

Beef. It's What's for Dinner?

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Imagine, it is the year 2050 and you are casually strolling down a grocery store aisle. You stop in front of the beef display, and bright lights illuminate a plethora of choices from traditional, to organic, to plant-based protein alternatives, and a new addition: lab-cultured “meat.” Interested, you look closer. The package claims that this “meat” is the best option for you, your family, and your world. But how do you know?

While petri-dish protein sounds like the subject of a science fiction novel, the technology is more developed than we may realize. There is a new industry on the horizon working on culturing animal muscle cells in a lab, and companies promise plenty of alluring benefits. JUST Foods, Memphis Meats, and Mosameat are pioneers in this innovative field of food science.

Here is how it works: a small biopsy of cells is harvested from a living animal. Stem cells are then extracted from the tissue and placed in a petri dish where they are bathed in a growth-promoting fetal bovine serum. They multiply until around 20,000 muscle fibers are produced, and are then minced, mixed with fats, and shaped into burger patties. It seems simple, but this process is currently very expensive. The first burger grown in 2013 was valued at \$330,000, and this is one of the reasons this meat alternative is currently not on the market (Zaraska, 2016). However, the cost has decreased rapidly to around \$11.00 per pound with an anticipated price of below \$4.50 per pound by 2020 (Peters, 2018). Companies even hope to have marketable products in the next few years. As their availability draws closer, both advocates and critics have come forward with strong opinions on petri-dish protein.

One major topic of contention is how these proteins should be marketed. Proponents advocate that use of the term “meat” grants consumers a frame of reference from which to view

the product and how it will fit into their meals. However, some companies aim to market their products as “clean meat”, a term they claim is due to the environmental benefits of the products. Cattle ranchers are firmly against this labeling because it places negative connotations on traditional beef. If lab-grown protein is clean, then is traditional beef dirty? As agriculturalists we know that there are plenty of regulations in place to ensure quality in our beef supply, but this connotation can be confusing to consumers. In fact, The U.S. Cattlemen’s Association submitted a petition to the United States Department of Agriculture’s Food Safety and Inspection Service in February of 2018 requesting that the term “meat” be limited to, “those that are derived from the tissue or flesh of an animal harvested in the traditional manner” (Agres, 2018). On August 28, 2018 Missouri become the first state to enact legal regulations on the labeling of lab-grown protein products through the Missouri Meat Advertising Law, with other states including Wyoming, Nebraska, and Virginia close behind (Missouri, 2018). The concern is that labeling lab-cultured protein as “meat”, and especially “clean meat,” misleads consumers and undermines the beef industry’s contribution to the global food supply.

Supporters of these products view the beef industry’s objection to lab-grown protein as a David versus Goliath confrontation where the \$29 billion processed meat industry attempts to stifle companies whose products have yet to hit the market (Tsang, 2018). In fact, whether or not these petri-dish proteins will be able to gain public acceptance is questionable. Already there is so much hesitation to consume genetically modified food that it seems unrealistic to assume the public would easily accept petri dish protein. The mental image brought about by the term “lab-grown protein” is anything but appetizing, and studies agree. Michigan State University’s

Food Literacy and Engagement Poll found that one-third of Americans would approach the idea of eating artificial meat with caution, and forty-eight percent said they would be unlikely to buy such a product (Johnson, Maynard, & Kirshenbaum, 2018). Even so, the optimistic innovators working on developing these proteins remain unphased. Ali Bouzari, a culinary biochemist, even contends that, “People will get used to clean meat in a hurry if it tastes right; if it feels right” (Simon, 2018).

So, if it tastes and looks the same as traditional beef, are these proteins necessary? Advocates cite the need for agricultural innovation as the inspiration behind these products, as well as tout numerous environmental, moral, and personal health benefits offered by consuming them.

A need for continued innovation in the efficiency of food production is undeniable. It is a well-known fact that the global population is expected to swell to 9 billion people by 2050, and the agriculture industry is faced with meeting increased food demands that “will double in the next three decades with a 50 percent increase in protein demand” (Innovation, n.d.). Lab-grown protein is a long way from being able to meet this demand with commercially viable and economically competitive products. However, if innovators are able to increase the efficiency of production, these products could be used to supplement the beef industry by providing protein to developing nations and urban food deserts.

Supporters also claim lab-grown protein could relieve environmental strains. One study conducted in 2015 and published in the *Environmental Science and Technology* academic journal verified that lab-cultured protein could increase the efficiency of land and animal feed use

(Mattick, Landis, Allenby, & Genovese, 2015). On the other hand, these benefits are a tradeoff for steep energy demands that result in a Global Warming Potential (GWP) rating that is lower than traditional beef practices, but higher than those of pork or poultry (Mattick, Landis, Allenby, & Genovese, 2015). Additionally, these estimates do not take into account the innumerable variety of goods that utilize animal byproducts. We depend on cattle for everything from household goods, to clothing, to a large number of pharmaceuticals. While supporters are quick to claim environmental benefits and preach making livestock agriculture obsolete, these views represent a limited understanding of the extent of the beef industry's impact on our country.

While arguments on both sides of the grocery aisle are clearly articulated, cattle ranchers and food scientists alike can agree that it is vital for the consumer to remain informed. Transparency and ag literacy must be promoted by both constituencies, and proper regulations must be in place to ensure clear communication between producers and consumers. We must work together as agriculturalists with a common purpose and align ourselves with the consumer as allies instead of enemies.

It is the year 2050, and the array of choices at your grocery store meat counter do not overwhelm you, but instead inspire confidence in the ag industry. Deciding what to feed those you love most is a choice that should be made with an educated perspective and leave you with a clear conscience. After all, you should not have to think twice about the meat you eat.

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