

Vegans Spill The Truth About Lab Grown Meat

This is a transcript of a live panel discussion that took place at Vegan Summerfest on July 27, 2019. You can watch the video of the live event on Born Vegan's Youtube channel: [Vegans Spill The Truth About Lab Grown Meat](#)

JoAnn Farb:

Some vegans are telling us that we should embrace lab-grown meat because promoting veganism is not working. They say we are losing the battle for people's hearts and minds in converting them to veganism. The same people who encouraged us to promote humane meat and dairy a few years back are now the loudest proponents of lab meat. Most people won't change their saying again. So instead of trying to inspire them to embrace authentic justice, we should be pragmatic. But a strong case can now be made that promoting humane meat actually sustained demand for meat and further legitimized killing. And my own experience of 25 years as an activist, the biggest stumbling block that I now encounter when I try to promote veganism to people is that I encounter people who won't consider it because of humane meat. It's promotion supported a cultural paradigm that is now an end point in many people's ethical evolution.

JoAnn Farb:

Once people embrace and form social networks around the ideology that it's okay to enslave and kill other beings, as long as you don't do all the terrible things that factory farms do, they become the most resistant to veganism. Now we have investors lining up to support lab meat and the same people who threw veganism under the bus for humane meat, they now want us to support lab meat. So if you care about justice, health, and sustainability, and a livable planet for our children, it's critical to deconstruct the rhetoric on this issue.

JoAnn Farb:

And to help us do that, we have put together this fantastic panel. So on the far end is attorney Lee Hall, a 35 year vegan and the author of *On Their Own Terms: Animal Liberation for the 21st Century*. Lee holds a specialized law degree in environmental law and is deeply involved in sustainability research as a consultant for the Encyclopedia of UN Sustainability Goals. Harold Brown, wave, was born and raised on a cattle farm. He was in for it and spent half his life in farming. After leaving the farm, Harold embarked on a journey of self-discovery, which led him to become vegan and an activist. On this end is Dr. Milton Mills, a graduate of Stanford University School of Medicine, and an urgent care physician in Washington, DC. And over there is Sarina Farb who holds degrees in biochemistry and policy studies and spent a year interning with filmmaker, Tribe of Heart. And so I think I'd like to begin by asking Lee to explain to us, why are we even talking about this here?

Lee Hall:

The idea that we would have flesh grown in a lab comes primarily... and the big funders behind this and the people who support high tech startups who are involved in promoting the idea are pointing out that there are now 7.7 billion people on the face of the planet and most, all of them, all of us, are aspiring to the Western diet. The income levels around the world are rising and more people want high fat fleshy diets throughout the world. So what that means is that within the next 30 years or so, or perhaps even sooner, we will have exceeded the planetary boundaries that allow us to have a safe planet for ourselves to survive on. What are we going to do? Well, they're saying, "Hey, there's an app for that. And it's in

the lab. We'll take some cells. We won't even need feed for these animals, or ruminant capabilities, breathing or anything. We're just going to make this flesh from a few cells."

JoAnn Farb:

Thank you. So let's ask our biochemist now to explain to us how is lab meat created?

Sarina Farb:

So the idea behind this technology is that we will take just a few cells, a little quarter sized biopsy or piece of flesh from animals, or even as some proponents are suggesting a feather that falls off of a chicken. And you just take that feather and can extract cells from that, grow them in a laboratory setting into all kinds of different pieces of meat, whether that's actually like a steak type cut or meatballs or... and they would have to take flesh from different animals to produce each kind of meat. And the idea is that you could take that amount of cells or flesh one time, grow them in a lab indefinitely and have now an endless supply of flesh that never came from a slaughtered animal and didn't require killing an animal. So that's the idea. And the idea is there would be no animals needed past that first point.

Sarina Farb:

But the reality is very different. The reality is that extracting cells from any flesh or feathers or anything like that is very difficult to get the right type of cells. We have to have... they need stem cells or specific muscle cells, different types of tissue, and extracting and growing cells in the lab is actually very hard. Cells do not normally stay alive indefinitely. And this is true in our bodies as well. Most cells will replicate a certain number of times before eventually dying off and being unable to replicate further. And the current technology right now requires that we would have to repeatedly take biopsies or pieces of flesh from animals once that set of cells can no longer replicate to produce meat.

Sarina Farb:

Cells also have to be grown in a growth medium with very specific nutrients. And the primary nutrient that most cells are grown in right now is something called fetal bovine serum, which comes from slaughterhouses as well. It's taken from baby cow fetuses by injecting a needle into their heart and draining their blood. That's what cells are being grown in. And cells are also easily contaminated. It is very hard to get cells to stay alive in a lab without antibiotics and very careful sterile technique. So there's a lot of technological problems. So there's two options really for how we can scale this up and potentially, proponents are saying, do this.

Sarina Farb:

So the first option is to repeatedly take flesh from an animal, grow it up, and it may produce a lot more meat, theoretically, than killing that animal would. But then those cells will still die out and you'll have to go back and take more cells, more flesh, on a pretty regular basis. The other option, which most proponents are putting forward as their goal and what they're telling us we're going to be doing is that we will take cells one time and then manage to transform them. And this is a technique using genetic modification to manipulate the cells to overcome their natural shortening and lifespan to make them what's something that's called immortal so that they will replicate indefinitely in culture and we will not have to take any more cells. So that's the second option.

Sarina Farb:

However, there's several mechanisms in transforming cells that will have to be put in place. One is making the cells immortal. The second is, most cells when they're in our body or in a lab, they grow until they start touching each other, and this is called contact inhibition, and they will stop growing once there are too many cells. When you overcome that mechanism, which they'll have to do to actually grow chunks of flesh and meat, when you overcome that, that has a lot of similarities to the way cancer cells behave. So that's the basic idea behind the science right now.

Sarina Farb:

And then there's the scaling up problem, because there are several companies that have made this technology a single meatball or a single piece of chicken in a lab, and there are animal advocates that have tasted these and said, "This is amazing, and this is the future." But scaling that up to any kind of level that works is a long, long ways off. There are many, many technological hurdles that are absolutely not in place from a scientific perspective and are many, many years away. So right now we are exploiting animals taking cells and flesh from them using fetal bovine serum and testing on animals in the name of a future technology.

JoAnn Farb:

Thank you. So Lee, there are a lot of different names for lab meat. Can you talk a little bit about the different terms that are currently being used?

Lee Hall:

Yes. Thank you, JoAnn. At the beginning we heard a lot of talk about in-vitro meat, lab meat, and terms that conjure up this idea of a lab are less frequently used today. Many of the journals discussing this, whether they be sociological journals or scientific journals, are referring to this now as cultured meat. So you'll see this more and more. Cultured still however does conjure up. Perhaps some proponents of lab-grown meat have said, it may conjure up ideas of a Petri dish. So it may not be ultimately the best language to use if we are going to promote social acceptance of lab-grown meat.

Lee Hall:

So instead of saying lab-grown meat, as I am right now, we might want to shift to saying clean meat because people like to eat clean. And the concern that people have when you have focus groups and you try to figure out are people going to accept this is this lab-grown meat something that people want in their everyday lives? And what you'll find out in the surveys that when people are exposed to it through words like lab meat, or when they hear fake meat, they react in a negative way. They use the term fake meat pejoratively.

Lee Hall:

So they respond better to terms such as clean meat, because their big concern is focus groups have found that people are concerned about the limits of the earth. They are concerned about the environmental impact of animal agribusiness. And they do believe that there is a connection between lab-grown meat and mitigation of climate change. They are also concerned about humane factors surrounding animal agribusiness. Almost universally, they express these concerns, but they didn't express the same

strength in the interest of buying, putting their money where their mouth is on these concerns. The focus groups found that the public was most interested in health, and they were most concerned that the lab-grown meat might be somehow not good for us over time, that maybe we would be used as experimental subjects in a sense, because we would be the first generation eating it.

Lee Hall:

And so the focus group said, "If you want to market this, if you want to promote this, focus on its naturalness, that it's like meat that people are used to eating, that it's like something traditional, and that it'll avoid health problems. So it'll avoid bacteria, salmonella and so forth." [crosstalk 00:12:58].

JoAnn Farb:

Well, thank you. So let's ask Milton, what are the health implications of lab-grown meat?

Dr. Milton Mills:

Thank you, JoAnn. First I'd like to say, I kind of liked the idea of cultured meat because I have visions of the meat arriving with a theater and a power pair of opera glasses. But the bottom line is that animal tissue should not be consumed by human beings. And so I don't care if you grow it in a lab, if you get it from an animal or of space aliens, deliver it in the middle of the night, it's still going to cause disease. It's going to promote cancer. It's going to harm your kidneys. It's going to create a heart disease and raise your risk for strokes, diabetes, and everything else. That's the bottom line. Human beings should not be ingesting animal tissue. And so no matter how it's produced, it's unhealthy and disease causing, and it shouldn't be done.

Dr. Milton Mills:

And the real problem I have with this is that the minute you start going through all these stipulations to try and create something we shouldn't have in the first place, you are in essence putting your stamp of approval on eating animal tissue. And ultimately, we all know what's going to happen. Some idiot is going to walk into a store, pick this crap up, eat it and say, "You know what? This is not as good as the real thing. I'm going to go kill me an animal." So the bottom line is this, whatever you call it, clean meat, which... by the way, if they call it clean meat, then we should get to be able to call the stuff that's in the meat case dirty meat. It's unhealthy for us.

JoAnn Farb:

Thank you. Let's ask the farmer. Harold, do you think lab-grown meat is likely to end slaughterhouses?

Harold Brown:

In my opinion, no. And there's a few things that, well, actually Lee talked about. As affluence grows, particularly we hear about it in the news in China, American agribusiness has been spreading CAFOs and meat culture into all parts, every continent on the planet. One of the markers or indicators of affluence among men in most cultures is that you get to eat meat. And they're going to eat meat. So the industry is looking at this. I would make a correlation between this and the tobacco industry. So we put a big dent with the anti tobacco campaign and put the hold on them. Where did they go? They went to China, huge market. They're making beaucoup bucks. Well, the meat industry is going to do the same. And I don't think it's going to be measurable, but slaughter houses are actually going to be built. More of them will

be built in these countries to meet the protein demand that those markets are going to develop, because the industry has a really interesting way of playing both ends against the middle.

Harold Brown:

So you'll see companies that will take dairy, for instance. Dean Foods bought Silk so they could be in the plant-based milk business. But they're the largest dairy cooperative in the United States. They learned that's just how markets work. It's playing both ends against the middle. They're going to do the same thing with this. So you might have entrepreneurs who are just going to say, "We're going to invest in this, we're going to make this happen," and I really don't see it happening over time because it's going to be the same thing. You're going to see some big agribusiness get involved, and they're going to buy up this small startup, and then... They're going to be playing both ends against the middle. And is that going to move the moral and ethical ball forward? I really don't think so.

JoAnn Farb:

Thank you, Harold. Sarina, you want to add something?

Sarina Farb:

I just want to share a quote from the Tri-State Livestock News of this month to support Harold's point. They actually ran an article titled *How Alternative Proteins Can Support the Animal Agriculture Industry*. And their quote says, "Alternative proteins from insects to cell cultures are not something to view as a replacement for animal proteins, but just another competitor in a huge global market." So the industry is getting involved in this and they're telling the agribusinesses and animal producers that the global protein market is going to increase so much due to the population growth in the next few years that they recognize they simply will not be able to produce that much traditional animal-based meat so they're accepting things like cell-based meat, but they don't view it as reducing or trading off with the production of traditional animal-based meat.

JoAnn Farb:

And Milton, did you have something to add?

Dr. Milton Mills:

Well, I have a whole bunch to add. And you may be eventually going to get to these issues because again, one of the things that troubles me is that the people who talk about this, talk about it as though it is a real thing, number one, and as though it is something that is easily accomplished. And the fact of the matter is that nobody has done a real cost analysis of what trying to do this, as Sarina had alluded to, on an industrial scale is going to really amount to. As a physician, when I look at what it takes for us to do an operation in terms of the inputs, we've got to use sterile gown, sterile gloves, booties, hats, masks, the room has to be cleaned with these very, very expensive reagents. And we have to drape the patient and sterile gowns, sterile instruments.

Dr. Milton Mills:

And even with all of that, within that operating room, the only thing that's considered truly sterile is that little area that is exposed on a patient that's going to be operated on. If you're talking about growing tons and tons of tissue, you are going to have to have an absolutely sterile factory, which of

course is impossible, which is why they're going to have to use these tons and tons of antibiotics. But then my question is, how in God's name are they going to make, and Sarina you may be able to answer this, the amino acids? Right now, the chemical manufacturing amino acids utilizes ammonia, which is one of the most toxic compounds around, but then you just can't throw ammonia in a big vat and boom you get an amino acid because the 20 different amino acids are very different and they're a very complicated chemical structure.

Dr. Milton Mills:

So again, you're talking about massive inputs of energy, reagents, to try and create these amino acids in the first place. And that's going to be done in some poor third world country where the environment will be poisoned to hell and back. And then transporting this stuff to wherever these factories are trying to grow this crap. The bottom line is, the way I look at it as a physician is, trying to grow tissue in the lab is like trying to make people pee. If your kidneys stopped working, I can pee for you, but it's a hell of a lot more expensive than what you can do for yourself at home.

JoAnn Farb:

Thank you. I'm from Kansas, and when I think about the people I know there that are the most resistant to veganism, that are really going to be the last people to give up meat, I start to wonder how likely are these people, the people that are really into local, organic humane grass fed, how likely are they or anybody to accept lab-grown meat? And I want to ask all of you, how likely is the public to accept lab-grown meat? Who is this for? Sarina?

Sarina Farb:

Not very likely. And the individuals who are involved in producing this right now have even admitted that. In several of their promotional videos and interviews, proponents and those working to manufacture this have said it's going to take a lot of education to overcome people's natural tendency to fear and find this not something they want to eat. And so that's where the language, the specific how to market this, how to sell it, how to talk about it. And they recognize that there is a big hurdle because they have made many statements on the record admitting that and saying this will take education. So I don't think it's that likely to be accepted without lots of education. And if we have to educate people to eat something different, why not just educate people to eat vegan?

Dr. Milton Mills:

For those of us in this room, it's hard to even conceptualize being convinced to eat lab-grown meat. So think of it this way. How likely are you to eat a lab-grown carrot? If somebody grew an actual plant or a piece of broccoli from a bunch of chemicals in some factory somewhere and said here, "I've got a lab-grown broccoli," I'm sorry, I don't want it. I'm not eating it. You can keep it.

Sarina Farb:

Well, and I just wanted to add one other thing on this too, talking about humane meat. The other thing many of the proponents of this technology have said is that they recognize this will never work for the "hardcore meat eaters", those that want to raise and kill their own animals in an organic, humane, sustainable way, that this technology isn't for them because sure they'll want to keep eating the real thing. Again, proponents have already admitted that and said that's not who this is for. It's for the

masses that choose what to eat based on taste, price, and convenience. So they're hoping to make this technology taste like real meat, be as cheap and accessible as real meat. And again, if that's the goal, why can't we just make plant-based foods taste that good and be cheap and accessible instead of using a different technology.

JoAnn Farb:

Thank you. Harold.

Harold Brown:

Just to last point that Sarina made, generally speaking technology now, when we come up with these new technologies, we have this free market idea that technology is going to pull our butt out of the fire when actually technology by and large is an open admission to our failures. A good example is if you look at NASA photographs of the Mediterranean Sea where Israel is desalinating the Mediterranean. The byproduct of that that comes off from those reverse osmosis filters is a very toxic sludge that's just pumped back out into the ocean. Yeah, it's getting people fresh water, potable water, but what's the cost to the marine life? What's the cost to the ecosystem of the Mediterranean?

Harold Brown:

But another part of this is, this is, to me, is such an Orwellian idea. And it's become this Orwellian debate about how we're going to market this, the idea of it, and I can see, I know people that are going to say, "Oh, well, if we're going to get away from using animals at all and all I've got, my only option in the store, is going to be lab meat, screw that. I'm going to go out and hunt." And I used to be a hunter. I can put myself into that mindset. Wildlife is going to suffer because of this. It's a hypothetical right, theoretically right. But I know a lot of people, that's where they're going to go. So you're going to have the hobby farm, we're going to have the humane, the healthy meat. And then the alternative to that will be hunting. I could foresee more hunting because they're going to see some of the BS.

Dr. Milton Mills:

And I want to be clear. I don't know if you guys got my reference to dialysis. My point is that there is no way that we are going to be able to grow animal tissue artificially more cheaply than you can raise an animal. It's just too expensive. All of the reagents, all of the gowns we'll need, the filtration equipment, the cost of transporting these chemicals, the cost of producing these chemicals, the cost of trying to maintain sterility, the fact that we're going to be pumping tons and tons of antibiotics into these factories and creating even more antibiotic resistant organisms, there is no way this is going to be cheaper than raising animals to eat. And the other corollary is trying to convince more human beings to eat animals is only going to massively ramp up the collective misery on this planet, not only for the animals, but in the levels of disease that we're going to create in human beings. This is a monstrous idea that needs to be disposed of immediately.

JoAnn Farb:

Thank you. So let's go a little further with that and talk about the elephant in the room, is lab meat likely to be better for the environment? Sarina, you want to?

Sarina Farb:

So potentially there is a small chance that lab-grown meat could offset some carbon emissions. However, like Milton was saying, the energy inputs required to grow cells in the lab, to run your incubators and maintain specific temperature and CO2 levels, and sterility, and the air filters, all of that takes an enormous energy input. And all of that will be coming from the electric grid. So if our electric grid were to shift from fossil fuels to green, renewable energy sources, then yes, lab-grown meat would likely reduce energy emissions, but given the direction things are right now and that that does not seem very likely, then we will just be shifting from raising animals that are producing greenhouse gas emissions to trying to grow meat from the electric grid and producing CO2 emissions that way. And there is a chance because raising cows produces so many greenhouse gas emissions that producing lab-grown beef would probably be lower on the emission spectrum, but for all of the other animals and types of flesh, it would likely be the same if not potentially more.

JoAnn Farb:

And that's assuming that we switched the electric grid?

Sarina Farb:

Yeah. Well...

JoAnn Farb:

Under a scenario where the electric grid is renewable.

Sarina Farb:

Assuming that the electric grid switched. Well, assuming the electric grid switched, then things would be lower, but that's a pretty big assumption.

Dr. Milton Mills:

But that's also only if you paint the rosiest picture. I say that to get the true cost, you got to factor in all of the cost of treating the excess disease you're going to create, all of the ambulances are going to be carrying people to the hospitals and all the extra catheterizations and chemotherapies and bypass operations that we're going to be doing, because all of that will be part of this. And when you factor all that in, there is no way this is going to do anything to reduce the carbon footprint of meat eating.

JoAnn Farb:

I'd actually also like to hear each of you comment on the idea that, will this technology actually do anything to shift the paradigm that created the problems that we are actually dealing with right now. Lee.

Lee Hall:

Yes. Speaking of the paradigm, let's back up and look at the big picture here. As far as I can see when looking at, when reading, when hearing about promotions of lab-grown meat, what's missing from the picture completely is habitat. That it's not an environmental argument. Nobody is talking about the reality that we live in the time of the sixth great extinction period. And this one is human driven. So it's progressing... the earth's bio community is deteriorating at a rate that's unheard of. And when we talk about lab-grown meat, what we're not doing is talking about how we can feed ourselves in generally

differently than most people are doing today.

Lee Hall:

So, for example, I think we need to talk more about lentils and beans and... because if we really want an alternative to pushing the earth past its capacity to replenish nourishment for us, what we're talking about is lentils and beans and peas, because these are foods that can be grown in financially poor areas of the world. And they can be grown with very low water inputs. And they can be grown and farmed by independent small farmers around the world. And as long as we are talking about solutions coming down from on high, from the food authorities somewhere with very wealthy people backing up some startups, then we're not talking about what we really need to do to advance humanity. And by advance humanity, I mean to learn to live as part of the bio community and not on top of it. And we have, right here at Summerfest, we have people making artisan farmhouse, Tomorrow's Creamery, artisan farmhouse cheeses out of culture cashews, how beautiful that is, Tomorrow's Dairy.

Lee Hall:

We haven't even begun to talk about lab-grown dairy products. Is that next? What's next after that? Do we replicate for a growth? So Chef Chew was here from the Oakland area and is working on... now is getting into the grocery stores with products that replicate the corner store foods that people go and get at 10:00 PM when they're craving something, from the local corner store, those foods, but only presented from plant-based healthful and absolutely delicious, if you've ever tried Chef Chew. And Summerfest North American Vegetarian Society has promoted these wonderful entrepreneurs of our own. And when people ask me, do I personally have a visceral feeling about lab-grown meat, I say, yes, I do. I have a visceral love for the vegan entrepreneurs who are working so hard with little cafes and food trucks and corner store replacements that are actually helpful in food deserts. I have a visceral love and empathy and wish for them to prevail.

JoAnn Farb:

Thank you, Lee. Sarina.

Sarina Farb:

So believe it or not, they are actually working on lab-grown dairy and lab-grown foie gras, specifically. Those are both already in the works. In the lab-grown dairy, they're trying to genetically modify yeast to produce the casein and whey and animal milk proteins to turn into dairy. And they are already working on foie gras from duct cells as well. But then the other thing I wanted to say in terms of the original question is that we have to keep in mind who is going to be in charge of this technology. While it might be some small animal advocates promoting this and startups that are in this because they want to reduce animal suffering or do something good and they view this technology as a way to do it, the largest investors are the biotechnology pharmaceutical companies, Gates Foundation, large multi billion dollar companies and organizations that for the most part view this as a profit-driven new technological innovation that have absolutely no ethical foundation.

Sarina Farb:

So while it might be starting small with people who do care right now, this technology will very quickly be out of their hands in large... or Tyson, for that matter, they're investing in this as well, large multi billion

dollar corporations that do not care about animals or people or the environment, really. They are in this for the money. And so if we're talking about feeding the world and doing it in an ethical way as well, do we really want these companies more in charge of our food? And what happens if they realize it is cheaper to continue taking animal cells regularly? And it is cheaper to continue using fetal bovine serum instead of finding a vegan alternative, which animal advocates are working on now. But when this goes to scale or goes to these big companies, they're going to go with whatever is cheapest and makes the most profit. So even if there is a theoretical possibility for this to be animal free, we cannot assume that it will stay that way because we're not doing anything to challenge the underlying notion that it's okay to use and exploit animals.

JoAnn Farb:

Yes.

Harold Brown:

Exactly. And what I want to add to this, this is what gets under my skin is that this system that's coming forward, when I talked about technology before, it is a cynicism in the potential for the transformation of people. It's an absolute flat out cynicism that people are not capable of being smart enough, wise enough, to make change. So that's why so many organizations and people are out there, their buzzwords are cruelty and suffering. And that's how they're selling this. But to me, what this is is, we're trying to create flesh to sell to people. And to me, this is just another remanent of violence, which means we need to maintain flesh as part of our cultural and social identity.

Harold Brown:

That I have a problem with because I don't want to be in that world. I am a vegan who's advocating and working by... we've got better options. I'm a proponent of organic agriculture or stock-free organic practices. We have other options. But the thing is, is we have this cultural identity to meat that we just can't let go. And what we're saying is, we're going to develop this technology. Billionaires are going to get on board with it. How many of you ever read Naomi Klein's book *The Shock Doctrine*? This is called disaster capitalism.

Harold Brown:

We are in a crisis. And by the time this is able to be scaled up to where it's going to be able to be a viable thing to replace animal flesh, I think we're going to be out of time on this planet, as a species for us. So do we have time to mess around with this? No. We should be promoting, like Lee said, lentils, veganic agriculture and talk to people about this idea as, is flesh part of our cultural and social identity? I don't think so. I left it behind. I walked away from it. I woke up. So if I can do it and as dense as I am, anybody can damn well do it.

JoAnn Farb:

Thanks.

Dr. Milton Mills:

For me, the issues are very clear and very straight forward. The bottom line is that human beings are committed plant eaters. That is absolutely demonstrable from the beginning to the end of our digestive

system, from our psychology and mentality, and even down to our sub cellular architecture. And so it is truly insane and stupid for us to be looking at going through all of these massive and ridiculous machinations to try and create something that, one, we are not designed to eat, two, that we know makes us ill, and three, that damages the planet, and four, creates unspeakable cruelty for no reason whatsoever. I think at some point, God is going to say, "You know what? These people are so stupid. I'm done. It's over. Let's just start over." Because this just makes no sense. And from my standpoint, we need to just pull out the Amy Winehouse record and go, "No, no, no."

JoAnn Farb:

Okay. We just have one more minute. I'd like to give the panelists each a chance to just maybe, 20 or 30 seconds, say one last thing. Who wants to go first?

Lee Hall:

Well, I'll go ahead. We hear a lot about what else are we going to do because there are people out there who are really diehard carnivores, and I'm listening to Dr. Mills and I'm thinking really we need to get the message out there that we're obligate herbivores.

Dr. Milton Mills:

Thank you.

Sarina Farb:

Thank you. And so what I'll just say is I actually... if you are still wondering about this or wondering if this will actually help reduce the number of animals killed in some way, I want to say, I totally understand where you're coming from. And when I first heard about this, I had very mixed feelings about the technology actually, because I had heard so many of the claims that proponents had made that I was thinking, "Well, at the very least, maybe we should just ignore it and maybe it will do some good." And what I want to say is, the main reason, again, that I think it's important to speak out is because by the time that the technology and scalability comes into place to do any of the things these proponents are claiming, it will probably be too late on an environmental level, and we have another alternative already that if we were investing all of those resources and energy in would be a much better solution that could actually fix our problem.

Harold Brown:

Well, for me, in my journey, this is more of an emotional thing rather than something that I heard, but something of the heart. And like I mentioned before, this idea, this open admission that we have to have flesh is a remnant of our violent nature. And if we can't imagine something better than that, then maybe we deserve it. But the thing is, there are alternatives. There are things we can do. It's where we're going to invest our energy, our time, our money, and our hearts and our minds. That's the question.

Dr. Milton Mills:

Cassandra was the Trojan princess who was a prophetess and she was cursed to always prophesy the truth and never be believed. And it drove her insane. So from now on call me Cassandra. I just want to say, I've already said that, it's clear that we're herbivores, that we shouldn't be doing this in the first place, but I know that we want to try and impact global warming and climate change so badly that we are

desperate to try new things. But remember the last person who said, "Try it, what do we got to lose?" We got a shit load to lose, ladies and gentlemen. And I'm telling you that when you are talking about carbon footprints, you can't simply say, "Oh, well, we won't have cows belching out methane and carbon dioxide." You've got to look at the cost of producing all of those sterile gowns, all of those sterile gloves, all of those reagents.

Dr. Milton Mills:

You guys probably saw me talking to Sarina. I was like, "How are they going to get these amino acids that have to go into the liquids that they're going to use to grow this lab meat?" She said that they think they're going to be able to get them from plants. So you're talking about growing massive amounts of plants to extract amino acids to turn around and send to a lab to try and grow a piece of crap. And right now we're already dealing with people being poisoned and made sick by salmonella, E. coli. As a physician, I am horrified to think of what kind of antibiotic resistant bacteria are going to come out of these factories and kill people. This is one of the most horrific ideas that anyone has ever come up with. The law of unintended consequences is not going to bite us in the butt, it's going to chew our rear ends off.

JoAnn Farb:

Thank you very much for being here. And a big round of applause to our panelists.