

[International Forum]

Envisioning the Human Rights of Women in the Age of Biotechnology and Science

2006.9.21(목) 10시~6시 Seoul Women's Plaza 1th floor

Section 2 [Panel Speeches 1]

Speaker : Myung, Jin Sook (Member of the Policy Committee of
Korean WomenLink / Director, Civil Leadership Program ELSD)

Embryonic Stem Cell Research and Women

Myung, Jin Sook

1. Introduction

A fierce wind swept through our society not long ago. It was the wind of Hwang Woo-suk. Professor Hwang became a national hero as he published a paper on stem cells tailored to patients in May 2005 again a year after a paper was posted in the magazine Science in February 2004. A scientist producing international research results, a patriot rejecting a position paying 1 trillion won, and a humanitarian dedicated to his work for patients with rare and incurable diseases and the disabled day and night! The excitement over him may be very natural. Actually, a craze for Hwang Woo-suk was worth being called 'syndrome'. There were something to make a lot of people enthusiastic for him: a security guard next to that of three key government figures, the stock market stimulated whenever his research outcomes were released regardless of its correlations, his acts and words treated importantly by the media and his good looking and modesty.

In November 2005, however, after a TV program explored an ethical issue of egg resources in Hwang's research, a chain of truths were revealed, including researchers' egg donation and the paper fabrication. Although the Seoul National University Investigation Committee(SNUIC), the prosecution and a trial discovered that Hwang's paper was fabricated, the craze for Professor Hwang has not disappeared easily. Hwang enthusiasts took to the street shouting 'Resume Professor Hwang's Research' and 'Protect a Patent on Hwang's technology for SCNT blastocysts every weekends. One of them attempted suicide by taking poison, and another took his own life by burning himself to death. Hwang supporters did not hesitate to attack the SNUIC members. Among them, also, there were women who established a 'Foundation for Egg Donation' with the intention of donating their eggs.

In fact, the social and ethical issues of the research conducted by Professor Hwang, as a way of obtaining stem cells, stemmed from cloning human embryos. There were a few successful cases of embryo cloning in Korea. They were intergeneric nuclear transfer experiments transplanting a human cell nucleus to a cow's egg. Such an intergeneric nuclear transfer method has been subjected to ethical blames that the embryos produced with animal genes were difficult to be applied to clinic demonstration and genes of human beings

and animals were mixed. As Hwang's research transferred a human cell nucleus into a human egg and the main focus of the research was using human eggs, it has been appraised as technical advancement. In the process that research using women's eggs received much global recognition and national competitiveness was sought, interest in women's bodies and health cannot but be dealt with badly. Furthermore, there is a great likelihood that egg donation will be recognized as an obligation in the circumstance of praising women's egg donation as a holy act and in the situation of women taking care of sick family members traditionally.

It is important to make an effort to view biotechnology development from women's perspective because there is a growing tendency for women's bodies to be objectified and used as an instrument such as embryo cloning, surrogate mothers and genetic diagnosis. To grasp the influence of biotechnology, therefore, different experiences by sex should be handled importantly. There are many cases where women have been not a subject of technology but an object to be controlled over past years while scientific technologies have made progress. It should be considered important that women's bodies and situations have different experiences from men's.

2. Embryonic Stem Cell Research and Women

Human embryo cloning attracts attention because it is one of powerful methods of obtaining stem cells with medical potential. Stem cells have the potential to make substitutive cells used for the treatment for Parkinson's disease, spinal cord injury, stroke, heart disease and diabetics. Although stem cells have been hailed for a new treatment for incurable diseases, there has been a controversy surrounding their resources. In general, stem cells can be obtained from embryo cloning, remaining embryos after In Vitro Fertilization (IVF) treatment, umbilical cord blood, fetus and adult tissues, and so forth. The research led by Hwang is called into question; transparency and legitimacy of the process such as the resources of eggs used for the research, legitimacy of the egg collection process and the origin of research funds. Here, problems of the research will be examined centered on women-related parts.

2.1 Eggs Provided for Hwang's Research

First, Hwang's team was given 427 eggs from 34 women for its research in 2004 and 2005. In detail, the team used 242 donor eggs from 16 women in the research in February 2004. Of 242 eggs, 170 good quality eggs suitable for the research were used for cloning, and the team got stem cell lines from only one cloned embryo among them. 15 eggs or more on average were extracted from each. In the research in May 2005, Hwang's team achieved 11 stem cell lines using 185 donor eggs from 18 women. According to a survey by the Ministry of Health and Welfare, however, Hwang's team received a total of 2,221 eggs from 119 women (including two researchers) over 138 times at four institutions between November 28, 2002 and December 24, 2005.

Egg donation conditions by institution showed that M Hospital provided 1,549 eggs, H Women's Clinic 543 eggs, H University Hospital 121 eggs, and J Hospital 8 eggs. M Hospital provided 1,549 from 79 women over 91 times from Nov. 28, 2002 to Oct. 24, 2005. 1,336 eggs were commercially donated by 63 women over 75 times, and 182 eggs voluntarily donated by 14 women over 14 times. Also, 31 eggs were collected from two female researchers of Hwang's team over twice.

H Women's Clinic provided 543 eggs over 37 times from 33 women between Jan. 25 2005 and Dec. 24 2005. Eggs by benefit offering were 313 eggs were donated with benefit in kind by 22 women over 25 times, and 230 eggs were donated voluntarily from 11 women over 9 times. H University Hospital provided 122 eggs from eight women over 9 times from Apr.12, 2005 to Nov. 8, 2005 and all of them were by voluntary donation. J Hospital provided eight eggs on Dec. 22, 2004 from a woman who had induced ovulation for her own pregnancy but had gave up IVF treatment.

Institution of Egg Extraction	Donation Period	Number of Donors	Donation Number	Number of Donor Eggs
M Hospital	Nov. 28, 2002~ Oct. 24, 2005	79	91	1,549
H Women's Clinic	Jan. 25, 2005~ Dec. 24 2005	33	37	543
H University Hospital	Apr. 12, 2005~ Nov. 8, 2005	8	9	121
J Hospital	2004.12.22	1	1	8
Total	2002.11.28~2005.12.24	121	138	2,221

When the types of egg donation are divided into commercial donation, benefit in kind donation, voluntary donation and donation for research, their conditions are as follows: All commercial donation was made in M Hospital, where 1,336 eggs were obtained from 63 women and provided them over 75 times. H Women's Clinic extracted eggs from 22 women over 25 times by benefit in kind donation. Voluntary donation was made in M Hospital, H Women's Clinic, H University Hospital and J Hospital. M Hospital provided 182 eggs from 14 women over 14 times, H Women's Clinic 230 eggs from 11 women over 12 times, H University Hospital 121 eggs from 8 women over 9 times, and J Hospital 8 eggs from a woman once. Researcher's donation was made in M Hospital, which provided 31 eggs from 2 researchers over twice.

Type of Egg Donation	Institution of Egg Extraction	Number of Donors	Number of Donation	Number of Donor Eggs
Commercial Donation	M Hospital	63	75	1,336
Benefit in Kind Donation	H Women's Clinic	22	25	313
Voluntary Donation	M Hospital	14	14	182
	H Women's Clinic	11	12	230
	H University Hospital	8	9	121
	J Hospital	1	1	8
Researcher's Donation	M Hospital	2	2	31
Total		121	138	2,221

2.2 Grounds for Ethical Judgment on the Egg Supply Process

In order to understand ethical issues of the egg supply process, judgmental standards require relevant domestic regulations and international rules. As international rules related to egg supply, there are the Nurnberg Code, Helsinki Declaration and ICH-GCP Guideline. Domestic laws include the Bioethics and Safety Act and the Korea Good Clinical Practice. Not having legal effect, the Code of Physicians' Ethics of the Korea Medical Association can be the standard for an ethical judgment. As the Nurnberg Code is the first internationally accepted code of ethics for medical research, articles to judge ethics of Hwang's

research are as follows:

1. The Voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment.

The Declaration of Helsinki, including principles to provide guidance to physicians in medical research involving human subjects, was adopted at Helsinki, Finland in 1964. Main rules of the Declaration of Helsinki were established between 1983 and 1989, and regulations on IRB were added. Moreover, it admitted that when a subject is difficult to decide whether to give assent to decisions, the informed consent must be obtained from the legally authorized representative. The following are key principles of the Declaration of Helsinki (a total of 32 articles) added until the 56th World Medical Association General Assembly in Tokyo in 2004:

1. Medical research involving human subjects must conform to generally accepted scientific principles and is subjected to ethical standards that promote respect for all human beings and protect their health and rights.

2. The design and performance of each experimental procedure involving human subjects should clearly formulated in an experimental protocol. This protocol should be submitted for approval to a independent ethical review committee.

3. In medical research on human subjects, considerations related to the well-being of the human subject should take precedence over the interests of science and society.

4. Some research populations are vulnerable and need special protection.

5. When obtaining informed consent for the research project the physician should be particularly cautious if the subject is in a dependent relationship with the physician.

6. In any research on human beings, each potential subject must be adequately informed of the aims, methods, anticipated benefits and potential risks of the study, the discomfort and so on it may entail, and after ensuring that the subject has understood the information, the physician should then obtain the subject's freely-given informed consent.

7. The informed consent should obtained by a well-informed physician who is not engaged in the investigation and who is completely independent of this relationship.

8. For a research subject who is legally incompetent, the investigator must obtain informed consent from the legally authorized representative in accordance with applicable law.

9. *The research protocol should always contain a statement of the ethical considerations involved and should indicate that there is compliance with the principles enunciated in this Declaration.*

10. *Reports of experimentation not in accordance with the principles laid down in this Declaration should not be accepted for publication.*

Meanwhile, article 13 of the Bioethics and Safety Act stipulates that "any person shall neither provide or use sperms or ova induce or help other persons to do so for the purpose of acquiring interests in money or property or other considerations". The Code of Physicians' Ethics, declared in November 15 2001, suggests ethical principles for IVF operation and medical research involving human subjects.

2.3 Review on Ethical Issues of the Egg Supply Process

Although the Bioethics and Safety Act and the Code of Physicians' Ethics prevent the sales of eggs, most of the supply of eggs used for Hwang's research was provided from the market for eggs. All of commercial donors were introduced by a broker, DNA Bank which had been known to provide eggs for infertile couples on cash payment. In M Hospital, there 63 commercial egg donors and 75 cases where extracted eggs stood at 1,336. The average age of commercial donors were 24.4, which was very low compared to 32.6, the average age of voluntary egg donors. Commercial donors attended M Hospital in the Southern part of Seoul to induce ovulation and then underwent egg extraction in M Hospital in the Northern part of Seoul to deliver eggs easily to Hwang's research team.

Some of donors provided eggs several times. In total, 15 women underwent egg extraction and provided eggs twice or more, and they are 9 commercial donors, 4 voluntary donors and 2 benefit in kind donors. Even M Hospital extracted eggs from a woman four times at most for research use.

In the meantime, there are ethical issues of benefit in kind donation: Women attended H Hospital to receive IVF treatment and donate their surplus eggs produced by IVF for research use. All of them were asked to provide their eggs by H Hospital which reduced all or part of drug expenses in exchange for donating surplus unfertilized eggs.

Voluntary donation was made in M Hospital, H Women's Clinic and H University Hospital. M Hospital obtained 182 eggs from 14 women 14 times, H Women's Clinic 230 eggs from 11 women 12 times, and H University Hospital 121 eggs from 8 women 9 times. According to the Ministry of the Health and Welfare, most voluntary donors knew that their eggs would be used to produce stem cells tailored to patients for their family member and close relationships while some did not know that their eggs would be used for Hwang's research at the time of providing eggs. Those who persuaded them to donate eggs were patients and their family, members of Korea Spinal Cord Injury Association, doctors in charge of patients, and Hwang's team members, and members of the Association for Mothers with Sick Children, and there were some cases where egg donors themselves expressed their intention to donate eggs. A woman said that she donated eggs to make matched stem cell lines for her older brother with spinal cord injury after being asked for to provide eggs in spite of the fact that she was single.

The egg supply process of Hwang's research has ethical issues. First, most commercial donors used an egg brokers and received cash rewards, and many of donations were not altruistic in a way that a lot of women provided eggs twice or more accepting payment. Second, in relation to benefit in kind donation, in the

course of providing surplus eggs for research use after IVF patients' consent, they provided highly ripe eggs for research. That is, although the best quality eggs should be used for infertility treatment, ripe eggs were given to the Hwang's team. Rather low quality eggs were used, which could bring about a risk to reduce IVF success rates. Infertility experts did not their best to do their medical duties. Last, even in voluntary donation, there is an ethical issue given that medical staff persuaded a single woman to donate eggs and then extracted eggs from her. The Declaration of Helsinki suggests that in medical research on human subject, considerations related to the well-being of the human subject should take precedence over the interests of science and society.

3. Stem Cell Research and Women

3.1 Embryo Cloning and Women

As stem cells have the potential to develop into many different cell types in the body, they are divided into three groups by the capacity for development: totipotent cell, pluripotent cells including embryonic germ cell and embryonic stem cell, and adult stem cells. Stem cells are derived from embryo cloning, surplus embryos produced by IVF, umbilical cord blood, fetus and adult tissues and so on. As there is a growing interest in stem cell research to utilize embryos with relatively high capacity for proliferation, some problems should be tackled. First, what embryos are used? Embryos can be produced from leftover embryos (surplus embryos) from IVF treatment, donor sperms and eggs for research use, embryo cloning using SCNT and human-animal hybrid embryos. Ethical issues vary depending on what kinds of methods are used to get stem cells.

Embryo cloning is one of methods to obtain stem cell lines, and the process of embryo cloning is as follows: First, after eggs are extracted from women, the nucleus is removed by being sucked out from an unfertilized egg cell and the nucleus of another somatic cell is then inserted into the denucleated egg cell. The egg becomes an embryo with 46 chromosomes without fertilization, and it is what is called 'human embryo cloning by somatic cell nuclear transfer' (SCNT). The cloned embryo is activated with electrical stimulation and begins to undergo normal process of cell division as if it were a fertilized egg. If it is implanted into the uterus, it can develop into a fetus.

The following are ethical discussions and concerns on embryo cloning:

First, embryo cloning can objectify embryos and women's eggs. A group of donor eggs are needed to treat diseases in the future. It means that many women are placed into serious danger related to drugs and medical treatment. At the same time, there was a problem that embryos as potential life are destroyed to produce potential stem cell lines. Second, large markets for eggs will open. The sales of eggs already existed in reality. For the United States, women are compensated between \$ 4,000 to \$ 10,000 for donating their eggs by fertility clinics. For Korea, egg donation ads are placed in front of women's universities, and there is a startup introducing egg donation. Third, embryo cloning can open the door to eugenics. The production of cloned embryos provides key elements for genetic modification to pass on to next generations.

Whichever is the purpose, therapy or genetic improvements, it is unpredictable that genetic modification may pass on any negative influence to future generations. Fourth, the possibility of human cloning cannot

be ignored. Few countries have the government agencies and effective laws to regulate and oversee embryos practically. As a result, there is a strong possibility that physicians and researchers attempting human cloning achieve success. Last, the treatment based on embryo cloning, even if it materializes, is enormously expensive so that many people cannot enjoy its benefits.

Eggs, as everyone knows, are extracted from women of reproductive age. Women capable of becoming pregnant normally release a single egg from an ovary in one menstrual cycle. As a large number of eggs are required for IVF treatment or human embryo cloning research, super-ovulation drug is used for women. Ovarian hyperstimulation to produce eggs begins 3-5 days after menstruation. Women receive a daily injection of hormones to mature multiple eggs. Women receiving an hormone injection on a daily basis should take blood sample to check out the blood hormone concentration at a regular interval. They have to suffer ultrasonic scanning through the virgin to see if eggs mature well. When it is good time to extract eggs, an infertility expert sucks and extracts eggs as a form of follicles before ovulation from both ovaries of women under drug or local anesthesia. Women undergoing egg extraction often suffer from side effects. The excessive hormone injections can cause various negative effects - kidney and liver damage, ovarian cancer and others.

In spite of such a difficult process of egg retrieval, a cloning team has been nowhere to be found like Hwang's team recruiting so many egg donors. In the United States, women donating eggs can be paid several thousand dollars in exchange for related expenses and inconvenience on health risks. Professor Jose Cibelli, a coauthor of the paper published in Science by Dr Hwang, said that he used no more than 20 eggs when he did human cloning research in 2001. Unlike other countries where researchers gave up cloning research due to the failure of egg collection, it is too easy to obtain eggs in Korea.

3.2 Remaining Embryos and Women

In fact, the development of IVF procedure made it possible to conduct research involving embryos. To such an extent that it is called the 'Kingdom of Infertility Clinics', Korea is one of countries where IVF is prevalent. 122 eggs are stored in medical centers for egg production across the country, and a total of 93,921 eggs were frozen and stored in 98 medical centers for egg production as of December 2005.

As remaining embryos are leftover embryos frozen and stored after IVF treatment, they are classified into the embryos which are intended not to be discarded with a given period of time left and the embryos which are intended to be discarded with the lapse of a given period of time. Actually, the number of surplus eggs are not accurate. The estimated number of them stand at between a minimum of 100,000 and a maximum of 1,500,000. Such situations have something to do with the fact that infertility clinics have been actively engaged in embryo cloning research and produced results. A lot of infertility treatments are performed without proper regulations, and leftover embryos in the process become materials for embryo research.

Under a social atmosphere that married women are forced to have a baby, women are undergoing painstaking treatment such as egg extraction in fertility clinics. Fertility clinics may produce as many embryos as possible in the cause of increasing the chance of pregnancy. Women's eggs can be used unduly in the course. There are embryos produced more than needed for IVF treatment, and they will be used for

research in five years. Those who cannot get 20-30 percent of IVF success rates may give up halfway and they may contribute to the research as frozen egg producers. Therefore, we should introduce a system for regulating embryos such as the number of embryos and the frozen storage period as soon as possible. The excessive intervention in women's bodies can pose health risks to women at a time when eggs are traded somewhere in our society and we are still unable to get hold of accurate situations on surplus embryos stored in fertility clinics. In short, if a social management system for remaining embryos is required, overall regulations on artificial fertilization should be made.

4. Biotechnologies and Women

As seen in stem cell research through embryo cloning, there is a growing possibility that exploitation of and intervention in women's bodies are justified. Purity of science, value neutrality, and freedom of scientific research need to be considered carefully in the social context of applications of scientific research. For example, when embryos are cloned, where can eggs be obtained from? How can embryos for stem cell research be secured? Whose uterus will fertilized embryos grow in? It is questions that women are facing. As shown in the egg supply process of Hwang's research, a lot of women providing eggs had relationships with patients. Even though women make up their mind to treat incurable diseases taking care of sick family members, how do they feel donating eggs for research involving potential risks to their bodies?

There are a variety of feminist positions to understand biotechnologies related to reproductive technologies. On the one hand, as biotechnology development makes it obscure to distinguish between human and nature, human and machine, including biological division into women and men, it will become material foundations to emancipate women from oppression through the binary existing order. There are advocacy groups for biotechnologies based on the optimistic vision that reproductive technologies will free women from the ideology of motherhood suppressing women.

On the other hand, there is a position to refuse biotechnologies by paying attention to their potential danger. As a matter of fact, these technologies are subject to applications for the need of existing society and conventional values. As a result, it is difficult for the technologies to be utilized as means of emancipation. The basic premises of such technologies are as follows:

First, such technologies are developed and are produced not to improve human's happiness but to challenge difficulties in the current global system maintaining a model of lifestyle based on sustainable growth on large scale. Second, the technologies are introduced at the global level while social relations between men and women are based on exploitation and subordination. Third, the technologies are justified in the cause of humanism by those who want to sell them. Last, the technologies themselves are not good or bad, and the problem is their application methods. Therefore, for valid criticism over biotechnologies, basic principles as well as methodology for embryo cloning should be criticised.

Recent issues surrounding biotechnological research are turned into a compromise between 'welfare' and 'ethics'. In other words, a question is not as to whether to allow research but as to under what conditions research is allowed. What is ignored seriously in the process, however, is basic principles on which biotechnologies are founded, and they are established on exploitation and subordination of women and

nature. Accordingly, if it is admitted that scientific technologies developed in sexist society cannot but be sexist, critical discussion on biotechnologies cannot but pay attention to the basic logic for technologies to be developed.