

# Tectonic Episode 04: Is the Future of Meat in the Lab?

Ben Wurgaft 0:01

Many people presume that meat is going to become harder to create, as climate change shrinks available farmland, water becomes less readily available. The broader question here is about the human imagination. What's available to us and what isn't, in order to imagine a better collective future or even to start to broker the conversation about what's a desirable future for the people engaged in that conversation?

Brendan Karch 0:30

Welcome to Tectonic, a podcast uncovering the shifting foundations between science and society. I'm your host, Brendan Karch. On this episode, we talk about our global food systems, and particularly how we grow and consume meat.

Ben Wurgaft 0:49

Hi, I'm Ben Wurgaft. I'm a writer and historian. And I come to this podcast as one of a small handful of people who has written extensively about the future of food and specifically laboratory grown meat.

Brendan Karch 1:09

As we feed a growing population, meat consumption is a key sticking point. Raising and slaughtering animals consumes vast quantities of land, water and other resources. Mass consumption of meat feeds the climate crisis. Are there technological fixes for our hunger for meat? Or must we instead revolutionize our food systems, our cultural values, and our dietary habits? Ben, in his book *Meat Planet*, looks at these questions by taking an ethnographer's eye to one new technology: laboratory grown meat. For Ben, this project was a culmination of his life experiences. His mother is a food anthropologist, and food has always been his lens onto life and his relationships.

Ben Wurgaft 2:02

Right after college, I worked in restaurants, but I was terrible at it. So I ended up going to graduate school and earned my doctorate in European Intellectual History at the University of California, Berkeley, lived in California for about 15 years in total, ended up writing a lot about food for magazines and journals. And I ended up writing a book which is called *Meat Planet, Artificial Flesh and the Future of Food*, which is about five or six years I spent with technicians, scientists, food futurists, consultants, venture capitalists, who think that the future of meat is grown in the lab.

Brendan Karch 2:47

Ben's odyssey began in 2013 when, sitting in Los Angeles, he watched a video conference from London. There, a Dutch doctor and researcher Mark Post, debuted the world's first lab grown hamburger

News voiceover 3:02

The world's first test tube burger has been unveiled. It's made of the cow cells, it's beef as we know it.

Brendan Karch 3:08

Ben became transfixed by the spectacle of the event. He honed in on the way the lab meat industry talked, the flows of money supporting it, and the ethical implications.

Ben Wurgaft 3:20

I'm interested in questions relating to the future of technology and to the future of big systems like food production and agriculture. Also to the way in which those systems are political and cultural, in complicated ways, that mean that they can never be just technological; problems with those systems can never be fixed simply with technology.

Brendan Karch 3:51

As Ben entered this world, he began to notice some strange trends. Like for example, how to define lab grown meat.

Ben Wurgaft 3:58

One of the things that I found in my fieldwork among people who tried to make what I call cultured meat, what other people call cultivated meat, schmeat, Franken meat, lab meat, etc, is a tendency to use the issue of natural versus artificial in a really funny way.

Brendan Karch 4:17

Discerning customers – the Whole Foods crowd, if you will – will often prioritize products declared natural over those deemed artificial. But can meat grown in a lab ever be considered natural?

Ben Wurgaft 4:30

If we say, okay, there's natural versus artificial? Why do these consumers have an aversion to things that they think are artificial? Why do they think that there's something that's natural and sacrosanct when there is nothing that we eat that is untouched, that is somehow genetically free of human tampering in some way, down to the grains that we consume that make up for many of us the staples of our diets.

Brendan Karch 5:00

Plant and animal breeding have transformed nearly everything you eat, just in the last 150 years. The Paleo Diet?

News voiceover 5:07

It is the latest diet fad, eating like the cavemen. The Paleo diet is popular...

Brendan Karch 5:11

Forget it. We would barely recognize most of the foods our long-ago ancestors ate. But does that mean nothing we eat is natural? Well, that's one argument developed by the lab grown meat crowd.

Ben Wurgaft 5:25

They would say, well, Okay, so everything's artificial, nothing's natural. Come on, relax, eat the lab grown meat. And I think that this is a kind of rhetorical sleight of hand. There is in fact a big difference between one form of modification of the natural world and another. To blur those boundaries is very interesting.

Brendan Karch 5:49

Lab grown meat is more than just a genetically modified crop or new crossbreed. It's a fundamental change in the technology and style of production, a potential revolution really. And it's a revolution that could transform how we relate to food and to other species.

Ben Wurgaft 6:08

If you could grow animal products, under laboratory and then factory conditions, you would fundamentally change the way human beings relate to non-human animals. Unsurprisingly, and for very good reasons, a great many of the people I spent time with have very strong, heartfelt commitments to the end of what they see as animal cruelty. Many of them are vegans, many of them have a history of activism in organizations like PETA, the People for the Ethical Treatment of Animals. One of the things that they think that we'll be able to do, is to create meat without suffering. And by creating meat that we don't have to raise and kill an animal for, they will enable us to eliminate factory farming, but indeed all forms of animal agriculture.

Brendan Karch 7:06

Promoters of lab grown meat have seemingly utopian ambitions for improving the world. Sometimes, Ben notes, they're motivated by profit to stay optimistic. The cultured meat revolution is just around the corner, they promise. But actual Frankenburgers are a very long ways off from hitting your grocery shelves. In particular, it's proven hard to replicate the variety of meats and cuts that humans actually consume.

Ben Wurgaft 7:33

Laboratory grown meat is usually in the form of a very familiar industrially produced piece of meat: hamburger, hotdog, chicken nugget. It's not in the form of a cut of meat taken from the animal. There's one thing that I really want to underline here: cultured meat doesn't exist.

Brendan Karch 8:03

Well, technically, it does exist. Remember that 2013 hamburger? And in late 2021, an Israeli company did announce its first lab grown steak. But there's still huge issues that prevent it from existing in our world, outside the lab.

Ben Wurgaft 8:21

When I say it doesn't exist, what I mean is that we can't walk into a Star Market or a Safeway and buy it. There's one country in the world that has allowed a restaurant to cook and sell small portions of it, and that's in Singapore. And there is some talk of a production facility in Qatar being built. And there are many companies that would, if they heard me say cultured meat doesn't exist, they would say, What are you talking about? We're making it. They have lots of incentives to do that. They need everybody to believe that this will be a product soon. And that's partly to keep venture capital flowing. And it's partly to keep up everyone's sense of the possibility of this. And it's entirely possible. It's just not here yet.

Brendan Karch 9:09

So why isn't cultured meat making the leap from lab to grocery aisle? Why are these experiments struggling to commercialize?

Ben Wurgaft 9:17

They all have a few features in common. And one of them is that they have technical challenges related to scaling. That word that's become a verb in Silicon Valley, how can we scale, how can we scale anything? In the case of cultured meat, the problem of scaling has to do with a few things. One of them has to do with the cost of growth media used to feed cells.

Brendan Karch 9:42

To make lab grown meat, you have to grow the cells, and the cells need energy, food to grow. And where do we get that from?

Ben Wurgaft 9:51

There are technical problems now related to growth media, which have usually been based on or incorporate something called fetal bovine serum. You can almost imagine the way that it's harvested.

Brendan Karch 10:05

And just in case you can't imagine it, well cover your ears, maybe. It all starts by collecting the precious blood of a cow fetus after its mother has been slaughtered. That blood? That's what cultured meat needs in order to grow.

Ben Wurgaft 10:20

It's obviously unacceptable for people who need laboratory grown meat to be vegan or vegetarian. And the effort is to find a vegan substitute. So that's one challenge. Another has to do with the kinds of cells you can grow and the arrangements of those cells. It's not easy to make hamburger. But you can do it by growing almost two dimensional sheets of cells in T flasks in a laboratory. You can't necessarily grow a steak.

Brendan Karch 10:51

In other words, we can grow two dimensional muscle cells. But it's much harder to interweave fat and muscle, let alone mimic the complex marbling of a steak. And those details are ultimately what gives meat its aroma, its mouthfeel, its taste. Remember that 2013 hamburger? Well, it had to be colored with beet juice, and critics said it barely tasted like the real thing. And that was just one hamburger. What about making a million of them?

Ben Wurgaft 11:22

It would be very, very difficult to make cultured meat scale for several reasons. And they include the difficulty getting cells to behave in a bioreactor in exactly the way that you want to, once you get beyond a certain scale of cells. There are different kinds of physical forces that act on those cells that are just massively different when you get up in scale.

Brendan Karch 11:48

Scale, growth medium, three dimensional cultures. These are all the technical challenges lab meat has yet to master. But there's another dilemma brewing – a bioethical one. The emerging technology to grow hamburgers is basically identical to that used to grow human cells. They're both done in bioreactors, and experiments are underway to create replacement human tissue. Which leads to the question, where should we be investing our science and research energy?

Ben Wurgaft 12:21

And if you could do that, in a bioreactor, you could probably also grow replacement muscle for a damaged arm, for example. You can imagine people asking questions. Why would we use that kind of technology to produce meat, if we could use that kind of technology to heal people? The value of medical tissue is absurdly greater than the value of tissue to be consumed as food.

Brendan Karch 12:50

At this point, with the finite resources of science, why should a lab grown steak be prioritized over potential breakthroughs in human regenerative tissue? In other words, why spend our innovation efforts on hamburgers instead of human organs? In studying promoters of cultured meat, then notice something that they don't talk about very much: vegetarians. The selling pitch of lab meat assumes that our desire for animal flesh is timeless and natural. There was even some early industry marketing that presented long-haired cavemen smoking meat. The message? Our carnivore nature is baked into our species from the beginning. And it's allegedly baked into the future too, if you ask the lab grown meat crowd. They say our global demand is only headed up by 50% by 2050, with nothing we can do to stop it.

Ben Wurgaft 13:47

One of the things that make sense to do if you're trying to sell something is to naturalize the need for it. It is both true that vegetarianism has been very rare in human history, and that human beings don't actually automatically require meat somehow nutritionally. But certainly what's most interesting about companies saying that we have a natural hunger for meat somehow, is that they are companies saying that we have a natural hunger for meat. The selective use or abuse of nutritional ideas was really all over the place when I was doing my

research. Many people presume that meat is going to become harder to create, as climate change shrinks available farmland, as water becomes less readily available.

Brendan Karch 14:48

The food tech companies pushing cultured meat have a hard time thinking beyond their techno-utopian solution to these challenges, which they're financially invested in. But what if the real solutions lie not in a scientific moonshot, but rather in hard social and political choices and tradeoffs, like making meat much more expensive and prioritizing plant proteins, or emphasizing more just distribution?

Ben Wurgaft 15:17

There is plenty of protein already. Why not redistribute it better? Why not treat food scarcity as a problem of distribution and justice, rather than as a problem of production? The broader question here is about the human imagination, and what's available to us and what isn't, in order to imagine a better collective future or even to start to broker the conversation about what's the desirable future for the people engaged in that conversation. That always seems to be much harder than imagining that a particular technology will change everything.

Brendan Karch 15:53

One of those potential changes is widespread adoption of vegetarianism in well-off societies that can afford meat. There's already signs of a shifting value system there. Might that change render lab grown meat irrelevant?

Ben Wurgaft 16:07

It's certainly possible for people to imagine a vegetarian future, imagine a vegan future. Many of the people I was talking to did. What becomes interesting is that they don't think of it in terms of a change in human values, a change in how people see non-human animal life.

Brendan Karch 16:28

Yet Ben says lab grown meat promoters aren't thinking about values changing, but mostly just about profits, much to their own detriment.

Ben Wurgaft 16:37

They imagine it coming through a combination of new technologies and the market. It's almost as though they have a sense of where they think historical change, social change comes from. And they've naturalized those assumptions within their model. I tend to think the technological futurism usually leads to different forms of imaginative blockage.

Brendan Karch 17:01

That's not to say that vegetarianism is a cure all. Take plant based burgers, like the Impossible Burger.

News voiceover 17:07

The Impossible Burger claims to be the world's only plant based burger...

Brendan Karch 17:11

Demand is surging for them. Startups now promise a meat-like experience, but the data on their environmental footprint is still lacking.

Ben Wurgaft 17:24

The plant based burgers are of course, infinitely easier technically to create and to create at scale. They're not necessarily better for you, they're often worse for you actually. They're not necessarily that much better for the environment. We don't have good third-party studies of their environmental footprints yet, we only have what the companies have put out, and they do use a lot of ingredients, and they are incredibly highly processed.

Brendan Karch 17:53

Nonetheless, in addressing the challenges of our future food supply, there may be some obvious solutions, some low-hanging fruit, if you will, that can be implemented with current day technologies. Take for example, food waste.

News voiceover 18:07

Every year, around 1/3 of all food produced for human consumption is lost or wasted. An enormous amount given the 820 million hungry people in the world.

Ben Wurgaft 18:19

You wouldn't necessarily need a startup to solve it. You might need a series of training programs for home chefs and professional cooks in how to make the best use possible of the ingredients that we have, and how to get the most out of them.

Brendan Karch 18:37

This is not theoretical. There are interesting experiments in place to recycle our food waste into new products.

Ben Wurgaft 18:45

There's a Basque culinary lab that works on this.

News voiceover 18:51

[Speaking in Spanish]

Ben Wurgaft 18:57

And they do all kinds of crazy things with things you would imagine to be refuse from their kitchens that they then use to grow mushrooms that end up in other parts of their food. They're really creative and interesting. They are getting fermentations and non-fermented sauces and different kinds of proteins out of things that most home cooks would consider waste. I would love for that to be a big part of the future of food. It's something that you need sort of skill and knowledge to do, but not necessarily tissue culture.

Brendan Karch 19:36

This is just one example of an alternative experiment in our food futures. Then there's the roads not yet taken – the regulatory and value-shifting roads. When I asked Ben to give me his quote 'Christmas list' of ways he'd like to revolutionize our food system, cultured meat was not on the list, but lots of social programs were

Ben Wurgaft 19:58

The Christmas list would include some form of reorganization of agricultural subsidy worldwide to disincentivize the production of industrially produced cheap meat, incentivize farming as a career path for younger people, and to shift those educational systems that don't already emphasize food almost as a subject for young children, to start talking with them and thinking with them, and doing practical things with them to get them to tune into food. I think that this is really, really important because any change to a food system is something that unfolds on a generational scale, not on the scale of a tech company.

Brendan Karch 20:50

Changing our meat production systems won't just mean incentivizing and educating farmers. It will also mean wide-scale rethinking of our land use and labor systems related to agriculture. Meat production is estimated to produce 14 to 18% of our human greenhouse gas emissions. Bringing that number down means changing almost everything.

Ben Wurgaft 21:13

This means less farmable land. It means different farmable land. It means changing patterns of crop growth, it means farmers becoming climate migrants and climate refugees. These are all going to be incredibly pressing questions. Even not being a prognosticator, I feel entirely comfortable saying that those are going to be pressing questions over the next 20 years.

Brendan Karch 21:38

These are not problems that lab grown meat alone can solve, Ben says, But governments and communities can through creative solutions.

Ben Wurgaft 21:50

Governments around the world need to rethink their relationship with technology, with regulation, with the maintenance of existing systems to, increasingly emphasize maintenances as a value. This is a complicated thing for those of us who are often in conversations about technology; conversations about technology are often conversations about the new. But I think that they can also be extremely valuable as conversations about the old and the existing, and what needs maintenance, rather than what needs tearing down and rebuilding.

Brendan Karch 22:27

These are the conversations that Ben wishes he would have heard more of in the culture of meatspace. But he thinks there's still room to include them in solving these tough society-shifting challenges.



Ben Wurgaft 22:40

I definitely think that people who spend a lot of their time in laboratories should be in those conversations, and that we all (the meat pun is everywhere) just have a stake in as many voices being in those conversations as possible. But it seems so clear that we're past the point where the conversation about the future of food should be governed by profit motives.

Brendan Karch 23:08

There's probably one question still on the minds of many. Has he ever tried lab grown meat?

Ben Wurgaft 23:14

I have not. And that's a really fun question to respond to, because the answer to the question thereby hangs a story, right? So the years I was doing most of my fieldwork were 2013 to 2015, with occasional bits of fieldwork, I was able to sneak in 2016, 2017, 2018, 2019. And in those years, so little cultured meat was produced that it could probably fit on the two desks we're sitting in front of.

Brendan Karch 23:50

Looking to consume more of Ben's work? Check out his book *Meat Planet* or some of his journalism linked from his webpage, [benwurgaft.org](http://benwurgaft.org). On our final episode of the season, we talked with Katie Stebbins, who has made her career building up innovation ecosystems in Massachusetts.

Katie Stebbins 24:08

Anytime you're in a post industrial city, there is an industrial legacy there. And I don't care where you are in the world. I love going into cities and just sort of unearthing what's been there all along that we forgot about, and building on it.

Brendan Karch 24:23

We discussed the role of cities in solving our big global challenges and the value of public private partnerships in accelerating change. *Tectonic* is hosted by me Brendan Karch with production and sound design by Anour Esa, you can subscribe to our podcast on Apple podcasts, Spotify, Google, or wherever you get your podcasts. And if you have a second, leave us a review on Apple podcasts. We'd love to hear your feedback. We are a production of Swissnex in Boston, the world's first science consulate located in the heart of Cambridge, Massachusetts. You can find us on LinkedIn or on Twitter at [swissnexBoston](https://twitter.com/swissnexBoston), or on the web at [swissnex.org/boston](http://swissnex.org/boston).