

# Building the best of us

Business



The 1997 movie *Gattaca* has been getting a lot of buzz lately, and rightfully so. In a time where the field of genetic engineering is advancing at an unprecedented rate, a dystopian society based on designer babies is closer and scarier than ever before. Throughout human history, people have engineered plants and animals via selective breeding, but it's only recently that scientists have actually begun to understand this process, due in large part to the human genome project that recorded the base pairs of over 20,000 genes.

Companies like 23andMe and AncestryDNA can now sequence your genome for as low as 224 dollars, a process that first ranged in the billions. As this science advances, we need to be ready once it opens a door that can't be closed. When you're born, the possibilities for what you can be are limitless. Could a future determined by a petri dish offer even more? We might already have the technology to take control over our own evolution. A massive new breakthrough called CRISPR has revolutionized gene editing from the way we modify food to how DNA labs function.

Before CRISPR, the editing process was imprecise, expensive, and complicated. Some labs saw leaving the outcome up to chance was simply a better investment, but CRISPR works uniquely, utilizing Cas9, an incredibly precise protein in bacteria that splices DNA by using the bacterium to cut out harmful viruses. Scientists have discovered the manipulation of the Cas9 gene is bafflingly simple. Drop the bit of DNA you want to be cut into Cas9, and it does its job like a surgeon. The second part of CRISPR's cut-and-paste system may be even more straightforward.

By placing the desired DNA next to the space left by Cas9, the proteins in the cell will build it into the system. The dominoes set into motion by this process are falling fast. Along with advancing GMO crops, it has already been used in an effort to erase malaria from the planet by engineering the *Anopheles gambiae* mosquito (the primary carrier of malaria) to be unable to produce. Meanwhile, a group of scientists infected every cell in test mice's bodies with HIV. After administering two injections of CRISPR-modified genes, scientists were able to cut out fifty percent of the HIV virus from each type of cell. Testing on the human genome has been led by two teams in China.

They edited human embryos for HIV resistance and changed a gene linked to blood disease. However, both of the study's embryos were not viable. Other labs in Sweden and around the world have been granted permission to start embryonic testing, and that's where we get back on topic of designer babies. In one part of the movie *Gattaca*, Vincent and Irene are listening to a genetically manufactured man play a piano piece. Their conversation offers up a good topic. If you have ever seen *Gattaca* (1997) you might remember when Vincent, the main character, said: Twelve fingers, or one, it's how you play.

In response, Irene said: That piece can only be played with twelve. By taking control of our own evolution, we erase the limitations of our bodies. We could edit humans suited for extended durations in space. Humans that could breathe underwater, and humans with extra appendages as seen in the piano man. When it comes to CRISPR, there's a lot of room to dream big, and

with all these studies going on to eradicate disease, we may start to agree with Vincent from Gattaca.

I'll never understand what possessed my mother to put her faith in God's hands, rather than her local geneticist. What Vincent points out is that his life has become grounded by his genetic inferiority. The punishment in this society for lack of genetic engineering is a status of "invalid," a status that snatches several opportunities away. As modified people become more and more mainstream, it may be seen as unethical to not editing an embryo. It makes sense that we shouldn't subject a child to needless suffering when the technology exists to free them from the pain of disease.

But as predicted by the movie Gattaca, we won't stop there. We'll work to perfect our babies. In some cases, it's already happening. Thus far, the process of in vitro fertilization is as close as we've come to actual, breathing designer babies. Parents can't exactly modify a specific egg, but with the help of relatively cheap genetic sequencing, they can help create one without debilitating diseases. They can be assured their children won't have to struggle with the same illness they or their family members went through.

After all, natural conception does not care about the well-being of the child that might be born—parents do. Sometimes the purpose of in vitro fertilization is for vanity reasons. Some couples will pay up to \$18,000 to choose the sex of their child. Although many countries have banned non-medical sex selection, such as Australia, China, India, Canada, and the United Kingdom, it remains legal in the United States. Some fertility clinics

have announced that among the option to choose sex, they will begin to offer traits like hair color, eye color, and skin color.

As you may be wondering, what's so bad about wanting your kid to have green or blue eyes? Look at Jerome from Gattaca; he's beautiful. Having the ability to choose your child's eye color isn't essentially wrong. It's what follows that should give you shudders. There's been a lot of articles on the Gattaca reality, but none go into the side effects of entirely manufactured babies. A society whose members are able to handpick every single one of their child's mental and physical traits is a society driven by eugenics. It could be dangerous.

James Clapper, U. S. director of national intelligence, recently added gene editing to the annual worldwide threat assessment report of the U. S. intelligence community. It's listed under " weapons of mass destruction and proliferation.

" This article goes into it with more detail. " Given the broad distribution, low cost, and accelerated the pace of development of this dual-use technology, it's deliberate or unintentional misuse might lead to far-reaching economic and national security implications," the report said. Imagine if a country like North Korea was able to harness this power and use it to create super soldiers. And the very real possibility exists that CRISPR could eliminate aging, granting people eternal youth. Seeing as damage to telomeres (protective capsule around DNA) gradually accumulates mutations in genes and is what causes people to age.

One of the creators of Crispr, George Church, said in a Washington Post interview “ One of our biggest economic disasters right now is our aging population. If we eliminate retirement, then it buys us a couple of decades to straighten out the economies of the world,”. But there’s also the stress an unaging population would have on the world’s resources. Overpopulation has already started to affect large cities such as Beijing. Then there’s the promise some fertility clinicians are making, a promise to wipe out an embryo’s risk of mental disease.

Which, let’s be honest, is baloney. Mental illness doesn’t only happen in your genome. Its a host of factors ranging from a parent’s decision making, the surrounding geography from which they are raised, and the society they live in. Not to mention your own decision making in the early teens highly affects your adult life. “ Plagued by mental health disorders—such as depression, bipolar polar disorder, and schizophrenia—are a host of artists, writers and famous people throughout history. In fact, many times the eccentric tendencies of genius are associated with mental illness.

” Is a quote from this article that describes the link between mental illness and intelligence. It goes on to list several examples of great minds with bipolar disease. Including Vincent Van Gogh, Buzz Aldrin, Emily Dickinson, and Ernest Hemingway. So much of a person can stem from a certain type of mental disorder. There’s no telling all the talents, ideas, and personality traits that are tangled up in it all.

In conclusion, It’s not true, or fair to say that a person with mental illness is damaged goods. Vincent [narrating] I belonged to a new underclass, no

longer determined by social status or the color of your skin. No, we now have discrimination down to a science. But in Vincent's world, he is considered damaged goods. Even though, besides his glasses, he's perfectly healthy and very ambitious.

Part of what makes Vincent such a good main character is knowing how valued he'd be in the society we live in today. Whereas, in *Gattaca*, he's often and nonchalantly referred to as an "invalid". Designer babies would be better looking, more intelligent, and more resistant to disease. Designer babies could create a gap in our society the same way it did in *Gattaca*. Especially since the procedure could be quite costly in the beginning, it may divide the rich and poor at a genetic level.

Vincent: for someone who was never meant for this world, I must confess I'm suddenly having a hard time leaving it. Will this new form of inequality permeate our society? That's a question I suspect we won't know the answer to until it's already upon us. Let's hope no one gets to feel like Vincent.

Besides the preciseness of CRISPR and advances in vitro fertilization, 23andme is a corporation introducing the concept of designer babies among the general public. 23andme was Recently granted a patent which allows the company to analyze two sets of DNA and determine traits the child is likely to possess.

As noted by the Huffington Post, " sperm banks already provide an array of donor information-What's unique about the patented technology is that it analyzes DNA from other individuals together with a person's own to identify a preferred donor". Examples of traits tested for in the patent include 100%

Likely Sprinter, lactose tolerance, high probability of blue eyes, longest expected lifespan, and their risk of certain diseases. There's no denying that this science is taking hold and is here to stay. Austen Heinz, CEO of Cambrian genomics, Can't imagine a future where we don't edit our babies online like 23andMe. But In case you're starting to fear the future, I want you to know that genes hardly ever control one thing.

For instance, deleting the CCR5 gene would make people resistant to HIV, but also make them 13 times more likely to die of West Nile virus. " I can only think of a handful of things that are plausible variants for editing," says Eric Lander from the broad institute in an interview from the Atlantic. Like people with the E4 version of the ApoE gene have much higher risks of Alzheimer's disease. You could edit that, says Lander, " but I can't swear there'd be no problem because ApoE4 has been kept around in 3 percent of every human population." That gives him pause. " If [editing that gene] is such a good idea, why didn't evolution think about doing it?" he asks.

We're closer than ever before, but not close enough to control one function of a gene and not others. Generally, those who agree that designer babies should exist stick to the eradication of disease as their reason. People who hate designer babies often feel very, very uncomfortable with the idea of being able to control a child's traits. It seems to them like they're entering into a future lacking compassion. A future that only judges a person by Guanine, Adenine, Thymine, and Cytosine.

Which is okay, that thought is scary. None of us know which era we're headed towards. There's something unsettling about imagining a world we



don't belong in. Especially one that seems so close. Will we be pitied as we pity people from past generations? As the poor dears who suffered from their lack of technology. Will we be responsible enough to handle it? " There's no gene for fate.

" -Vincent That's right Vincent. And we shouldn't ban all usage of human gene-editing because we're scared of it. That forces the science to work in the shadows. A dangerous, unregulated direction to move into. And if there's one thing we'll never be able to get rid of, its Human Error.

The technology we have can be used for wonderful things, we just have to keep an eye on it. " I not only think that we will tamper with Mother Nature, I think Mother wants us to." - Willard Gaylin Whether it's adapting ourselves to live on sea planets or playing 12 fingered piano solos, we remain apart of the human race. Devoted to pursuing our unrelenting curiosity.