Are 'Designer Babies' Possible? Researchers Say No

The prospect of "designer babies" is both a dream and a nightmare.

For a growing number of companies, it is not just a dream, but the pot of gold at the end of the rainbow. The Hong Kong company [Gene Discovery](#) offers its customers genetic testing for their children's "talent" — IQ, emotional IQ, nutrition metabolism, expertise (whatever that is), and physical condition.

One of its executives, Chris Jung, told the [Washington Post](#) that he had changed his plans for his daughter on the basis of a test.

"Originally, I would like her to become a professional like a doctor or lawyer," he said. "But once I looked into the results, it talked about how her memory is so bad. I switched my expectations because if I would like her to become a professional, she needs to study a lot and remember a lot."

So much for the Confucian view of success in education — [that hard work trumps talent](#), even in mathematics.

For well-heeled helicopter parents the world over, genetic analysis could be a dream come true. Potentially they could sort through their embryos to find the one with the highest IQ or the greatest height. "Those with the cash to do so will have an opportunity to give their offspring a greater chance of living a long and healthy life," reports [The Economist.](#)

Some bioethicists even argue that they have a serious moral obligation to do so. Oxford's Julian Savulescu has defended his theory of "[procreative beneficence](#)" for years. "Selection for non-disease genes which significantly impact on well-being

is morally required," he says.

The nightmare is, of course, the triumphant return of eugenics. Completely discredited after Nazi atrocities as a government policy, it is making a comeback as consumer choice offered by firms like Gene Discovery.

But before either side of the debate becomes too agitated about the future, are designer babies possible?

A study published in [the leading journal Cell](#) last week says no.

The ability to select for traits that are brought about by multiple genes — rather than genetic diseases caused by a single mutation — is more far off and complicated than most people probably realize.

While the recent live births resulting from human embryonic CRISPR editing have heightened global attention to these issues, the most practical approach to genetic enhancement of embryos is still preimplantation genetic diagnosis of IVF embryos.

"The ability to do genomic sequencing of embryos is much easier than it was even five years ago, and we know many more gene variants linked to certain traits," says one of the authors, Shai Carmi, of the Hebrew University of Jerusalem. But it's still not possible.

Carmi's team looked at the feasibility of selecting embryos based on each of two traits caused by multiple genes — IQ and height — as a kind of thought experiment.

While there are many traits determined by multiple genes that the researchers could have investigated, they chose to focus on IQ because it is frequently brought up in concerns regarding eugenics and on height because it is objectively measurable and a lot is known about the complex genetics

influencing height.

The researchers ran computer simulations using genomic sequences from real people to model genomic profiles of hypothetical embryos that would result from pairs of those people — some actual couples and some artificially paired. In the simulations, they assumed that each couple would have ten embryos to choose from. They then predicted the IQ or adult height for each of the offspring based on the gene variants present in the genomes of the simulated embryos. Their experiments were based on the assumption that the embryo with the top score could then be selected for implantation.

They found that expected advantages to these theoretical offspring would be relatively small. For IQ, the most it increased above the average of the embryos was only 2.5 points. For height, the most it increased above the average was only 2.5 centimeters.

And even if some people believe that those increases were great enough to warrant using the technology, they are not guaranteed.

"There is much about these traits that is unpredictable," Carmi says. "If someone selected an embryo that was predicted to have an IQ that was two points higher than the average, this is no guarantee it would actually result in that increase. There is a lot of variability that is not accounted for in the known gene variants."

Apart from the serious ethical issues, designer baby hucksters face several challengers.

For one, the researchers conducted their simulations using ten embryos from each couple. But in reality, many couples get far fewer viable embryos when they do IVF. For example, with five embryos, the gain would be reduced to 2.5 IQ points or 2.5 centimeters. When they based the simulation on 50 or 100 embryos, they found that the benefit per embryo decreased as

the number of embryos increased, indicating diminishing returns even with large numbers of hypothetical embryos to choose from.

Besides, our knowledge of gene variants linked to traits like height and IQ (like blood pressure and cholesterol) applies mainly to people of European descent. They would be much less applicable for people from other parts of the world.

Finally, attempting to maximize more than one trait at once, a potential future scenario, would make embryo selection far more complicated: an embryo that ranked highest for IQ may rank lowest for height, for example.

To corroborate their findings, the researchers used real-world data. They reported on an analysis of 28 families with up to 20 children (the average was about 10) who have grown to adulthood. Based on gene variants, they found that the offspring they would have selected for having the greatest height was not always the tallest one in adulthood.

In short, designer babies are still science fiction. We should all chill out.

—

This [article](#) has been republished from MercatorNet under a Creative Commons license.