

RECOMMENDATION

Ethical justification for the use of genome
editing technology for human reproduction



August 4, 2020

the Science Council of Japan
the Subcommittee on Bioethics and Humanities of
the Philosophy Committee

This recommendation is the result of the deliberations of the Subcommittee on Bioethics and Humanities *of the Philosophy Committee of the Science Council of Japan.

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* The name of the subcommittee is "いのちと心を考える分科会 (Inochi to Kokoro wo kangaeru Bunkakai)" in Japanese was translated as "the Subcommittee on Bioethics and Humanities" in light of the meaning and purpose.

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The original was written in Japanese and SCJ provides English version of the Executive Summary for non-Japanese readers.

Executive Summary

1. Background to the Development of this Recommendation

In 2017, the Subcommittee on Genome Editing Technology in Medical Sciences and Clinical Applications of the Science Council of Japan released its recommendation, entitled “Genome Editing Technology in Medical Sciences and Clinical Applications in Japan”. The Subcommittee recommended that not only should a temporary prohibition on the clinical application of reproductive medicine be put in place, but also that basic research that aims for clinical application should not be performed at present, and it called for legal regulations governing genome editing technology. No legal regulations were subsequently put in place, but in April 2019, The Expert Panel Special Committee on Bioethics of the Cabinet Office’s Council for Science, Technology and Innovation submitted a report calling for legal regulations banning the reimplantation of genome-edited human embryos in the womb, and this was expected to be debated at an ordinary session of the Diet. In June 2019, however, the Japanese government announced its policy to allow basic research aimed at developments such as genetic disease prevention and to approve the creation of new embryos for research purposes. The Expert Panel Special Committee on Bioethics has also held deliberations regarding the creation of newly fertilized eggs. Nonetheless, it is clear from recent global trends that there is a very fine line between basic research and clinical application. Since the use of genome editing in human reproduction may have direct consequences for the future of all humanity, there should be discussions involving the whole nation on the appropriate use of this technology. The Subcommittee on Genome Editing Technology of the Science Council of Japan’s Committee for Scientific Community released its recommendations, entitled “Legal Regulations for Clinical Application of Genome Editing Technology to Human Embryos”, on March 27, 2020. In this, the Subcommittee on Bioethics and Humanities examines the issues surrounding the use of genome editing technology in human reproduction mainly from an ethical viewpoint, explicitly stating the need for nationwide dialogues and recommending measures to be put in place.

2. Current Situation and Issues

The ethical challenges concerning genome editing technology in human reproduction were referred to in the 2017 recommendations, but further examination is needed particularly as it would not be true to say that they were fully discussed. In light of the importance of these issues, further examination of philosophical questions, including topics concerning the relationship

between the means and the ends in science and technology, the issue of the new eugenics, the issue of the right to self-determination, and the responsibility to future generations, is needed. The main results of such a discussion can be summarized into three points: human dignity, eugenics and social discrimination, and the impact on future generations.

Regarding the first of these points, human dignity, it is crucial that careful consideration should be given to both the rights of the unborn child and the rights of the parents, in particular the mother. When thinking about the rights of the child, there needs to be sufficient consideration of the fact that the use of genome editing technology in human reproduction on the basis of genetic indicators may be an invasion, performed without regard to the wishes of the child, which carries the irreversible risk of the onset of new genetic diseases. Concerning the human rights of the woman in particular, there is the problem that the clinical application of genome editing technology to reproduction is an experimental treatment that depends on the body of the woman who will become pregnant and give birth.

Regarding the second point, eugenics and social discrimination, there is a widespread understanding today that decisions concerning reproduction are entrusted to the autonomy of the parents and to individual judgment, rather than the state, and that as long as all people's rights are protected, there will be no issues like the evils of eugenics in the past. Against the backdrop of this understanding, the expectation of treatment and medical support for people suffering from genetic diseases is discussed in relation to the use of genome editing technology in reproduction. This is a very earnest and reasonable expectation, and researchers and society should make every effort to meet it.

However, if genetic modification of those children yet to be born is further advocated from the perspective of guaranteeing and improving genetic quality, and if improvement is regarded as some kind of duty, this could send the message to people presently living with disabilities or with intractable diseases that they should not have been born. The old eugenics permitted an invasion of women's bodies in the form of sterilization or abortion on the basis of genetic characteristics that were deemed undesirable, for the purpose of preventing inheritance of such characteristics. The use of genome editing in human reproduction is carried out on the basis of genetic characteristics, and on a tacit understanding that if a new genetic disease were to appear in the embryo or fetus, the birth of a child with a disease or disability would be avoided by abortion or by miscarriage/stillbirth. Genetic modification of a child yet to be born by genome editing could therefore become eugenic coercion, whereby a woman who accepts the pregnancy and childbirth could be pressured into not giving birth to a child with a disease or disability. In this sense, there is a threat that it may result in an unacceptable endorsement of eugenics and a pattern of thinking that is the same as in the old eugenics.

The third point regards the impact on future generations. Genome editing technology used in human reproduction affects not just the unborn children but also those yet to be born and those children's descendants. The conventional bioethics of the present generation is based on the right to self-determination, but the logic of this approach is unable to adequately address some ethical challenges. The ethical responsibility to future generations must also be taken into account, that rather than limiting their interest in genome editing research and its possible outcomes; scientists, and indeed society as a whole, should pay attention not only to the positive outcomes of genome editing research, but also must devote their attention to its effects on humans and other organisms, to society, and on our whole world, to ensure that we avoid unexpected bad outcomes.

3. Details of the Recommendation

There are a number of challenges and issues that need to be considered with regard to the ethical justification for the use of genome editing technology in human reproduction. From the perspective of medical intervention in human reproduction, issues concerning (1) informed consent, (2) the selection of life and death decisions, and (3) the diversity of views of people with genetic diseases or people affected by disabilities need to be considered. Particularly in relation to the challenges of the new eugenics or social discrimination, if an abnormality were to be discovered in an embryo or fetus that had undergone genome editing, eugenic coercion to proactively opt for abortion would come into play. This choice would be expected in order to avoid failures of experimental treatments using genome editing, and the woman's body thus functions as a breakwater against the results of experimental failure. The same applies to the pregnancy of a woman using genome editing technology. Therefore, there are significant ethical concerns regarding the use of this technology in that (4) it is an experimental treatment that invades the body of the woman who becomes pregnant and gives birth, (5) it uses genetic characteristics as the basis for approving such an invasion, and (6) it restricts sexual and reproductive rights. Furthermore, (7) we must be held responsible by future generations and (8) to the ethical responsibility of scientists and society as a whole in line with changes in the state of technical knowledge. In order to examine the ethical challenges from this perspective, it is therefore necessary to (9) design a participatory consensus-building process and (10) devise public participation and new legislation. In Japan, people's excessive expectations for assisted reproduction are increasing, and even though the various challenges in reproductive medicine have been identified, there is still no legislation in place. There is, therefore, the undeniable concern that human reproduction using genome editing will be carried out in a slipshod manner in this country, leading to ethical and social problems. the Subcommittee on Bioethics and

Humanities therefore makes the following three recommendations regarding the issues of human embryos, etc. resulting from genome editing.

(1) Legal prohibition of reproduction using genome editing technology

As set forth above, the use of genome editing in human reproduction has numerous problems that cannot be overlooked, including human dignity, eugenics and social discrimination, and irreversible effects on future generations, and it therefore cannot be justified ethically, at least at present. Consequently, the following statements in the 2017 recommendation are considered to be relevant: that there should be a temporary prohibition on clinical applications of reproductive medicine involving genome editing and that basic research that clearly aims for applications in reproductive medicine should be withheld at the moment. Guidelines alone without regulations or penalties are insufficient, and legal regulations accompanied by penalties should be examined promptly in Japan.

(2) Basic research aimed at clinical application should be also prohibited

In legal terms, for the time being, it would be highly desirable to hasten legislation prohibiting not only the use of genome editing technology in human reproduction, but also, within the field of basic research, basic research that is clearly aimed at applications in human reproduction. Needless to say, basic research that aims to contribute to our understanding of the mechanisms of human reproduction and infertility or research into cures for incurable genetic diseases could be allowed following the ethical review process. This would be judged according to whether a plan to pursue the possibility and efficiency of repairing mutations and to give birth to genetically modified children in the future is discerned from the purposes of the research application. This judgment would depend on the deliberations of the ethics committee, and the requirement for prompt disclosure of the minutes of ethics committee meetings that would enable public scrutiny. In addition, the progress of the research (number of embryos lost, etc.) should be disclosed on an annual basis.

(3) The start of a nationwide dialogue for the development of a more comprehensive reproductive medicine laws.

In order to elucidate various effects of this technology on society as a whole, and to develop a comprehensive legislation of reproductive medicine, a nationwide dialogue should be initiated by the government involving diverse stakeholders such as the Cabinet Office, the Ministry of Health, Labor and Welfare, the Ministry of Education, Culture, Sports, Science and Technology, researchers working on genome editing, medical professionals at fertility clinics, prospective parents, patients with incurable genetic diseases, and the general public. To ensure that such dialogue takes place, sufficient information must be fairly provided to these stakeholders avoiding the manipulation of information. The government should urgently consider the design

of such participatory processes for the development of a comprehensive reproductive medicine laws.