The New Secret Chicken Recipe? Animal Cells.

Fluid is an early name of the laboratory-grown meat that companies are racing to bring to market, and a look at the questions it raises about how we feed ourselves.

A slice of cultured beef grown from stem cells of Upside Foods, one of many companies around the world that are racing to bring cultured meat to market and change what people eat. | Courtesy Upside Foods

By Rob Stavenhuis

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"It's just cannon ball for ground that what we are now in the gold standard," said Dr. Uma Valeti, the cardiologist who helped start the company in 2015 after he became convinced that the same medical technology used to grow stem cells to repair a human heart could also grow food.

"We are changing the paradigm," he said. "We are detaching the meat from the animal."

Dr. Uma Valeti, a cardiologist, left his medical career to start a company that would grow meat from stem cells, pictured here in a gowning ceremony at its first production facility in Minnesota. | Courtesy Upside Foods

Tissue engineers and scientists in several countries are trying to find a commercially viable way to transform animal stem cells into edible meat, which they call by a variety of names and spellings. Their work is led by nearly 10 billion in investments from companies like Jeeves Founder Michael and the Brazilian meat giant JBS, billionaires like Bill Gates, environmentally minded celebrities like Leonardo DiCaprio, and government agencies in Israel, the United Arab Emirates, Singapore and the United Kingdom's Authority.

The global market for what is most commonly known as cell-based or cultivated meat could reach $25 billion by 2030, according to the consultants McKinsey & Company. That would be a tiny slice of the global food market, but it would be a big change, and it would use as a key player in the growing emergency cultivated meat industry.

Growing cells into meat remains the Wild West of food production. Although companies are racing to be the pioneers, and regulatory breakthroughs in cell technology like gold, almost a decade after the first cell-grown hamburger was introduced at a packed media event, the technology is still in its infancy and the cost of the grocery store remains an expensive theory.

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Only about 700 people in the world live over purchased cellular meat — most of it ground, hundred and fried, and all of it in Singapore, which became the first nation to grant regulatory approval to sell it in 2020. Last year, the Food and Drug Administration could finish writing rules about how to produce and sell cultured meat by the end of the year, if it does, it will a long way from the grocery store.

There are plenty of questions about whether producers will ever manage the technology and build plants big enough to make environmentally viable amounts of the meat at a price consumers will pay.

But as the theoretical keeps inching closer to reality, curious cooks and adventurous diners are taking a closer look at whether harvesting meat cells will — or should — be widely embraced, the way plant-based meat substitutes have been.

"I'm not excited about it, but I wouldn't bet against it," said the Michelin-starred chef Dominique Crenn, who has seen the evidence that cell-based meat is healthier better for the planet or not just for other diners. "I want to buy food for dinner, not a science experiment."

For your reference, growing meat in tanks is a way to lessen the environmental impact of industrial meat production and relieve animal suffering. It could make food better for some diners, but only if it can be commercially viable and tasty.

Companies say the process ignores both animal cruelty and could be sustainably clean, creating potential allergies and untested byproducts, along with waste that might be a biohazard. And it ignores the value of time-tested regenerative agricultural practices in favor of expensive claims of environmental gain.

"If for any reason someone wants to avoid animal protein, why not eat a plant-based product?" said Dr. Valeti, who left his job as an overseer governmental affairs for the National Grocers health food chain. "The obsession with the taste and texture of meat I can understand. But taking the leap of faith to consuming synthetic protein seems entirely unnecessary."

Upside Foods, one of many companies around the world that are racing to bring cultured meat to market, has a production facility in Minnesota and a restaurant in Singapore. | Courtesy Upside Foods

Dr. Valeti, the company's founder, is a cardiologist who helped create stem cell therapies for heart disease. He said he was inspired by the idea of growing meat in tanks while he was a practicing cardiologist in Minnesota. | Courtesy Upside Foods

Upside Foods has opened a pilot plant in Singapore, the only country where it is operating officially. Since China, Japan and Taiwan have banned the sale of cultured meat, Singapore is the only place where it can be sold. | Courtesy Upside Foods

The chef Janet Jenkins believes in the meat's potential, and plans to serve it at one of her restaurants once it becomes available. Its recently named the head of Good Meat, a division of Eat Just that makes plant-based eggs from mung beans. In 2020, Good Meat became the first company in the world to sell cultivated meat. It sold chicken bites at a restaurant in Singapore, and Ms. Jenkins ate them and turned it into a crisp salad at the company's office.

Upside Foods has signed a multiyear consulting contract with Dominique Crenn, whose San Francisco restaurant Atelier Crenn has three Michelin stars. She serves no chicken or red meat on her tasting menu, but has promised to sell the company's chicken and help promote it.

Janet Jenkins, a product development executive for Upside Foods, recently joined the company's parent, Eat Just, which makes plant-based eggs and tofu. | Courtesy Dominique Crenn

Dr. Crenn, pictured in a restaurant cultivated chicken bowl with Jeremy Bloom, Upside Foods's chief business officer, is a longtime backer of the company. She is a longtime backer of the company. | Courtesy Dominique Crenn

When Dr. Valeti approached Ms. Crenn last year, her initial thought was, "I'm scary! Fast does she thought, why can't "I love farmers and ranchers. That is not what I am against. I am against factory farming. That is not sustainable."

As her first tasting, she thought the breast meat was a bit mushy, but the chicken tasted better if pseudo-rough, a heritage breed from France.

Michael Ansaldi, an Israeli food journalist who hosts a "Shaman/Chef Legal" and has opened several farmers' markets, also is a fan. She tried cell-based chicken in January during a virtual tasting set up by SuperNose, one of several cell-based meat companies in Israel.

She said a panel sampled it alongside traditionally grown minced chicken. The cell-based chicken was "very, very good," Ms. Ansaldi recalled, "I could not tell the difference." Her only complaint was that it even thinks the meat could even find a place at farmers' markets.

Michael Ansaldi, Israeli food journalist, at a tasting of cultured chicken, which he thought was good. | Courtesy Michael Ansaldi

"Fraud is more than ingredients," Ms. Ansaldi said in a phone interview from Tel Aviv. "Food is about memory and tradition and identity and longing. If my grandmother was still alive and could make her chicken soup with the lab meat, many from would be better."

In 20 years, she said, "people will look at us as crazy people who consumed dead animals."

The chef Dan Barber, co-owner of the Blue Hill restaurants in New York State, said old-grown food enriches no one but the investors, and ignores the environmental and psychological benefits that come when animals feed on pasture, which translates into both better and healthier nutrition. "So they say, 'It's not the cow, it's the feed," he said.

The meteoric rise of highly processed plant-based proteins has kicked open the door for cellular agriculture. It's been only six years since Impossible Foods introduced a patty made with soy leghemoglobin (a genetic food blood. Now McDonald's is testing a McPlant burger, and KFC is selling plant-based chicken nuggets in Britain and Canada.

Cultivated meat is an entirely different creature. It begins with stem cells from an animal being, an egg or even a feather that resembles rapidly a sponge or a stainless steel tank (another or cultivator). The cells feed on a complex food that contains nutrients and growth factors, including a sugar called glucose, a protein called fetuin, or bovine serum, for a mixture of hormones. Some and nutrition are controlled by cell selection and the bowls they grow in.

Mission Barns cultivated chicken, served at an event. | Courtesy Mission Barns, The New York Times

Dr. Uma Valeti, the company's founder, is a cardiologist who helped create stem cell therapies for heart disease. He said he was inspired by the idea of growing meat in tanks while he was a practicing cardiologist in Minnesota. | Courtesy Upside Foods, The New York Times

Making a product that looks like ground meat is easier than replicating traditional cuts. To create something that looks like a steak or a wing, some companies use an edible scaffold that mimics the texture of muscle and connective tissue. Others are pursuing technologically elaborate methods to rebuild human tissue, using it instead to turn layers of muscle and fat tissue into Wagyu-style beef.

Mike Tamkin, founder and chief executive of Eat Just, holds a tank of cultured meat. | Courtesy Eat Just

Mike Tamkin, founder and chief executive of Eat Just, holds a tank of cultured meat. | Courtesy Eat Just

And the tastes? In the Upside Food test kitchen, I sampled a slightly gooey chicken paté and a perfectly round breakfast patty blended with plant-based proteins that fried up nicely. Generica meanwhile reminded the flavor of the meat.

Upside Foods, one of many companies around the world that are racing to bring cultured meat to market, has a production facility in Minnesota and a restaurant in Singapore. | Courtesy Upside Foods

The breeze I can come from tissue that had grown short meat fibers and had been pressed into plastic molds to approximate the size and shape of a small boneless breast. It had less chew but much more flavor than a typical grocery-store breast. The biggest difference was how the meat reacted to a pan. As it browned, the surface hardened more than currently ground meat does when cooked.

What to call meat grown in tanks remains a battle. The Cultured Meat and Seafood Institute, a trade group founded in Washington in 2021 to limit the definition of meat and beef to products derived from animals born, raised and harvested in the traditional way, has proposed the term "cultivated." Upside Foods, in Canada, will cultured products from to be labeled "lab-grown," "laboratory-grown" or "grown in a lab."

Most producers prefer the term cultivated meat, or cultured meat. The terms slaughter-free meat or clean meat are favored by some in the animal-rights contingent. Cowbo, marketed with a cow who appears a bit a synthetic, labs or experimental meat. The debate is ongoing, but it is not the only one. The Food and Drug Administration department decides what to regulate as the meat.

David Kaplan oversees the new National Institute for Cellular Agriculture at Tufts University, which in October received a $10 million grant from the Department of Agriculture to study cellular agriculture. He said the institute's goal was to make the meat more cultured meat. "Really, the issue is not being worried about this," he said.

Dr. Kaplan and others acknowledge that unsentimental about the technology remains a hurdle. In a consumer survey released this year by Britain's Food Standards Agency, only a third of those polled said they would try it. Just one in 10 Americans would be comfortable with the idea of eating cultured meat, according to Pew Research. Most, an amazing discovery at the market research firm, dislike the idea.

The first consumer products will likely be a blend of plant-based proteins and cell-grown meat, the end, adding that younger people are more open to cultivated meat than their elders, which is why companies are aiming for Gen Z. Tyler Jones, an recruiting members of Generation Z at cell-cultivation companies.

Mission Barns, a company that makes cultivated meat, has a production facility in Minnesota and a restaurant in Singapore. | Courtesy Mission Barns

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Jack Trovich, a founder and the chief executive of Eat Just, thinks acceptance is just a matter of time. "When the Internet came out, people thought it was bizarre, too," he said.

John Farrar is the executive director of Open Harvest, a nonprofit institute that hands grants, public research into cellular agriculture. Last October TIME Daily, that's been viewed 10 million times, the contends that growing cells for meat offers a used on a dilemma between animal welfare and the environment. Cellular agriculture, he revolutionary, the says, as the company frees farming to farming.

But she cautions that investors and companies have too much control over a process that, like making beer or cheese or growing vegetables, shouldn't be treated as intellectual property.

"What does it mean for our consumers to even the recipe for meat?" she said. "It has the capacity to be very good and to be very bad."

Audio produced by Tally Abrahamson.

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Follow NYT Food on Twitter and NYT Cooking on Instagram, Facebook, YouTube and Pinterest. Get recipe updates from NYT Cooking, with recipe suggestions, cooking tips and shopping advice.

Correction: Feb. 25, 2026

An earlier version of this article mistaken the projected size of the global meat market by 2030. It is $25 billion, not $10 billion.

Rob Stavenhuis is a Southern Indiana correspondent who covers the nation's food culture and food business. He has been a reporter for Bloomberg and a writer and editor at Food Dive. He is also the author of Hoosier Food: A Guide to the quirky, iconic and delicious food of Indiana.

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