

# Scientists Sound Alarm as Gates, WEF Promote Gene-Editing Technology for Everything From Fake Meat to Designer Babies

*Bill Gates and the World Economic Forum are among the biggest promoters of CRISPR, a recently developed gene-editing technology, but scientists interviewed by The Defender warned about the technology's flaws and risks.*

**By [Michael Nevradakis, Ph.D.](#)**

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CRISPR, a recently developed gene-editing technology is promoted as a potential solution to numerous diseases, to food security and climate change — even as a way to deliver “designer babies” and bring extinct mammals back to life.

The technology has attracted significant investments and the attention of actors such as Bill Gates and the World Economic Forum (WEF).

But many scientists express concerns about the technology's potential harmful effects.

In interviews with The Defender, [Dr. Michael Antoniou](#), head of the Gene Expression and Therapy Group at King's College London, and Claire Robinson, managing editor of [GMWatch](#), provided insights into the flaws of this technology, its potential consequences and the risks associated with not regulating it sufficiently.

## What is CRISPR?

[CRISPR](#) — which stands for Clustered Regularly Interspaced Short Palindromic Repeats — acts as a “precise pair of molecular scissors that can cut a [target DNA sequence](#), directed by a customizable guide.”

Put differently, this technology allows scientists to [edit sections of DNA](#) by “snipping” specific portions of it and replacing it with new segments. Gene editing is not a new concept, but CRISPR technology is viewed as being cheaper and more accurate.

This stems from the 2012 discovery that RNA can guide a [Cas protein nuclease](#) to any targeted DNA sequence, and to (theoretically) target only that one specific sequence. Indeed, CRISPR technology is often referred to as CRISPR-Cas9 for this reason.

The Media and many scientists have expressed optimism about the technology.

Medlineplus.gov, for instance, said CRISPR “has generated a lot of excitement in the scientific community because it is faster, cheaper, more accurate, and more efficient than other [genome editing methods](#).”

Wired, in 2015, [described CRISPR as “revolutionary,”](#) writing that it had “already reversed mutations that cause blindness, stopped cancer cells from multiplying, and made cells impervious to the virus that causes AIDS.”

The technology also made wheat “invulnerable to killer fungi,” and altered yeast DNA “so that it consumes plant matter and excretes ethanol,” according to Wired.

In the same article, Wired wrote that “Technical details aside, CRISPR-Cas9 makes it easy, cheap, and fast to move genes around — any genes, in any living thing, from bacteria to people.”

A scientist quoted in the story added, “These are monumental moments in the history of biomedical research.”

Bloomberg, in 2016, said CRISPR will “change the world,” quoting scientist Andrew May of Caribou Biosciences, who described CRISPR as “potentially, a cheap and quick way to fix anything about a [genetic code](#)” and “almost as fundamental as the transistor.”

The discovery of CRISPR's gene-editing applications was viewed as so significant that two scientists, Emmanuelle Charpentier and Jennifer Doudna, won the 2020 [Nobel Prize in Chemistry](#), even as a [patent dispute](#) between Doudna and another scientist, Feng Zhang — also viewed as instrumental in CRISPR's development — continues to this day.

Other scientists, though, do not share the same optimism about CRISPR.

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### A 'genetic modification procedure' that is 'not precise' and 'not breeding'

Robinson told The Defender that "in general terms, CRISPR is a gene-editing tool" that "cuts the DNA across the double strand" and can be targeted "to a precise sequence in the genome."

CRISPR can be used with three potential aims, Robinson said: disrupting the function of a gene, modifying the function of a gene or inserting entirely new genes.

According to Antoniou, "Gene editing has been around ... for far longer than the CRISPR-Cas9 system has been. It's been around for decades."

Antoniou described gene editing as:

"A DNA manipulation method or methods with which the intended outcome is to make a very targeted change in the genetic material of the organism, which could be anything from a bacterium, a plant, animal or human.

"Gene editing, I guess the operative word here is editing, which implies an alteration in a very precise, targeted way. You're trying to make a very specific alteration in the genetic material of your target organism."

Robinson said that while CRISPR is said to be site-specific, it is actually "sequence-specific ... it will look for that particular sequence and cut the DNA at that point." This has led many to tout CRISPR's "precision breeding" ability.

For Antoniou though, "It is clearly a genetic modification procedure. It is not precise and it's not breeding."

Gene editing is often confused with gene therapy, but Antoniou said they are two different things. With gene therapy, a "normal functioning copy" of a gene is added to existing cells, he said.

However, he added, "With gene editing, you're not adding another gene. You're trying to alter a gene that's already there in the DNA, in order to either correct the defective gene directly or alter some other gene function that compensates for the defective gene function in the patients."

### Designer humans 'no longer science fiction'

Doudna, in a 2015 TED Talk, described genetic engineering as the "[future of human evolution](#)", even touting CRISPR's potential applications in creating "enhanced" or "designer" human beings and declaring this is no longer science fiction.

She said:

“Many scientists believe that genetic engineering is the future of our evolution. It provides us with a chance to give ourselves any traits we want, such as muscle mass or eye color.

“Imagine that we could try to engineer humans that have enhanced properties such as stronger bones or less susceptibility to cardiovascular disease, or even to have properties that we would consider maybe to be desirable like different eye color or to be taller ... Designer humans, if you will. Geo-engineered humans are not with us yet. But this is no longer science fiction.”

Others in the scientific community expressed similar techno-utopianism. For instance, Wired wrote that CRISPR could deliver anything from [designer babies](#) to species-specific bioweapons.

In 2018, for instance, a Chinese biophysicist announced that he and his team created the world’s first [gene-edited babies](#).

An article last month in [The Intercept](#) noted that the [CIA has invested](#) in a biotechnology startup, Colossal Biosciences — along with Peter Thiel, Paris Hilton and Tony Robbins — that aims to use CRISPR technology to “jumpstart nature’s ancestral heartbeat” by resurrecting extinct mammals, even the woolly mammoth.

And the Financial Times reported that another biotech firm is backing a project to bring back the [Tasmanian tiger](#) from extinction.

For Antoniou, “The reason why CRISPR has captivated the imagination of scientists is its simplicity compared to the other [gene-editing] tools I mentioned. It’s a very simple entity to construct and to deliver to the cells of your target organism to bring about the gene edit that you’re after.”

One realm in which CRISPR is promoted is medicine and the treatment of diseases. For Wired, “the real money is in [human therapeutics](#),” including “target[ing] HIV directly.”

According to Synthego, a company that makes genome editing platforms, “CRISPR is poised to revolutionize medicine, with the potential to cure a range of [genetic diseases](#), including neurodegenerative disease, blood disorders, cancer, and ocular disorders.”

Livescience.com writes that “CRISPR has been tested in [early-stage clinical trials](#) such as cancer therapy and as a treatment for an inherited disorder that causes blindness,” and as “a strategy for preventing the spread of [Lyme disease](#) and malaria,” while Medlineplus.gov adds “[cystic fibrosis](#), hemophilia, and sickle cell disease” to the list.

And Bloomberg, in a 2016 article, reported that “CRISPR is being viewed as a way to make [cancer drugs more effective](#), to build a better class of antivirals to fight HIV, and to modify pig organs to make them more suitable as transplants for humans.”

### **CRISPR promoted as a solution for agriculture, food shortages**

Scientists and the media also promote CRISPR as a potential solution to problems facing agriculture and food production.

Business Insider quoted [Bill Gates](#) as saying, “Researchers are studying ways to [modify the genes](#) of livestock animals ... to make them produce milk more like dairy cows” and “make dairy cattle more resilient in hot weather.”

Another report stated that CRISPR can be used to [prolong the shelf-life of perishable foods](#) and “create crops that are disease-resistant and drought-resistant,” citing the example of a partnership between Mars, Inc., the Innovative Genomics Institute and the University of Berkeley “to create disease-resistant cacao plants.”

According to the journal Science, CRISPR can be used to create [gene drives](#) — a [genetic engineering](#) technique that increases the chances of a particular trait passing on from parent to offspring.”

Potential applications include “eradicating invasive species” and “reversing pesticide and herbicide resistance in crops.”

Livescience.com adds that “CRISPR technology has also been applied in the food and agricultural industries to engineer probiotic cultures and to [vaccinate industrial cultures](#) ... against viruses,” citing yogurt as an example. It is also “used in crops to improve yield, drought tolerance and nutritional properties.”

A February 2022 article in the journal Nature reported that China has approved new guidelines for the development of [gene-edited crops](#) using technologies such as CRISPR, significantly reducing the biosafety approval time of these crops.

Such crops are claimed to “have increased yields, resilience against climate change and a better response to fertilizer,” in addition to “rice that is particularly aromatic and [a] soya bean that has a high content of oleic fatty acids.”

Bloomberg reported in 2016 that “DuPont is already working with Caribou [Biosciences] on mushrooms that stay white after being cut” and on “[25 CRISPR-related products](#) [that] are in the pipeline, including corn, soybeans, wheat, and rice.”

And in September 2021, the [Sicilian Rouge High GABA tomato](#) reached consumers, becoming the first CRISPR-edited food to go on sale anywhere in the world.

### **CRISPR also used for COVID diagnostics, touted as weapon against pandemics**

CRISPR also has been promoted as a technology that is useful for the development of diagnostic tests — and as a weapon against potential new pandemics.

During the [COVID-19](#) pandemic, for instance, CRISPR was used as a therapeutic and [diagnostic tool](#) for the coronavirus via the [Sherlock CRISPR SARS-CoV-2 test kit](#), which was granted an Emergency Use Authorization by the U.S. Food and Drug Administration (FDA).

Sherlock Biosciences also developed a [wearable COVID test](#) in 2021.

[DETECTR](#) and other [COVID diagnostic methods](#) also were developed during this period, while “similar diagnostics utilizing the [search function of Cas9](#) have also been engineered to identify other diseases, both infectious and genetic.”

[Feng Zhang](#) — embroiled in the patent dispute with Doudna — wrote in 2020 that CRISPR is “being used as a research tool by scientists who are working to better understand how SARS-CoV-2 enters the human cells and to learn more about the biology of its pathogenesis.”

Zhang, who developed a new [mRNA delivery system](#) known as SEND that [utilizes CRISPR technology](#), added that scientists “are working to harness CRISPR as natural viral defense properties to develop a novel antiviral effective against COVID-19.”

Messenger RNA (mRNA) technology, used in the Pfizer and Moderna COVID-19 vaccines, also has been used to “deliver CRISPR gene-editing technology that could permanently treat a [rare genetic disease \[transthyretin amyloidosis\]](#) in humans.”

Dr. John Leonard, president and CEO of [Intellia Therapeutics](#), described mRNA as “a way to make CRISPR gene editing come alive,” adding that “CRISPR is the workhorse; mRNA encodes it.”

In turn, as far back as 2015, pharmaceutical giant (and, later, COVID-19 vaccine manufacturer) [AstraZeneca](#) announced collaborations with four biotechnology firms “to use CRISPR technology for genome editing across its drug discovery platform.”

[Novartis](#), another big pharma giant, announced similar collaborations that year.

Further highlighting the potential role of CRISPR for diagnostics, the WEF in 2020 said the technology can help deliver a “[future of healthcare](#)” that “lies in decentralized testing,” resulting in the “accelerated adoption of value-based care models, rather than fee-for-service healthcare as in the United States.”

### **Gates, NIH involved in development of CRISPR technology, lab-grown meat**

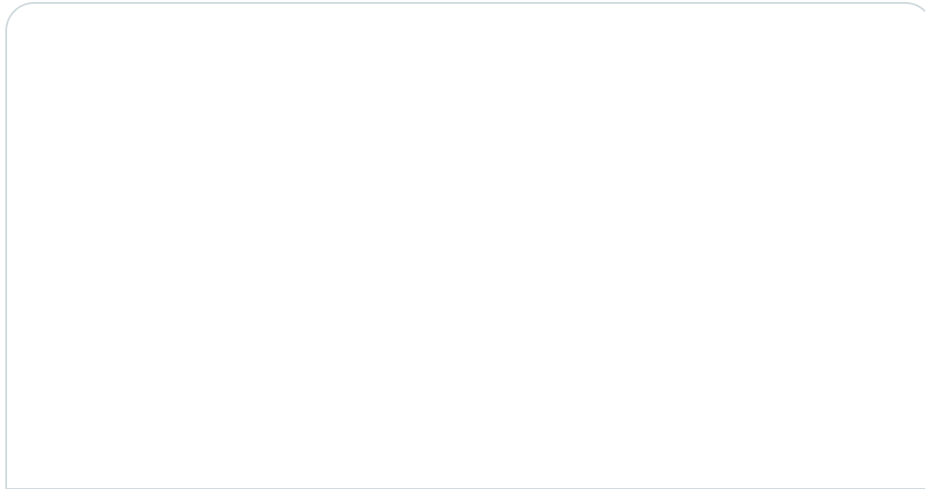
One of the most enthusiastic proponents of CRISPR technology has been Bill Gates, individually and through the Bill & Melinda Gates Foundation (BMGF).

Gates has repeatedly expressed his excitement for CRISPR. On July 8, he [tweeted](#):

Bill Gates   
@BillGates · [Follow](#)



Happy 10th birthday to CRISPR, one of the most important inventions in medicine, biology, and agriculture.



nytimes.com  
CRISPR, 10 Years On: Learning to Rewrite the Code of Life

2:33 PM · Jul 7, 2022



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A [2021 video by Gates](#) was entitled “How CRISPR could save lives and end diseases.”

Also in 2021, [Gates wrote on his blog](#) that his “excitement about CRISPR has grown from super high to off the charts” since 2016, while in 2020, Gates said he was “very excited” about the “opportunity, with the advance of tools like artificial intelligence and [gene-based editing technologies](#), to build this new generation of health solutions.”

And in a 2018 Foreign Affairs article, Gates wrote that “ultimately, eliminating the most persistent diseases and causes of poverty will require scientific discovery and technological innovations [including] CRISPR and other [technologies for gene editing](#),” that “could help humanity overcome some of the biggest and most persistent challenges in global health and development.”

In the same article, Gates listed some of the possibilities he foresaw for CRISPR, including “gene editing to make crops more abundant and resilient,” stating it “could be a lifesaver on a massive scale.”

He added that “one of the most promising near-term uses of gene editing involves research on malaria.”

Gates, who has long funded [malaria research](#), also promoted the potential applications of CRISPR for treating [sickle cell disease](#), [cystic fibrosis](#), [beta thalassemia](#) and [malaria](#).

In 2018, Gates wrote “It would be a tragedy to pass up the opportunity” to use [CRISPR gene drives](#) as a potential means of stopping the transmission of malaria.

As recently reported by The Defender, Sanaria, a company funded by the BMGF, is closely connected to recent trials of a [malaria “vaccine”](#) using live mosquitoes.

The BMGF also funded Oxitec, a company conducting trials involving the release of [genetically modified mosquitoes](#) in Florida, California and Brazil.

Notably, Gates, the BMGF and the National Institutes of Health (NIH), collaborated in 2019 on a \$200 million, four-year project to launch clinical trials to investigate “[gene-based cures for HIV and sickle cell disease](#)” in Africa — including CRISPR.

[Dr. Anthony Fauci](#), director of the NIH’s National Institute of Allergy and Infectious Diseases, touted the potential to “save hundreds of billions of dollars in health care costs” if an HIV cure is ultimately found via this project.

Gates, in his blog, wrote that “CRISPR has fundamentally changed my thinking about what’s possible for improving the health and nutrition of families in poor countries — and how quickly,” adding that the BMGF is investing in CRISPR-related projects including:

- Plant varieties that can withstand the effects of climate change.
- Programmable medical therapies, which could greatly speed up the development of treatments for new viruses and head off future pandemics.
- Quick, inexpensive ways of diagnosing diseases in poor countries.
- Monoclonal antibodies that target and kill pathogens causing malaria and AIDS.

Gates’ investments in CRISPR go beyond his joint project with the NIH. For example, he was an early investor in [Editas Medicine](#) — which, according to Business Insider, was one of the first companies to attempt to use CRISPR technology to treat and [eliminate human diseases](#) — and which is “leading the way in using CRISPR to treat [rare genetic eye diseases](#),” in addition to trials related to sickle cell disease.

The WEF named Editas a 2015 [Technology Pioneer](#). According to Forbes, one of the company’s lead investors is [bng0, a select group of family offices led by Boris Nikolic](#) — who was previously a science advisor to Bill Gates and also named as an executor of the late [Jeffrey Epstein’s estate](#). Gates is one of the backers of bng0. Google Ventures is another.

Gates also worked with Intellia to “envision a simpler [gene-editing procedure](#) that doesn’t require chemotherapy, a hospital stay, or modifying cells outside the body,” instead using CRISPR “inside the body to edit a person’s blood stem cells.”

The BMGF, in turn, has provided grants to other CRISPR-related biotechnology firms, including [CRISPR Therapeutics](#) and [Edge Animal Health](#), and to a firm known as [Acceligen](#), which “provide[s] small-scale dairy producers in sub-Saharan Africa access to highly-productive and well-adapted cows to increase their income.”

Earlier this year, Acceligen received FDA approval for its [gene-edited beef](#), reportedly based on a trial involving two cows.

CRISPR Therapeutics was recently described by [fool.com](#) as having “the most advanced pipeline among CRISPR-focused biotech stocks,” and is seeking regulatory approval for CTX001, for the [treatment of beta thalassemia](#) and sickle cell disease, later this year, in addition to work on experimental cancer, tumor and diabetes therapies.

Another of Gates’ CRISPR-related investments, however, involves both CRISPR and [lab-grown meat](#). Memphis Meats, described by [futurism.com](#) as “a lab-grown meat outfit,” has received funding from Gates and Richard Branson to “create real chicken and beef tissue” — and has received a [patent](#) for this purpose.

### **WEF touts ‘CRISPR’s potential’ to contribute to ‘quest for human perfection’**

In 2015, a WEF article described how CRISPR has “[changed genetic research](#),” while a 2016 article on the WEF’s website asked if we are ready for [genetically modified animals](#), and a 2019 article connected “CRISPR’s potential” to the “[Fourth Industrial Revolution](#)” — and the “quest for human perfection.”

A 2020 WEF article listed “5 things to know about [CRISPR and gene editing](#) in the COVID era,” describing CRISPR as “the search engine for biology,” adding that “precision medicine is playing a key role in helping scientists understand COVID-19” and that “CRISPR-based diagnostics will help rapidly and accurately diagnose a wide range of diseases.”

The same article suggested that “biotechnology will become a top strategic priority for many governments, as an ability to prevent and mitigate a pandemic is an enormous political and economic advantage” and that “the focus on infectious disease will continue beyond the pandemic.”

In turn, a 2021 [WEF Intelligence Monitor](#) report described CRISPR as “revolutionary,” stating, “One day, it could make it possible to do everything from resurrecting extinct species to developing cures for chronic disease.”

Another 2021 article by the WEF discussed CRISPR’s ability to “[improve poor eyesight](#).”

And a 2022 article on the WEF’s website listed CRISPR, and other [gene editing methods](#), as one of the “five key technologies that will transform our lives.”

The WEF has also partnered with one of the primary biotechnology firms involved with the CRISPR technology, [Mammoth Biosciences](#), claiming that “Through the discovery and development of novel CRISPR systems, the company is enabling the full potential of its platform to read and write the code of life.”

The WEF also appears to be connected to Gates’ purported efforts to eradicate malaria through the use of genetic engineering and CRISPR technology. At a 2017 TED Talk, Fredros Okumu, a [WEF Young Global Leader](#) from Tanzania who works for that country’s [Gates-funded Ifakara Health Institute](#), said:

“There is already proof of principle that gene-editing techniques such as CRISPR can be used effectively to transform mosquitoes so that either they do not transmit malaria, we call this population alteration, or that they no longer exist, population suppression.

“There is even proof that if you were to release just a small number of genetically modified mosquitoes that you can actually achieve elimination very quickly.”

Even [Doudna is listed as part of the WEF](#), and addressed the [WEF’s annual meeting](#) in Davos, Switzerland, in 2018.

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Michael Nevradakis, Ph.D., based in Athens, Greece, is a senior reporter for The Defender and part of the rotation of hosts for CHD.TV's "Good Morning CHD."

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