PacificMUN 2017

United Nations Commission on Science and Technology for Development (UNCSTD)

Backgrounder Guide

Topic A: Human Cloning

PacificMUN 2017

Dare to Speak | February 24–26 2017

Dear Delegates,

It is with pleasure and elation that I welcome you to the United Nations Commission on Science and Technology for Development (UNCSTD) at PacificMUN 2017. My name is Edward Luo and I will be serving as your Director for this committee. I am currently a Grade 12 student attending Fraser Heights Secondary School. Model UN conferences are known for continually providing engaging, enlightening, and inspiring experiences and I am excited to guide delegates to have the same memorable experience at PacificMUN 2017.

Model UN is an authentic simulation of the United Nations. Prior to arriving at the conference, delegates should have carried out thorough and helpful research. In addition, delegates should think critically and respond spontaneously during the conference. As intimidating as this may sound, I am confident that the UNCSTD will be an exciting and fruitful experience for all delegates regardless of skill or background.

With that said, I present the two topics we will be discussing: Human Cloning and Artificial Intelligence. Human Cloning has sparked great controversies in the past and remains to be a dilemma of ethical concerns, moral values, and scientific advancement. In recent years, many industries saw the merit of artificial intelligence while others are concerned the AI will spell the end of humanity.

The following pages will provide you with a detailed understanding of both topics. Keep in mind that a comprehensive grasp of the topic is as equally important as a clear understanding of your country's stance and foreign policies. If you may need any assistance leading up, during, or after the conference, I will be more than delighted to help you via e-mail. Once again I extend my warmest welcome to all of you and I look forward to reviewing your position papers and working with all of you in February at PacificMUN 2017.

Best regards,

Edward Luo
Director, UNCSTD

The United Nations Commission on Science and Technology for Development (UNCSTD) is a subsidiary body of the Economic and Social Council (ECOSOC) established in 1992 to enable the General Assembly and the ECOSOC to guide the future work of the United Nations, develop common policies, and agree on appropriate actions. The commission fulfills its mission through providing those bodies with high-level advice on relevant issues through analysis and appropriate policy recommendations or options in the field of science and technology.[1] Furthermore, the commission acts as a forum for its members to exam science and technology questions and their implications for development, to advance in their understanding on science and technology policies, and to formulate recommendations and guidelines on science and technology matters within the United Nations System.

[1] http://unctad.org/en/Pages/CSTD/CSTD-Mandate.aspx

The term cloning encompasses numerous processes that are used to create a genetically identical copy of another biological entity.[2] The product of these processes, which has the same genetic makeup, or genotype, is referred to as a clone.[3] Specifically, the committee will be dedicated to the discussion of topics relevant to artificial Human Cloning.

Nevertheless, there are several types of natural reproduction that are similar to the concept of cloning: creating an identical genetic copy. Asexual reproduction, a form of natural cloning, is the processes through which organisms produce genetically identical copies of themselves as a form of reproduction. In addition, natural clones, also known as identical twins, are commonplace in society, with their cloning occurring during the natural processes of reproduction.

Further advancements occurred on July 5th, 1996 which marked the birth of Dolly the Sheep, a successful genetic sheep clone. This technological breakthrough sparked numerous contentious discussions on the ethical values of cloning. What would be the next organism to be cloned? Or even, who would be the next to be cloned?[4] The topic of Human Cloning has been especially prevalent since the birth of Dolly, although formal applications of Human Cloning remain in infancy. As a result of the ethical concerns of cloned humans, numerous governmental and organizational restrictions have taken the matter into their own hands restricting and impeding further developments on cloning.

Even decades following Dolly, the science and technological advancements behind Human Cloning have not progressed substantially. In the last decade, almost all major breakthroughs in Human Cloning are in the field of therapeutic cloning, the type of Human Cloning dedicated to the medical applications of embryonic stem cells. Although cloning technology has improved, the process still holds a slim rate of success which is between one and four percent. In 2008, the Food and Drug Association (FDA) officially deemed dairy and meat from cloned animals and their offspring to be safe to eat. Increasing acceptance of cloning begs the question: how, and can Human Cloning work?

[2] http://www.medicaldaily.com/science-human-cloning-how-far-weve-come-and-how-far-were-capable-going-340006
[3] https://www.genome.gov/25020028/
[4] http://science.howstuffworks.com/life/genetic/human-cloning.htm

1880s	Wilhelm Roux and August Weismann independently proposed the germ plasm theory. The theory encompasses the idea that each somatic cell only carries part of the hereditary potentials[5].
1891	Hans Adolf Edward Driesch isolates the sea urchin blastomeres at the 2-cell stage and observed the development of two complete but smaller than normal sea urchins. This experiment suggested that each cell in the early embryo has its own complete set of genetic instructions and can grow into a full organism.[6]
1903	Herbert Webber of the United States Department of Agriculture coins the term *clone* to refer to "any group of cells or organisms produced asexually from a single sexually produced ancestor."
1958	John Gurdon created genetically identical copies of tadpoles through somatic cell nuclear transfer (SCNT). His experiment proved that somatic cells could be used in cloning and suggested that cells retain all of their genetic materials even as they divide and differentiate.[7]
1978	The release of David Rorvik's book, In His Image: The Cloning of a Man, drew the public's attention and sparked a worldwide debate on cloning ethics.[8]
1996	Ian Wilmut and Keith Campbell created Dolly the Sheep by transferring the nucleus from an udder cell of an adult lamb into an enucleated cell and resetting the nucleus's genetic information to an embryonic state.[9]
February 1997	Researchers at the Oregon Regional Primate Research Center cloned the first pair of primates through embryonic cell nuclear transfer.
June 1997	President Bill Clinton banned the use of all federal funding towards Human Cloning experiments and research projects.[10]
2000	British company Geron Corporation was granted a patent covering cloned human embryos in the very early stage of development. The first of its kind, Britain was the first country to allow patents of cloned human embryos.[11]
March 2005	The General Assembly adopted the United Nations Declaration on Human Cloning, by which Member States were called on to adopt all measures necessary to prohibit all forms of Human Cloning. The Assembly adopted the text by a vote

[5] http://learn.genetics.utah.edu/content/cloning/clonezone/
[6] Ibid.
[7] Ibid.
[8] http://www.nsta.org/images/news/legacy/scope/0603/cloningtimeline.pdf
[9] Ibid.
[10] http://www.cnn.com/TECH/9703/04/clinton.cloning/
[11] http://www.nytimes.com/2000/01/24/business/britain-grants-embryo-cloning-patent.html?_r=0

	of 84 in favour to 34 against, with 37 abstentions.
December 2006	Shoukhrat Mitalipov and his team were the first to successfully revert the genome of differentiated primate somatic cells back to their embryonic state of pluripotency[12] following somatic cell nuclear transfer.
November 2007	Shinya Yamanaka and colleagues at Kyoto University, Japan successfully induced human somatic cells into a pluripotent state.
March 2009	Barack Obama reverses policy introduced by George W. Bush allowing federal taxpayer dollars to fund significantly broader research on embryonic stem cells[13].
2010	Geron Corporation and Advanced Cell Technologies both received the FDA approval to start human clinical trials using cells grown from human embryonic stem cells.
2011	Dieter Egli, a regenerative medicine specialist, successfully produced human embryonic stem cell lines, but only when oocyte was not enucleated[14]. As a result, these stem cell lines have limited usage due to the abnormal number of chromosomes.[15]
June 2013	Mitalipov and his colleagues became the first to create a human embryo stem cell line (hESC) through somatic cell nuclear transfer that was proven to be able to form various cell types. Their success came through a combination of various minor technical tweaks. Due to the inevitable destruction of the cloned embryo required by the technique, Mitalipov and his team cannot receive any from the US National Institutes of Health.[16]
June 2014	A group of scientists lead by Young Gie Chung and Dong Ryul Lee reported the creation of hESCs with dermal fibroblast[17]from a mid-aged male and an elderly male using an approach based on the protocol outlined by Tachibana et al. Their success suggested that age-associated changes are not necessarily an impediment to SCNT-based nuclear reprogramming of human cells.[18]

[12] Pluripotency, in this case, describes the ability of cells to develop into all types of somatic cells
[13] http://www.cbsnews.com/news/obama-ends-stem-cell-research-ban/
[14] To enucleate: to remove the nucleus from a cell
[15] http://www.nature.com/news/human-stem-cells-created-by-cloning-1.12983
[16] http://dx.doi.org/10.1016/j.cell.2013.05.006
[17] Dermal fibroblasts are cells found in the dermis layer of skin. These cells generate and maintain the connective tissue.
[18] http://dx.doi.org/10.1016/j.stem.2014.03.015

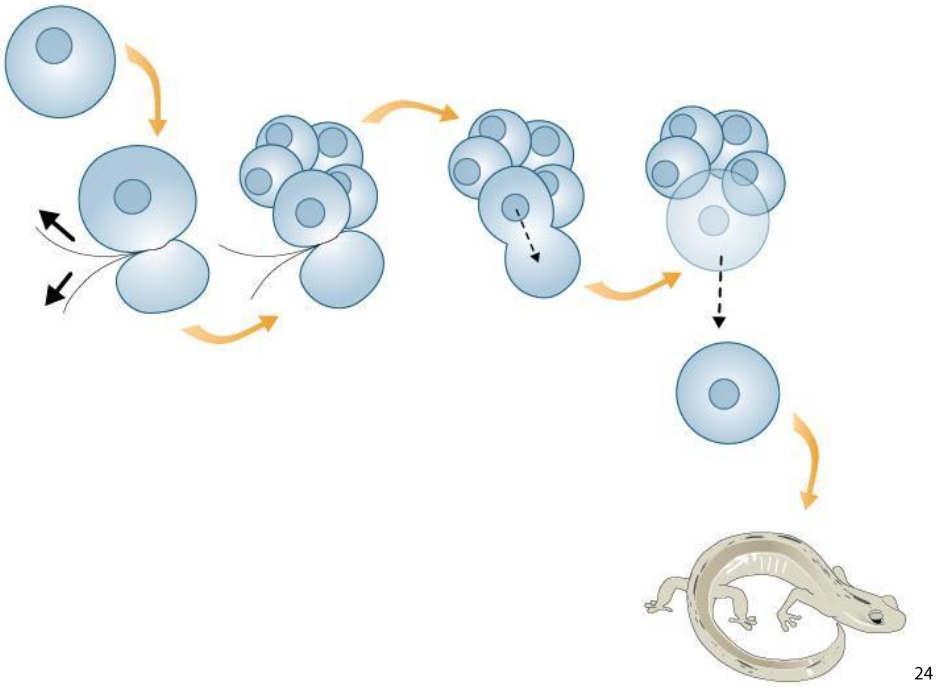
The rise of doctrines that lead to the concept of Human Cloning occurred during the late nineteenth century. Two German scientists, Wilhelm Roux, a leading pioneer in experimental embryology, and August Weismann, an evolutionary biologist, independently proposed the germ plasm theory. The theory encompassed the idea that chromosomes are the carriers of hereditary potentials, later classified as deoxyribonucleic acid (DNA). They believed that the gametes were the only cells to carry the complete set of hereditary potentials and contributed those equally to the zygote.[19] It is important to note that this theory falsely stated the idea that somatic cells do not carry all of the hereditary potentials. Hans Driesch, who studied the work of Weismann, performed experiments based on Weismann's hypothesis. In 1891, Driesch isolated the blastomeres of sea urchins at the 2-cell stage and observed the complete development of two small sea urchins. This experiment suggested the idea that the cell in the early embryo already had its own complete set of genetic instructions, and was capable of developing into a full organism.[20]

Further development and advancement occurred during the early 20th century when Hans Spemann, another German scientist, conducted a series of constriction experiments, the first two of which involved salamander embryos. His experiments established the view that a succession of cell to cell induction in the embryo signals the differentiation of their neighboring cells and facilitates the animal's development. His first experiment involved directly dividing a salamander zygote into two separate embryos and each embryo developed into a separate salamander. This was the first successful human attempt of an induced natural cloning of a complex animal.[21] Two decades later, his second experiment occurred as a variation of his first. Spemann became the first to conduct a successful nuclear transfer in the human history. His experiment showed that the nucleus from an early embryonic cell directs the complete growth of a salamander. Spemann's proposed "fantastical experiment" of 1938 involved the removal of a nucleus from an unfertilized egg, replacing it with a differentiated embryonic nucleus. Although Spemann lacked the adequate technology required to perform such an experiment, his ideas and theories helped pave the path for the first nuclear-transfer experiments in 1952. [22]

In 1996, Ian Wilmut and Keith Campbell, two British scientists, conducted one of the most fruitful and well-known cloning experiments in history. By transferring the nucleus from the cell of an adult lambs' udder into an enucleated cell, and resetting the nucleus' genetic

[19] https://www.faseb.org/Portals/2/PDFs/opa/cloning.pdf
[20] http://learn.genetics.utah.edu/content/cloning/clonezone/
[21] http://learn.genetics.utah.edu/content/cloning/clonezone/
[22] http://www.nsta.org/images/news/legacy/scope/0603/cloningtimeline.pdf

information to an embryonic state, the two were able to clone a lamb.[23] This is the first time a mammal was cloned using the nucleus of a somatic cell and its success paved the way for scientists to clone other mammals, even potentially humans. Of 277 attempts, only one produced an embryo that was able to be transferred into the uterus of a surrogate mother and was able to develop. The sheep was born on July 5th, 1996 and became known as Dolly the Sheep. This technology soon became known as Somatic Cell Nucleus Transfer (SCNT) and would be refined and used in the years to come.


[24]

An illustration of Hans Spemann's second salamander experiment.

One week after its creators announced the success of Dolly the Sheep, researchers at the Oregon Regional Primate Research Center published their report of the first cloned pair of rhesus monkeys through embryonic cell nuclear transfer. The succession of successes in the cloning of mammals alerted the public that technology to clone an entire human might be soon available. Responding to the troubling uncertainties of Human Cloning, President Bill Clinton banned the use of all federal funding for Human Cloning experiments and research projects within the United States in 1997.[25] This hindered research and advancements on Human Cloning from one of the most technologically advanced countries in the world.

[23] http://learn.genetics.utah.edu/content/cloning/clonezone/
[24] http://learn.genetics.utah.edu/content/cloning/clonezone/
[25] http://www.cnn.com/TECH/9703/04/clinton.cloning/

Clinton also privately called upon funded researchers to avoid attempting to clone a human baby, concerned that "[Human Cloning] could lead to misguided and malevolent attempts to select certain traits, ...to make our children objects rather than cherished individuals."[26] Later in June of the same year, Clinton proposed legislation that would ban cloning "for the purposes of creating a child."[27] Though he stopped short of banning the research of human embryonic stem cells, his legislation limited the use of federal funds to only the stem cell lines produced before the legislation's introduction.

In 2000, British company Geron Corporation was granted a patent covering cloned human embryos in their very early stages of development. This stage is when embryos consist of stem cells with the potential to develop into any type of somatic cell. As the first company in history to receive a patent of this kind, the Geron Corporation hopes to use the technology to grow new tissue for those suffering from degenerative diseases. That being said, Geron has no plans or intentions to create cloned humans.[28]

The end of the 20th century and the beginning of the 21st century saw success in cloning many species of domestic animals, including goats, cows, and rabbits. The first cloned human embryo was not produced until the year of 2001. Unfortunately, the embryo failed to produce the stem cells scientists had hoped for. Although several research groups have announced success in producing cloned human beings, most of the scientific community believes their claims to be invalid due to the lack of evidence provided.

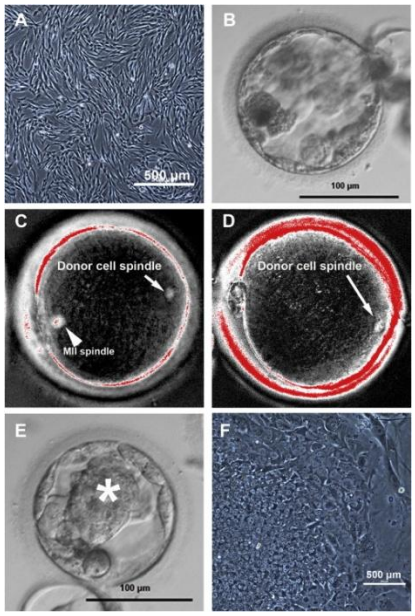
[26] http://www.nytimes.com/1997/06/10/science/clinton-seeks-to-ban-human-cloning-but-not-all-experiments.html
[27] Ibid.
[28] http://www.nsta.org/images/news/legacy/scope/0603/cloningtimeline.pdf

The General Assembly adopted the Declaration on Human Genome and Human Rights on 8 March 2005. Article 11 of the Declaration states "practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted."[29] Despite this, scientists and researchers continued to invest time and effort into their research.
In 2007, the international scientific community saw a major breakthrough in stem cell research. Shinya Yamanaka and colleagues at Kyoto University in Japan successfully reprogrammed human somatic cells into a pluripotent state. This means that induced pluripotent stem cells (iPSCs) are capable of differentiating into different types of cells. Human iPS cells are similar to human embryonic stem cells in morphology, proliferation, surface antigens, gene expression, epigenetic status of pluripotent cell-specific genes, and telomerase activity.[30] In other words, the iPS technology allows creation of patient-specific and disease-specific stem cells without the use of cloning or destruction of embryos at all. Therefore, iPSC technology is not as controversial since the process does not require women to donate their eggs. However, an ethical concern is that in theory, iPS cells can be guided to differentiate into gametes and generate a clone.[31] Ethics aside, some studies have pointed out some disadvantages of iPS cells. Compared to embryonic stem cell lines, iPS cell lines are found to differentiate at a significantly lower rate and had higher rates of cell death. Another study found that while embryonic stem cells expressed the expected mutation, the iPS cells did not.[32]

In 2009, the United States relaxed legislation on stem cell research. President Barack Obama reversed the policy introduced by George W. Bush allowing federal taxpayer dollars to fund significantly broader research on embryonic stem cells. A CBC News poll on the topic shows a steady increase in the number of Americans who support medical research using embryonic stem cells.[33] President Obama believes that "[the American] government has forced...a false choice between sound science and moral values" and that "[Americans] have been given the capacity and will to pursue [embryonic stem cell] research and the humanity and conscience to do so responsibly." According to Obama, some of America's best scientists have relocated to other countries that will sponsor their work. The Early Show is an American television program produced by CBS News. Its medical contributor, Dr. Holly Phillips has pointed out that many scientists have been spending more time seeking private sponsorship for their research than actually carrying out their research.[34] Mr. Obama's decision will have a profound effect on researchers and scientists located in the United States and will allow them to seek for cure of many well-known neurological illnesses and other severe medical conditions.

[29] Universal Declaration on the Human Genome and Human Rights
[30] http://dx.doi.org/10.1016/j.cell.2007.11.019
[31] http://www.hopkinsmedicine.org/institute_basic_biomedical_sciences/news_events/articles_and_stories/stem_cells/2010_07_pluripotent_stem_cells
[32] Ibid.
[33] http://www.cbsnews.com/news/obama-ends-stem-cell-research-ban/
[34] Ibid.

Subsequently in 2010, the FDA approved two clinical trials using cells grown from human embryonic stem cells. The Geron Corporation, who received the first-ever patent relating to cloned human embryos back in 2000, sponsored the first embryonic stem cells clinical trial in the world. The FDA first approved this clinical trial in January 2009, but later required further research before the study could proceed. The FDA gave final approval in July of 2010. This allowed the company to begin searching for the first patients who might qualify for this phase 1 clinical trial. To be eligible, patients have to have suffered a medical condition known as a complete thoracic spinal cord injury. The patient then has to be injected with the stem cell therapy. The CEO of Geron, Dr. Thomas Orkama, explains that the injected cells are programmed to become glial cells to rewrap the nerve with myelin. The goal of the therapy is to permanently repair the damage from the spinal cord injury that caused the paralysis.[35] In November of 2010, Massachusetts-based company Advanced Cell Technologies (ACT) was granted the FDA approval to start a clinical trial using cells grown from human embryonic stem cells of a for an inherited degenerative eye disease. Similar to Geron's approach, ACT has reprogrammed the harvested hESCs to develop into pigment epithelium cells. Contrastingly to Geron's method, however, ACT only removes one stem cell from the embryo and thus avoids the destruction of the embryo.[36] These clinical trials appear to be promising and may pave the path to future regenerative medicine.



Images showcasing the results of different modifications made by Mitalipov and his team.

Starting in 2013, breakthroughs in Somatic Cell Nuclear Transfer came one after another. Mitalipov and his colleagues became the first to create a human embryo cell line through somatic cell nuclear transfer that was proven to be able to form various cell types. Their success came through a combination of various minor technical tweaks. Due to the inevitable destruction of the cloned embryo required by the technique, Mitalipov and his team could not receive any federal funds, hampering further clinical research.

The method created by Mitalipov and his team are far more efficient that the one used to produce iPS cell lines. This technique took 15 eggs from one donor to produce one cell line and 5 from different donors to produce another.[37] One year later, a group of scientists lead by Young Gie Chung and Dong Ryul Lee reported the creation of hESCs with somatic cells from a mid-aged male and an elderly male using an approach based on the protocol outlined by Mitalipov and his team. Clinical applications of ESC lines would most likely involve aged nuclear donor and there were no reports of hESCs produced from cells of an aged donors.[38] Their breakthrough may cause more patients to be eligible to receive treatment based on ESC lines produced by SCNT. The success of Mitalipov's team and Young Gie Chung and Dong Ryul Lee's team would lead to more breakthroughs in creating patient-specific and disease-specific cures with increased efficiency and higher success rates in the future.

[35] http://thechart.blogs.cnn.com/2010/10/11/first-human-injected-in-human-embryonic-stem-cell-trial/
[36] http://thechart.blogs.cnn.com/2010/11/22/fda-approves-second-human-embryonic-stem-cell-trial/
[37] Ibid.
[38] http://www.cell.com/cell-stem-cell/fulltext/S1934-5909(14)00137-4

Although the technology is still being developed, the member states of United Nations Educational, Scientific and Cultural Organization UNESCO discussed and taken a stance on Human Cloning. On 11 November 1997 at UNESCO's 29th General Conference, the Universal Declaration on the Human Genome and Human Rights was adopted unanimously and by acclamation. Article 11 of the Declaration states "practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted. States and competent international organizations are invited to cooperate in identifying such practices and in taking, at national or international level, the measures necessary to ensure that the principles set out in this Declaration are respected." One year later, aware of the significance and scope of this Declaration, the United Nations General Assembly endorsed the Declaration on 9 December 1998. The embrace of the Declaration shows that the member states of the United Nations despises human cloning and saw the technology as incompatible with human dignity.

Subsequently, on 8 March 2005, the United Nations General Assembly adopted the 'Declaration on Human Cloning', by which member states were called on to adopt "all measures necessary to prohibit all forms of Human Cloning inasmuch as they are incompatible with human dignity and the protection of human life." By further terms of the Declaration, member states were called on to adequately protect human life and dignity in the application of life sciences and prevent the exploitation of women as well. The vote was 84 in favor, 34 against, 37 abstaining, and 35 were absent. It was evident that less than half of the members were in favor of the text. A major point of controversy in the Declaration is its definition of "human life". Following the vote, the representative of the United Kingdom explained that the ambiguity of the Declaration might "sow confusion about the acceptability of [therapeutic cloning]."[39] He also expressed that the Declaration was non-binding and would not affect the United Kingdom's support of stem cell research.

The representative of the United Kingdom is not alone. For instance, the representative of China also noticed that "different countries varied in their understanding of the text's inherent moral, ethical and religious aspects" and regretted that "the Declaration failed to give effect to the concerns of those countries."[40] As a matter of fact, representatives of several other states, including Japan, Republic of Korea, India, and South Africa, commented after the vote that the declaration will not affect their countries' future positions on therapeutic cloning or their legislation.[41] Meanwhile, many countries such as Costa Rica and Ethiopia welcomed the adoption of the Declaration. They believed the Declaration was a step to

[39] http://www.un.org/press/en/2005/ga10333.doc.htm
[40] Ibid.
[41] Ibid.

advance science in a clear framework of ethical norms and sent a clear message against unethical research.

The United Nations recognized that the problem remained unsolved and did not stop their effort there. The International Bioethics Committee (IBC) of UNESCO is a body of 36 independent experts that follows progress in the life sciences and its applications in order to ensure respect for human dignity and freedom. The committee devoted four years of its work to evaluate whether the international community is ready to reconsider its approach to Human Cloning. Its members concluded that global dialogue would greatly benefit from efforts in readdressing the relevant terminology, improving international governance, and encouraging the dissemination of Human Cloning.[42] The IBC argues that due to the rise of new technologies, redefinition and clarification of widely used terms are needed to adequately describe the dichotomous technical procedures relevant to Human Cloning. The IBC also calls for the initiation of the establishment of a stringent mechanism to prohibit reproductive cloning. Last but not least, the IBC stresses the importance of fostering public awareness by disseminating, discussing and debating on cloning issues at all levels.[43] They hope this would allow all nations to take part in the debate and improve the international governance of Human Cloning.

[42] http://www.unesco.org/new/en/social-and-human-sciences/themes/bioethics/international-bioethics-committee/
ibc-sessions/eighteenth-session-baku-2011/human-cloning/
[43] Ibid.

United States

There is currently no federal regulation or policies overseeing both reproductive and therapeutic cloning. At the 28th meeting of the Sixth Committee, the representative of United States expressed that her country had supported the Declaration. She believed medical research must proceed in an ethical manner and no human life should ever be produced to be destroyed for the benefit of another.[44] However, more recently, President Barack Obama lifted the stem cell research ban and allowed federal taxpayers' dollars to fund significantly broader research on embryonic stem cells. He believes that "[the American] government has forced...a false choice between sound science and moral values" and that "[Americans] are called to care for each other and work to ease human suffering."[45]

Canada

The *Assisted Human Reproduction Act (AHR Act)* became law in March 2004. Under the *AHR Act*, it is illegal to knowingly create a human clone, regardless of the purpose, including therapeutic and reproductive cloning. The *AHR Act* defines a human clone as an embryo that has been genetically manipulated and "contains (a) diploid set of chromosomes obtained from a single...human being, fetus, or embryo." (section 3 of the *AHR Act*) However, the *AHR Act* allows human embryo research using an embryo no longer needed for reproductive purposes.[46]

United Kingdom

The *Fertilisation Act* of 1 November 1990 and the *Human Fertilisation and Embryology Act 2008* prohibits reproductive cloning. At the same time, cloning used for developing treatments for serious disease or other serious medical conditions is allowed in the United Kingdom. The Human Fertilisation and Embryology is the United Kingdom's independent regulator that grants licenses to human embryo research projects.[47]

France

Loi de bioéthique (Bioethics Law), adopted by the French National Assembly and the Senate, prohibits the use of IVF embryos and cloned human embryos for research purposes. (Article L2151-2) Article 3 and 4 also prohibit the creation of human embryos by cloning and therapeutic cloning. Furthermore, no research on human embryos or embryonic stem cells can be undertaken without authorization. The research can only be permitted if the scientific

[44] http://www.un.org/press/en/2005/gal3271.doc.htm
[45] http://www.cbsnews.com/news/obama-ends-stem-cell-research-ban
[46] http://www.hc-sc.gc.ca/dhp-mps/brgtherap/legislation/reprod/research-recherche-eng.php#fnb2
[47] Report of IBC on Human Cloning and International Governance

relevance of research is established, the research is part of a medical purpose, and the research cannot be conducted without using embryos or embryonic stem cells. (Article L2151-5)

Spain

Law n°14 on Assisted Reproductive Techniques makes the practice of nuclear transfer within a reproductive purpose a very serious infraction. The Law on Biomedical Research allows for research on embryos for therapeutic and research purposes. However, the law prohibits the creation of embryos and pre-embryos exclusively for this purpose.[48]

Germany

Embryonenschutzgesetz (The Embryo Protection Act) 1991 prohibits the development of a human embryo with the same genetic information as another embryo, fetus, human being, or deceased person. *Stammzellgesetz* (The Stem Cell Act) was amended in 2008, as a result of pressure from scientists, to allow import of embryonic stem cells derived before 1 May 2007. In addition to these criteria, embryonic stem cell lines can only be used for research if they have vital roles in medical advancement.[49]

Italy

Law n°40/2004 on medically assisted reproduction recognizes the embryo as a subject of rights form the moment of fertilization. The law forbids cloning interventions for reproduction or research purpose. Article 13 prohibits experimentation on human embryos for therapeutic or diagnostic purpose unless it is concerning the health of the embryo itself. On the other hand, the Law gives widespread support to adult tissue stem cell research.[50]

Council of Europe

The Council of Europe has several conventions that can be applied to human embryonic stem cell research and Human Cloning. The Council's 1997 Convention on Human Rights with Regard to Biomedicine states that "any intervention seeking to create a human being genetically identical to another human being, whether living or dead is prohibited." While this statement specifically bans reproductive cloning, it does not necessarily ban therapeutic cloning. The Council left the interpretation of 'human being' to national Parliaments, allowing therapeutic cloning where it is accepted.[51]

[48] http://www.eurostemcell.org/stem-cell-regulations
[49] http://www.eurostemcell.org/stem-cell-regulations
[50] Ibid.
[51] http://cnx.org/contents/4O_mfmxO@1/Overview-of-World-Human-Cloning

Australia

The Prohibition of Human Cloning for Reproduction Act, as amended by Act n°172 of 12 December 2006, criminalizes the act of intentionally placing a human embryo clone in the body of a human or the body of an animal. It also makes the act of creating a human embryo by any processes other than the fertilization of a human egg by a human sperm, or the act of developing a human embryo so created an offense.[52] Simply put, both reproductive cloning and human embryo research is banned.

Korea

The Bioethics and Safety Law n°7150, as revised on 16 March 2008, prohibits the act of implanting a somatic cell embryo clone into a uterus, maintaining a cloned embryo within a uterus, or giving birth when the pregnancy results from the above act. Because of fraudulent claims from Korean scientists, research on stem cells was banned until the National Bioethics Committee removed the ban on March 2007. Article 22 prohibits the use of somatic cell nuclear transfer other than for the purpose of conducting research aimed at curing rare or currently incurable disease. The type, subject, and extent of allowed research shall be reviewed by the National Committee and decided by the Presidential Decree.[53]

China

China stands firmly against reproductive cloning and does not allow any reproductive Human Cloning experiment. The Chinese government recognizes the ethical concerns therapeutic cloning brings and advocates for effective regulation and examination of therapeutic cloning. China believes that different countries varied in their understanding of the text's inherent moral, ethical and religious aspects and that it is unlikely and unnecessary to seek for total consensus. [54]

Costa Rica

Embryonic stem cell research, therapeutic cloning, and reproductive cloning are heavily condemned in Costa Rica. Costa Rica's Supreme Court rules in vitro fertilization unconstitutional. Any manipulation of an embryo's genetic code is prohibited, as well as any experimentation on the embryo.[55]

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[52] Report of IBC on Human Cloning and International Governance
[53] ibid
[54] http://www.mfa.gov.cn/chn//gxh/zlb/tyfg/t23619.htm
[55] ibid

1. Is it possible for the committee to reach a consensus on whether or not reproductive cloning is considered unethical?

2. Do research and application of Human Cloning affect human dignity?

3. Do religious beliefs conflict with the ethics of Human Cloning? If so, to what extent?

4. Can research be continued on Human Cloning if it causes a divide between moral issues?

5. What policies should be recommended to prevent exploitation of products, including embryos, stem cells, and differentiated cells, made from methods of Human Cloning?

6. Are therapeutic cloning and embryonic stem cell cloning optimal research methods to develop treatments for diseases or medical conditions?

7. How will the resolution incorporate the three goals outlined by the International Bioethics Committee?

http://learn.genetics.utah.edu/content/cloning/clonezone/

https://www.faseb.org/Portals/2/PDFs/opa/cloning.pdf

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2323472/

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