

Will It Ever Really Be Meat?

Will It Ever Really Be Meat?

Trever Campbell

Wyoming

2024

Will It Ever Really Be Meat?

I love LEGOs. I have since I was a little kid. I spent hours crouched on the floor taking simple bricks and slowly making something that was greater than the sum of its parts. I was so hooked on them that my parents played into the next evolution in my building obsession—a 3D printer. From then on, I had something even better than LEGOs, the power to make something out of nothing. Now imagine the same process but with nutrient rich tissue. In vitro meat is a meat-like product that is grown outside of an animal and 3D printed to mirror the structure of real muscle (Sharma, 2021). I'm sure we all agree that growing meat without harvesting it from an animal sounds like something out of a science fiction movie. What we can't seem to figure out is if it's fantasy or horror; a new, ethical source of protein that could help to sustain a growing population or a Frankenstein experiment that will replace us as producers. Maybe it's neither. To figure out what we, as agriculturists, should think about In Vitro meat, we need to understand what it is and how it's made, why people think it's too good to be true, and why it's not the threat to our way of life we worry it could be.

In vitro meat is cultured meat grown in petri dishes in a lab. The process starts with stem cells, cells from an animal that have not been assigned a purpose yet (Sharma, 2021). These impressionable cells receive information from their environment and adapt to fit in. Machines called bioreactors simulate the environment of actual muscles and the cells adopt those characteristics. The mature cells can then be put into printer-like machines that lay out the tissue into the desired form. The final product matches the color, taste, and even some of the texture of conventional meat. In vitro meat is, down to a molecular and physical level, as close to natural protein as you can get without slaughtering an animal (Nishitani, 2011).

At first glance, this new alternative sounds too good to be true and, sadly, that seems to be the case. From its debut, in vitro meat has been portrayed as a more environmentally friendly,

Will It Ever Really Be Meat?

ethical alternative to conventional meat. While the field aspires to make these ideas a reality, it just isn't there yet. Statistics from the University of California Davis have shown almost the opposite is true. Professor Edward Spang and his team compare the complete impact of retail and cultured meat in their industries. They have found that this new environmentally friendly meat has a less stable and predictable industry outlook than conventional meat (Quinton, 2023). Lab grown meat currently demands so much energy that its global warming potential is four to 25 times greater than the average for retail beef (Quinton, 2023). The energy demand not only affects the environment, it affects the consumer's wallet. In 2023, one pound of conventional beef cost around \$5 to produce, the same amount of lab grown meat could cost up to \$23 (Hudson, 2023). Despite this, some people may still prefer in vitro meat as a more ethical product, though there are gaps in this information as well. The only consistently viable option for growing these stem cells is through a fetus or an unborn calf (Sharma, 2021). Though no mature animal is slaughtered, in my eyes, raising an animal for the sole purpose of harvesting stem cells from its unborn fetus is no better quality of life. In vitro meat is an underdeveloped product that is being pushed too quickly to replace conventional meats. But have we only heard half of the story?

Among us meat producers, in vitro meat is Frankenstein's monster, an experiment with the sole purpose of collapsing our industry. But if we stop and look at the many aspects of the cultured meat operation, it becomes apparent that it may not be the threat that many people think. Lab grown meat presently costs nearly five times as much to be produced as conventional protein (Hudson, 2023). With modern technology too far off to mass produce the alternative protein at an affordable price, it seems that scientists have no immediate plans for this to be a commercial replacement of conventional farm-raised meat. We also cannot forget that livestock

Will It Ever Really Be Meat?

produce more than just meat. They are a multipurpose commodity. Animal byproducts are one of the most utilized resources in the country, and many of them still require the slaughter of the animal. Resources like leather; natural fat; and fetal bovine serum, a key element to the production of in vitro meat, would still need to be sourced from an animal when it is processed (Lehrich, 2021). Until an alternative source for these materials is secured, it can be safely said that the livestock industry will be relevant and needed for years to come. My 3D printer was a fun concept, but my LEGOs are the tried and trusted product that I prefer. The same will be true for the meat industry.

While in vitro meat cannot attempt to replace our traditional meat production system, it does have potential to aid us in other areas. With its immediate production capacity at less than 1% of what would be needed to rival the beef industry, there is very little present risk of it replacing our methods (Hudson, 2023). Lab grown meat could help us to understand more about our livestock and the related processes that are conventionally used. With the knowledge of how to form muscles artificially, we better our understanding of many muscle characteristics to help us more effectively produce natural meat. Here is an example: in vitro meat is unable to produce certain essential minerals, like iron and zinc, or vitamins like B12, so these elements have to be added in artificially (Broucke, 2022). This process will in turn teach us how to add more nutrients to naturally produced meat when needed. To help appeal to those who look to in vitro meat for its alleged environmental and ethical superiority, more effort could be put into revolutionizing the current meat production methods, making the original process more efficient (Quinton, 2023). This approach could help producers to develop a more public-appealing production process, while preserving the traditions that many of us fear to lose.

Will It Ever Really Be Meat?

When things seem too good to be true, they usually are. My 3D printer was never able to replace my LEGOs. Instead, I 3D printed new pieces that make my LEGOs even better. In vitro meat is very similar. It is not the solution to the skepticisms people may have about the meat industry, but it also isn't the monster that we fear will bring down our way of life. Rather, it is a potential tool that we can use to help further develop our industry and feed the world.

References

Broucke, K. (2022, March 18). *Cultured meat and challenges ahead: A review on nutritional, technofunctional and sensorial properties, safety and legislation*. ScienceDirect.

Retrieved July 28, 2024, from

<https://www.sciencedirect.com/science/article/abs/pii/S0309174022002741>

Hudson, A. O. (2023, June 27). *Lab-Grown Meat Techniques Aren't New, but the Scale Required Will Be*. Food Manufacturing. Retrieved January 31, 2024, from

<https://www.foodmanufacturing.com/supply-chain/news/22865959/labgrown-meat-techniques-arent-new-but-the-scale-required-will-be>

Lehrich, B. M. (2021, January 25). *Foetal bovine serum influence on in vitro extracellular vesicle analyses*. NCBI. Retrieved August 28, 2024, from

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7830136/>

Nishitani, A. (2011, March 30). *Food of the future: in vitro meat?* Science in the News.

Retrieved March 27, 2024, from <https://sitn.hms.harvard.edu/flash/2011/issue90/>

Quinton, A. (2023, May 22). *Lab-Grown Meat Potentially Worse For The Climate Than Beef*.

UC Davis. Retrieved January 31, 2024, from <https://www.ucdavis.edu/food/news/lab-grown-meat-carbon-footprint-worse-beef>

Will It Ever Really Be Meat?

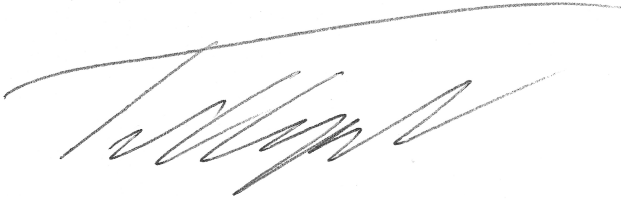
Sharma, N. (2021, July 31). *In-vitro meat: a promising solution for sustainability of meat sector*.

NCBI. Retrieved January 31, 2024, from

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8367411/>

To whom it may concern,

I certify that all materials presented here are of my own creation and that the work adopted from other sources is duly cited and referenced as such.

A handwritten signature in dark ink, appearing to read 'Trever Campbell', with a long horizontal flourish extending to the left.

Trever Campbell

Casper FFA Chapter

Wyoming