

How close are we to a hamburger grown in a lab?

By Charlotte Hawks, CNN

🕒 Updated 1923 GMT (0323 HKT) March 8, 2018



Photos: Fearing the future?

Fearing the future? – Americans are wary of many sci-fi developments in science and technology according to a [recent Pew survey](#). Read on to see U.S. adults' opinions about drones, robot nurses, engineered meat and other futuristic advancements.

Story highlights

The creation of in vitro, or "clean," meat involves extracting stem cells from animals

The extracted cells are grown and multiplied in a lab to create meat

Experts' conservative estimates say clean meat will on store shelves by 2021

repair damaged heart muscle," he said.

(CNN) — The latest craze in the food industry, in vitro or "clean" meat, is produced by extracting stem cells from animals and then growing and multiplying those cells in a lab to create a piece of meat.

The cells "start to divide and start to form new muscle tissues. ... (We) let them proliferate until we have trillions of cells," explained Dr. Mark Post, CEO of Mosa Meats, one of the earliest creators of clean meat. The process of making a hamburger patty takes about nine weeks.

It's the same technology that's being utilized in the medical field to repair organs. said Dr. Uma Valeti, CEO of another clean meat manufacturer, Memphis Meats. "At my own cardiology practice, I used stem cells in a clinical study to



Bill Gates, Richard Branson and others are investing \$17 million in the in vitro meat company Memphis Meats, which produces laboratory-grown meat for meatballs and other products.

But how does it taste?

To achieve public acceptance, industry leaders agree, in vitro meat must taste the same as, if not better than, conventional meat. Bruce Friedrich, co-author with Kathy Freston of "Clean Protein: The Revolution That Will Reshape Your Body," has tried chicken and duck from Memphis Meats and concludes that these products "both look and taste identical" to traditional meat.

Paul Shapiro, author of "Clean Meat: How Growing Meat Without Animals Will Revolutionize Dinner and the World," has tried clean meat versions of beef, duck, fish, foie gras and chorizo and said they "taste like meat because they are meat."



Friedrich, who is also the CEO of the Good Food Institute, a nonprofit focused on supporting the clean meat and plant-based alternative industries, wants the public to know that although it is grown in a completely different way, this is the "exact same meat."

Josh Tetrick, CEO of clean meat manufacturer JUST, emphasizes the importance of taste in the success of these products. Clean meat "will be a complete fantasy if (we) cannot bring the full sensory experience to bear," including color, texture, smell, elasticity, how the meat thaws and shelf life.

Related Article: How test-tube meat could be the future of food

When can I try it?

In vitro meat for public consumption may become a reality relatively soon. Tetrick said that "before the end of 2018 is an accurate timeline" for some products to be offered in a number of restaurants in the United States and Asia, starting with chicken nuggets, sausage and foie gras.



Memphis Meats' Southern fried chicken

Other companies forecast that we're a few years away from seeing clean meat in your local grocery store. Shapiro believes we will see clean meat on store shelves by 2021.

Clean meat will be sold at a premium when it's introduced. Though his first hamburger in 2013 was \$330,000, Post claims that when it is offered to the public, it will be "maybe \$11 for a hamburger."

Friedrich said clean meat "only totally supplants animal meat when it becomes cheaper."

*Today's
Today's
Always*

Start learn

Health » How close are we to a hamburger grown in a lab? International Edition + 🔍



Clean meat may also be healthier for our waistlines. Clean meat production is about growing and proliferating muscle cells. However, with certain meat products such as hamburgers, fat is an integral part of the taste and texture. Clean meat producers can control what type of fat goes into these burgers. Post said they can produce clean meat to contain healthy fats, such as [omega-3 fatty acids](#), which have protective effects for the heart, among other health benefits.

Related Article: The case for fake meat on Thanksgiving

The 'ick factor'

Although in vitro meat might be healthier for consumers, its success hinges on public acceptance. A potential obstacle for the clean meat industry is whether consumers can get past the "ick factor" with lab grown meat, said Kenneth A. Cook, president of the Environmental Working Group, a US environmental and health research and advocacy organization.

Natural reluctance may have been part of the reason why 80% of respondents in a 2014 Pew survey said they would [not be willing to eat meat grown in a lab](#) -- but that might be changing. A 2017 survey showed that nearly a third of people [would be willing to eat clean meat regularly](#) or as a replacement for traditional farmed meat.



Related Article: Americans wary of futuristic science, tech

The clean meat industry is well aware that it might face initial resistance from consumers, so producers are trying to be transparent about their process. "At scale the process will look something like a beer brewery," Valeti said. "In fact, we intend to eventually open our production facilities to the public so that consumers can see it for themselves."

Interestingly, large meat conglomerates are embracing this new technology. Both Tyson Foods and Cargill have invested in Memphis Meats.

Pasture-raised meat producers aren't as enthusiastic about this new direction for the industry.

Rebecca Thistlethwaite, a farmer for the past 10 years, is quick to point out the difference between pasture-raised meat producers and factory farmers. *Many grass-fed*

By using this site, you agree to our updated [Privacy Policy](#) and our [Terms of Use](#).

Thistlethwaite argues that as long as clean meat producers use stem cells, they're still dependent on animals. "They're multiplying them in a lab rather than on a farm. ... Are they dependent on this industry they say they want to get rid of?"

The big picture

Innovators such as Bill Gates and Richard Branson are investing \$17 million in Memphis Meats.

The US Department of Agriculture projects that [meat consumption will reach a record high](#) in 2018: 222.8 pounds of meat per person for the year. With record meat consumption and an ever-growing world population that is projected to reach [9.7 billion by 2050](#), the current meat supply will be insufficient.

Follow CNN Health on Facebook and Twitter

See the latest news and share your comments with CNN Health on [Facebook](#) and [Twitter](#).

reality.

Clean meat production could also result in 78% to 96% lower greenhouse gas emissions, use 7% to 45% less energy, 99% less land, and 82% to 96% less water than traditional methods, [according to a study from the University of Oxford](#).

British Prime Minister Winston Churchill predicted the advent of clean meat in 1932.

"We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium," Churchill wrote. Eighty-six years later, his dream is growing closer to