Biodiversity? Scientists Want To Wipe Out Entire Species

This is the Technocrat mindset that science can solve any problem. Problem: Mosquitos make people sick. Solution: Kill all mosquitos. This is a slippery slope that will lead to tampering with other species. TN Editor

The villagers of Bana in Burkina Faso survive by working the land. Yet recently they have been paid to sit still for six hours while a fellow villager hovers close by on the look out for mosquitoes. When one lands on their neighbour they catch it, alive and intact, before it bites and then hand it over to researchers.

This is one small stage in a painstakingly slow process of research into the local mosquito population, led by scientists at Imperial College, London.

They hope that one day Burkina Faso will be the testbed for a technology that many hope will lead to the eradication of malaria, the mosquito-borne disease that is the biggest killer of children under five in Africa.

The researchers have developed a genetically-modified mosquito in their laboratory that can kill off its own species by spreading a faulty gene.

If it works in the wild, the technology – called gene drive – could help eliminate malaria where decades of efforts involving bed nets, repellents and insecticides have failed.

But as the scientists edge closer to releasing gene drive mosquitoes into the wild for the first time – by 2024 in Burkina Faso – environmental and human rights groups and others are desperate to slow the process down.

Playing God in this way, they warn, could do infinitely more harm than good.

“Gene drives are a complete unknown,” says Tom Wakeford, UK spokesperson for ETC, a global campaign group monitoring the impact of emerging technologies on biodiversity, agriculture and human rights.

“It’s a huge risk when we know that other approaches [to eradicating malaria] exist,” he adds.

Target Malaria, the name of the Imperial College-led research consortium, is just one of many projects exploring ways to engineer mosquitoes so that they stop spreading disease.

But unlike so-called ‘self-limiting’ genetic modification of mosquitoes – which, for example, renders them infertile or produce infertile offspring – gene drive works by unleashing a mutated gene that spreads rapidly through the species.

Once it is released it can’t be stopped.

“If it works, it will eliminate a whole species,” says Dr Wakeford, a biologist at the University of Exeter.

Target Malaria’s work in Burkina Faso, Mali and Uganda, involves just one of more than 3,000 species of mosquito, the Anopheles gambiae.

But environmentalists warn that removing even one species could disrupt the whole ecosystem in unforeseeable ways. Anopheles gambiae

could be an important food source and pollinator without which the flora and fauna where it lives could change dramatically.

“There are agrarian communities [where gene drive research is taking place]. If their crops are affected, that’s their livelihoods, their health, everything,” says Dr Wakeford.

Dr Ify Aniebo, a molecular geneticist from Nigeria, asks what the impact could be on the disease itself. In an article published by campaign group GMwatch he wrote: “Will the engineered organism upset the delicate balance of ecosystems, thereby causing new diseases to emerge or prompting already existing illnesses to spread?”

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CRISPR Gene Editing Toolbox Is Expanding

There is an arms race of sorts as genetic scientists ‘scour the planet’ for alternatives to standard CRISPR technology. As it gathers steam, editing the human genome will prove to be the scourge of humanity. TN Editor

The gene-editing tool that has revolutionized biology is becoming even more powerful.
CRISPR, as the system is known, allows scientists to target and snip a specific sequence of letters on a strand of DNA with unprecedented precision. That has opened up new possibilities for treating genetic diseases, helping plants adapt to global warming and even preventing mosquitoes from spreading malaria.

CRISPR is made up of two basic components. The first is a piece of RNA that locates a predetermined sequence of DNA in an organism's genome that scientists want to alter. The second is a type of protein called an enzyme that attaches itself to the target section of DNA and splices it.

Cas9 has been the workhorse enzyme because it executes a neat, blunt cut. But in the last few years, scientists have started to search for — and find — alternative CRISPR systems that cut with enzymes other than Cas9.

"Cas9 is a powerful tool, but it has limitations," said CRISPR pioneer Feng Zhang, a bioengineer at MIT and the Broad Institute. "Each of these proteins has shortcomings and strengths, and together they help us create a much more versatile box of tools."

Some of the new Cas enzymes cut DNA in different ways that make certain edits more likely to work. Other enzymes are smaller, allowing scientists to more easily insert them into cells.

"The diversity of CRISPR proteins is exceptionally broad," said Benjamin Oakes, an entrepreneurial fellow at the Innovative Genomics Institute, a joint project of the University of California, Berkeley and the University of California, San Francisco. "They have been evolving over millennia and nature has developed hundreds, if not thousands, that can work."

In nature, bacteria use this technology as a defense mechanism to find and destroy attacking viruses.

Bacteria store sequences of viral DNA within their own DNA, bookended by a repeating sequence of letters. Hence the system's name CRISPR, which stands for Clustered Regularly Interspaced Short Palindromic

Repeats. (The first CRISPR systems discovered were indeed partly palindromic, however scientists later found that that this is not universally true.)

CRISPR-Cas9 has already proved to be an exceedingly useful tool for a wide variety of genetic tinkering, including turning genes on and off, disabling them entirely, introducing new DNA into a genome, and deleting DNA you don't want.

But scientists wondered what other CRISPR enzymes might bring to the genetic editing table.

CRISPR-Cas12a was the first system after CRISPR-Cas9 to be used for gene editing in the lab. A recent study on Cas12a's cousin Cas12b demonstrated that this variant could edit the human genome as well, giving scientists yet another tool to tackle genetic diseases.

Other work has shed light on a suite of additional promising CRISPR enzymes, including Cas13, Cas14 and CasY. The latest candidate, CasX, was described in detail Monday in a study by Oakes and others in the journal Nature.

Comparing CRISPR systems is a bit like comparing fruits, Zhang said. If Cas9 enzymes are apples, then Cas12 enzymes might be plums — still edible and delicious, but also totally different.

And like fruit, these different systems have variations within them. Just like there are subspecies of plums, there is also a wide variety of Cas12 enzymes.

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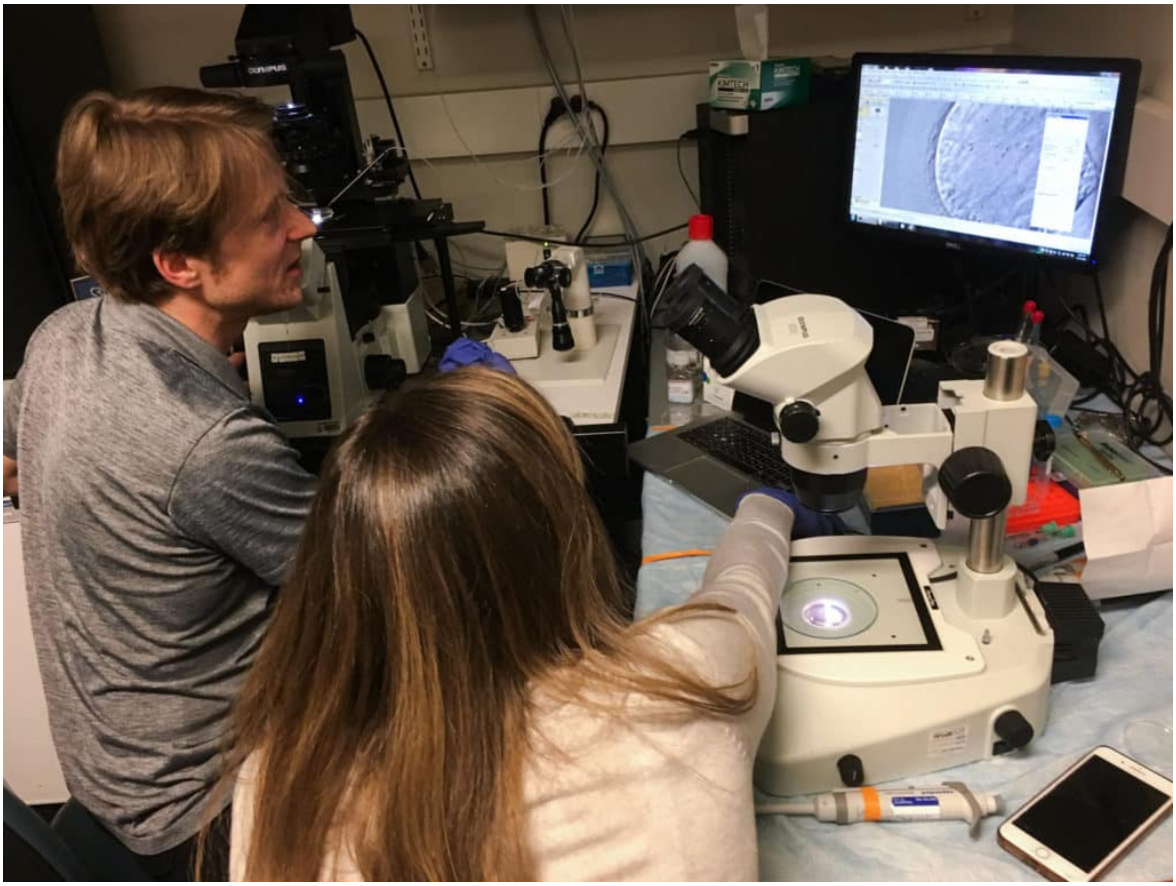

New U.S. Experiments Aim To Create Gene-Edited Human Embryos

Technocrat scientists at Columbia University are following China's lead in editing human embryos with CRISPR technology. One lead scientists says, "Right now we are not trying to make babies", indicating that they fully intend to make GMO babies later TN Editor

A scientist in New York is conducting experiments designed to modify DNA in human embryos as a step toward someday preventing inherited diseases, NPR has learned.

For now, the work is confined to a laboratory. But the research, if successful, would mark another step toward turning CRISPR, a powerful form of gene editing, into a tool for medical treatment.

A Chinese scientist sparked international outrage in November when

he announced that he had used the same technique to create the world's first gene-edited human babies. He said his goal was to protect them from infection with HIV, a claim that was criticized because there are safe, effective and far less controversial ways of achieving that goal.

In contrast, Dieter Egli, a developmental biologist at Columbia University, says he is conducting his experiments "for research purposes." He wants to determine whether CRISPR can safely repair mutations in human embryos to prevent genetic diseases from being passed down for generations.

So far, Egli has stopped any modified embryos from developing beyond one day so he can study them.

"Right now we are not trying to make babies. None of these cells will go into the womb of a person," he says.

But if the approach is successful, Egli would likely allow edited embryos to develop further to continue his research.

Egli hopes doctors will someday be able edit embryonic human DNA to prevent many congenital illnesses, such as Tay-Sachs disease, cystic fibrosis and Huntington's disease.

In the lab, Egli is trying to fix one of the genetic defects that cause retinitis pigmentosa, an inherited form of blindness. If it works, the hope is that the approach could help blind people carrying the mutation have genetically related children whose vision is normal.

"Preventing inherited forms of blindness would be wonderful — very important for affected families," Egli says.

But that is likely to take years of additional research to demonstrate that the technique is both effective and safe.

Nevertheless, even this kind of basic research is controversial.

"This is really disturbing," says Fyodor Urnov, associate director of the Altius Institute for Biomedical Sciences in Seattle. He worries such experiments could encourage more irresponsible scientists to misuse

gene-editing technologies.

“As we’ve learned from the events in China, it is no longer a hypothetical that somebody will just go ahead and go rogue and do something dangerous, reckless, unethical,” Urnov says.

Egli’s research is reviewed in advance and overseen by a panel of other scientists and bioethicists at Columbia.

While the debate over research like Egli’s continues, the U.S. National Academies of Science, Engineering and Medicine, the World Health Organization and others are trying to develop detailed standards for how scientists should safely and ethically edit human embryos.

Some bioethicists and scientists are calling for an explicit global moratorium on creating any more gene-edited babies. Others, like Urnov, would like to see a hiatus in even basic research.

The U.S. government prohibits the use of federal funding for research involving human embryos. But gene editing of human embryos can be done using private funding. The Food and Drug Administration is barred from considering any studies that would involve using genetically modified human embryos to create a pregnancy. But laws that govern the creation of genetically modified babies vary widely internationally.

Egli is well aware that his work may be controversial to some people. To try to be completely transparent about his experiments, Egli recently invited NPR to his laboratory for an exclusive look at his research.

“We can’t just do the editing and then hope everything goes right and implant that into a womb. That’s not responsible,” Egli says. “We have to first do the basic research studies to see what happens. That’s what we’re doing here.”

To show NPR what he is doing, early one morning Egli pushes open the door of a tiny windowless room on the sixth floor of one of Columbia’s research towers in Upper Manhattan. The lab is jammed with scientific equipment, including two microscopes.

Egli snaps on blue rubber gloves and opens a frosty metal cylinder

holding frozen human eggs.

“I’m going to wear gloves because we want to keep things clean,” he tells me.

To begin his experiment, Egli starts the long, slow process of thawing the frozen human eggs that were donated for research. After several hours of careful work and waiting, Egli has readied 15 eggs for his experiment.

After setting up a large microscope, Egli slides a round glass dish under the lens. The dish contains sperm from a blind man who carries the mutation that Egli is trying to fix. It also holds the CRISPR gene-editing tool.

“I’m starting with just one egg,” he says as he gently places the first thawed egg into the dish.

“It’s a beautiful cell,” Egli says, pointing to a magnified image of the egg on a computer monitor. “I would say it’s one of the most beautiful cells.”

Egli maneuvers a tiny glass needle protruding into the side of the microscope dish toward one of the sperm. “So you can see a moving sperm over here,” he says. “Now I’m picking it up. The sperm is in the needle. Now I’m dipping it in the CRISPR tool.”

Once the sperm is inside the needle with the CRISPR gene-editing tool, Egli points the needle’s tip at the egg. “Oh no!” he exclaims with a sigh. “The sperm is swimming away.”

He searches the dish for the errant sperm.

“Oh, here it is,” he says as he pulls the sperm back into the needle.

Next, Egli gently pierces the egg with the needle. “The membrane is broken — breached. There we go,” Egli says as he injects the sperm and CRISPR tool into the egg. He breathes a sigh of relief.

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California Biochemist Sells ‘Gene-Editing Kit’ To The Masses

Technocrat-minded scientists apparently see no problem in spreading gene editing technology to amateurs in order to experiment with nature. Worse, there will be no accountability or oversight. TN Editor

After scientists unlocked the secrets of the human genome in 2003, there was immediate concern about how that knowledge might be abused in the wrong hands. Now, an East Bay entrepreneur wants to put that power in everyone’s hands.

Dr. Josiah Zayner has a PhD in biochemistry and worked for NASA, engineering organisms to help astronauts survive on Mars. But that wasn't innovative enough for the young, self-described "Bio Hacker."

"Normal scientists want to study, like, how fruit flies have sex or something, something that nobody really cares about," said Dr. Zayner. "And what I want to study is, how do we make dragons or super-humans or something like that?"

Zayner wants others to do it as well. Out of a West Oakland apartment, he operates a company called The Odin that sells “gene-editing” kits; they come with all that’s necessary to create your own Genetically Modified Organism.

The kit teaches novice scientists how to inject tree frogs with a type of human growth enzyme that causes the frogs to double in size in about a month.

“It sounds ridiculous,” Dr. Zayner said, “but we’ve been doing gene therapy on human beings since the late 90’s, right? The stuff works, we know how to do it, I want to teach people that. I want people to see how it works.”

But at St. Mary’s College in Moraga, biology professor Vidya Chandrasekaran says there are ethical concerns about an untrained person using a live animal for experimentation.

“Using it in this manner, I’m not sure is the right way to approach biology,” she said.

Dr. Zayner frequently uses himself as a guinea pig. He once injected himself with a growth accelerator while live-streaming a talk at a bio conference. Dr. Chandrasekaran said that’s the kind of thing that occurs

when people use science without accountability.

“It really matters whether the people who are doing these things understand the implications and the outcome of it,” she said.

But according to Dr. Zayner, new and powerful technologies are always feared at their beginnings. He pointed out that computers were once giant machines used only by business, government and universities.

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Chickens Genetically Modified To Lay Eggs Containing Cancer Drugs

Monsanto delivers pesticides in corn seed and not GMO chickens will deliver cancer drugs through their eggs. The problem? The DNA

germline is permanently changed and can never be restored to its original state. Secondly, there is no testing possible to see what affect it will have on humans. TN Editor

Scientists have genetically modified chickens to lay eggs containing high quality cancer drugs, in the latest breakthrough.

Researchers from the University of Edinburgh's Roslin Institute believe the technique could offer a cost-effective way of producing drugs in the near future.

The chickens were genetically modified to produce drugs in their eggs, and amazingly, the researchers found that the drugs worked just as well as ones produced using existing methods.

Amazingly, just three eggs were enough to produce an adequate dosage, with hens able to lay up to 300 eggs a year.

Professor Helen Sang said: "We are not yet producing medicines for people, but this study shows that chickens are commercially viable for producing proteins suitable for drug discovery studies and other applications in biotechnology."

Eggs are already used for growing viruses used as vaccines, such as in the flu jab.

But in this case the chicken's DNA was encoded with proteins produced as part of the egg white – a human protein called IFNalpha2a, which has powerful anti-viral and anti-cancer effects, and the human and pig versions of a protein called macrophage-CSF.

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Monstrous: China Clones Monkeys, Edits Genes To Make Mentally Ill

Technocrats have no moral or ethical compass, nor concern about the future of mankind. These experiments on animals are just one step away from tinkering with the human genome, which has already been demonstrated by another Chinese scientist. TN Editor

China's latest monkey cloning experiment has sparked outrage and been labeled "monstrous" by animals welfare advocates.

Researchers at the Chinese Academy of Sciences Institute of Neuroscience have cloned five monkey babies from a single donor with genes edited to cause diseases.

The Chinese scientists tinkered with a specific gene in the original donor monkey to produce the unhealthy animals which they say will help medical research.

The gene is BMAL1, which helps regulate the circadian rhythm but

scientists made it inoperative using a gene-editing tool, known as CRISPR. With the gene turned off, the animals are at greater risk of developing sleeping problems, hormonal disorders and a host of diseases.

Researchers said the monkeys demonstrated increased anxiety and depression, reduced sleep time, and even "schizophrenia-like behaviors," according to a pair of papers published by the scientists in the *National Science Review*.

All five macaques were born with identical genes, which include the mutation.

"Disorder of circadian rhythm could lead to many human diseases, including sleep disorders, diabetic mellitus, cancer, and neurodegenerative diseases, our BMAL1-knock out monkeys thus could be used to study the disease pathogenesis as well as therapeutic treatments" said Hung-Chun Chang, senior author and investigator of the Chinese Academy of Sciences Institute of Neuroscience in a statement.

Researchers used a cloning technique known as somatic cell nuclear transfer to produce the five macaques, the same method they used to generate the first two cloned monkeys this time last year.

It is also the same general method used to clone Dolly the sheep more than two decades ago.

The experiment to clone the two healthy monkeys, reported in the journal Cell in January last year, also caused some apprehension among the broader scientific community.

"The genie's out of the bottle now," said Jose Cibelli at the time, a cloning expert at Michigan State University in the US.

Animals rights advocated have slammed the latest experiment. Dr. Julia Baines, Science Policy Adviser at PETA UK, said: "Genetically manipulating and then cloning animals is a monstrous practice that causes animals to suffer."

But speaking to news.com.au in June, Director of the Chinese Academy of Sciences Institute of Neuroscience and co-author of the latest papers, Dr Mu-ming Poo, defended the practice of using cloned animals for medical research.

“More cloned monkeys will soon be produced,” he said at the time. “Some of them will carry gene mutations known to cause human brain disorders, in order to generate useful monkey models for drug development and treatment.”

It’s important to note that because primates share approximately 95 percent of human genes and a number of physiological and anatomical similarities, biomedical research currently uses a large number of monkeys, sometimes up to 100,000 annually around the globe.

“This number will be greatly reduced by the use of monkeys with uniform genetic background that reduces the noise in experimental studies,” Dr. Poo said, pointing to the example of testing drug efficacy before clinical trials.

“This will greatly help the ethical use of non-human primates for biomedical purposes.”

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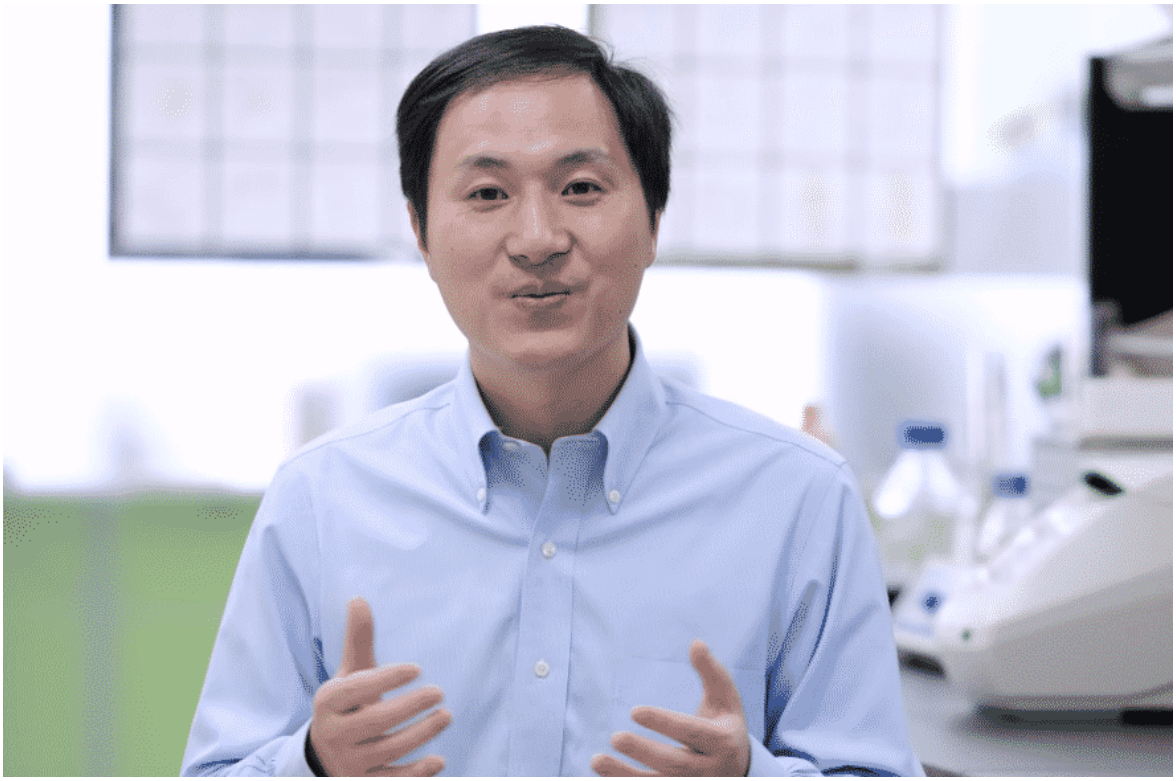

China’s Second Gene-Edited Fetus Is 12-14 Weeks Old

Professor He Jiankui is a consummate Chinese Technocrat, applying advanced technology to the human condition while scorning oversight and regulation. The human genome has now officially been violated. TN Editor

Chinese scientist He Jiankui shocked the scientific community after revealing that he had successfully altered the DNA of twin girls born in November to prevent them from contracting HIV Chinese scientist He Jiankui speaks at the Second International Summit on Human Genome Editing in Hong Kong on November 28, 2018.Organisers of a conference that has been upended by gene-edited baby revelations are holding their breath as to what He, the controversial scientist at the centre of the “breakthrough”, will say when he takes the stage on November 28.

The second woman carrying a gene-edited foetus in China is now 12 to 14 weeks into her pregnancy, according to a US physician in close contact with the researcher who claimed to have created the world’s

first genetically-modified babies last year.

Chinese scientist He Jiankui shocked the scientific community after revealing that he had successfully altered the DNA of twin girls born in November to prevent them from contracting HIV.

State media reported on Monday that a preliminary investigation confirmed that a second woman became pregnant and that she will be put under medical observation, but no other details about her are known.

Professor He, who now faces a police investigation, had mentioned the potential second pregnancy at a human genome conference in Hong Kong in late November, but its status was unclear until now.

William Hurlbut, a physician and bioethicist at Stanford university in California who has known He for two years, told AFP it was “too early” at the time for the foetus to appear on an ultrasound.

Based on extensive conversations with He, Hurlbut said: “I get the impression the baby was fairly young when the conference happened. It could only be detected chemically, not clinically (at the time).

“So it could be no more than four to six weeks old (at the time), so now it could be about 12 to 14 weeks.”

Hurlbut said he had planned to visit He’s lab following the genome summit. They had seen each other several times over the past two years.

But after news of his experiment was published, He was placed “under protection of security people” and the two never saw each other in person, he said.

They exchanged emails and spoke on the phone every week after that, but Hurlbut last heard from He seven days ago.

He has been residing in an apartment at the Southern University of Science and Technology (SUSTech) in the city of Shenzhen, where his family has been allowed to visit him in the day time, Hurlbut said.

“He doesn’t sound like a person under terrible fear or stress.” said Hurlbut.

“He said he was free to go out on to the campus and walk around.”

But He could be facing legal trouble.

A probe by the Guangdong provincial government found that He had “forged ethical review papers” and “deliberately evaded supervision”, according to state-run Xinhua news agency.

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