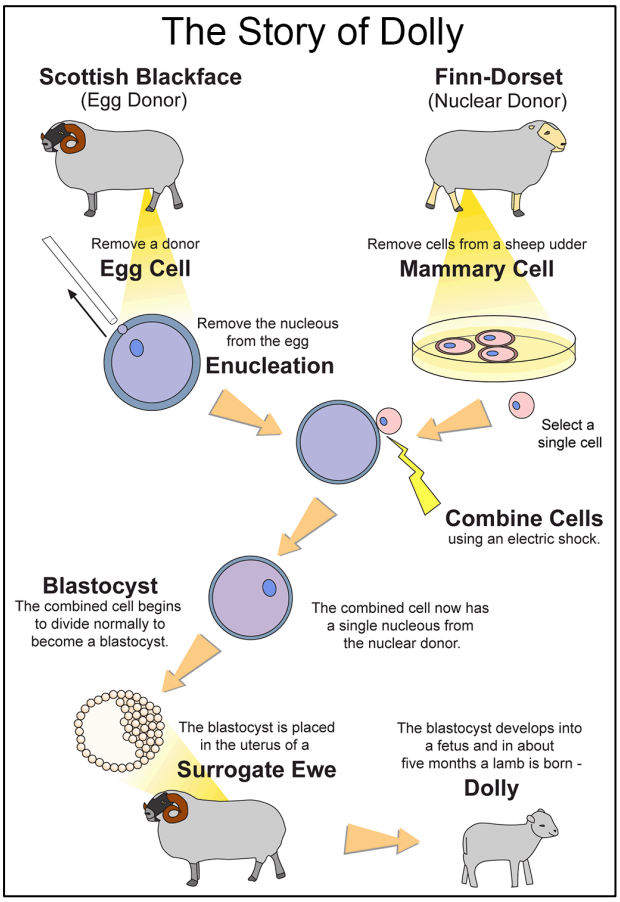
The first category is a molecular biology technique that involves making identical copies of a DNA piece, such as a gene. The process involves using plasmid and inserting into bacteria so as to express the gene and make proteins. This process is accepted all over the world, because it does not put in danger human dignity or present any downsides. A widespread example of this technique is the creation of insulin for diabetics and so this type of cloning has the best of both worlds. Additionally, it can help to further analyse genes in the future, produce different gene therapies that may be able to treat patients with hereditary and chronic diseases, and lastly, it helps with biopharmaceuticals as it is an innovative way to create proteins such as the insulin mentioned before, human growth hormones and others.

[8] https://biologydictionary.net/organism/
[9] https://www.dictionary.com/browse/bioethics?s=t
[10] https://www.dictionary.com/browse/human-genome-project?s=ts

The second branch, therapeutic cloning, has to do with the creation of embryos so scientists can extract their stem cells so as to create specialized cells or even organs. It is mostly used in medicine, but it has caused a huge controversy in the world and there are arguments both in favour of the embryonic stem cell cloning and against it. The guide though won't be too focused in this topic as it is already another issue of our committee.

Lastly, the third category, will be the one mostly developed. Reproductive cloning is: "*To explain in a scientific way, cloning means replacing the egg nucleus of an organism with the donor's nucleus. This nucleus contains unique genes of the donor. The procedure involves removing the nucleus of a somatic cell and inserting it into an enucleated or unfertilized egg cell. Unlike natural reproduction, wherein the egg contains a combination of genetic material, this egg which grows into an embryo contains only the donor's gene.*"[11] Basically, what this means is that scientists implant an ovary with the DNA of a donor into the uterus of a third animal. A perfect example is "Dolly" the first cloned sheep from an adult cell. Dolly, was created in 1996 at the Roslin Institute in Midlothian, Scotland, with the use of the technique described in the image above. It caused serious controversy as it showed the lengths biotechnology can go and what it can achieve.

Nonetheless, the mixed reactions did not stop the scientific community from conducting more extensive research and achieving more successful animal clonings as the years progressed. But reproductive cloning is not easy; the success rate of it is minimal and the resources needed are really costly.



#1. The cloning technique used to create Dolly the sheep.

PROS

Cloning can provide humanity with a plethora of advantages and can improve our quality of life.

First of all, it can provide organs for transplantation. If scientists are able to successfully reproduce experiments of cloning human tissue, they can create organs able to be transplanted to patients. That extinguishes the problem of finding a matching donor as genetic material of the patient is used to create the organ and subsequently their organism won't reject it.

[11] https://sciencestruck.com/ethical-issues-of-cloning

Additionally, cloning can help increase the populations of endangered species or even reverse extinction that have already happened. For example, species such as the Chinese panda that has few remaining animals could use the help of cloning.

Furthermore, the development of genetic engineering programs can be achieved and people will be able to choose particular characteristics they want to have for their children but without that meaning they would grow up to be the same person as the one with the same genetic code because nurture also plays a very important role. Another very possible genetic engineering use is similar to a resurrection of the dead. This of course doesn't mean that they would be exactly the same but, rather, that there would be embryos that held the same DNA as they did. The chance of creating an embryo that would have the same genetic characteristics as your great-great-grandfather seems unrealistic but it may come to reality in the next decades.

Cloning can also help in furthering research regarding the world we live in and additionally provide treatments for different diseases with the use of stem cells. Illnesses such as Parkinson's, diabetes, Alzheimer's and even cancer can be combated if proper gene therapies are developed. This also applies to some extent, to food supplies as we are already able to create genetically modified food which is more durable and can last longer than food normally grown.

Finally, cloning can be an improvement to cosmetic surgery as they can match the client's tissue perfectly and it can also reverse the aging process if breakthroughs on that sector are achieved.

CONS

Although the aforementioned advantages could be very helpful towards the evolution of our species, we must also consider the disadvantages that escort them.

First of all, we will probably lose the diversity of our genes. The reason we have survived so many years is that genes keep evolving and adapting to change. It is because we are different that we are able to live on this earth. The problem of keeping only one identical genetic code throughout generations is that it will pass abnormalities and diseases down to next generations. Everyone will be prone to getting infected by the same pathogens and that means that if one person gets sick then the whole human race will get infected.

The next very serious issue that comes up is the risk of abuse. It is true that not all people have good intentions. A specific misuse of cloning could be the start of a new era of slavery. People would be able to print the perfect servants with the appropriate characteristics every time. Then the question comes up what will happen if someone doesn't like their clone? Are the clone's expendable? Is killing them considered homicide? These are questions that the legislative organs of each country will have to answer and thus regulate clones.

For all we know, there is no certainty when it comes to cloning. Science can't provide definite answers and a lot of further research is required to reach a point of comfort. We can't know if the babies created from cloning will have disabilities or abnormalities. Keeping in mind that the costs of such procedures is huge, one can simply not be certain if cloning is the right way to go.

ETHICAL ASPECT

Ethics is what guide people to make the correct choices in life. These morals keep human life up to a standard and maintain human dignity. When it comes to cloning, there are plenty of ethical issues with it.

First and foremost, it suggests that humans will have no way to control their lives and they will turn out exactly how they were supposed to when their genetics were picked for them.

Additionally, one of the biggest concerns so far is the issue of "playing God". Many religious people believe it is wrong to meddle with the forces of nature and God, thus only evil will come out of it. Some believe it is the right thing to do as it may cure the humankind from many deadly diseases.

In whatever way someone might bring about it, the clone is never exactly the same being as the prototype. That is because genes are not the only factor that decides who we are and how humans turn out, but also the environment they grow up in and the nurture they receive play a huge role in determining one's characteristics.

Also, a problem that will arise shortly after the first cloned babies are created is the psychological condition of the clones. Growing up knowing, or even worse, finding out you are a copy of someone else, surely destroys the psychological health of children. This will cause huge clashes within the child that will contradict his whole existence and many serious questions will torment its head.

MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

COUNTRIES:

United States of America:

The country of the United States of America is in favour of a ban regarding reproductive cloning but holds a standstill when it comes to stem cells cloning as they believe these cells could prove very beneficial for the human kind.

China:

The Chinese government is against the use of human cloning and supports the establishment of very strict controls and laws regarding therapeutic cloning.

India:

India opposes a ban on cloning as it has recently had some success regarding the reproductive sector and hopes that a better solution is found because research may prove useful for member states.

France:

France has officially passed legislation banning reproductive cloning and holds a ban regarding the creation of clonal embryos.

Russian Federation:

Russia has recently announced their plans to "resurrect" a Woolly Mammoth using tissue they have preserved in ice for years. Lately, they have been more open towards cloning projects and hope to reap the rewards it can offer them.

ORGANIZATIONS:

European Union (EU):

The European Union has issued a ban regarding animal cloning and has passed strict legislation regarding cloned food and crops.

National Human Genome Research Institute:

This American institute, is leading the research regarding genes and cloning. It uses human participants in their research, but it follows all the necessary legislation. Furthermore, it promotes the use of cloning at all scales and hopes for the cooperation of nations.

TIMELINE OF EVENTS

Date	Description of Event
1966	Scientists Niremberg, Mathaei and Ochoa "crack the genetic code" by determining which codon sequences specify each of the 20 amino acids and in doing so allow advances in genetic engineering.
1990	The Human Genome Project begins.
1997	Dolly the sheep is successfully created.
1997	Researchers at the University of Hawaii produce first mouse cloned from an adult cell.
1999	Researchers at the University of Hawaii produce Fibro, the first male clone. All previous clones of adult mammals had been female.
2004	The first domestic cats are cloned using CT technology and are displayed publicly.
2005	Researchers at Seoul National University produce Snuppy, the first clone of a domestic dog.
2011	Human stem cells cloned.
2011	Projects in Japan, Russia and South Korea to resurrect the extinct woolly mammoth.

2016	4 identical clones of Dolly are alive at their ninth year of their lives. Their names are Daisy, Debby, Dianna and Denise.
2018	The first successful cloning of macaque monkeys, a primate species, is achieved and so Zhong Zhong and Hua Hua are born.

RELEVANT RESOLUTIONS, TREATIES AND EVENTS

United Nations Declaration on Human Cloning[12] (8 March 2005)

This declaration bans all forms of human cloning and condemns any trials thereof. It also calls upon all member states to take the necessary measures to prohibit the application of genetic engineering techniques that contradict human dignity and also to prevent the exploitation of women.

International convention against the reproductive cloning of human beings[13] (28 January 2002)

This convention passed a resolution that basically says that there must be a creation of an Ad Hoc Committee, meaning on this matter, and it calls upon many agencies to cooperate as to solve the problems posed by reproductive cloning.

Universal Declaration on the Human Genome and Human Rights[14] (11 November 1997)

This UNESCO declaration identifies the right to human dignity and underlines that people should not be reduced to their genetic characteristics but rather be respected for their uniqueness and diversity. It also promotes the cooperation between countries and organizations as to ensure the correct conduct of research and that the law is being followed.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Approximately 46 countries have formally banned human cloning. Some countries, notably France, Germany and Canada have issued an explicit ban regarding the cloning of embryos.

The United Nations have passed resolutions that call upon all member states to ban all forms of human cloning and establish very strict legislation regarding cloning research. Furthermore, many countries have passed some form of legislation tackling the topic but seeing as it is a recent one not much action has been taken.

[12] http://legal.un.org/docs/?symbol=A/RES/59/280
[13] http://legal.un.org/docs/?symbol=A/RES/56/93
[14] http://portal.unesco.org/en/ev.php-URL_ID=13177&URL_DO=DO_TOPIC&URL_SECTION=201.html

POSSIBLE SOLUTIONS

In order for this issue to be dealt with, there a couple of things that can be done. First and foremost, there has to be transparency regarding cloning research and scientific institutes worldwide must cooperate and share information to ensure a stable progress and that no illicit means are being used by states or organizations. Furthermore, member states could implement different programmes, in order to raise awareness and explain this problem to the younger generations. To tackle the problem efficiently member nations could organize a committee which would be able to meet frequently and discuss different findings and maybe reach a consensus regarding the ethical aspects of cloning.

Additionally, strict regulations need to be established as to moderate the limits of researches and that no exploitation or attempts regarding human testing take place. Another possible solution could include a short-time ban on reproductive cloning until further research is put in cloning in general. Finally, delegates can propose different ways to work around the dangers of cloning in order to achieve only positive results.

In retrospect, if this issue is dealt with accordingly and all the risks are abolished, the humankind could reap all kind of benefits from one of the biggest breakthroughs of the 21st century.

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