Dan Zamarelli
danzamarelli@gmail.com
630-738-0407

Meat the Future

I sat on a wooden booth inside the State Street location of Chicago's own Epic Burger, staring down at that most ubiquitous of American guilty pleasures, the cheeseburger. But this wasn't just any cheeseburger, is was a "Beyond Burger." Epic Burger's vegetarian Beyond Burger claims to look, smell, and taste like beef – but isn't. It is composed of pea protein, and gets that distinct "beef" coloring from beet juice.

Beyond Burger isn't the only plant-based burger in town. Lettuce Entertain You's M Burger chain also offers a meatless meat burger – The Impossible Burger. Created by Silicon Valley's Impossible Foods, Impossible Burgers adhere to the same basic formula as Beyond Burgers, but also include heme (soy leghemoglobin), which adds additional meat-like coloration and texture. In July 2016, rockstar chef David Chang featured the Impossible Burger on the lunch menu of his Manhattan eatery, Momofuku Nishi. 15 minutes before lunch service began at noon, a line of eager diners had already wrapped around the block, marking what is likely the first time in the history of the universe that red-blooded Americans have queued for a chance to take a bite of a veggie burger.

Synthetic meat is the next big thing in the world where cooking and the science of gastronomy intersect: and it's both prettier and more pragmatic than a gelatinous green smear that tastes, somehow, like bacon and eggs. Americans are by nature enthusiastic omnivores. We consider animal protein to be the centerpiece of every meal, and the health-necessitated vegetable side-dishes strictly secondary. But what about meat that isn't actually meat?

The history of vegetarian meat is, perhaps not surprisingly, European. In 2013, Dutch scientist Mark Post helped pioneer the creation of lab-grown meat, utilizing a bioreactor to house satellite cells sampled from the muscles of live animals. The cells were then left to multiply until they were numerous enough to be formed into strips, mechanically stretched, and eventually dosed with the nutrients necessary to prepare them for harvest.

The production cost of Post's first lab-grown meat patty? $300,000. A bit pricier than the mass-produced drive-thru standbys Americans often turn to satisfy their cravings for umami-laden grease bombs. But fake meat patties have become a touch more affordable since their launch party – Memphis Meats and Mosa Meat are two examples of the multitude of start-ups working to make lab-grown meat readily available at reasonable prices. So how long do we have to wait to get an Impossible Burger at Wendy's prices? "In terms of commercial sales, I would say in four to five years, it will still be a somewhat expensive burger, around the $10 mark," Post predicts. "Another few years of commercial production and the price will start to fall further."

The difficulty rests on finding an efficient and sustainable method of mass-production: a synthetic meat processing plant would require several 25,000-liter bioreactors. Each bioreactor would be able to grow enough meat to feed 10,000 people. One problem is that the cell cultures subsist on a diet of potent, animal-blood based nutrient serums, and as Post says, "There would not be enough serum in the world to grow all the cells you need to mass-produce." Post and other researchers are hard at work searching for alternatives to the serums, but have not yet discovered a viable solution.

Although we like our meat, (some) Americans also recognize the ethical and environmental quandaries inherent to meat consumption: factory farming, greenhouse gas emissions, the consumption of water, land, and electricity that might be better spent elsewhere.

Synthetic meat offers at least a partial solution to these conundrums, as it requires a significantly smaller allocation of natural resources than farmed meat: 1,000 kg of synthetic meat requires 7-45% less energy, approximately 90% less water, 99% less land, and produces 78-96% lower greenhouse emissions.

However, synthetic meat production does present a host of logistical and ethical problems. Besides the continued usage of water and energy, obtaining the requisite muscle protein samples involves an invasive procedure, and so animal suffering is still not eliminated. Moreover, as Chicago's DePaul University Philosophy Professor H. Peter Steeves notes in his recently published book, *Beautful, Bright and Blinding*, eating any type of meat, regardless, of how it is procured, may be by its nature a morally bankrupt act. "The craving is for animal flesh…Is there not something bad about the desire itself, apart from whether or not any animal is affected?"

But the utilitarian benefits of synthetic meat may undermine such concerns. As the nations of the third-world continue to grow and develop, so does their meat consumption. In Asia alone, demand for meat is expected to increase 76% by 2060. Lab-grown meat may be the most sanitary, and ethical method by which that demand can be satisfied.

Vegetarians remain a small minority of the world's population, and short of the advent of some cultural zeitgeist which alters that fact, omnivorous diets are likely to remain in vogue. And so synthetic meat might be the meat of the future.

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I took my first bite. It was…hard to describe - almost like meat, but clearly not. I could see the potential – a few more years of tinkering, and the Beyond Burger and its cohorts might very well end up the only burgers in town.

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