

[NY Times: OPINION](#)

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Can Lab-Grown Burgers Help Stop Climate Change?

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Humanity's love of eating animals should worry you, even if humans are the only animals you care about. Meat and dairy production is responsible for [14.5 percent](#) of the planet's greenhouse gas emissions, with about two-thirds of those coming from cattle. To keep global warming below two degrees Celsius above preindustrial levels, the limit established by the Paris climate accord, the World Resource Institute [says](#) much of the wealthy world needs to cut its beef and lamb consumption by 40 percent — and that's on [the low end](#) of such estimates.

Americans are [among the top eaters of beef in the world](#), and persuading them to cut down on it or swap plant-based burgers for their steaks is a challenge.

Enter lab-grown — or, as some prefer, “cultured” or “cultivated” — meat: In the past few years, [a small but fast-growing industry](#) has sprung up with a mission to create meat from cell lines that doesn't just taste like meat but actually *is* meat. Last year, a restaurant in Singapore even put [lab-grown chicken](#) on its menu.

As the sector has bloomed, so too [have predictions](#) of its imminent usurpation of meat of the slaughter-requiring variety. But how close are we really to that future, and is it the one we should be aiming for in the first place? Here's what people are saying.

The urgency of reducing meat consumption

Vexing as the problem beef poses for climate change mitigation already is, it's going to get worse. That's because the world is getting richer, and when people get richer, they eat more meat.

- Since 1961, global meat production has [more than quadrupled](#), to more than 340 million tons from 71 million tons.
- By 2050, the Food and Agriculture Organization [estimates](#) that global demand will reach 455 million tons.

“The 7.8 billion of us on this planet cannot have a steak every night,” Inger Andersen, executive director of the U.N. Environment Program, [told](#) The Times in April. “It doesn't compute.”

And climate change isn't the only issue at stake in the race to cut down on meat:

- **Pandemics:** The increasing demand for animal protein is one of the major risk drivers of pandemic outbreaks, [according](#) to the United Nations. Another is the “intensification” of animal agriculture that the growing demand for meat requires: Animals are bred to be genetically similar and crowded together in huge facilities that promote viral transmission and mutation. Since 1940, agricultural intensification measures — dams, irrigation projects and factory farms — have been linked to more than 50 percent of zoonotic infectious diseases that have spread to humans.
- **Animal welfare:** You don't have to believe that eating meat is per se immoral to object to the incalculable suffering factory farming inflicts on billions of animals — [including human workers](#) — every year.
- **Antibiotic resistance:** About [65 percent](#) of antibiotics in the United States are sold for use on farms, often just to prevent animals from getting sick. That's contributed to the [rise of antibiotic-resistant diseases](#), which are already killing 700,000 people a year worldwide. By 2050, the number could [rise to 10 million](#).

- **Food-borne illness:** Lab-grown meat could reduce the threat of food-borne pathogens like E. coli and salmonella, [which kill 420,000 people every year.](#)

Why lab-grown meat isn't filling grocery stores just yet

As Vox's Kelsey Piper [has reported](#), there are still a number of hurdles lab-grown meat has to overcome before reaching commercial viability:

- **Scaffolding:** Growing ground beef is one thing, but replicating the structure and texture of a steak, say, requires shaping cultured cells into complex tissue — and researchers are still working out how to do that.
- **Scale:** As Piper wrote, "it's not enough to be able to make one steak — you need to be able to make steaks at the same incredible scale that factory farms do." And at least for the moment, the economics and engineering challenges of building full-scale facilities are prohibitive.
- **Cost:** Lab-grown meat is staggeringly expensive. In early 2019, the Israeli-based company Aleph Farms [said](#) it had driven the cost of producing a beef patty down to about \$100 per pound. Eat Just, the company behind the Singaporean lab-grown chicken, initially [said](#) making a single nugget cost \$50.

For lab-grown meat to start replacing factory-farmed meat, all of these problems will have to be solved.

Should we launch a moonshot for affordable, lab-grown meat?

While other countries have thrown money behind alternative proteins, America's lab-grown meat industry has emerged without the support of the U.S. government, which spends \$38 billion each year subsidizing the meat and dairy industry.

My colleague Ezra Klein believes that should change. In [an April column](#), he noted that the Good Food Institute, a nonprofit that promotes the alternative protein industry, had asked the Biden administration for [\\$2 billion in funding](#), half of it for research and half of it to set up a network of innovation centers. The institute [estimates](#) that with enough investment, by 2030, cultivated meat would be able to compete on cost with some conventional meats, requiring only \$2.57 per pound to produce — a stunning reduction.

"I've never seen anything like this in terms of the volume of money being talked about and the opportunities to do something transformational," Representative Earl Blumenauer, an Oregon Democrat, told Klein. "It wouldn't take a lot of investment in alternative protein to take it to a whole different level. It'd be a rounding error in terms of the money going through Congress."

State involvement may be needed not only to accelerate innovation but also to ensure that innovation is widely shared. The international regime of intellectual property law that has governed the world's disastrously unequal vaccine rollout offers "a troubling preview of how other lifesaving technologies might be apportioned, including those needed to keep global warming below two degrees Celsius," the climate journalist Kate Aronoff [writes](#). "Setting technology transfer as a baseline at this early stage of cellular agriculture's development could (optimistically speaking) set a precedent that discourages other sectors from using patents to charge exorbitant rents for everything from cultured salmon to clean energy."

But some say lab-grown meat won't be able to start displacing conventional meat in time — or perhaps ever. David Humbird, a Berkeley-trained chemical engineer who spent over two years researching a [techno-economic assessment](#) of lab-grown meat, believes the industry faces extreme, intractable technological challenges. In interviews with [Joe Fassler of The Counter](#), he said it was "hard to find an angle that wasn't a ludicrous dead end."

Even the chief executive of Eat Just conceded that the challenges Humbird raised need to be reckoned with, leaving it "very uncertain" whether cultured meat can displace slaughtered meat in the next 30 years. In Fassler's telling, for cultured meat to be a meaningful climate solution would require several scientific breakthroughs worthy of many Nobel Prizes — and in the next 10 years, not 30.

A strong case can be made for the state to stake money on those breakthroughs, just as it did on vaccines for the coronavirus. But then again, conservative members of the Senate have fought to pare back the size of prospective climate spending, potentially forcing policy trade-offs that climate experts and activists [would prefer not to make](#).

“The environmental ravages we face are vast, destabilizing, and encroaching on our real lives right now,” Fassler [writes](#). “The fires, the floods, are already at our door. In all this, it would be so good to know we have a silver bullet. But until solid, publicly accessible science proves otherwise, cultured meat is still a gamble — a final trip to the casino, when our luck long ago ran out. We should ask ourselves if that’s a chance we want to take.”

We could also just eat less meat

Perhaps, as [Piper](#) and Klein hope, lab-grown meat will eventually become more widely available, and even if its cost never reaches parity with that of factory-farmed meat, a meaningful amount of substitution will become possible.

But as Aronoff notes, diets need to change now, particularly in the West. And people generally exercise a degree of control over what they eat in a way they simply do not over how their electricity is generated. America’s love of beef might seem intractable, but another beef-loving country, Brazil, has shown what the beginning of a national shift toward more climate-friendly diets might look like.

Although vegetarians and vegans have the smallest dietary carbon footprints, adopting a more climate-friendly diet doesn’t require becoming one, as the Times food columnist Melissa Clark wrote in [her meat-lover’s guide to eating less meat](#). Following the World Resource Institute’s recommendations, she started focusing more on chicken, pork and seafood (especially mollusks), which produce far fewer greenhouse gas emissions than beef and lamb, both of which she has relegated to special-occasion status.

“I like to loosely think of my approach as mindful meat-eating,” she [wrote](#). “Now, when I do simmer up a pot of beef short ribs (or smear cream cheese on my bagel, or go for sushi), I’m thoughtful and deliberate about it, which makes it taste even more delicious, seasoned with anticipation.”