

Scientists Call for Ban on Human Gene Editing

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Japan has banned gene-edited human embryos and international scientists are increasing the call to ban the highly uncertain and risky practice of gene-editing of human DNA. The growing opposition comes as details of a Chinese biologist's attempt to gene-edit embryos to resist HIV led to massive criticism of the flawed experiment. While the technology of altering DNA of humans, plants, animals is still in its infancy, the rate at which it is spreading worldwide with little oversight gives cause for alarm.

In December, 2019 the Japanese Health Ministry recommended a ban on implanting genetically modified human embryos. They warned such procedures could lead to a market for 'designer babies.' They follow recommendations of a panel of experts who warned that allowing gene-edited human embryos to be placed in the uterus for gestation held very serious health risks for both the infant and for future generations. In 2018 the Japanese government had moved to permit gene-editing of human embryos.

The latest decision by Japan to call for a ban on using the gene-edited embryos to give birth to gene-altered babies is a clear reaction to worldwide protest against a Chinese biologist who reported he had gene edited twins to be immune to HIV. It was the first report of babies born who had been genetically edited with CRISPR. Since then a growing number of scientists have called for a moratorium on gene editing of humans. Feng Zhang, a member of the Broad Institute of MIT and Harvard and the co-inventor of CRISPR/Cas9, has called for a moratorium on gene-edited babies. Nobel laureate David Baltimore said the He human experiment showed "there has been a failure of self-regulation in the scientific community."

Human gene experiments

Last December, a full year after proclaiming their success in creating the first gene edited twins who were HIV resistant, Chinese biologist He Jiankui, professor at Southern University of Science and Technology, agreed to release the full details of his human gene editing experiment. The MIT Technology Review has now published extensive excerpts from the He document. In November, 2018 He claimed a major first: to have used the gene editing technology CRISPR to change the DNA of human embryos during in vitro fertilization using CRISPR gene editing technology.

The MIT critique is a devastating condemnation of the scientific procedures of He and his team. After criticizing He for ignoring ethical and scientific norms in creating the twins Lula and Nana, allegedly born in late 2018, the MIT journal states, that Prof. He did not even succeed in reproducing the gene mutation that gives HIV resistance. Fyodor Urnov, a genome-editing scientist at the University of California, Berkeley told the MIT Technology Review:

"The claim they have reproduced the prevalent CCR5 variant is a blatant misrepresentation of the actual data and can only be described by one term: a deliberate falsehood."

In addition to their deliberate falsehoods, the MIT journal points out that He and his associates have made it difficult to find the family by deleting the names of the fertility doctors from their paper and giving a false date of birth. In short, the human gene editing experiment did not prove what He had claimed and could have created major biological dangers <u>instead</u>.

Reacting to the international uproar over He's radical experiment, Chinese government investigation found He Jiankui violated state law in pursuit of "personal fame and fortune," sentencing He to three years in prison.

In another highly controversial case involving human gene editing, a team of researchers led by Prof Juan Carlos Izpisúa Belmonte from the Salk Institute in the USA have produced monkey-human chimeras in 2017. The report says that the research was conducted in China "to avoid legal issues." In December 2019 Chinese scientists announced they had created pig monkey hybrids as a step to eventually grow human organs in animals for transplant.

"This is the first <u>report</u> of full-term monkey-pig chimeras", Tang Hai at the State Key Laboratory of Stem Cell and Reproductive Biology in Beijing told New Scientist.

The real issue in the exploding use of gene editing to alter DNA in animals, plants and even humans is the fact that it is not at all clear how safe it is in the long term. Most countries including the United States require no special government regulatory oversight. Recently it was discovered that gene edited mosquitoes intended to eradicate zika or malaria in Brazil had failed and the mutants had survived. The genetically engineered mosquitoes produced by the biotech company, Oxitec, now part of the US company Intrexon, escaped human control after trials in Brazil and are now spreading in the environment.

Potentially CRISPR gene-editing technology might enable positive change as well, such as treatments for genetic diseases; altering the germline of humans, animals, and other organisms; and modifying the genes of food crops for positive traits. We don't know at this point. Yet the degree of unbiased scientific and government oversight over use of CRISPR is appalling and potentially dangerous. At present China seems to be making major experiments in gene editing and sees it as a core part of its biotechnology goals, one of the ten areas of Made in China 2025. At this point China would significantly add to its credibility in terms of safe research by following the lead of Japan and formally banning gene editing experiments of humans as a principle of precaution.

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Seeds of Destruction: Hidden Agenda of Genetic Manipulation

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This skilfully researched book focuses on how a small socio-political American elite seeks to establish control over the very basis of human survival: the provision of our daily bread. "Control the food and you control the people."

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