

This response was submitted to the Call for Evidence held by the Nuffield Council on Bioethics on Genome editing between 15 May 2017 and 14 July 2017. The views expressed are solely those of the respondent.

Dear Nuffield Council on Bioethics,

I am absolutely opposed to the genetic engineering of human germline, and believe it must be banned, globally!

There are way too many ways altering the complex genetic of the human organism will lead to unintended consequences, especially ones not immediately obvious - perhaps not for decades, or even for a generation (which means it would have spread in the population before being recognized, belatedly, affecting many lives).

Even if gene editing is 100% pinpoint accurate - which CRISPR-CAS9 is NOT, as there is a lot of evidence that it can cause off target mutations - it STILL may lead to unintended consequences, due to the limitation in our understanding of the human system. Even the mere procedure of laboratory manipulation of the germline cells or the embryo, and artificial insemination, could all potentially cause damages that aren't immediately obvious.

History of the biological and medical sciences, and of genetic engineering, is replete with examples of such surprises. History of other natural sciences similarly always reveal that nature has more surprises for us every time we thought we're so clever and have it under control. Our manipulations of nature lead to countless examples of destruction and devastation.

Whereas altering somatic cells affect only the individual, and may be acceptable if the person so chooses after being fully informed of the risks, it is absolutely not acceptable to do so to germline cells or to an embryo. **Neither the parents nor the doctors have the right to impose such risks on the future generations.**

To avoid having children with inherited severe genetic diseases, genetic testing of embryos and fetuses is already available.

If parents don't want to abort a fetus due to ethical reasons, then knowing the fact that (one of them) carries such a diseased gene and may pass it on to their offspring, means they have the responsibility to avoid getting pregnant to begin with. It's not their right to alter the baby's genes and let the baby (and future generations) risk unforeseen consequences. If it means they have to abort an affected fetus, or mustn't get pregnant at all, so be it - life is not perfect.

Additionally, it is a completely slippery slope from "curing genetic disease", to "enhancing human trait", to designer babies, as your own survey questions (which is designed with a strong bias in favor of the technology) show.

While severe genetic disorders are relatively rare, enhancing human traits is in fact where the primary market for genetic engineering will be, if such procedure is legalized. Not only will this hugely exacerbate inequality (as only affluent couples can afford it), it will also drastically alter the human genetic pool, reducing its diversity and resilience as a species.

And the military can go unhindered to create SUPER WARRIOR ZOMBIES.

Yes, you have full permission to publish my comments with my name.

Sincerely,

Maggie Zhou, PhD (genetics)