

Why We Should Declare a Moratorium on CRISPR Babies

by Christina Griffith

In response to the shocking [announcement last fall that a Chinese researcher had used Crispr to produce genetically edited twin babies](#), scientists from seven countries have proposed a moratorium on editing the heritable DNA found in sperm, eggs, and embryos.

Published today in the journal [Nature, the proposal for voluntary restrictions](#) on germline editing seeks a temporary stay of any clinical applications of the Crispr technology while international guidelines are negotiated. Developed in 2012, Crispr uses RNA and an enzyme to locate and destroy specific DNA, effectively customizing a genome, the blueprint for living beings. In germline editing, the altered DNA is passed on to subsequent generations.

While the call for a moratorium connotes implies a sweeping new ban, in practice the suggested halt does not represent a change in policy for most laboratories. These voluntary restrictions will not affect existing legislation in nearly 30 countries that already bar use of Crispr in modifying human embryos. Editing DNA in cells that do not get passed on in reproduction, called *somatic* cells, is at the forefront of experimental gene therapy and is not restricted under the proposed moratorium. Also unaffected would be research into DNA editing performed in laboratory settings without human subjects, such as cell cultures or animals.

What the moratorium does accomplish is mobilizing scientists and policy makers to address controversial issues surrounding the broader topic of bioengineering human beings. These technologies have the potential to alter the medical destiny of future generations: longevity, improved quality of life, a cure for cancer, and the end of viruses that have evolved alongside us. The biggest threat to this future is our penchant for undisciplined exploitation and hubris.

The announcement made by Dr. He Jiankui, via YouTube rather than in a scientific journal, appears to have surprised a community that just a few months earlier heard Dr. He speak at a genome engineering conference in Cold Spring Harbor, New York. He described his experimental work editing genes in embryos to resist HIV infection; omitting that he had implanted those embryos in a human subject.

In addition to violating Chinese law that bans such experiments on human subjects, Dr. He also stands accused by fellow scientists of sloppy, unethical, unprofessional and poorly designed experimental work.

In response, the international scientific community is trying to develop a framework for assessing risks and resolving issues surrounding clinical use of germline editing. Editing the DNA of living human subjects is still in its infancy. Research into gene therapies has been both [disastrous](#) and [promising](#), but the difference between modifying somatic cells in a patient with an autoimmune disorder, for example, and designing an embryo that is HIV resistant, is in the unintended “off-target” mutations that can result in unpredictable consequences for the engineered person’s life, health, and offspring.

Medical and scientific justifications for editing DNA to cure diseases and eradicate disabilities are hard to argue with. However, the social and moral implications of this technology are much more complicated. Hotly debated in the general public as well as scientific circles is whether the modification of the human genome is an ethical pursuit at all. Many religious groups are aghast at what is rendered most simplistically as “playing God.” Moreover, as with any technological advancement, access and privilege create inequality. Is it at all possible to ensure that through genetic enhancement all members of future generations will enjoy disease-free lives, or only the fortunate elite who can afford it?

These are serious questions that must be addressed by the international community. It will require cooperation between governments and outside agencies, agreements between

researchers and regulatory bodies, and acceptance of uniform enforcement. Unfortunately, the international political climate does not appear promising.

Regardless, a framework must be developed. This is necessary not only to protect human subjects from unregulated and dangerous experimentation, but to protect the technology itself. Performing gene editing is not particularly expensive nor technically difficult, but as Dr. He demonstrated, performing it well is. The misuse of Crispr can only be avoided with a concerted effort by the scientific community. The short-term consequences of failure could mean individuals like Dr. He's twins who, according to the sparse details of the procedure that scientists are now reviewing, have potentially damaged genes as a result of the unsupervised, unethical work. Long-term consequences could mean future generations of uncontrolled genetic mutations we are unprepared to treat, and the exploitation of class differences in pursuit of designer children.

Humanity has never been able to reign in its baser instincts. In accepting a temporary moratorium, no one in the scientific community is giving anything up. We must use this time to address the medical, social, and ethical considerations necessary to secure a promising future. Before we can take advantage of this technology for a better quality of human life, we must consider and agree on an acceptable, ethical, and healthy approach to our newfound power.