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Lab-Grown Meat Is 25 Times Worse for the Environment

Analysis by Dr. Joseph Mercola Fact Checked | May 24, 2023

STORY AT-A-GLANCE

- According to a recent "cradle-to-gate life cycle" analysis, the lab-grown meat industry produces four to 25 times more CO_2 than traditional animal husbandry
- Cultured meats are ultraprocessed and therefore likely to cause health problems similar to those caused by other ultraprocessed products, such as obesity, cardiovascular diseases, Type-2 diabetes, metabolic syndrome, irritable bowel syndrome, cancer, mental health problems and increased all-cause mortality
- The starting ingredients in the new fermented synthetic biology products are cheap sugars derived from genetically engineered (GE) corn and soy. GE crops are grown in environmentally destructive monocultures that use loads of herbicides, pesticides and synthetic fertilizers. As a result, they're loaded with chemical residues
- Once the target organisms in the ferment have consumed the nutrients they need, what's left over is hazardous biowaste that must be deactivated and safely disposed of. The waste cannot be sent to a landfill or used for any other purpose
- Lab-grown meats are not about your health or the environment's; they're a tool to phase out farmers and ranchers and replace them with an ultraprocessed product controlled by patents

Lab-grown, or cultured, meat is being promoted as the wave of the future — the "green, sustainable" way to eat. No animal suffering, no greenhouse gas emissions, just meat-like protein that will taste like the burgers and steaks you're used to. Too bad it's all a lie.

Beneath the greenwashed façade, the promises of lab-grown meat fall flat. Lab-grown meats are not about your health or the environment's; they're a tool to phase out farmers and ranchers and replace them with an ultraprocessed product controlled by patents.

Importantly, even if cultured meats aren't toxic per se, they're ultraprocessed products[1] and therefore likely to cause health problems similar to those caused by other ultraprocessed foods, such as obesity,[2] cardiovascular diseases, Type-2 diabetes, metabolic syndrome, irritable bowel syndrome, cancer,[3] mental health problems[4] and increased all-cause mortality.[5,6,7,8,9]

On top of that, they're more harmful for the environment than conventional ranching. Since synthetic biology relies on genetically engineered (GE) monoculture, it creates the very things they claim to counteract, namely environmental degradation that promotes climate change.

Synthetic Biology Is Made With Junk Food Ingredients

In the video above, Alan Lewis, vice president of government affairs for Natural Grocers, reviews what goes into the making of synthetic biology. Synthetic biology goes by many names, including "gene edited fermentation" and "precision fermentation products."

While that sounds fairly innocuous, synthetic biology manufacturers rarely ever discuss what goes into the feed they use to grow the target organism, or what happens to the waste at the end of the fermentation process. That's understandable, as both raise a number of serious questions.

As explained by Lewis, the starting ingredients in fermented synthetic biology products are cheap sugars derived from genetically engineered corn and soy. All GE crops are grown in environmentally destructive monocultures with taxpayer subsidies, and use loads of herbicides such as glyphosate, pesticides like neonicotinoids, and synthetic fertilizers.

As a result, they're loaded with chemical residues. In addition to a base of sugars, hundreds of other ingredients may be added to the ferment in order to produce the

desired end product, such as a certain protein, color, flavor or scent.

As explained by Lewis, the most-often used microorganism in the fermentation process is E. coli. The E. coli is gene-edited to produce the desired compound through its digestive process.

The microorganism must also be antibiotic-resistant, since it needs to survive the antibiotics used to kill off other undesirable organisms in the vat. As a result, antibiotic-resistant organisms also become integrated into the final product, and the types of foodborne illness that might be caused by gene-edited antibiotic-resistant E. coli and its metabolites are anyone's guess. Nobody knows what such illness might look like.

Cultured Meat Produces Toxic Biowaste

Aside from the desired target metabolite, these gene-edited organisms may also be spitting out any number of non-target metabolites with unknown environmental consequences and health effects.

As explained by Lewis, the various "feed" ingredients are placed in a fermentation bioreactor set at 87 to 90 degrees Fahrenheit for anywhere from 24 to hundreds of hours to grow the target microorganism. The target organisms in the ferment consume the nutrients they need, and what's left over after those organisms are extracted is hazardous biowaste.

While traditional fermentation processes, such as the making of beer, produce waste products that are edible by animals, compostable and pose no biohazard, the biowaste from these synthetic biology ferments must first be deactivated, and then must be securely disposed of. It cannot go into a landfill. Making food that produces hazardous biowaste is hardly a sustainable model.

Lab-Grown Meat Is 25 Times Worse for Climate Than Beef

Lab-grown meats are also an environmental disaster in the making. Their impact is far more akin to that of the pharmaceutical industry than the food industry.

> **"According to a recent 'cradle-to-gate life cycle' analysis, the lab-grown meat industry actually produces anywhere from four to 25 times more CO_2 than traditional animal husbandry."**

Indeed, precision fermentation — i.e., the process of engineering a gene sequence for a specific protein into a bacterium or yeast strain, and then growing it in fermenters to produce the required protein — has been used for decades in the production of drugs and vaccines.[10]

According to a recent "cradle-to-gate life cycle" analysis,[11,12,13,14] the lab-grown meat industry produces anywhere from four to 25 times more CO_2 than traditional animal husbandry.

As noted by the authors, investors have poured billions of dollars into animal cell-based meat (ACBM) sector based on the theory that cultured meat is more environmentally friendly than beef. But according to these researchers, that hype is based on flawed analyses of carbon emissions.

The primary sources of CO_2 emissions are the purification processes, which require fossil fuels. The bacteria used to produce the "meat" releases endotoxins, and these must be eliminated from the growth medium or else the cells won't reproduce properly. As noted by the authors:

> *"Animal cell culture is traditionally done with growth medium components which have been refined to remove/reduce endotoxin. The use of these refinement methods contributes significantly to the economic and environmental costs associated with pharmaceutical products since they are both energy and resource intensive."*

Based on this assessment, each kilo of cultured meat produces anywhere from 542 pounds (246 kilos) to 3,325 pounds (1,508 kg) of carbon dioxide emissions, making the climate impact of cultured meat four to 25 times greater than that of conventional beef.

The authors also point out that several estimates of ACBM climate impacts are dependent on novel technologies that either do not exist yet or are unlikely to work.

For example, some have proposed growing cyanobacteria hydrolysate in open concrete ponds to then be "harvested, sterilized, hydrolyzed and used as an animal cell growth medium." The problem is that this technology is not currently used, "nor is it one that is currently near feasibility," the authors note.

In short, the claims propping up the cultured meat industry are a sham, as the idea that cultured meat is a greener option is based on nonexistent technologies rather than the technologies that are in use.

Climate Impact of Cultured Meat Versus Cattle

Other studies have also been critical. For example, a 2019 article in the journal Frontiers in Sustainable Food Systems found that were the world to make the transition to cultured meat, its impact on global warming might initially appear to be beneficial. However, over time, cultured meat production would result in greater warming. As explained in the abstract:[15]

> *"Improved greenhouse gas (GHG) emission efficiency of production has been proposed as one of the biggest potential advantages of cultured meat over conventional livestock production systems ... In this study, we present a more rigorous comparison of the potential climate impacts of cultured meat and cattle production than has previously been made.*
>
> *Warming impacts are evaluated using a simple climate model that simulates the different behaviors of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), rather than relying on carbon dioxide equivalent (CO_2e) metrics.*

We compare the temperature impact of beef cattle and cultured meat production at all times to 1,000 years in the future, using four synthetic meat GHG footprints currently available in the literature and three different beef production systems studied in an earlier climate modeling paper.

Cattle systems are associated with the production of all three GHGs above, including significant emissions of CH_4, while cultured meat emissions are almost entirely CO_2 from energy generation.

Under continuous high global consumption, cultured meat results in less warming than cattle initially, but this gap narrows in the long term and in some cases cattle production causes far less warming, as CH_4 emissions do not accumulate, unlike CO_2.

We then model a decline in meat consumption to more sustainable levels following high consumption, and show that although cattle systems generally result in greater peak warming than cultured meat, the warming effect declines and stabilizes under the new emission rates of cattle systems, while the CO_2 based warming from cultured meat persists and accumulates even under reduced consumption, again overtaking cattle production in some scenarios.

We conclude that cultured meat is not prima facie climatically superior to cattle; its relative impact instead depends on the availability of decarbonized energy generation and the specific production systems that are realized."

Gaps Between Facts and Claims

Another paper,[16] published in the April 2023 issue of Animal Frontiers, concluded there are several implications of cell-based meat that need to be considered, but aren't. In the video above, the corresponding author, Paul Wood, also reviews these issues, which include:

Significant technical, ethical, regulatory and commercial challenges

Widespread adoption is likely to “exacerbate global inequity between affluent and poor individuals and between high- and low-income countries”
Cell-based products are not identical to the foods they’re intended to replace in terms of sensory and textural properties, nor are they nutritionally equivalent
Societal roles associated with animal production will be lost, “including ecosystem services, co-product benefits and contributions to livelihoods and cultural meaning”
Detailed production procedures are unavailable, which makes it “impossible to corroborate the many claims related to their product characteristics and sustainability.” According to the authors, “most of the claims related to the production of ‘CBM’ [cell-based meat] in view of sustainability improvements (e.g., energy or water use) seem not scientifically substantiated or remain at best speculative, especially for its environmental footprint”
Cell-based meat companies claim the cost of synthetic meat will be significantly reduced, as per Moore’s law. However, cell-based meat systems “have natural limits and feedback mechanisms that negate this law”

As noted in this paper:

> *“There has been significant investment in the precision fermentation space and many predictions that this technology is going to disrupt the traditional meat and dairy industries; however, there are many technical, regulatory, and consumer challenges that need to be addressed.*
>
> *The major technical challenge will be the cost of goods, with precision fermentation being significantly more expensive. For milk proteins, a range of yeast strains can produce recombinant proteins at a rate of 10–30 g/l, but these proteins then need to be separated from the yeast cells and cell debris using a variety of downstream processing techniques that can account for up to 60% of the cost of manufacture.*

> *Precision fermentation technology will also be critical for the 'CBM' sector to produce the various growth factors and perhaps other compounds required to culture mammalian cells. To scale-up precision fermentation, companies use fermenters at >100,000-l capacity, which will require complex engineering and energy intensive processors."*

Will Lab-Grown Meat Cause Cancer?

There are also unanswered questions about the potential carcinogenicity of cell-based meats. Most cultured or cell-based meats are created by growing animal cells in a solution of fetal bovine serum (FBS).

Aside from the fact that this "green" alternative requires the slaughter of pregnant cows in order to drain the unborn fetus of its blood, to get the cell cultures to grow fast enough, several companies are using immortalized cells. As reported by The Fern,[17] "Immortalized cells are a staple of medical research, but they are, technically speaking, precancerous and can be, in some cases, fully cancerous."

The reason precancerous and cancerous immortalized cells are used is because normally-behaving cells cannot divide forever. Most cells will only multiply a few dozen times before they become senescent (old) and die.

This won't work when your intention is to grow thousands of pounds of tissue from a small number of cells, hence they use immortalized cells that continue to divide indefinitely. Immortalized cells are by definition cancerous (or at bare minimum precancerous) as there's no off switch for their replication.

MIT biologist Robert Weinberg, Ph.D., believes humans won't get cancer from these cells because they're not human cells and therefore cannot replicate inside your body.[18] However, there's no long-term research to back this claim.

The fact that "cow tumors sometimes wind up in store-bought ground chuck"[19] and doesn't cause a problem does not mean that a piece of meat consisting of nothing but cancerous and precancerous cells won't have unpredictable effects.

To circumvent this PR nightmare, some cell-based meat companies are using embryonic stem cells rather than immortalized cells. Others are using cells from living animals.[20] Both of these strategies, however, destroy the argument that cultured meat is animal-free.

Beware of the Fake Food Agenda

The video above features a presentation I made at **The Attack on Food Symposium**, hosted by Dr. Meryl Nass and presented by Children's Health Defense TV, March 4, 2023. In it, I describe how food and agriculture are under attack, and how the fake food agenda threatens human health and the environment alike.

In attempting to create cultured meat on the scale that would be necessary to feed the world, logistical problems are numerous and, possibly, insurmountable. There are waste products — catabolites — to deal with, as even cultured cells excrete waste that is toxic.

The environmental benefits are also on shaky ground when you factor in GE soy production and the use of conventional energy sources. When that is factored in, analyses predict cultured meat will be worse for the environment than conventionally produced chicken, pork[21,22] and beef.[23]

At the end of the day, it's important to realize that the synthetic meat market is based on a slew of false premises and assumptions, and that the real agenda has nothing to do with saving the planet or improving human health. It's to eliminate traditional farming and make populations dependent on mass-produced, patented, ultraprocessed foods.

Do We Need to Worry About Biowarfare Too?

There are also open questions about whether lab-grown meat may be weaponized in some way. GOOD Meat, which recently gained FDA approval for its cultured chicken, is using a Chinese firm called JOINN Biologics for its production and quality control — a company linked to China's biowarfare program.

JOINN Biologics is also involved in some sort of animal-breeding operation. In 2022, they purchased 1,400 acres of land in Morriston, Florida, with the intention to build a primate facility. As reported by The National Pulse:[24]

> *"A number of key personnel who work for JOINN Biologics and its parent company studied or worked at the Academy of Military Medical Sciences in Beijing. In 2021, the Academy was added to the U.S. trade blacklist for supplying biotechnology to the Chinese military.*
>
> *The founder of JOINN and chair of its board of directors is Yuxia Feng, a military physician and a graduate of the Academy. Her co-founder and vice chair of the board of directors, Conglin Zuo, worked at the Academy, in its Institute of Biotechnology.*
>
> *Other key personnel such as Hemei Wang and Shusheng Feng were also employed by the Academy, in the Institute of Pharmacology and Toxicology. Feng has worked on research with a number of scientists in the People's Liberation Army who are considered key players in China's biological weapons research ...*
>
> *JOINN's involvement in the testing and production of America's first commercially available lab-grown meat raises questions about the safety certification process for the product and about Chinese influence over critical aspects of America's infrastructure, including its food supply."*

What are we to make of this? I don't know, but the idea of relegating production and quality control, of all things, to a company tied to the Chinese biowarfare program seems rather reckless, and certainly doesn't instill confidence. Without doubt, however, food could be used as a distribution route for a bioweapon, and I'll just leave it at that for now.

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