


05 Uehiro Research
Division for
iPS Cell Ethics



Stem cells are a hotly debated ethical topic. This group seeks to build policy that allows scientists to communicate with the public in order to clarify the expectation of stem cell applications.



Data-based discussion of ethical issues in iPS cell technology

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Activities of Uehiro Research Division for iPS Cell Ethics

Survey of attitudes to ethical issues in iPS cell technology

Public interest and attitudes have a vital impact on scientific innovation such as iPS cell technology. It is therefore important to survey the attitudes of the general public. We surveyed 520 members of the public and 105 researchers about research using human-animal chimeric embryos (see Figure). The results revealed the following:

- 1) Around 80% of the general public and over 90% of researchers accept research to create pig embryos containing human iPS cells.
- 2) Around 60% and over 80% accept research to create a pig with a pancreas made of human cells.
- 3) Researchers had both higher expectations and greater concerns than the general public about this kind of research.
- 4) Members of the general public who outright refuse such research were very concerned about its unnaturalness and the infringement of human dignity.
- 5) Many respondents expressed unease and concern over animal welfare.

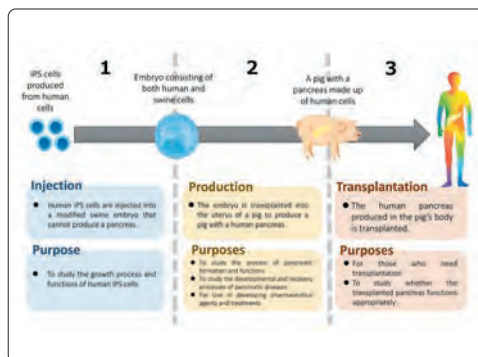
We have now launched a similar survey on research into the creation of human germ cells using iPS cells.

Identification of issues relating to the Act on the Safety of Regenerative Medicine(ASRM)

Since 2014, in Japan, cell therapy has been regulated by ASRM. However, the way many private clinic websites present information is viewed as problematic. We evaluated the websites of 24 clinics in Japan and found:

- 1) 74 types of cell therapy were offered for 126 conditions.
- 2) The scientific basis for the treatments was largely unmentioned.
- 3) None of the websites fulfilled E-Health Code of Ethics Minimum Standards.

Meanwhile, to study the collection, storage, and supply of umbilical cord blood used for cell therapy in private medicine, we have launched a survey in collaboration with Keio University.



Example of research using human-animal chimeric embryos



- (1) Public attitudes in Japan towards human-animal chimeric embryo research using human iPS cells. Sawai T *et al. Regen Med.* (2017) 12(3): 233-248.
- (2) The current status of clinics providing private practice cell therapy in Japan. Fujita M *et al. Regen Med.* (2016) 11(1): 23-32

- (3) Recent court ruling in Japan exemplifies another layer of regulation for regenerative therapy. Ikka T *et al. Cell Stem Cell.* (2015) 17(5): 507-8



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Working with society to create a new vision of life for the age of regenerative medicine — Yoshimi Yashiro

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For regenerative medicine to progress, an understanding of science is needed

Along with the science, the advancement of regenerative medicine depends on a number of ethical, legal, and social issues. One example is the creation of chimeric individuals derived by injecting human iPS cells into animal embryos for organ generation. In response, our laboratory has surveyed the opinions of researchers and non-specialists.

Exploring society's acceptance of the life sciences

Although a high level of support for regenerative medicine was shown in our survey, many members of the public said they would not accept the creation of chimeric embryos and individuals, indicating a large divergence of attitudes between the public and researchers. Additionally, we have examined a wide range of media including literary journals as well as television and radio, newspapers, and the Internet, to evaluate the evolution of these attitudes in a post-iPS cell society.

Promoting responsible research and innovation in regenerative medicine

Regenerative medicine has attracted great interest from the research community and a large amount of support from the public. Nevertheless, the research needs to progress transparently. As part of a program launched in 2014 by the Japanese government, we have been involved in the planning and proposal of educational courses for the general public and have implemented other activities to improve public knowledge of regenerative medicine and the life sciences. From 2016 we began investigating the cost of regenerative medicine research, considering financial aspects from the initial stage of the technology's development and seeking to link this to policy.



Symposium on Developing Risk Communication Models organized by the Ministry of Education, Culture, Sports, Science and Technology



- (1) Current public support for human-animal chimera research in Japan is limited despite high levels of scientific approval.
Inoue Y *et al.* *Cell Stem Cell*. (2016) 19(2): 152-3
- (2) Recent court ruling in Japan exemplifies another layer of regulation for regenerative therapy.
Ikka T *et al.* *Cell Stem Cell*. (2015) 17(5): 507-8
- (3) Future relations between humans and artificial intelligence.
Ema A *et al.* *IEEE Technology and Society Magazine*. (2016) 35(4): 68-75



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