



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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