

# Babies With 3 Genetic Parents: Good Idea or Just Wrong?

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March 07, 2014

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Doctors and scientists are about to cross an important ethical line, a very bright line, and it is interesting to wonder whether they should. Until now, if you perform genetic therapy, if you try to repair diseases or treat diseases -- cancer, hemophilia, melanoma, different types of eye diseases -- you are changing the genes in the individual, but they will not be passed along to their descendants. That is where science draws the line. You make a gene therapy repair for macular degeneration. It may repair the cells in the eye that have worn out, but it will not be something that is inherited by future generations.

But a new form of therapy, so-called mitochondrial therapy, breaks through the line that doctors and scientists have for a long time said they will not cross: to create changes in individuals that will be passed along to future generations.

Let me explain this therapy. Some people are born with mitochondrial diseases. The mitochondrion is the part of the cell that is the battery. It has its own little component of DNA. Geneticists have realized that if you replace diseased mitochondria with normal mitochondria from a donor egg and put it into an embryo, you can take someone who has mitochondrial diseases that are often lethal or severely disabling and make a healthy child. It sounds good. What could be wrong with repairing a faulty battery in the cell that will allow a child to be born who is healthy and will have a normal lifespan?

The problem is that you have crossed the line. Those changes in that mitochondrial DNA are going to be passed on to future generations. Mitochondrial DNA is inherited, and the offspring of this child that has these engineered mitochondria will get the new mitochondrial DNA.

## Can We Curb Our Enthusiasm?

Some people, and I am in this group, would say that if you can fix a disease, if you can repair something that is deficient by changing genes, even if they are passed on, that is not a big deal. Others, however, warn that once you cross the line from gene therapy for the individual to genetic engineering of inherited genes, you are opening the door to eugenics. What begins as repairing diseases today can become efforts to genetically engineer future generations of better (or even perfect) babies. Who is going to stop someone from saying, "Hey, why don't we make taller children?" Or if a set of parents wants to use techniques of genetic engineering, "Why don't we make children who are less likely to be homosexual?" "Why don't we make children who are less likely to have mental illnesses?" There are perfection problems here, and whether we want to cross the line into eugenics is really what this simple mitochondrial procedure is asking us to address.

In my opinion, I believe you can still make a distinction between treating diseases -- clear-cut diseases such as the mitochondrial disorders -- and opening the door to efforts that are purely preference or aiming at perfection. I still believe that you can hold the line if that is what our society chooses to do.

Others are doubtful. They still think that once the door opens, the slippery slope will follow. My own view here is that the door is going to open. We will see genetic engineering of heritable genes used to repair diseases and disorders, so if we are going to draw the line in a new place, we had better have that debate about medicine's responsibility to stick to disease and not get into cosmetic genetic engineering.

I am Art Caplan, at the NYU Langone Medical Center. Thanks for watching.

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