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# George Church, CRISPR Pioneer, Embraces Alternative Tech In Project To Recode A Human Genome



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Healthcare

*I cover science and medicine, and believe this is biology's century.*

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Harvard Medical School's George Church.. (AP Photo/Susan Walsh)

George Church, a Harvard scientist who pioneered the use of the enzyme CRISPR to edit the genes of human cells, will use an alternative, older technology in an effort to recode an entire human genome in hundreds of thousands of locations in order to make it immune to viruses.

The news was announced by Collectis, a biotechnology company that controls the intellectual property around the older technology, called TALENs.

In an interview, Church, a core member of the Wyss Institute for Biologically Inspired Engineering, made clear that he thinks every technology possible should be part of his effort, called GP-Write, which aims to reduce the cost of editing DNA by 1,000-fold, much as the original Human Genome Project led to a dramatic decrease in the cost of reading human DNA. But he said that there are still issues with any technology that necessitates cutting DNA, as CRISPR does, for making large numbers of genetic changes, and that he thinks the TALEN technology may hold promise, too.

"It is also fair to say there is quite a fad tendency that when a few positive results or the illusion of cost can drive a field away from something that is a reasonable technology," Church says. "I have a tendency to keep following technologies long after they've been discounted or long before they have been counted in. There is no bad technology."

eGenesis, a company Church co-founded, has been using CRISPR to make edits to pigs in order to remove retroviruses embedded in their genetic code that some worry could be dangerous to humans. The goal is to make the pig organs transplanted into people. But the goal with the rewrite program is much grander than with that effort.

Church says that removing the porcine retroviruses will involve making at most 62 genetic edits. (In the end, he says, the task was done with 25 changes.) Another project he is involved in, to make an Asian elephant resemble a woolly mammoth, would require 44 changes. But the changes be considered for making human cells virus-proof would require making 230,000 changes, he says. If it worked, the cells might be used in manufacturing or to create cancer-killing white blood cells of the type that Collectis is developing. But the implication would be even bigger: it would mean that in the future DNA might be far more changeable than just about anyone imagines now.

Or, at least, anyone but George Church.

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**Matthew Herper**

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