


Is a lab-grown hamburger what's for dinner?

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By Rachel Koning Beals

'Flexitarians' also want plant-based protein in the mix -- and most want it to taste, smell and sizzle like meat

Familiar cuts of beef, pork and poultry turned out by San Francisco Bay Area-based Memphis Meats and its handful of competitors are 100% meat in taste and texture. The sizzle from the grill is there, too.

But these steaks, chops and chicken strips were entirely grown from animal cells in a petri dish, not raised down on the farm.

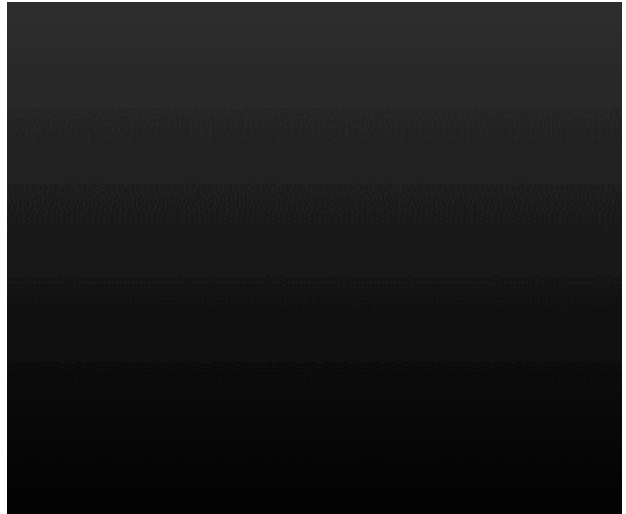
Alternatives to conventionally produced meat, whose water and land use, waste runoff and the controversy around antibiotic treatments have some consumers rethinking food sources, are positioned alongside plant-based meat substitutes to grab nearly one-third of the global protein market in the next few decades, said Liz Specht, senior scientist at the Good Food Institute.

Specht, who participated on a panel Wednesday at Northwestern University's Kellogg School of Management, said animal agriculture is ripe for a technology disruption that recreates the protein platform as we know it, now typically cultivating, growing and slaughtering animals at a big cost to the environment.

Rethinking meat, including a lab's focus on prime cuts without byproducts, is a trend that's even luring giant traditional food companies, including Tyson Foods Inc.(TSN) , the largest U.S. meat company by sales, to take a chance on a future combining farm-raised meat, culture-grown meat and ever-advancing plant-based options, like black bean or soy burgers, in order to feed the globe's nearly 10 billion people by 2050.

Tyson in 2016 launched a \$150 million venture capital fund called Tyson New Ventures LLC. The fund's first investment was a 5% stake in Beyond Meats, a company making burgers, chicken and other traditional "meat" out of peas, carrot fiber and more. A venture unit of General Mills (GIS) also invested in the company.

The Tyson venture now has a stake in Memphis Meats, which has also drawn funding from Cargill, the privately held agriculture conglomerate. Investment details have not been released, but Memphis said at the time that Cargill's investment was part of \$17 million in funding that



included stakes from Bill Gates, Richard Branson and venture-capital firms Draper Fisher Jurvetson and Atomico, the Wall Street Journal reported (<https://www.wsj.com/articles/cargill-backs-cell-culture-meat-1503486002>).

Justin Whitmore, executive vice president of corporate strategy and chief sustainability officer at Tyson, told the Kellogg event that his company considers technology-driven protein as an "and not an or" to conventional meat production -- including the some 10,000 farmers and ranchers who supply Tyson -- as both approaches can go after a share of the \$2 billion meat industry. The size of Tyson's supply chain positions it to get the meat out of the lab and onto store shelves, Whitmore said.

"We don't want to be disrupted," he said. "We want to be part of the disruption."

While it's a tough conversation between Tyson and its producers, Whitmore said, farmers would be short-sighted to dismiss sustainability concerns. It takes about 15,000 liters (3,963 gallons) of water to produce 1 kilogram (2.2 pounds) of beef, compared with 1,600 liters for a kilo of wheat, according to estimates from the Water Footprint Network.

David Kay, manager of communications and sustainability at Memphis Meats, said the lab approach to "clean meat" can also reduce the risks of contamination and foodborne pathogens in the production chain, which can be a key marketing tool. Traditional meat regulators, who are working with the firm, haven't decided how they will oversee meat production that doesn't involve feed lots and butchers.

Kay conceded that transparency and information sharing is key to his business getting a foothold among consumers also caught up in the "farm to fork" trend for which the notion of "processing" food in a lab may seem contradictory. He sees room in the market of the future for small, sustainable traditional farms.

But consumers can be won over, proponents believe. "You can, and are more likely to, tour Memphis Meats than tour a slaughter house," Specht weighed in. She expects farm-based production to continue to grow for higher-margin product, using sustainable practices.

A study published last year by researchers at Australia's University of Queensland, and cited by Memphis Meats, found that about a third of 673 respondents in the U.S. would be willing to eat cell-cultured meat regularly. Nearly half said they would choose it over soy-based meat substitutes. About one-fifth said they were unlikely to try the meat or would refuse it.

Sergio Eleutorio, general manager of the Boca plant-based protein brand at Kraft Heinz (KHC), told the Kellogg panel that consumer preference drives their strategy. Weight-loss goals tended to drive early demand for the lower-calorie Boca burger meat substitutes as the brand first gained traction in the 1990s.

Now, "flexitarians -- who focus on a plant-based diet and eat meat occasionally -- provide the most volume for Boca," said Eleutorio.

Protein-consumption trends have moved in this industry's favor. The recommended daily intake of protein for a healthy adult is 46 grams for women and 56 grams for men, yet most American adults eat about 100 grams of protein per day, or roughly twice the recommended amount. The Hartman Group, a consumer research firm that has been conducting a study of American food culture over the past 25 years, has found that nearly 60% of Americans are now actively trying to increase their protein intake as more try to avoid sugar and simple carbohydrates.

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And with that trend, annual global sales of plant-based substitute meat have gained 8% a year since 2010, and are growing at twice the rate of processed meat, according to an October report from Bloomberg Intelligence. That boost is thanks in part to expanding shelf space in Whole Foods Markets Inc. stores (AMZN) and other retailers. The market for meat substitutes may grow 8.4% annually over the next five years, with China helping to speed the expansion as it seeks to cut meat consumption in half by 2030, according to estimates in the Sustainalytics report.

Memphis Meats's Kay said the revolution for the beer market's micro-brewing phenomenon is a model that "at scale" can be patterned by meat labs. Memphis executives told the Wall Street Journal last year that the company, founded in 2015, can make a pound of meat for less than \$2,400 start to finish, down from \$18,000 a year earlier.

"Our goal is not to put family farmers out of business," Kay said Wednesday, "but we see a real role in feeding the world."

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