**Resolved**: Bio-engineering of humans should be banned.

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| --- | --- |
| **Pro** | **Con** |
| Biological rich-poor gap | End disease |
| Mistakes—mutant humans | Banning anything destroys creativity |
| Moral argument: “playing god” | Scientific progress—other possible impacts |
| Purpose-bred humans removes autonomy | Improve key markers (memory, strength, etc.) |

**Pro: Edited genes may carry risk**

#### *Rogue Chinese scientist made 'foolish' choice in gene-edited babies.* ***Reuters (2019).****U.S.. Retrieved 16 November 2019, from https://www.reuters.com/article/us-health-china-genes/rogue-chinese-scientist-made-foolish-choice-in-gene-edited-babies-idUSKCN1T41ZO*

A rogue Chinese scientist who caused outrage last year when he said he had created the world’s first “gene-edited” babies in an attempt to protect them from HIV may also have put them at risk with a “foolish” choice of gene, experts said on Monday.

**....**

But in a study published in the journal Nature Medicine on Monday, scientists found that people who have two copies of a so-called “Delta 32” mutation of CCR5 - which protects against HIV infection in some people - also have a significantly higher risk of premature death.

**Pro: Unethical: Humans not ‘wise’ enough for powerful technology**

#### *Genetically engineered humans will arrive sooner than you think. And we're not ready.* ***Vox. (2016).****Retrieved 16 November 2019, from https://www.vox.com/conversations/2016/10/24/13357298/michael-bess-biotechnology-bioengineering-technology-revolution-science*

“We’re going to give ourselves a power that we may not have the wisdom to control very well,” he told me. But that won’t stop us from developing it, and Bess’s book is an attempt to wrestle with the implications of this.

....

But what's scary about it is that the human beings will have much greater powers over not just their surrounding environment, not just their ability to engage in warfare and things like this, but they'll have power to reach directly down into the biological basis of their mind and spirit and soul.

If we transform ourselves beyond a certain point, which seems inevitable, we’ll have to ask what it means to be a human in a world of walking gods. And I don't know what the answer to that is.

**Pro: Gene editing heavily regulated around the world**

#### *Karsten, B.* ***Brookings. (2019).****Is there a responsible way forward for gene editing?.  Retrieved 18 November 2019, from https://www.brookings.edu/blog/techtank/2019/10/29/is-there-a-responsible-way-forward-for-gene-editing/*

Although the U.S. has no outright ban on editing the genes of human embryos, a [restrictive regulatory landscape](https://ir.lawnet.fordham.edu/flr/vol87/iss1/15/) and a lack of federal support has imposed significant restrictions on researchers.

….

Additionally, Congress has banned NIH funding for research involving live human embryos, forcing researchers to either abandon these projects entirely or seek private funding with fewer restrictions.

Additionally, a patchwork of [international regulations](https://rbej.biomedcentral.com/articles/10.1186/1477-7827-12-108) further impede attempts at creating a comprehensive framework for regulating CRISPR and other gene editing technologies. While [Sweden, Belgium, and the UK](https://academic.oup.com/hropen/article/2018/1/hox024/4797562) allow the creation of human embryos for research purposes, the complex regulatory landscape is murkier in other countries, comprising of legally binding bans, ambiguous rules, or unenforceable guidelines.

**Con: Twin girls edited for HIV resistance, possible improved intelligence**

#### *Gene-edited Chinese babies may have enhanced brains.* ***South China Morning Post. (2019).****Retrieved 16 November 2019, from https://www.scmp.com/news/china/science/article/2187497/gene-edited-chinese-babies-may-have-enhanced-brains-scientists*

He Jiankui could have altered cognitive functions of twin girls when he used CRISPR to disable the CCR5 gene that allows HIV to infect human cells

CCR5 is linked to deficits in learning and memory but it is impossible to predict the effect of gene editing, according to neurobiologist

**....**

Neurobiologist Alcino J. Silva, from the University of California, Los Angeles, who co-authored a 2016 study that found CCR5 was linked to deficits in learning and memory, said the gene editing likely affected the babies’ brains, though the exact effect was impossible to predict.

**Con: Gene editing could cure deafness**

#### [*David Cyranoski*](javascript:;)*.* ***Nature****. 18 October* ***2019****. Russian ‘CRISPR-baby’ scientist has started editing genes in human eggs with goal of altering deaf gene.* [*https://www.nature.com/articles/d41586-019-03018-0*](javascript:openWebLink('https://www.nature.com/articles/d41586-019-03018-0'))

Russian biologist Denis Rebrikov has started gene editing in eggs donated by women who can hear to learn how to allow some deaf couples to give birth to children without a genetic mutation that impairs hearing. The news, detailed in an e-mail he sent to Nature on 17 October, is the latest in a saga that kicked off in June, when Rebrikov told Nature of his controversial intention to [create gene-edited babies resistant to HIV](https://www.nature.com/articles/d41586-019-01770-x) using the popular CRISPR tool.

**Con: Gene editing could cure up to 89% of genetic defects**

#### *Jessie Yeung, C.* ***CNN. (2019).****New gene editing technology could correct 89% of genetic defects.  Retrieved 18 November 2019, from https://edition.cnn.com/2019/10/22/health/gene-editing-study-intl-hnk-scli-scn/index.html*

Scientists have developed a new gene-editing technology that could potentially correct up to 89% of genetic defects, including those that cause diseases like sickle cell anemia.

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About two-thirds of known human genetic variants associated with diseases are single point gene mutations, so gene editing has the potential to correct or reproduce such mutations.