

From lab to table: Can cell-cultured meat win over Americans?

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Alt-meat is having quite a moment.



California-based Beyond Meat, a leading plant-based meat company, this week had the strongest stock market debut of any company this year. Ikea announced a meatless version of its Swedish meatballs. And Burger King said it will roll out a version of its signature Whopper made with Impossible Burger, Beyond Meat's chief competitor, nationwide by the end of the year.

But conventional animal agriculture faces an even bigger threat than plant-based patties. This one comes from petri dishes.

Companies in the United States and abroad are moving quickly to bring to market hamburgers and other meat, poultry and seafood products derived from muscle tissue grown in a lab with cells harvested from a living animal.

U.S. regulators will introduce rules for such products later this year, and companies say they are poised to launch their first commercial products within the same time frame. Like the introduction of genetically modified foods before it, cell-cultured meat has the potential to transform how the world eats. And as with genetically modified foods, there probably will be pushback.

Plant-based meat, while growing in popularity, still largely appeals to the tiny fraction of who are vegetarians and vegans. If lab meats can replicate the taste and texture of traditional meat — at a lower cost and with fewer downsides — it would be a game-changer for global nutrition.

“If only half of it becomes remotely true, it will be one of the most important advancements of the century,” said Kristopher Gasteratos, founder of the Cellular Agriculture Society, an international nonprofit organization working to advance cellular agriculture.

This prospect is launching a three-way battle over the future of meat, with factions jockeying to shape government regulation, consumer tastes and the debate over the social and environment implications of alternative meats.

Traditional American animal agriculture, a \$176 billion business in 2017, wants to preserve its business while, in some cases, it dabbles in the future. (Giants like Cargill and Tyson have invested in alt-meat companies.)

The plant-based meat companies, currently getting all the buzz, must convince the world they're not just for vegans and vegetarians.

And the lab-based meat companies, which perhaps hold the most promise to disrupt the food industry, have to unpack the science for consumers and nudge people past the ick-factor.

The recent burst in enthusiasm for alternative meat products is striking because industry experts for years have been skeptical about whether they would find acceptance.

"When they introduced plantbased products, restaurateurs said it looked really promising, but the reorder rate is really slow," Don Close, senior animal protein analyst in North America for Rabo AgriFinance, said in an phone interview. "It's a negligible percentage of overall sales, and the amount of traction they are getting from the public is small compared to the media attention."

Beyond Meat's lively IPO was a strong indication of public sentiment; so too was this week's announcement that Impossible was experiencing a shortage of ingredients, and would probably not be able to meet demands at restaurant chains including White Castle and Red Robin.

Plant-based meat alternatives have exploded as a result of two conflicting trends: growing demand for meat and growing fears about meat.

Animal agriculture is an expanding economic powerhouse driven by growing demand in developed and developing countries. But it is also a source of concern about public health, worker safety, animal cruelty and climate change.

The World Health Organization and the British medical journal the Lancet this year warned of the dangers of red meat. On Friday, New York Mayor Bill de Blasio said that, for environmental reasons, he wanted to phase out processed and red meat served from city hospitals, schools and correctional facilities.

Gardenburger and Tofurky launched their veggie burgers in the early 1980s. But the concept leaped forward over the past decade with innovations such as Impossible Burger's introduction of "heme," a protein from the roots of soy plants that provides a meaty taste. The result is a patty with the mouth feel of the real deal, some Americans to which earlier plantbased burgers could only aspire.

The changes to meat could be even more sweeping once cellbased meat arrives on the market.

Gasteratos talks about a revolution — but he is patient in his time frame. He predicts lab-grown meat will replace 50 percent of the global meat consumption by the middle of this century.

By the end of the century, Gasteratos predicts, intensive animal agriculture will be phased out entirely and all meat will be grown in factories.

Speaking at a recent conference of ranchers and meat experts in College Station, Tex., Gasteratos cited global population growth projections and increasing per capita meat consumption among countries with growing middle classes against a backdrop of climate-related changes likely to shift or shrink arable land.

“I don’t believe plant-based has any revolutionary capacity,” he said. “I don’t support it. People like eating animal flesh, they have a psychological disinterest in eating plant-based. And I have yet to meet someone who can make a cell from another kingdom that can taste like an animal cell.”

According to Gasteratos, cellbased production uses a live anything mal’s adult muscle stem cells, raising them in a nutrient-rich environment until they take on the look and shape of the desired meat.

The first lab-grown burger was presented at a news conference in London in 2013, its tissue grown in a lab at Maastricht University in the Netherlands at an estimated cost of \$1.2 million per pound. Now the United States has at least nine cell-culturing companies, among 26 worldwide and with potentially more shadow companies gearing up in China. This year Israeli-based company Aleph Farms said it had gotten the cost down to \$100 per pound, and industry insiders say American companies are getting the cost to \$50 per pound.

Leading American companies now say they plan to launch their products before the end of 2019, slightly ahead of schedule. The Food and Drug Administration and the U.S. Department of Agriculture are expected to finalize rules regarding inspection and labeling this fall.

Eighty percent of early products will be “unstructured meat” — ground beef and the insides of a chicken nugget as opposed to a T-bone or chicken wing. With this country dispatching 50 billion hamburgers annually, wresting one of those away from traditional agriculture, or from plantbased companies, would be big business.

The barnyard lobby — representing the meat, livestock and poultry industries — has moved swiftly, launching lawsuits in 20 states to restrict the use of the term “beef.”

“Cell-cultured meat manufacturers must not be permitted to use the term ‘beef’ or any nomenclature associated with traditional livestock production,” the National Cattlemen’s Beef Association wrote last year in a letter to the USDA.

Danielle Beck, senior director of government affairs for the National Cattlemen’s Beef Association, said Big Beef is eager to avoid the dairy industry’s ongoing kerfuffle over milk. The FDA has chosen not to take enforcement action against the proliferation of nut milks, soy milks, oat milks, among others, using the term milk on their labels. From Beck’s perspective, these products should be labeled as “imitation milk.”

“Our producers are looking at the struggles of the dairy industry, and they are being proactive because we don’t want to end in the same way. Every single product needs to be distinctly identified in the marketplace,” she said.

Cell-based meat producers could also face resistance from consumers — although Erlinde Cornelis, a marketing professor at the business school at San Diego State University who studies consumer psychology, argues that younger diners are unlikely to be queasy about alt-proteins’ fabrication.

For people who have grown up with the specter of climate change, adoption of plant-based or cell-based meat over traditional animal agriculture is easy. Though there are bound to be skeptics, she said the overall appeal of moving from landbased animal agriculture to the lab was undeniable.

“Plant- and cell-based will appeal to different markets,” Cornelis said. “Actual meat is an old technology. It’s almost ignorant if you know how much of our resources it takes; it’s like typing on a typewriter when you have speech-to-text technology.”

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